POLYMER HANDBOOK

FOURTH EDITION

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J. BRANDRUP, E. H. IMMERGUT, and E. A. GRULKE

Associate Editors

A. ABE
D. R. BLOCH

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Contributors

Abe, A.
Tokyo Institute of Polytechnics, Atsugi, Japan

Allegra, G.
Dipartimento di Chimica del Politecnico, Milano, Italy

Andreeva, L. N.
Institute of High Molecular Weight Compounds, Russian Academy of Sciences, St. Petersburg, Russian Federation

Andrews, R. J.
Chemical and Materials Engineering Department, University of Kentucky, Lexington, Kentucky, USA

Bai, F.
The Maurice Morton Institute of Polymer Science, Univeristy of Akron, Akron, USA

Bareiss, R. E.
Editorial Office, Macromolecular Chemistry and Physics, Mainz, FR Germany

Barrales-Rienda, J. M.
Instituto de Ciencia y Tecnología de Polímeros, Madrid, Spain

Bello, A.
Instituto de Ciencia y Tecnología de Polímeros, Madrid, Spain

Bello, P.
Instituto de Ciencia y Tecnología de Polímeros, Madrid, Spain

Bloch, D. R.
Lakeshore Research, Racine, Wisconsin, USA

Brandrup, J.
Wiesbaden, FR Germany

Calhoun, B. H.
The Maurice Morton Institute of Polymers Science, University of Akron, Akron USA

Casassa, E. F.
Department of Chemistry, Carneagíe–Mellon University, Pittsburgh, Pennsylvania, USA

Cheng, S. Z. D.
The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio, USA

Chiu, F.-C.
The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio, USA

Cho, J.
Polymer Science and Engineering Department, Dankook University, Seoul, South Korea

Collins, E. A.
Avon Lake, Ohio, USA

Daniels, C. A.
The Geon Company, Avon Lake, Ohio, USA

DeLassus, P. T.
The Dow Chemical Company, Freeport, Texas, USA

Dixon, K. W.
Akzo Nobel Chemicals, Inc., Dobbs Ferry, New York, USA

Elias, H.-G.
Michigan Molecular Institute, Midland, Michigan, USA

Fink, G.
Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr, FR Germany

Fink, H.-P.
Fraunhofer Institut für angewandte Polymerforschung, Teltow-Seehof, FR Germany

Fouassier, J. P.
Laboratoire de Photochimie Génèrale, Ecole Nationale Supèrieure de Chimie, Mulhouse, France

Fu, Q.
The Maurice Morton Institute and Department of Polymer Science, University of Akron, Akron, Ohio, USA

Furuta, I.
Japan Synthetic Rubber Company Ltd., Yokkaichi, Mie, Japan

Ganster, J.
Fraunhofer Institute for Applied Polymer Research, Teltow-Seehof, Germany

Greenley, R. Z.
Monsanto Corporation (retired), St. Louis, Missouri, USA

Grulke, E. A.
Chemical and Materials Engineering, University of Kentucky, Lexington, Kentucky, USA

Goh, S. H.
Department of Chemistry, National University of Singapore, Singapore

Guzmán G. M.
Instituto de Ciencia y Tecnología de Polímeros, Madrid, Spain

Hill, D. J. T.
Department of Chemistry, University of Queensland, St. Lucia, Australia

Hiltner, A.
Department of Macromolecular Science, School of Engineering Case Western University, Cleveland, Ohio, USA

Inomata, K.
Department of Polymer Chemistry, Tokyo Institute of Technology, Ookayama, Meguro-ku, Tokyo, Japan

Iwama, M.
Japan Synthetic Rubber Company Ltd., Yokkaichi, Mie, Japan

Jenkins, A. D.
School of Chemistry, Physics and Environmental Science, University of Sussex, Brighton, Sussex, UK

Jenkins, J.
School of Chemistry, Physics and Environmental Science, University of Sussex, Brighton, Sussex, UK

Johnson, M.
Chemistry/Physics Library, University of Kentucky, Lexington, Kentucky, USA

Kamachi, M.
Department of Applied Physics and Chemistry, Fukui University of Technology, Gakuen, Fukui, Japan

Kerbow, D. L.
DuPont Fluoroproducts, Wilmington, Delaware, USA

Kimura, S.-I.
Japan Synthetic Rubber Company Ltd., Yokkaichi, Mie, Japan

Korte, S.
Zentrale Ferschung, Bayer AG, Leverkunsen, FR Germany

Krause, S.
Department of Chemistry, Rensselaer Polytechnic Institute, Troy, New York, USA

Kurata, M.
Institute for Chemical Research, Kyoto University, Uji, Kyoto, Japan

Lechner, M. D.
Physikalische Chemie, Universität Osnabrück, Osnabrück, FR Germany

Leonard, J.
Department de Chimie and CERSIM, Université Laval, Quebec, Canada

Li, F.
The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio, USA

Liggat, J.
Department of Pure and Applied Chemistry, University of Strathclyde, Glasgow, Scotland

Lindemann, M.
Greenville, South Carolina, USA

Luft, G.
Institut für Chemische Technologie, Technische Hochschule, Darmstadt, FR Germany

Magill, J. H.
School of Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

McKenna, T. F.
Centre Nationale de la Recherche Scientifique, Laboratoire de Chimie et Procédés de Polymerisation/Departement Genie des Procédés, Villeurbanne, France

Mehta, R. H.
Dupont Nylon, Chattanooga, Tennessee, USA

Meille, S. V.
Dipartimento di Chimica del Politecnico, Milano, Italy

Metanomski, W. V.
Chemical Abstracts Service, Columbus, Ohio, USA

Michielsen, S.
School of Textile and Fiber Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA

Miller, R. L.
Michigan Molecular Institute, Midland, Michigan, USA

Morita, Y.
Japan Atomic Energy Research Institute, Takasaki, Gunma-ken, Japan

Mück, K.-F.
Ticona GmbH, Kelsterbach, FR Germany

Nagai, S.
Plastics Technical Association, Osaka, Japan

Nordmeier, E.
Physikalische Chemie, Universität Osnabrück, Osnabrück FR Germany

Ogo, Y.
Research Institute for Solvothermal Technology, Hayashi, Takamatsu, Kagawa, Japan

Orwoll, R. A.
College of William and Mary, Williamsburg, Virginia, USA

Pauly, S.
Fachlaboratorium für Permeationsprüfung, Wiesbaden, FR Germany

Peebles, L. H., Jr.
Chemistry Division, Naval Research Laboratory, Washington, DC, USA

Perera, M. C. S.
Magnetic Resonance Facility, School of Science, Griffith University, Nathan, Australia

Porzio, W.
Instituto di Chimica delle Macromolecole del C.N.R., Milano, Italy

Pyda, M.
Department of Chemistry, University of Tennessee, Knoxville, Tennessee, USA

Quirk, R. P.
The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio, USA

Riande, E.
Instituto de Ciencia y Tecnología de Polímeros, Madrid, Spain

Richter, W. J.
Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr, FR Germany

Rothe, M.
University of Ulm, Ulm, FR Germany

Rule, M.
Coca Cola Company, Atlanta, Georgia, USA

Salort, J. F.
Madrid, Spain

Salom, C.
Escuela Técnica Superior de Ingenieros Aeronáuticos, Universidad Politécnica, Madrid, Spain

Sanchez, I. C.
Chemical Engineering Department, University of Texas at Austin, Austin, Texas, USA

Santos, A. M.
Faculdade de Engenharia Quimica de Lorena - FAENQUIL, Lorena, Sao Paulo, Brazil

Schoff, C. K.
PPG Industries, Allison Park, Pennsylvania, USA

Schuld, N.
Institut fur Physikalische Chemie, Universität Mainz, Mainz, FR Germany

Seferis, J. C.
Chemical Engineering Department, University of Washington, Seattle, Washington, USA

Seguchi, T.
Japan Atomic Energy Research Institute, Takasaki, Gunma-ken, Japan

Schrader, D.
The Dow Chemical Company, Midland, Michigan, USA

Sperati, C. A.
Chemical Engineering Department, Ohio University, Athens, Ohio, USA

Steinmeier, D. G.
Physikalische Chemie, Universität Osnabrück, Osnabrück, FR Germany

Tsunashima, Y.
Institute for Chemical Research, Kyoto University, Uji, Kyoto, Japan

Tsvetkov, N. V.
Institute of High Molecular Weight Compounds, Russian Academy of Science, St. Petersburg, Russian Federation

Tsvetkov, V. N.
Institute of High Molecular Weight Compounds, Russian Academy of Science, St. Petersburg, Russian Federation

Ueda, A.
Osaka Municipal Technical Research Institute, Morinomiya, Joto-ku, Osaka, Japan

Wagener, K. B.
Department of Chemistry and Center for Macromolecular Science and Engineering, University of Florida, Gainesville, Florida, USA

Whiteman, N. F.
The Dow Chemical Company, Freeport, Texas, USA

Witenhafer, D. E.
Dublin, Ohio, USA

Wolf, B. A.
Institut für Physikalische Chemie, Universität Mainz, Mainz, FR Germany

Wu, S.
E. I. DuPont de Nemours, Central Research and Development Department, Experimental Station, Wilmington, Delaware

Wunderlich, B.
Department of Chemistry, University of Tennessee, Knoxville, Tennessee, USA

Wunderlich, W.
RÖHM GmbH, Darmstadt, FR Germany

Yamada, B.
Department of Applied Chemistry, Faculty of Technology, Osaka City University, Sumiyoshi, Osaka, Japan

Zhu, L.
The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio, USA

Preface

The purpose of the *Polymer Handbook* is to bring together the data and constants needed in theoretical and experimental polymer research. All polymer researchers have experienced the frustration of searching for data in the ever-expanding polymer literature and know the difficulties involved in trying to locate a particular constant that is buried in a long journal article. The contributors to this Handbook have taken on the arduous task of searching the literature and compiling the data and constants that polymer chemists, polymer physicists, and polymer engineers are likely to need.

The 520 and odd tables in this Handbook are divided into eight sections. The first lists the IUPAC nomenclature rules for polymers and the International System of Units. Although several naming conventions exist in the technical literature, IUPAC names permit a consistent listing of all polymers. Section II contains data and constants needed for polymer synthesis, kinetic mechanisms, and thermodynamic studies of polymerization and depolymerization reactions. Sections III and IV contain physical constants of monomers, solvents, and oligomers. Section V lists the physical constants of many important commercial polymers. Section VI and VII cover the solid state properties of polymers and the properties of polymer solutions. Section VIII of the Handbook lists the commonly used abbreviations or acronyms for polymers and Chemical Abstract Registry Numbers, and gives suggestions for electronic data searching for polymer information. This section should also be consulted in the few cases where contributors have not used IUPAC nomenclature.

As in the previous editions, the *Polymer Handbook* concentrates on synthetic polymers, poly(saccharides) and derivatives, and oligomers. Few data on biopolymers are included. Spectroscopic data as well as data needed by engineers and designers, such as mechanical and rheological data, are minimized, since many excellent compilations exist elsewhere. Only fundamental constants and parameters that refer to the polymer molecule, that describe the solid state of polymer molecules, or that describe polymer solutions, were compiled. Constants that depend on processing conditions or on sample history were not emphasized, as they can be found in existing plastics handbooks and encyclopedias.

A critical evaluation of the values published in the literature was not attempted, since such a task would have required an inordinate amount of time and a sizable staff. Therefore, the users of this Handbook should consult the original literature for details when in doubt about the validity of any data. (The authors of the individual tables were nevertheless requested to eliminate obviously erroneous data from otherwise complete compilations.)

The Fourth Edition revisions have focused on data generated in the ten years since the publication of the Third Edition. Therefore, a completely revised *Polymer Handbook* has been prepared. We have added new tables and incorporated a large amount of new data into existing tables. As a result, the Fourth Edition contains approximately twenty-five percent more data, and the number of pages has increased from about 1850 in the Third Edition to about 2250.

We hope that this new edition will be as useful to the polymer research community as the three earlier editions and that many of the *Polymer Handbook*'s previous users will also obtain the Fourth Edition for their laboratory and library.

The publisher plans a CD-ROM for the *Polymer Handbook* in the near future. We would be grateful if our contributors and users send us any new data they accumulate in the course of their research, and any errors, misprints, omissions and other flaws. We will pass on such data to the publisher, for the polymer database, and for future editions of this Handbook.

We would like to thank all of the contributors to the *Polymer Handbook* for their help and continued patience. The staff at John Wiley, especially Carla Fjerstad, Shirley Thomas, and Jacqueline Kroschwitz, have provided excellent help and support in getting all the work done. We hope that the outstanding efforts of all these people will find due appreciation among the users of this Handbook.

July, 1998

J. Brandrup
E. H. Immergut
E. A. Grulke
A. Abe
D. R. Bloch

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SECTION I

NOMENCLATURE RULES — UNITS

Nomenclature

W. V. Metanomski
Chemical Abstracts Service, Columbus, Ohio, USA

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A. INTRODUCTION

Macromolecular (polymer) nomenclature has an almost 50-year history. As early as 1949 there existed a Subcommission on Nomenclature within the International Union of Pure and Applied Chemistry (IUPAC) under the chairmanship of Maurice L. Huggins. The Subcommission was part of the IUPAC Commission on Macromolecules, chaired then by Herman F. Mark. Other notable pioneers in polymer science, Jan Joseph Hermans, Otto Kratky, Harry W. Melville, and George J. Smets, were members of the Commission.

The Subcommission produced its first official report in 1952. It recognized then, what is just as true today, that the practice in the field of small molecules of providing rigorous definitions is impractical for polymers. The latter consist of molecules not necessarily exactly of the same size, chemical composition, or structure. The differences result from the presence of end groups, branches, variation in orientation of monomeric units, and irregularity in the sequence of different types of units.

The American Chemical Society (ACS) Division of Polymer Chemistry established its Nomenclature Committee in 1963 to try to unify earlier attempts to name polymers in some coherent way. Their first major project resulted in a structure-based nomenclature for regular linear polymers, first published in ACS Polymer Preprints in 1967, adopted by Chemical Abstracts in 1968, and incorporated in IUPAC recommendations in 1975 [1].

When the IUPAC Commission on Macromolecules was elevated to become the IUPAC Division of Macromolecular Chemistry, the latter in turn established its Commission on Macromolecular Nomenclature in 1968.

The Commission in the course of its nearly 30 years of existence produced a series of major documents that have shaped modern nomenclature and terminology of polymer science. The recommendations are being published in the IUPAC official journal, Pure and Applied Chemistry, and occasionally are republished in the form of a "Compendium" which groups all the currently valid documents in a single volume. The Commission published its "Compendium of Macromolecular Nomenclature" in 1991 [2]. The book, which IUPAC has designated the "Purple Book", in analogy to other IUPAC books ("Blue" – organic, "Red" – inorganic, "Orange" – analytical, "Green"– physical, and "Gold" – overall chemistry), has the two most basic macromolecular nomenclature recommendations: "nomenclature of regular single-strand organic polymers" and "source-based nomenclature for copolymers". In more recent years, the Commission extended that basic nomenclature to double-strand (ladder and spiro) organic polymers, irregular and crosslinked polymers, and polymer blends and interpenetrating networks.

In this article, the basic structure-based and source-based nomenclature of polymers is explained and illustrated in some detail. The continuing use of common and semisystematic nomenclature with reference to specific tables in this Handbook is highlighted. The current Chemical Abstracts (CA) index names [3] are compared and contrasted with the IUPAC practice and typical names employed in the polymer journals and textbooks.

B. IUPAC RECOMMENDATIONS

Since polymers, unlike low-molecular-weight compounds, have no uniform structure and are mixtures of macromolecules of different length and different structural

arrangement, their graphical representation and their names require a special approach.

Often enough, the structure of the polymer has not been sufficiently characterized and the researcher cannot draw its chemical structure. Consequently, no name of the polymer reflecting its structure is possible.

A polymerization reaction for a polymer formed from a monomer such as vinyl chloride can schematically be represented by

$$n\mathrm{CH_2{=}CHCl} \rightarrow \mathrm{\text{-}(CH_2\text{-}CHCl)\text{-}}_n$$

That shows an idealized product. In fact, however, the polymer consists of long-chains of various lengths. The repeating units, $-CH_2-CHCl-$, are not necessarily all uniquely oriented and joined in a regular fashion as shown in the idealized structure above. In addition to "head-to-tail" links

$$\mathrm{\text{-}CH_2\text{-}CHCl\text{-}CH_2\text{-}CHCl\text{-}}$$

other links such as "head-to-head"

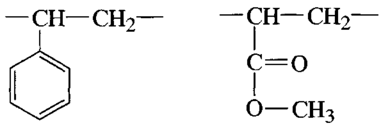
$$\mathrm{\text{-}CHCl\text{-}CH_2\text{-}CH_2\text{-}CHCl\text{-}}$$

and "tail-to-tail"

$$\mathrm{\text{-}CH_2\text{-}CHCl\text{-}CHCl\text{-}CH_2\text{-}}$$

can occur, and the exact sequence of all these repeating units usually is not known.

This becomes even more complicated when a copolymer is derived from more than one monomer, such as styrene and methyl acrylate, which contribute two constitutional or monomeric units:



They can combine into a polymeric chain, resulting in many types such as unspecified, statistical, random, alternating, periodic, block, or graft copolymers.

Because the exact structure of the polymer is not always known, two systems of naming polymers exist:
source-based nomenclature,
structure-based nomenclature.

1. Source-Based Nomenclature

1.1. Homopolymers Homopolymers are derived from only one species of monomer, which may be the actual starting reactant (or source), or be a hypothetical monomer if the homopolymer is formed by a modification of another homopolymer.

The name of the polymer is formed by attaching the prefix "poly" to the name of the actual or assumed monomer, or the starting reactant (source), from which the polymer is derived.

Examples: poly(acrylic acid)
polyacrylonitrile
polybutadiene
polyethylene
poly(methyl methacrylate)
poly(methyl vinyl ether)
polystyrene
poly(tetrafluoroethylene)
poly(vinyl alcohol)
poly(vinyl acetate)
poly(vinyl chloride)
poly(vinylidene dichloride)

Parentheses are used when the name of the monomer consists of two or more words, and when the monomer has substituents.

These are all olefinic type reactants, from which two carbon atoms originally linked by a double bond form a bivalent group:

$$\mathrm{R\text{-}CH{=}CH\text{-}R^1 \rightarrow \text{-}CHR\text{-}CHR^1\text{-}}$$

where R and R^1 represent a hydrogen atom or a substituent group. Many of these are joined, in turn, to each other but their exact orientation or sequence is seldom known.

On the other hand, different polymers derived from a single monomer and having identical constitutional units can still be differentiated by additional information, such as average molecular weight and other chemical and physical characteristics.

1.2. Copolymers For copolymers, the names of monomers are cited after the prefix "poly". In addition, an italicized connective (infix) is placed between the names of monomers to denote the kind of sequential arrangement by which the constitutional (monomeric) units, derived from each monomer, are related in the structure [4].

Seven types of sequence arrangements are listed with their corresponding connectives:

Type	Connective
unknown or unspecified	*-co-*
statistical (obeying known statistical laws)	*-stat-*
random (obeying Bernoullian distribution)	*-ran-*
alternating (for two monomeric units)	*-alt-*
periodic (ordered sequence of more than two)	*-per-*
block (linear arrangement of blocks)	*-block-*
graft (side blocks chains connected to main chain)	*-graft-*

Examples: poly[styrene-*co*-(methyl methacrylate)]
poly(styrene-*stat*-acrylonitrile-*stat*-butadiene)
poly[ethylene-*ran*-(vinyl acetate)]
poly[(ethylene glycol)-*alt*-(terephthalic acid)]
poly[formaldehyde-*per*-(ethylene oxide)-*per*-(ethylene oxide)]
polystyrene-*block*-polybutadiene
polybutadiene-*graft*-polystyrene

The names of the monomers are those common or semisystematic names that are encountered most often in the literature of polymer science. The order of citation of monomers in copolymer names is arbitrary.

An equally acceptable alternative scheme for naming copolymers utilizes the prefix "copoly", followed by citation of the names of the monomers, separated by an oblique stroke (a solidus). Parentheses are not needed to enclose monomer names consisting of two or more words.

Examples: copoly(styrene/methyl methacrylate)
stat-copoly(styrene/acrylonitrile/butadiene)
ran-copoly(ethylene/vinyl acetate)
alt-copoly(ethylene glycol/terephthalic acid)
per-copoly(formaldehyde/ethylene oxide/ethylene oxide)
block-copoly(styrene-butadiene)
graft-copoly(butadiene-styrene)

1.3. Nonlinear Macromolecules and Macromolecular Assemblies

Most recently, the source-based nomenclature has been extended for non-linear macromolecules and macromolecular assemblies [5]. The non-linear macromolecules comprise branched, graft, comb, star, cyclic, and network macromolecules. The macromolecular assemblies comprise polymer blends, interpenetrating polymer networks, and polymer–polymer complexes.

The following italicized qualifiers can be used as both prefixes (e.g., *blend-*, *net-*) and infixes (connectives) (e.g., *-blend-*, *-net-*) to designate the skeletal structure of non-linear macromolecules or macromolecular assemblies:

Type	Connective
cyclic	*cyclo*
branched, unspecified	*branch*
short-chain-branched	*sh-branch*
long-chain-branched	*l-branch*
branched with branch point of functionality *f*	*f-branch*
comb	*comb*
star	*star*
star with *f* arms	*f-star*
network	*net*
crosslink	ι (Greek iota)
polymer blend	*blend*
interpenetrating polymer network	*ipn*
semi-interpenetrating polymer network	*sipn*
polymer–polymer complex	*compl*

In naming non-linear homopolymer molecules, the italicized prefix for the skeletal structure of the macromolecule is placed *before* the source-based name of the constituent linear chain.

Assemblies of macromolecules held together by non-covalent bonds are named by a combination of the names of the constituent macromolecules with an italicized connective between them.

Examples: polystyrene-*comb*-polyacrylonitrile
comb-poly(styrene-*stat*-acrylonitrile)
polystyrene-*comb*-[polyacrylonitrile; poly(methyl methacrylate)]
4-*star*-polystyrene
star-(polyA-*block*-polyB-*block*-polyC)
star-(polyA; polyB; polyC)
star-(polyacrylonitrile; polystyrene) (M_r 100000 : 20000)
net-polystyrene-ι-divinylbenzene
net-poly[styrene-*alt*-(maleic anhydride)]-ι-(ethylene glycol)
polystyrene-*blend*-poly(2,6-dimethylphenol)
poly(methyl methacrylate)-*blend*-poly(*n*-butyl acrylate)
(*net*-polystyrene)-*sipn*-poly(vinyl chloride)
[*net*-poly(styrene-*stat*-butadiene]-*ipn*-[*net*-poly(ethyl acrylate)

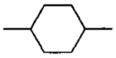
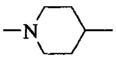
2. Structure-Based Nomenclature

2.1. Regular Single-Strand Organic Polymers

For regular organic polymers which have only one species of constitutional repeating unit (CRU) in a single sequential arrangement and consist of single strands only, the name is

poly(constitutional repeating unit),

wherein the repeating group is named as a bivalent organic group according to the IUPAC nomenclature rules for organic compounds [1]. Each such repeating group can consists of simple or substituted subunits such as:

$-CH_2-$	methylene
$-CH_2CH_2-$	ethylene
$-CH{=}CH-$	vinylene
$-CH_2CH_2CH_2CH_2CH_2CH_2-$	hexane-1,6-diyl
$-CHCl-CH_2-$	1-chloroethylene
$-COCH_2-CH_2-$	1-oxopropane-1,3-diyl
$-COCH_2CH_2CH_2CH_2CO-$	adipoyl
	1,4-phenylene
	cyclohexane-1,4-diyl
$-O-$	oxy
$-S-$	thio
$-SO_2-$	sulfonyl
$-NH-$	imino
$-N(CH_3)-$	methylimino
$-NHNH-$	hydrazo
	piperidine-1,4-diyl
$-SiH_2-$	silanediyl
$-Si(CH_3)_2-$	dimethylsilanediyl

Before the total constitutional repeating unit (CRU) can be given a unique name, a single preferred CRU must be selected.

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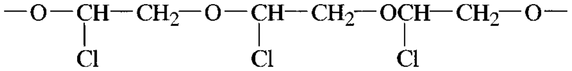
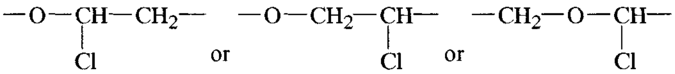
For instance, in a polymer such as

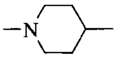


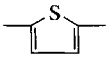
it is immediately evident that a three-atom group (oxygen, chlorine-substituted methylene group, and methylene group) are being regularly repeated. Yet, the CRU can be identified in at least three ways



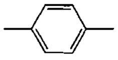
To obtain a unique name based on a preferred CRU, several rules have to be applied. Rules have been developed to specify both seniority among subunits, that is, the point at which to begin writing the CRU, and also the direction in which to move along the chain from left to right to reach the end of the chain.

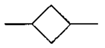
The order of seniority among the types of bivalent groups that are parts of the chain of a single-strand polymer is

a. heterocycles, e.g., piperidine-1,4-diyl: 

thiophene-2,5-diyl: 

b. heteroatomic acyclic groups, e.g., oxy: –O–, sulfonyl: $-SO_2-$, imino: –NH–

c. carbocycles, e.g., 1,4-phenylene: 

cyclobutane-1,3-diyl: 

d. carbon-containing acyclic groups, e.g., 1-chloroethylene: $-CHCl-CH_2-$ propane-1,3-diyl: $-CH_2-CH_2-CH_2-$

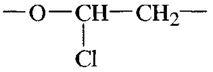
Within each structural type, the seniority is established by further criteria:

a. for heterocycles, a ring system containing nitrogen is senior to a system containing a hetero atom other than nitrogen, with further descending order of seniority governed by the greatest number of rings in the ring system, the largest individual ring in the ring system, the largest number of hetero atoms, and the greatest variety of hetero atoms;
b. for heteroatomic acyclic chains, oxygen is senior to sulfur, sulfur to nitrogen, nitrogen to phosphorus, phosphorus to silicon, silicon to germanium, etc.;
c. for carbocycles, a three-ring system is senior to a two-ring system, a two-ring system containing two 6-membered rings is senior to one containing a 5- and a 6-membered rings, a fused two-ring system (two atoms common to both rings) is senior to a spiro two-ring system (one atom in common), and an unsaturated ring is senior to a saturated ring of the same size;
d. for carbon-only acyclic chains, seniority is determined first by length, then by the number of substituents, by the ascending order of locants, and, finally, by the alphabetical order of the names of the substituent groups.

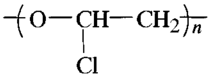
In all cases, the basic seniority rules apply only to those atoms or groups of atoms that are in the main chain. The kinds of substituents on the main chain (whether acyclic carbon-only groups, or hetero-atom-containing groups, or any ring systems) do not affect the selection of the CRU, unless identical basic subunits in the chain have to be further differentiated by the number of substituents and their alphabetical order, but not by the type of the substituent.

If completely identical subunits are separated by other subunits, the direction of citation is determined by the shorter part between them.

The preferred CRU is the one beginning with the subunit of highest seniority. To establish direction, one proceeds from this subunit to the neighboring subunit of the same or next in seniority. In the example of a poly(chloroethylene oxide), shown above, where a regularly repeating structure has been assumed, the subunit of the highest seniority is the oxygen atom and the subunit next in seniority is a substituted $-CH_2-CH_2-$. The substituted subunit, $-CHCl-CH_2-$, is oriented in such a way that the substituent, chlorine atom, is assigned the lowest locant (1 rather than 2). The CRU is written to read from left to right. Thus, the preferred CRU is



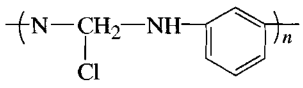
and the polymer



is named

poly[oxy(1-chloroethylene)]

The second example:

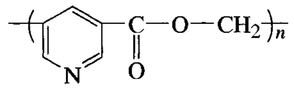


poly[(methylimino)methyleneimino-1,3-phenylene]

illustrates a polymer whose CRU starts with a substituted nitrogen atom and proceeds through the shortest path to the unsubstituted nitrogen atom and then through a carbocycle.

The chemical structure of the CRU is enclosed in parentheses or brackets. While dashes representing chemical bonds may be omitted within the formula unless necessary for clarity, at the ends of the CRU, dashes must be shown. They are drawn across the enclosing marks.

The third example:

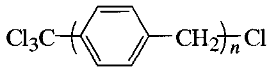


poly(pyridine-3,5-diylcarbonyloxymethylene)

shows a polymer, whose CRU starts with a heterocycle and then proceeds through a substituted carbon atom to a hetero atom.

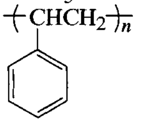
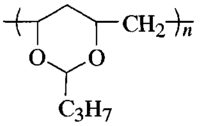
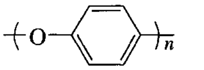
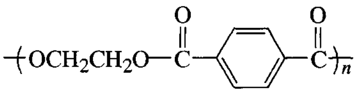
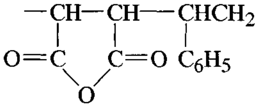
If the end groups of the chain are known, they may be specified by adding prefixes to the polymer name, with the symbol α denoting the left-hand end group and the symbol ω denoting the other end group.

Example:



α-(trichloromethyl)-ω-chloropoly(1,4-phenylene-methylene)

The following table compares and contrasts structure-based and source-based names of some common polymers.

Structure	Structure-based name	Source-based or trivial name
$-(CH_2CH_2)-_n$	Poly(methylene)	Polyethylene
$-(CH(CH_3)CH_2)-_n$	Poly(propylene)	Polypropene
$-(C(CH_3)_2CH_2)-_n$	Poly(1,1-dimethylethylene)	Polyisobutylene
$-(C(CH_3){=}CHCH_2CH_2)-_n$	Poly(1-methyl-1-butenylene)	Polyisoprene
	Poly(1-phenylethylene)	Polystyrene
$-(CH(Cl)CH_2)-_n$	Poly(1-chloroethylene)	Poly(vinyl chloride)
$-(CH(CN)CH_2)-_n$	Poly(1-cyanoethylene)	Polyacrylonitrile
$-(CH(OCOCH_3)CH_2)-_n$	Poly(1-acetoxyethylene)	Poly(vinyl acetate)
$-(CF_2CH_2)-_n$	Poly(1,1-difluoroethylene)	Poly(vinylidene fluoride)
$-(CF_2CF_2)-_n$	Poly(difluoromethylene)	Polytetrafluoroethylene
	Poly[(2-propyl-1,3-dioxane-4,6-diyl)methylene]	Poly(vinyl butyral)
$-(C(CH_3)(COOCH_3)CH_2)-_n$	Poly[1-(methoxycarbonyl)-1-methylethylene]	Poly(methyl methacrylate)
$-(OCH_2CH_2)-_n$	Poly(oxyethylene)	Poly(ethylene oxide)
	Poly(oxy-1,4-phenylene)	Poly(phenylene oxide)
$-(NH-C(=O)-(CH_2)_5)-_n$	Poly[imino(1-oxohexane-1,6-diyl)]	Poly(ε-caprolactam)
	Poly(oxyethyleneoxyterephthaloyl)	Poly(ethylene terephthalate)
$-(NH-C(=O)(CH_2)_4C(=O)-NH(CH_2)_6)-_n$	Poly(iminoadipoyliminohexamethylene)	Poly(hexamethylenediamine-*alt*-adipic acid) *or* poly(hexamethylene adipamide)
	Poly[(2,5-dioxotetrahydrofuran-3,4-diyl)(1-phenylethylene)]	Poly(maleic anhydride-*alt*-styrene)

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2.2. Regular Double-Strand Organic Polymers In a double-strand polymer, the macromolecules consist of an uninterrupted sequence of rings with adjacent rings having two or more atoms in common (a ladder polymer) or one atom in common (a spiro polymer).

As for a single-strand polymer, a single preferred constitutional repeating unit (CRU) must be selected in order to obtain a unique name [6]. The CRU is usually a tetravalent group denoting attachment to four atoms and is named according to the usual rules of organic nomenclature. Again, the name of the polymer is in the form of

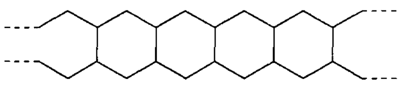
poly(constitutional repeating unit)

Since the polymer has a sequence of rings, in order to identify a preferred CRU, the rings must be broken by observing the following criteria in decreasing order of priority:

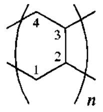
a. minimize the number of free valences in the CRU,
b. maximize the number of most preferred hetero atoms in the ring system,
c. retain the most preferred ring system, and
d. choose the longest chain for acyclic CRU.

Further decisions are based on the seniority of ring systems (indicated in the preceding section), on the orientation of the CRU to give the lowest free valence locant at the lower left of the structural diagram, and on placing the acyclic subunits, if any, on the right side of the ring system within the CRU.

For a polymer consisting of adjacent 6-membered saturated carbon rings:



the name of the preferred CRU, which in this case is an acyclic chain of four carbon atoms with four free valences at each atom (the lowest at the lower left), is



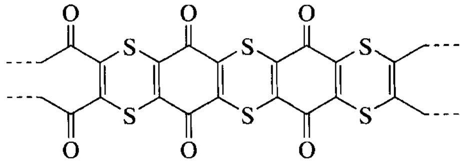
poly(butane-1,4 : 3,2-tetrayl)

The free valence locants are always placed just in front of the corresponding ending of the tetravalent unit and are cited in the order

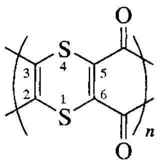
lower-left, upper-left : upper-right, lower-right

that is, in a clockwise direction, the left locants being separated from the right locants by a colon.

For a more complex ladder polymer consisting of an alternating sequence of 6-membered sulfur-containing rings and keto-group containing carbocycles, with two atoms in common at each junction:



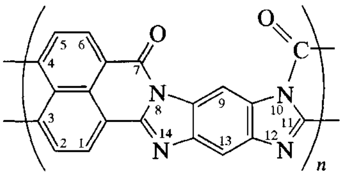
the name based on the preferred CRU is



poly(1,4-dithiin-2,3 : 5,6-tetrayl-5,6-dicarbonyl)

Here, by applying the seniority of the rings system, the heterocycle was left intact, but the carbocycle was broken. That left two bivalent acyclic subunits (carbonyl groups), which according to the rule, have been placed on the right side of the cyclic subunit, with attachments as in the original polymer.

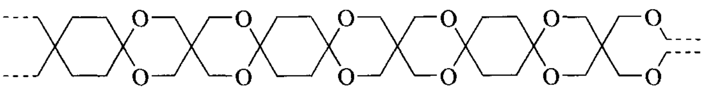
Another, still more complex ladder polymer, derived from the polycondensation of 1,4,5,8-naphthalenetetracarboxylic dianhydride with 1,2,4,5-benzenetetramine:



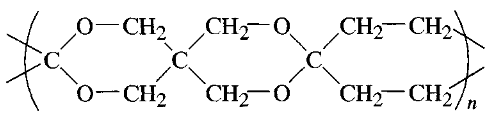
poly[(7-oxo-7*H*,10*H*-benz[*de*]imidazo[4′,5′ : 5,6]benzimidazo [2,1-*a*]isoquinoline-3,4:10,11-tetrayl)-10-carbonyl]

illustrates a six-ring system with four free valences oriented in such a way that the lowest free valence locant is at lower left. It is followed within the total CRU by an acyclic group at the upper right side of the diagram.

For a polymer consisting of regularly repeating adjacent cyclohexane and 1,3-dioxane rings in a spiro sequence (one atom in common at each junction):



the preferred CRU and the name are:



poly(2,4,8,10-tetraoxaspiro[5.5]undecane-3,3:9,9-tetrayl-9,9-diethylene)

2.3. Regular Single-Strand Inorganic and Coordination Polymers The names of inorganic and coordination polymers are based on the fundamentals developed for organic polymers [7]. As in the nomenclature of organic polymers, these rules apply to structural representations

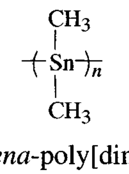
which may at times be idealized and do not take into account irregularities, chain imperfections, or random branching.

A constitutional repeating unit (CRU) is selected and named. However, because of the basic difference between the organic and inorganic nomenclature, the subunits of the CRU are not named as bivalent groups, but as inorganic or coordination groups indicating covalent and/or coordinate bonding.

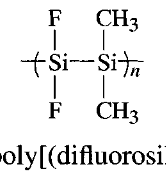
The name of the polymer is the name of the CRU prefixed by the term "poly", "*catena*", or other structural indicator. In order to arrive at the preferred CRU, seniorities of the constitutent subunits are considered as well as the preferred direction for the sequential citation.

The constituent subunit of the highest seniority must contain one or more central atoms; bridging groups between central atoms in the backbone of the polymer are of lower seniority. This is consistent with the principle of coordination nomenclature which puts the emphasis on the coordination center.

Examples of homoatomic backbones are

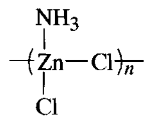


catena-poly[dimethyltin]

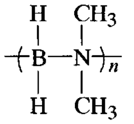


catena-poly[(difluorosilicon)(dimethylsilicon)]

More common coordination polymers consist of a mononuclear central atom with a bridging ligand. The CRU of such a polymer cites the central atom first, which is prefixed by its associated non-bridging ligands, followed in turn by the name of the bridging ligand prefixed by the Greek letter μ:

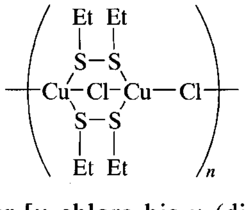


catena-poly[(ammine-chlorozinc)-μ-chloro]



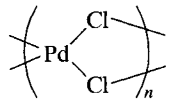
catena-poly[(dihydro-boron)-μ-(dimethylamido)]

Multiple bridging ligands between the pair of central atoms are cited in alphabetic order. Italicized element symbols indicating the coordinating atoms in bridging ligands are cited in the order of direction of the CRU and are separated by a colon:

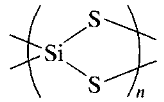


catena-poly[copper-[μ-chloro-bis-μ-(diethyl disulfide-*S*:*S*′)]-copper-μ-chloro]

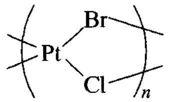
2.4. Regular Quasi-Single-Strand Coordination Polymers In a regular quasi-single-strand coordination polymer, the preferred CRU has one terminal constituent subunit connected through a single atom to the next CRU [7]. Such polymers are named as single-strand coordination polymers:



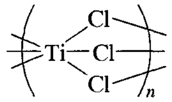
catena-poly[palladium-di-μ-chloro]



catena-poly[silicon-di-μ-thio]



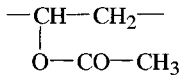
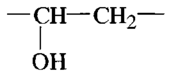
catena-poly[platinum(μ-bromo-μ-chloro)]



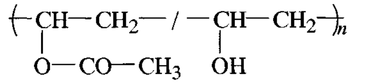
catena-poly[titanium-tri-μ-chloro]

2.5. Irregular Single-Strand Organic Polymers Irregular polymers are named by placing the prefix "poly" before the structure-based names of the constitutional units, collectively enclosed in parentheses or brackets, with the individual constitutional units separated by an oblique stroke (a solidus) [8]. The stroke indicates the irregular or unknown sequential arrangement of these units. The dashes at each end of the formula are drawn *fully inside* the enclosing marks to denote that these are not necessarily terminal bonds of the macromolecule.

For instance, a partially hydrolyzed poly(vinyl acetate) containing units:

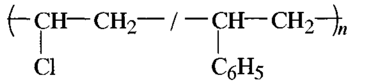
 and 

is represented graphically and named:



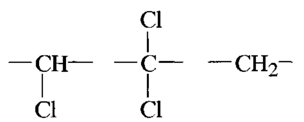
poly(1-acetoxyethylene/1-hydroxyethylene)

A copolymer of vinyl chloride and styrene joined head-to-tail is



poly(1-chloroethylene/1-phenylethylene)

A chlorinated polyethylene consisting of units



is shown and named as

$\text{+CHCl-/-CCl}_2\text{-/-CH}_2\text{-+}_n$

poly(chloromethylene/dichloromethylene/methylene)

C. USE OF COMMON AND SEMISYSTEMATIC NAMES

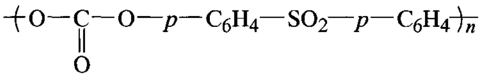
The main purpose of chemical nomenclature is to identify a chemical species by means of written or spoken words for a useful communication among chemists. A systematic nomenclature arose from the need to provide a relationship between the structure and the name. In other words, the reader should be able to deduce and identify the structure from the name.

Traditional names, however, not necessarily based on structures, have been widely used for many common compounds. These are the so-called common, trivial, or semisystematic names, which are satisfactory for communication within a given special chemical field.

It was earlier stated that in the macromolecular nomenclature IUPAC is recommending the use of common and semisystematic names for monomers in the source-based polymer names. The structure-based names, on the other hand, are more related to the structural characteristic of the polymers. But even there, IUPAC allows for a limited number of common names for such substituent groups as "allyl" and "vinyl", and for bivalent groups such as "adipoyl" and "terephthaloyl".

The authors in this *Handbook* for the most part are using the IUPAC-recommended names, or very close variants thereof. On the other hand, in some compilations such as "Crystallographic Data for Various Polymers" (in Section VI), the author provides an excellent introduction and explanation of the names used. For some structure-based names, reflecting constitutional repeating units (CRU), especially for those with a center of symmetry, the naming of linking bivalent groups begins with the central subunit and proceeds in both directions. The IUPAC method selects the most senior bivalent group and proceeds naming from left to right.

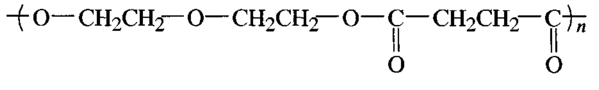
Examples:



Handbook name: poly(4,4′-sulfonyldiphenylene carbonate)

IUPAC name: poly(oxycarbonyloxy-1,4-phenylenesulfonyl-1,4-phenylene)

2.



Handbook name: poly(oxydiethylene succinate)

IUPAC name: poly(oxyethyleneoxyethyleneoxysuccinyl)

In no case, there is any misunderstanding in either case as to which structure is associated with each name.

Abbreviations and acronyms are also extensively used in the chemical literature for monomers, polymers, as well as for additives, modifiers, and fillers. Their extensive list is provided in Section VIII of this Handbook.

As is clearly stated there, the same abbreviation is often used for different monomers and polymers, and the same polymer may have different abbreviations or acronyms.

Examples:

1. DPP	diphenyl phthalate
	dipropyl phthalate
2. PVA	poly(vinyl alcohol)
	poly(vinyl acetate)
3. trioctyl phosphate	TOF
	TOP
4. polyacrylonitrile	PAC
	PAN

The IUPAC policy [9] on the use of abbreviations in the chemical literature states that there are great advantages in defining all abbreviations in a single conspicuous place in each paper, preferably near the beginning of the paper in a single list. An alternative is to define each abbreviation fully the first time it appears in the text. No abbreviations should be used in the titles of publications. A chapter of this Handbook contains a set of abbreviations recognized by international organizations.

D. CHEMICAL ABSTRACTS (CA) INDEX NAMES

Chemical Abstracts Service (CAS), the publisher of printed Chemical Abstracts (CA) and corresponding products and services in microform, online databases, CD-ROM, and World Wide Web also names the polymers, selected for inclusion in the CAS Chemical Registry System and in the *CA Chemical Substance Indexes*, in two ways:

a. in terms of the component monomer(s) from which they are prepared
b. in terms of the final structure of the resulting polymer.

There are definitive rules that govern when each type of structure is recorded and named [3]. The *primary*, comprehensive representation of polymers by CAS is by citation of the component monomer(s) because, in many cases, the structure of the final polymer is either not known or is not described in sufficient detail by the author.

When the polymer structure is well documented by the author or can be confidently assumed, because one and only one structure is chemically possible, then a *supplementary* representation with a corresponding systematic name is added to the CAS Registry System and included in the printed indexes and online files.

The chemical nomenclature used by CAS has developed in parallel, and generally in accordance, with the rules and recommendations published by IUPAC. However, their rules of systematic nomenclature do not necessarily lead to a unique name for each compound, but do lead to an unambiguous one. This causes no difficulty in normal scientific communication, but is unacceptable in a formal, rigidly controlled, alphabetic listing such as the CA Chemical Substance Index.

The CA index names must not only be unambiguous, unique, and totally reproducible, but also selected so as to bring the names of structurally related substances into juxtaposition in the alphabetic index. CAS has always recognized that, while a unique name is needed for an index and for substance identification, the use of such invariant name in scientific papers is neither practicable nor desirable.

In this section, it is intended to highlight the characteristics of the CA index names for polymers and compare them with some of the typical names used in the scientific community.

a. IUPAC rules have been adapted to the specific needs of a highly ordered alphabetical index.
b. Most common names were eliminated and exceptional treatment for various classes of substances was discontinued.
c. A single preferred name is determined for each identifiable substance.
d. A strict order of precedence of chemical functions and compound classes is followed to determine the preferred "index heading parent".
e. A total name is "inverted" by citing first the *index heading parent* (usually, basic skeleton name with a locant and suffix denoting the principal function), followed by the *comma of inversion*, the *substituents*, and the *modification* (derivative of the principal function), e.g., 2-propenoic acid, 2-methyl-, methyl ester

As mentioned above, most common names, including those still sanctioned by IUPAC, have been replaced by fully systematic names. The following is a short list of most common monomers with both common names and CA Index names:

Common	CA Index names (inverted form)
acrylamide	2-propenamide
acrylic acid	2-propenoic acid
acrylonitrile	2-propenamide
adipic acid	hexanedioic acid
ε-caprolactam	2*H*-azepin-2-one, hexahydro-
ε-caprolactone	2-oxepanone
ethylene glycol	1,2-ethanediol
ethylene oxide	oxirane
fumaric acid	2-butenedioic acid, (*E*)-
glycolic acid	acetic acid, hydroxy-
hydroquinone	1,4-benzenediol
isophthalic acid	1,3-benzenedicarboxylic acid
lactic acid	propanoic acid, 2-hydroxy-
maleic acid	2-butenedioic acid, (*Z*)-
maleic anhydride	2,5-furandione
melamine	1,3,5-triazine-2,4,6-triamine
methacrylic acid	2-propenoic acid, 2-methyl-
methyl acrylate	2-propenoic acid, methyl ester
phthalic anhydride	1,3-isobenzofurandione
propylene oxide	oxirane, methyl-
styrene	benzene, ethenyl-
terephthalic acid	1,4-benzenedicarboxylic acid
vinyl alcohol	ethenol
vinyl chloride	ethene, chloro-
vinylidene chloride	ethene, 1,1-dichloro-

Similarly, commonly named substituent and multiplying groups have their systematic equivalents in CA Indexes:

adipoyl	1,6-dioxo-1,6-hexanediyl
allyl	2-propenyl
tert-butyl	1,1-dimethylethyl
ethylene	1,2-ethanediyl
hexamethylene	1,6-hexanediyl
isopropyl	1-methylethyl
succinyl	1,4-dioxo-1,4-butanediyl
vinyl	ethenyl
vinylene	1,2-ethenediyl

Homopolymers are described by the term "homopolymer" cited in the *modification* under the monomer name in the index. In the structural diagram derived from the CAS Registry System records, the structure of the monomer is enclosed in parentheses followed by a subscript "x". The corresponding empirical formula is also expressed in a similar way.

Examples:

1. Poly(methacrylic acid):
   $(CH_2{=}CH{-}COOH)_x$ (with CH_3 on the CH)
   $(C_4H_6O_2)_x$
   CA name: 2-Propenoic acid, 2-methyl-, homopolymer
2. Polystyrene:
   $(CH_2{=}CH)_x$ (with C_6H_5 on the CH)
   $(C_8H_8)_x$
   CA name: Benzene, ethenyl-, homopolymer
3. Poly(11-aminoundecanoic acid):
   $(H_2N{-}(CH_2)_{10}{-}COOH)_x$
   $(C_{11}H_{23}NO_2)_x$
   CA name: Undecanoic acid, 11-amino-, homopolymer

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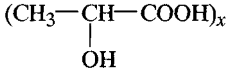
4. Poly(lactic acid):
   
   $(C_3H_6O_3)_x$
   CA name: Propanoic acid, 2-hydroxy-, homopolymer

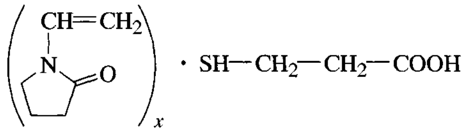
Copolymers formed from two or more monomers are described by the term "polymer with" (followed by the other monomers in alphabetical order) cited in the *modification* under each monomer name. In the structural diagram derived from the CAS Registry System records, the structures of monomers, separated by a period or periods, are enclosed in parentheses followed by a subscript "x". The corresponding empirical formulas are similarly expressed. The descriptors *alternating, block*, and *graft* are cited whenever applicable.

Examples:

1. Butadiene-vinyl ethyl ether copolymer:
   $(CH_2{=}CH{-}CH{=}CH_2{\cdot}CH_2{=}CH{-}O{-}CH_2CH_3)_x$
   $(C_4H_8O{\cdot}C_4H_6)_x$ (in Formula Index order)
   CA names: 1,3-Butadiene, polymer with ethoxyethene
   Ethene, ethoxy-, polymer with 1,3-butadiene
2. Isophthalic acid-terephthalic acid-ethylene glycol polyester:
   (HOOC-*m*-C_6H_4–COOH·HOOC-*p*-C_6H_4–COOH·OH–$(CH_2)_2$–OH$)_x$
   $(C_8H_6O_4{\cdot}C_8H_6O_4{\cdot}C_2H_6O_2)_x$
   CA names: 1,3-Benzenedicarboxylic acid, polymer with 1,4-benzenedicarboxylic acid and 1,2-ethanediol
   1,4-Benzenedicarboxylic acid, polymer with 1,3-benzenedicarboxylic acid and 1,2-ethanediol
   1,2-Ethanediol, polymer with 1,3-benzenedicarboxylic acid and 1,4-benzenedicarboxylic acid

Telomers are named as copolymers with the term "telomer with" cited in the *modification* under both the monomer (taxogen) and the chain-transfer agent (telogen). In the structural representation, the monomer is enclosed in parentheses with a subscript "x", followed by the telogen structure. The corresponding empirical formula is expressed in the same way.

Examples:

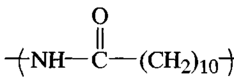
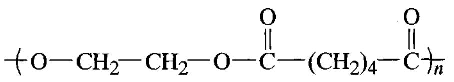
1. Vinylpyrrolidone homopolymer terminated with mercaptopropionic acid:
   
   $(C_6H_9NO)_x{\cdot}C_3H_6O_2S$
   CA names: 2-Pyrrolidinone, 1-ethenyl-, telomer with 3-mercaptopropanoic acid
   Propanoic acid, 3-mercapto-, telomer with 1-ethenyl-2-pyrrolidinone
2. Acrylic acid-vinyl choride copolymer terminated with carbon tetrachloride:
   $(CH_2{=}CH{-}COOH{\cdot}Cl{-}CH{=}CH_2)_x{\cdot}CCl_4$
   $(C_3H_4O_2{\cdot}C_2H_3Cl)_x{\cdot}CCl_4$
   CA names: 2-Propenoic acid, telomer with chloroethene and tetrachloromethane
   Ethene, chloro-, telomer with 2-propenoic acid and tetrachloromethane
   Methane, tetrachloro-, telomer with chloroethene and 2-propenoic acid

Structural repeating units (SRU), equivalent to IUPAC constitutional repeating units (CRU), are selected and named for polymers that have well documented regular structure, or can confidently be assumed. Assumptions are made for

a. polyamides formed from a dibasic acid (ester or halide) and a diamine; from an amino acid (ester or halide); from a lactam;
b. polyesters formed from a dibasic acid (anhydride, ester, or halide) and a dihydric alcohol (phenol); from a hydroxy acid (ester, halide); from a lactone;
c. polycarbonates formed from carbonic acid (ester, dihalide) and a dihydric alcohol (phenol);
d. polyurethanes formed from a diisocyanate and a dihydric alcohol (phenol).

The structural repeating unit is named by citation of one or more multivalent radicals of regular substitutive nomenclature. The selection of the preferred SRU, its orientation, and the construction of the name, proceeding from left to right, follows the same rules as those in the IUPAC recommendations for the CRU. In CA names, however, the names of the radicals are fully systematic, as explained and contrasted above. The empirical formula is enclosed in parentheses followed by a subscript "n".

Examples:

1. Nylon 11:
   
   $(C_{11}H_{21}NO)_n$
   CA name: Poly[imino(1-oxo-1,11-undecanediyl)]
2. Poly(ethylene adipate):
   
   $(C_8H_{12}O_4)_n$
   CA name: Poly[oxy-1,2-ethanediyloxy(1,6-dioxo-1,6-hexanediyl)]

3. Poly(ether ether ketone) (PEEK):

$$-\!\!\left(\mathrm{O}-p\text{-}\mathrm{C_6H_4}-\mathrm{O}-p\text{-}\mathrm{C_6H_4}-\overset{\overset{\displaystyle \mathrm{O}}{\|}}{\mathrm{C}}-p\text{-}\mathrm{C_6H_4}\right)_{\!n}\!-$$

$(C_{19}H_{12}O_3)_n$

CA name: Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)

Poly(alkylene glycols) and their ethers and esters are indexed in CA as structural repeating units with the specified end groups, if aplicable.

Examples:

1. Poly(ethylene glycol):
   $H(O-CH_2-CH_2)_nOH$
   CA name: Poly(oxy-1,2-ethanediyl), α-hydro-ω-hydroxy-
2. Poly(trimethylene glycol) dimethyl ether:
   $CH_3(O-CH_2-CH_2-CH_2)_nO-CH_3$
   CA name: Poly(oxy-1, 3-propanediyl), α-methyl-ω-methoxy-
3. Poly(tetramethylene glycol) diacrylate:
   $CH_2{=}CH-C(O)(O-CH_2-CH_2-CH_2-CH_2)_n O-C(O)-CH{=}CH_2$
   CA name: Poly(oxy-1, 4-butanediyl), α-(1-oxo-2-propenyl)-ω-[(1-oxo-2-propenyl)oxy]-

E. POLYMER CLASS NAMES

In most textbooks, handbooks, encyclopedias, and indexes to polymer nomenclature, information on polymer is grouped under polymer class names. The following is a list of such terms extracted from these sources.

Acrylic Polymers
Alkyd resins
Aminoplasts
Coumarone-indene-resins
Epoxy resins
Fluoropolymers
Phenolic resins
Polyacetals
Polyacetylenes
Polyacrylics
Polyalkylenes
Polyalkenylenes
Polyalkynylenes
Polyamic acids
Polyamides
Polyamines
Polyanhydrides
Polyarylenealkenylenes
Polyarylenealkylenes
Polyarylenes
Polyazomethines
Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazinones
Polybenzoxazoles
Polybenzyls
Polycarbodiimides
Polycarbonates
Polycarboranes
Polycarbosilanes
Polycyanurates
Polydienes
Polyester-polyurethanes
Polyesters
Polyetheretherketones
Polyether-polyurethanes
Polyethers
Polyhydrazides
Polyimidazoles
Polyimides
Polyimines
Polyisocyanurates
Polyketones
Polyolefins
Polyoxadiazoles
Polyoxides
Polyoxyalkylenes
Polyoxyarylenes
Polyoxymethylenes
Polyoxyphenylenes
Polyphenyls
Polyphosphazenes
Polypyrroles
Polypyrrones
Polyquinolines
Polyquinoxalines
Polysilanes
Polysilazanes
Polysiloxanes
Polysilsesquioxanes
Polysulfides
Polysulfonamides
Polysulfones
Polythiazoles
Polythioalkylenes
Polythioarylenes
Polythioethers
Polythiomethylenes
Polythiophenylenes
Polyureas
Polyurethanes
Polyvinyl acetals
Polyvinyl butyrals
Polyvinyl formals
Vinyl polymers

These classes are not mutually exclusive, some are relatively generic and some more specific. Some of them

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could be grouped and arranged in a hierarchy, e.g.,

Polyacetals	Polyethers
Polyvinyl acetals	epoxy resins
polyvinyl butyrals	polyetheretherketones
polyvinyl formals	polyoxyalkylenes
	polyoxymethylenes
Polyesters	polyoxyarylenes
polycarbonates	polyoxyphenylenes

Some are synonymous or near synonymous, e.g., polyalkenylenes and polydienes, polyalkynylenes and polyacetylenes, polyethers and polyoxides, polythioethers and polysulfides.

F. REFERENCES

1. IUPAC, "Nomenclature of Regular Single-Strand Organic Polymers (Recommendations 1975)", Pure Appl. Chem. **48**, 373 (1976). Reprinted as Chapter 5 in Ref. 2.
2. IUPAC, "Compendium of Macromolecular Nomenclature". W. V. Metanomski, (Ed.), Blackwell Scientific, Oxford, 1991.
3. Chemical Abstracts Service, "CA Index Guide 1997", Appendix IV, "Chemical Substance Index Names", Chemical Abstracts Service, Columbus, Ohio, 1997.
4. IUPAC, "Source-Based Nomenclature for Copolymers (Recommendations 1985)", Pure Appl. Chem. **57**, 1427 (1985). Reprinted as Chapter 7 in Ref. 2.
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6. IUPAC, "Nomenclature of Regular Double-Strand (Ladder and Spiro) Organic Polymers (Recommendations 1993)", Pure Appl. Chem. **65**, 1561 (1993).
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8. IUPAC, "Structure-Based Nomenclature for Irregular Single-Strand Polymers (Recommendations 1994)", Pure Appl. Chem. **66**, 873 (1994).
9. IUPAC, "Use of Abbreviations in the Chemical Literature (Recommendations 1979)", Pure Appl. Chem. **52**, 2229 (1980).

Units

J. Brandrup
Wiesbaden, FR Germany

A. Introduction I-13
B. International Units I-13
C. SI-Prefixes I-14
D. Conversion Factors I-14
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A. INTRODUCTION

The International System of Units (1) is used in this Handbook as far as possible, since this system has become obligatory in many European countries and since it is supported by the National Bureau of Standards (2) and the American Society for Testing and Materials (3). Only cursory information is given here for units needed in this Handbook. Detailed information may be found in the following References:

1. "SI-units and recommendations for the use of their multiples and of certain other units", ISO 1000–1973.
2. "The International System of Units (SI)", Eds. C. H. Page, P. Vigoreux, Natl. Bur. Std. Spec. Publ., 1981, 330.
3. "Standard Metric Practice Guide", ASTM E-380–85.
4. Manual of Symbols and Terminology for Physicochemical Quantities and Units; Pergamon Press, Oxford 1979 (Pure Appl. Chem., **51**, 1 (1979).
5. F. S. Conant, using the SI units, Polym. Eng. Sci., **17**, 222 (1977) (further references).

B. INTERNATIONAL UNITS

Quantity	SI-unit	Selection of multiples of the SI-unit	Accepted units used with SI	Units accepted temporarily	Non SI units that should not be used
Length	m (metre)	km, cm, mm, μm, nm		1 Å = 10^{-10} m	1 μ = 10^{-6} m
Area	m^2	km^2, dm^2, cm^2, mm^2			
Volume	m^3	dm^3, cm^3, mm^3	litre (l, L) (1 l = 1 dm^3)		
Time	s (second)	ks, ms, μs, ns	d, h, min		
Frequency	Hz (hertz)	THz, GHz, MHz, kHz			
Mass	kg (kilogram)	Mg, g, mg, μg	t		1γ = 10^{-9} kg
Density	kg/m^3	mg/m^3; kg/dm^3; g/cm^3	t/m^3; kg/l		
Force	N (newton)	MN, kN, mN, μN			1 dyn = 10^{-5} N; pond, kilopond
Pressure	Pa (pascal) or N/m^2	GPa, MPa, kPa, mPa, μPa		1 bar = 10^5 Pa 1 atm = 101325 Pa	$1\ \text{Torr} = \frac{101325}{760}\ \text{Pa} = 133.32\ \text{Pa}$
Stress	Pa or N/m^2	GPa; MPa or N/mm^2; kPa			
Viscosity (dynamic)	Pa s	mPa s			poise; 1 P = 0.1 Pa s
Viscosity (kinematic)	m^2/s	mm^2/s			stokes; 1 St = 1 cm^2/s
Surface tension	N/m	mN/m			dyn/cm
Energy, work, heat	J (joule)	TJ, GJ, MJ, kJ, mJ	Electronvolt (eV) 1 eV ≈ 1.602 × 10^{-19} J		1 erg = 10^{-7} J 1 cal = 4.1868 J
Power	W (watt)	GW, MW, kW, mW, μW			
Temperature	K (kelvin), °C				1°K = 1 K
Thermal conductivity	W/mK				0.86 kcal/(m h grd)
Heat capacity	J/K	kJ/K			
Specific heat	J/(kg K)	kJ/(kg K)			
Entropy	J/K	kJ/K			
Amount of substance	mol (mole)				Mole
Electrical resistance	Ω				
Electrical conductivity	S (1/Ω)				

C. SI-PREFIXES

Factor	Prefix	Symbol	Factor	Prefix	Symbol
10^{18}	exa	E	10^{-1}	deci	d
10^{15}	peta	P	10^{-2}	centi	c
10^{12}	tera	T	10^{-3}	milli	m
10^{9}	giga	G	10^{-6}	micro	μ
10^{6}	mega	M	10^{-9}	nano	n
10^{3}	kilo	k	10^{-12}	pico	p
10^{2}	hecto	h	10^{-15}	femto	f
10^{1}	deca	da	10^{-18}	atto	a

D. CONVERSION FACTORS

Length	m	in	ft	yd	thou or mil
1 m	1	3.937×10^{1}	3.281	1.094	3.937×10^{4}
in	2.540×10^{-2}	1	8.333×10^{-2}	2.778×10^{-2}	1.0×10^{3}
ft	3.048×10^{-1}	12	1	3.333×10^{-1}	1.2×10^{4}
yd	9.144×10^{-1}	36	3	1	3.6×10^{4}
thou or mil	2.540×10^{-5}	1.0×10^{-3}	8.334×10^{-5}	2.778×10^{-5}	1

Area	m^2	sq. in	sq. ft	sq. yd	ar
1 m^2	1	1.550×10^{3}	1.076×10^{1}	1.196	1.0×10^{-2}
sq. in	6.452×10^{-4}	1	6.994×10^{-3}	7.716×10^{-4}	6.452×10^{-6}
sq. ft	9.290×10^{-2}	1.440×10^{2}	1	1.111×10^{-1}	9.290×10^{-4}
sq. yd	8.361×10^{-1}	1.296×10^{3}	9	1	8.361×10^{-3}
ar	1.0×10^{2}	1.550×10^{5}	1.076×10^{3}	1.196×10^{2}	1

Volume	m^3	1 (lit)	cu. in	cu. ft	cu. yd	gal (US)	gal (UK)
1 m^3	1	10^{3}	6.102×10^{4}	3.531×10^{1}	1.308	2.642×10^{2}	2.20×10^{2}
1 (lit)	10^{-3}	1	6.102×10^{1}	3.531×10^{-2}	1.308×10^{-3}	2.642×10^{-1}	2.20×10^{-1}
cu. in	1.639×10^{-5}	1.639×10^{-2}	1	5.787×10^{-4}	2.143×10^{-5}	4.329×10^{-3}	3.605×10^{-3}
cu. ft	2.832×10^{-2}	2.832×10^{1}	1.728×10^{3}	1	3.703×10^{-2}	7.481	6.229
cu. yd	7.646×10^{-1}	7.645×10^{2}	4.666×10^{4}	2.7×10^{1}	1	2.020×10^{2}	1.682×10^{2}
gal (US)	3.785×10^{-3}	3.785	2.310×10^{2}	1.337×10^{-1}	4.951×10^{-3}	1	8.327×10^{-1}
gal (UK)	4.546×10^{-3}	4.546	2.774×10^{2}	1.605×10^{-1}	5.946×10^{-3}	1.201	1

Mass	kg	lbm	ton (UK) (long ton)	cwt (UK) (long cwt)	ton (US) (short ton)	ounce	grain
1 kg	1	2.205	9.842×10^{-4}	1.968×10^{-2}	1.102×10^{-3}	3.527×10^{1}	1.543×10^{4}
lbm	4.536×10^{-1}	1	4.464×10^{-4}	8.929×10^{-3}	5.0×10^{-4}	1.6×10^{1}	7.0×10^{3}
ton (metric)	1×10^{3}	2.205×10^{3}	9.842×10^{-1}	19.68	1.102	3.527×10^{4}	1.543×10^{7}
ton (UK)	1.016×10^{3}	2.240×10^{3}	1	2.0×10^{1}	1.120	3.584×10^{4}	1.568×10^{7}
cwt (UK)	5.080×10^{1}	1.120×10^{2}	5.0×10^{-2}	1	5.600×10^{-2}	1.792×10^{3}	7.840×10^{5}
ton (US)	9.072×10^{2}	2.0×10^{3}	8.929×10^{-1}	1.786×10^{1}	1	3.2×10^{4}	1.4×10^{7}
ounce	2.835×10^{-2}	6.250×10^{-2}	2.790×10^{-5}	5.580×10^{-4}	3.125×10^{-5}	1	4.375×10^{2}
grain	6.480×10^{-5}	1.429×10^{-8}	6.378×10^{-8}	1.276×10^{-6}	7.143×10^{-8}	2.286×10^{-3}	1

Density	kg/m^3	$Mg/m^3 = g/cm^3$	lbm/cu.ft	lbm/cu.in	lbm/gal (UK)	lbm/gal (US)
1 kg/m^3	1	1.0×10^{-3}	6.243×10^{-2}	3.613×10^{-5}	1.002×10^{-2}	8.345×10^{-3}
$Mg/m^3 = g/cm^3$	1.0×10^{3}	1	6.243×10^{1}	3.613×10^{-2}	1.002×10^{1}	8.345
lbm/cu. ft	1.602×10^{1}	1.602×10^{-2}	1	5.789×10^{-4}	1.605×10^{-1}	1.337×10^{-1}
lbm/cu. in	2.768×10^{4}	2.768×10^{1}	1.728×10^{3}	1	2.774×10^{2}	2.310×10^{2}
lbm/gal (UK)	9.978×10^{1}	9.978×10^{-2}	6.229	3.605×10^{-3}	1	8.327×10^{-1}
lbm/gal (US)	1.198×10^{2}	1.198×10^{-1}	7.480	4.329×10^{-3}	1.201	1

Force	N (kg m/s^2)	kgf, kp	lbf	dyn	tonf (UK) (long ton)	tonf (US) (short ton)
1 N	1	1.020×10^{-1}	2.248×10^{-1}	1.0×10^{5}	1.004×10^{-4}	1.124×10^{-4}
kp	9.807	1	2.205	9.807×10^{5}	9.842×10^{-4}	1.102×10^{-3}
lbf	4.448	4.536×10^{-1}	1	4.448×10^{5}	4.464×10^{-4}	5.0×10^{-4}
dyn	1.0×10^{-5}	1.020×10^{-6}	2.248×10^{-6}	1	1.004×10^{-9}	1.124×10^{-9}
tonf (UK)	9.964×10^{3}	1.016×10^{3}	2.240×10^{3}	9.964×10^{8}	1	1.120
tonf (US)	8.896×10^{3}	9.072×10^{2}	2.0×10^{3}	8.896×10^{8}	8.929×10^{-1}	1

Pressure	Pa	kPa	MPa (N/mm^2)	bar	p/cm^2	kp/m^2	at†	atm†	Torr†	Psi (lbf/sq. in)†
1 Pa (= 1 N/m^2)	1	10^{-3}	10^{-6}	10^{-5}	1.02×10^{-2}	1.02×10^{-1}	1.02×10^{-5}	9.87×10^{-6}	7.50×10^{-6}	1.450×10^{-4}
1 kPa	10^{3}	1	10^{-3}	10^{-2}	1.02×10^{1}	1.02×10^{2}	1.02×10^{-2}	9.87×10^{-3}	7.50	1.450×10^{-1}
1 MPa (=1 N/mm^2	10^{6}	10^{3}	1	10^{1}	1.02×10^{4}	1.02×10^{5}	1.02×10^{1}	9.87	7.50×10^{3}	1.450×10^{2}
1 bar (= 0.1 MPa)	10^{5}	10^{2}	10^{-1}	1	1.02×10^{3}	1.02×10^{4}	1.02	9.87×10^{-1}	7.50×10^{2}	1.450×10^{1}
1 p/cm^2 †	9.81×10^{1}	9.81×10^{-2}	9.81×10^{-5}	9.81×10^{-4}	1	10^{1}	10^{-3}	9.68×10^{-4}	7.36×10^{-1}	1.422×10^{-2}
1 kp/m^2 †	9.81	9.81×10^{-3}	9.81×10^{-6}	9.81×10^{-5}	10^{-1}	1	10^{-4}	9.68×10^{-5}	7.36×10^{-2}	1.422×10^{-3}
1 at (= 1 kp/cm^2)†	9.81×10^{4}	9.81×10^{1}	9.81×10^{-2}	9.81×10^{-1}	10^{3}	10^{4}	1	9.68×10^{-1}	7.36×10^{2}	1.422×10^{1}
1 atm (= 760 Torr)†	1.01325×10^{5}	1.01325×10^{2}	1.01325×10^{-1}	1.013	1.033×10^{3}	1.033×10^{4}	1.033	1	7.60×10^{2}	1.470×10^{1}
1 Torr (= 1/760 atm)†	1.33×10^{2}	1.33×10^{-1}	1.33×10^{-4}	1.33×10^{-3}	1.36	1.36×10^{1}	1.36×10^{-3}	1.32×10^{-3}	1	1.934×10^{-2}
Psi (lbf/sq. in)	6.895×10^{3}	6.895	6.895×10^{-3}	6.895×10^{-2}	7.031×10^{-5}	7.031×10^{-6}	7.031×10^{-2}	6.805×10^{-2}	5.171×10^{-1}	1

† Non SI units.

Stress	Pa	N/mm^2	kp/cm^2 †	kp/mm^2 †	Psi (lbf/sq. in)†
1 Pa (= 1 N/m^2)	1	10^{-6}	1.02×10^{-5}	1.02×10^{-7}	1.450×10^{-4}
1 N/mm^2 (= 1 MPa)	10^{6}	1	1.02×10^{1}	1.02×10^{-1}	1.450×10^{2}
1 kp/cm^2 (= 1 at)†	9.81×10^{4}	9.81×10^{-2}	1	10^{-2}	1.422×10^{1}
1 kp/mm^2 †	9.81×10^{6}	9.81	10^{2}	1	1.422×10^{3}
Psi lbf/sq. in	6.895×10^{3}	6.895×10^{-3}	7.031×10^{-2}	7.031×10^{-4}	1

Non SI units.

Viscosity (dynamic)	Pa s (N s/πm^2) (kg/(s m))	mPa s (mN s/m^2)	cP	kp s/m^2	kp h/m^2	lbm/(ft s)	lbm/(ft h)	lbf s/sq. ft
1 Pa s	1	1.0×10^{3}	1.0×10^{3}	1.020×10^{-1}	2.833×10^{-5}	6.720×10^{-1}	2.419×10^{3}	2.089×10^{-2}
mPa s	1.0×10^{-3}	1	1	1.020×10^{-4}	2.833×10^{-8}	6.720×10^{-4}	2.419	2.089×10^{-5}
cP	1.0×10^{-3}	1	1	1.020×10^{-4}	2.833×10^{-8}	6.720×10^{-4}	2.419	2.089×10^{-5}
kp s/m^2	9.807	9.807×10^{3}	9.807×10^{3}	1	2.778×10^{-4}	6.590	2.372×10^{4}	2.048×10^{-1}
kp h/m^2	3.530×10^{4}	3.530×10^{7}	3.530×10^{7}	3.60×10^{3}	1	2.372×10^{4}	8.540×10^{7}	7.373×10^{2}
lbm/(ft s)	1.488	1.488×10^{3}	1.488×10^{3}	1.518×10^{-1}	4.215×10^{-5}	1	3.60×10^{3}	3.103×10^{-2}
lbm/(ft h)	4.134×10^{-4}	4.134×10^{-1}	4.134×10^{-1}	4.215×10^{-5}	1.171×10^{-8}	2.778×10^{-4}	1	8.634×10^{-6}
lbf s/sq. ft	4.788×10^{1}	4.788×10^{4}	4.788×10^{4}	4.882	1.356×10^{-3}	3.217×10^{1}	1.158×10^{5}	1

Viscosity (kinematic)	m^2/s	mm^2/s	m^2/h	cSt	sq. ft/s	sq. ft/h
1 m^2/s	1	1.0×10^{6}	3.60×10^{3}	1.0×10^{6}	1.076×10^{1}	3.875×10^{4}
mm^2/s	1.0×10^{-6}	1	3.60×10^{-3}	1.0	1.076×10^{-5}	3.875×10^{-2}
m^2/h	2.778×10^{-4}	2.778×10^{2}	1	2.778×10^{2}	2.990×10^{-3}	1.076×10^{1}
cSt	1.0×10^{-6}	1.0	3.60×10^{-3}	1	1.076×10^{-5}	3.875×10^{-2}
sq. ft/s	9.290×10^{-2}	9.290×10^{4}	3.345×10^{2}	9.290×10^{4}	1	3.60×10^{3}
sq. ft/h	2.581×10^{-5}	2.581×10^{-1}	9.290×10^{-2}	2.581×10^{1}	2.778×10^{-4}	1

Surface tension	N/m (kg/s^2)	mN/m	kgf/m (kp/m)	dyn/cm
1 N/m	1	1.0×10^{3}	1.020×10^{-1}	1.0×10^{3}
mN/m	1.0×10^{-3}	1	1.020×10^{-4}	1.0
kp/m	9.807	9.807×10^{3}	1	9.807×10^{3}
dyn/cm	1.0×10^{-3}	1.0	1.020×10^{-4}	1

Energy	J (N m) (kg m^2/s^2)	kW h	kgf m kp m	Ps h	lbf ft	erg	HP h	kcal	BTU[a]
1 J	1	2.778×10^{-7}	1.020×10^{-1}	3.777×10^{-7}	7.376×10^{-1}	1.0×10^{7}	3.725×10^{-7}	2.388×10^{-4}	9.478×10^{-4}
kW h	3.60×10^{6}	1	3.671×10^{5}	1.360	2.655×10^{6}	3.60×10^{13}	1.341	8.598×10^{2}	3.412×10^{3}
kp m	9.807	2.724×10^{-6}	1	3.704×10^{-6}	7.233	9.807×10^{7}	3.653×10^{-6}	2.342×10^{-3}	9.295×10^{-3}
PS h	2.648×10^{6}	7.355×10^{-1}	2.70×10^{5}	1	1.953×10^{6}	2.648×10^{13}	9.863×10^{-1}	6.324×10^{2}	2.510×10^{3}
lbf ft	1.356	3.766×10^{-7}	1.363×10^{-1}	5.120×10^{-7}	1	1.356×10^{7}	5.051×10^{-7}	3.238×10^{-4}	1.285×10^{-3}
erg	1.0×10^{-7}	2.778×10^{-14}	1.020×10^{-8}	3.777×10^{-14}	7.375×10^{-8}	1	3.725×10^{-14}	2.388×10^{-11}	9.478×10^{-11}
HP h	2.685×10^{6}	7.457×10^{-1}	2.737×10^{5}	1.014	1.980×10^{6}	2.685×10^{13}	1	6.412×10^{2}	2.544×10^{3}
kcal	4.187×10^{3}	1.163×10^{-3}	4.269×10^{2}	1.581×10^{-3}	3.088×10^{3}	4.187×10^{10}	1.560×10^{-3}	1	3.968
BTU	1.055×10^{3}	2.931×10^{-4}	1.076×10^{2}	3.985×10^{-4}	7.782×10^{2}	1.055×10^{10}	3.930×10^{-4}	2.520×10^{-1}	1

[a] British thermal unit.

Heat	J (N m) (kg m^2/s^2)	kcal	BTU	CHU[a]
1 J	1	2.388×10^{-4}	9.478×10^{-4}	5.262×10^{-4}
kcal	4.187×10^{3}	1	3.968	2.203
BTU	1.055×10^{3}	2.520×10^{-1}	1	5.552×10^{-1}
CHU	1.900×10^{3}	4.539×10^{-1}	1.80	1
W h	3.60×10^{3}	8.598×10^{-1}	3.412	1.894

[a] Centigrade heat unit.

Power	W (J/s) (kg m^2/s^3)	kgf m/s kp m/s	PS HP (metr)	HP	erg/s	ft lbf/s	kcal/h	BTU/h
1 W	1	1.020×10^{-1}	1.360×10^{-3}	1.341×10^{-3}	1.0×10^{7}	7.376×10^{-1}	8.598×10^{-1}	3.412
kp m/s	9.807	1	1.333×10^{-2}	1.315×10^{-2}	9.807×10^{7}	7.233	8.432	3.346×10^{1}
PS	7.355×10^{2}	7.5×10^{1}	1	9.863×10^{-1}	7.355×10^{9}	5.425×10^{2}	6.324×10^{2}	2.510×10^{3}
HP	7.457×10^{2}	7.604×10^{1}	1.014	1	7.457×10^{9}	5.50×10^{2}	6.412×10^{2}	2.544×10^{3}
erg/s	1.0×10^{-7}	1.020×10^{-8}	1.360×10^{-10}	1.341×10^{-10}	1×10^{-8}	7.375	8.598×10^{-8}	3.412×10^{-7}
ft lbf/s	1.356	1.383×10^{-1}	1.843×10^{-3}	1.818×10^{-3}	1.356×10^{7}	1	1.166	4.626
kcal/h	1.163	1.186×10^{-1}	1.581×10^{-3}	1.560×10^{-3}	1.163×10^{7}	8.578×10^{-1}	1	3.968
BTU/h	2.931×10^{-1}	2.988×10^{-2}	3.985×10^{-4}	3.930×10^{-4}	2.931×10^{6}	2.162×10^{-1}	2.520×10^{-1}	1

Thermal conductivity	W/m K (kg m/(s^3 K))	kcal/(m h °C)	BTU/(ft h °F)	BTU/(in h °F)	BTU in/ (sq. ft h °F)
1 W/(m K)	1	8.598×10^{-1}	5.778×10^{-1}	4.815×10^{-2}	6.933
kcal/(m h °C)	1.163	1	6.720×10^{-1}	5.60×10^{-2}	8.064
BTU/(ft h °F)	1.731	1.488	1	8.333×10^{-2}	1.2×10^{1}
BTU/(in h °F)	2.077×10^{1}	1.786×10^{1}	1.2×10^{1}	1	1.44×10^{2}
BTU in/(sq. ft h °F)	1.442×10^{-1}	1.24×10^{-1}	8.333×10^{-2}	6.944×10^{-3}	1

Specific heat, heat capacity	J/kg K (m^2/(s^2 K))	kJ/(kg K)	kcal/(kg °C)	BTU/(lbm °F)
1 J/(kg K)	1	1.0×10^{-3}	2.389×10^{-4}	2.389×10^{-4}
kJ/(kg K)	1.0×10^{3}	1	2.389×10^{-1}	2.389×10^{-1}
kcal/(kg °C)	4.187×10^{3}	4.187	1	1.0
BTU/(lbm °F)	4.187×10^{3}	4.187	1.0	1
Wh/(kg K)	3.60×10^{3}	3.60	8.598×10^{-1}	0.8598

E. CONVERSION TABLE FOR SI vs. ENGLISH–AMERICAN UNITS

	SI to English–American unit	English–American unit to SI
Length		
	$1\,m = 1.0936\,yd = 3.28\,ft$	$1\,yd = 3\,ft = 0.9144\,m$
	$= 39.37\,in$	$1\,ft = 12\,in = 0.3048\,m$
	$1\,mm = 0.03937\,in$	$1\,in = 25.4\,mm$
Mass, weight		
	$1\,kg = 2.2046\,lb$	$1\,lb = 0.45359\,kg$
Force		
	$1\,N = 1(kgm)/s^2 = 2.248 \times 10^{-1}\,lbf$	$1\,lbf = 4.448\,N$
Pressure		
	$1\,Pa = 1\,N/m^2 = 1.450 \times 10^{-4}\,lbf/in^2$	$1\,lbf/in^2 = 1\,psi = 6.89475 \times 10^3\,Pa$
	$= 2.953 \times 10^{-4}\,in\ Hg$	$= 6.89475 \times 10^{-2}\,bar$
	$= 4.015 \times 10^{-3}\,in\ H_2O$	$1\,in\,Hg = 3.38638 \times 10^3\,Pa$
	$1\,bar = 10^5\,Pa = 1.450 \times 10^1\,lbf/in^2$	$= 3.38638 \times 10^{-2}\,bar$
	$= 2.953 \times 10^1\,in\ Hg$	$1\,in\,H_2O = 2.49089 \times 10^2\,Pa$
	$= 4.015 \times 10^2\,in\ H_2O$	$= 2.49089 \times 10^{-3}\,bar$
Tension, stress		
	$1\,N/mm^2 = 1.450 \times 10^2\,lbf/in^2$	$1\,lbf/in^2 = 6.89475 \times 10^{-3}\,N/mm^2$
Dynamic viscosity		
	$1\,Pa\,s = (N\,s)/m^2 = 2.089 \times 10^{-2}\ (lbf\,s)/ft^2$	$1\,(lbf\,s)/ft^2 = 4.78802 \times 10^1\,Pa\,s$
	$= 1\,kg/(m\,s) = 6.72 \times 10^{-1}\,lbf/(ft\,s)$	$1\,lb/(ft\,s) = 1.488\,Pa\,s$
Kinematic viscosity		
	$1\,m^2/s = 1.076 \times 10^1\,ft^2/s$	$1\,ft^2/s = 9.29 \times 10^{-2}\,m^2/s$
Energy, quantity of heat		
	$1\,J = 1\,W\,s = 1\,N\,m = 7.376 \times 10^{-1}\,ft\,lbf$	$1\,ft\,lbf = 1.35582\,J$
	$1\,kJ = 9.478 \times 10^{-1}\,BTU$	$1\,BTU = 1.05506\,kJ$
Power, heat flow rate		
	$1\,W = 1\,Nm/s = 7.367 \times 10^{-1}\,(ft\,lbf)/s$	$1\,(ft\,lbf)/s = 1.35582\,W$
	$= 1\,J/s = 4.425 \times 10^1\,(ft\,lbf)/min$	$1\,(ft\,lbf)/min = 2.25969 \times 10^{-2}\,W$
	$= 3.412\,BTU/h$	$1\,BTU/h = 2.93072 \times 10^{-1}\,W$
Specific heat capacity		
	$1\,J/(kg\,K) = 2.388 \times 10^{-4}\,BTU/(lb/^\circ F)$	$1\,BTU/(lb\,^\circ F) = 4.1868 \times 10^3\,J/(kg\,K)$
	$1\,J/(m^3\,K) = 1.491 \times 10^{-5}\,BTU/(ft^3\,^\circ F)$	$1\,BTU/(ft^3\,^\circ F) = 6.71 \times 10^4\,J/(m^3\,K)$
Thermal conductivity		
	$1\,W/(m\,K) = 6.933\,(BTU\,in)/(ft^2\,h\,^\circ F)$	$1\,(BTU\,in)/(ft^2\,h\,^\circ F) = 1.442 \times 10^{-1}\,W/(m\,K)$
	$= 5.778 \times 10^{-1}\,BTU/(ft\,h\,^\circ F)$	$1\,BTU/(ft\,h\,^\circ F) = 1.7307\,W/(m\,K)$
	$= 4.815 \times 10^{-2}\,BTU/(in\,h\,^\circ F)$	$1\,BTU/(in\,h\,^\circ F) = 2.07689 \times 10^1\,W/(m\,K)$

	SI to English–American unit	English–American unit to SI
Heat flux density		
	$1\,W/m^2 = 3.17 \times 10^{-1}\,BTU/(ft^2\,h)$	$1\,BTU/(ft^2\,h) = 3.1546\,W/m^2$
	$= 2.201 \times 10^{-3}\,BTU/(in^2\,h)$	$1\,BTU/(in^2\,h) = 4.54263 \times 10^2\,W/m^2$
Heat transfer coefficient		
	$1\,W/(m^2\,K) = 1.761 \times 10^{-1}\,BTU/(ft^2\,h\,^\circ F)$	$1\,BTU/(ft^2\,h\,^\circ F) = 5.678\,W/(m^2\,K)$
Thermal resistance		
	$1\,(m^2\,K)/W = 5.678\,(ft^2\,h\,^\circ F)/BTU$	$1\,(ft^2\,h\,^\circ F)/BTU = 1.761 \times 10^{-1}\,(m^2/K)/W$
Temperature		
	$1\,K = 1\,^\circ C = 1.8\,^\circ F$	$1\,^\circ F = 5.55\bar{5} \times 10^{-1}\,K = 5.55\bar{5} \times 10^{-1}\,^\circ C$
	Conversion:	
	$T_C = \frac{5}{9}(T_F - 32)$	$T_F = \frac{9}{5}T_C + 32$
	$T_K = \frac{5}{9}T_F + 255.372$	$T_F = \frac{9}{5}(T_K - 255.372)$

T_C – Temperature in celsius (°C); T_F – Temperature in fahrenheit (°F); T_K – Temperature in kelvin (K).

SECTION II

POLYMERIZATION AND DEPOLYMERIZATION

Decomposition Rates of Organic Free Radical Initiators

K. W. Dixon
Akzo Nobel Chemicals Inc., Dobbs Ferry, NY, USA

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A. INTRODUCTION

The decomposition of most organic free radical initiators follows first order kinetics. With certain peroxides, however, higher order decompositions are observed. Generally, the higher order reaction is caused by a reaction of radicals with the initiator (induced decomposition). The value of the rate for unimolecular decomposition may be determined either by extrapolation of the rate back to zero initiator concentration or by use of a monomer or other radical "trap". Some of the peroxides may also decompose by non-radical routes. Acids, bases, and polar solvents favor ionic intermediates. Koenig (296) presents an excellent discussion of azo and peroxide decomposition pathways.

Decomposition rate (k_d) data in these tables are reported for first order kinetics:

$$dL/dt = k_d L$$

where I is the initiator concentration (mol/l) and t is the time (s). The decomposition rate constant k_d is related to half-life ($t_{1/2}$) by the following equation:

$$t_{1/2} = 0.693/k_d$$

Fig. 1 relates k_d in s^{-1} to half-life for the range of k_d found in the tables.

For some of the initiators listed, the enthalpy (ΔH^*) is given (Note h) rather than the Arrhenius activation energy (E_a). The two quantities are related by the equation $E_a = \Delta H^* + RT$, where R is the gas constant (in kJ/mol-deg.) and T is the absolute temperature (94). Assuming that k_d is linear with respect to $1/T$ and that the activation energy, E_a, and the decomposition rate constant, k_d, for one temperature are known, k_d for any temperature can be calculated from the following expression:

$$\log k_2 = \log k_1 - \frac{E_a(T_2 - T_1)}{2.303R(T_2T_1)}$$

Where given by the author, the overall equation for k_d in terms of the frequency factor (A) and activation energy (E_a) has been included. Thus for any temperature (converted to K) the k_d may be calculated:

$$k_d = A\exp(-E_a/RT)$$

Although a wide range of initiators is reported in the tables, the author admits that the compilation is far from complete. There are several purposeful omissions: (a) azo compounds, where the azo group is part of a ring structure – these recombine almost exclusively; (b) compounds that decompose at appreciable rates only above 200 degrees. Neither class would be expected to be useful initiators. The data have been arranged into seven tables. Within each table the individual initiators are listed according to the following criteria:

1. Initiators:
   (a) according to increasing number of carbon atoms;
   (b) alphabetically (neglecting trivial prefixes), for compounds containing equal number of carbons;
   (c) miscellaneous initiators are listed alphabetically in Table 7.
2. For each initiator, solvents are listed alphabetically.
3. For a given solvent, all measurements reported by one investigator are listed in a series, with the activation energy listed opposite the lowest temperature.

Abbreviations: DMSO – dimethyl sulfoxide; DMAC – dimethylacetamide; DMF – dimethylformamide; THF – tetrahydrofuran; DCB – 1,2-dichlorobenzene.

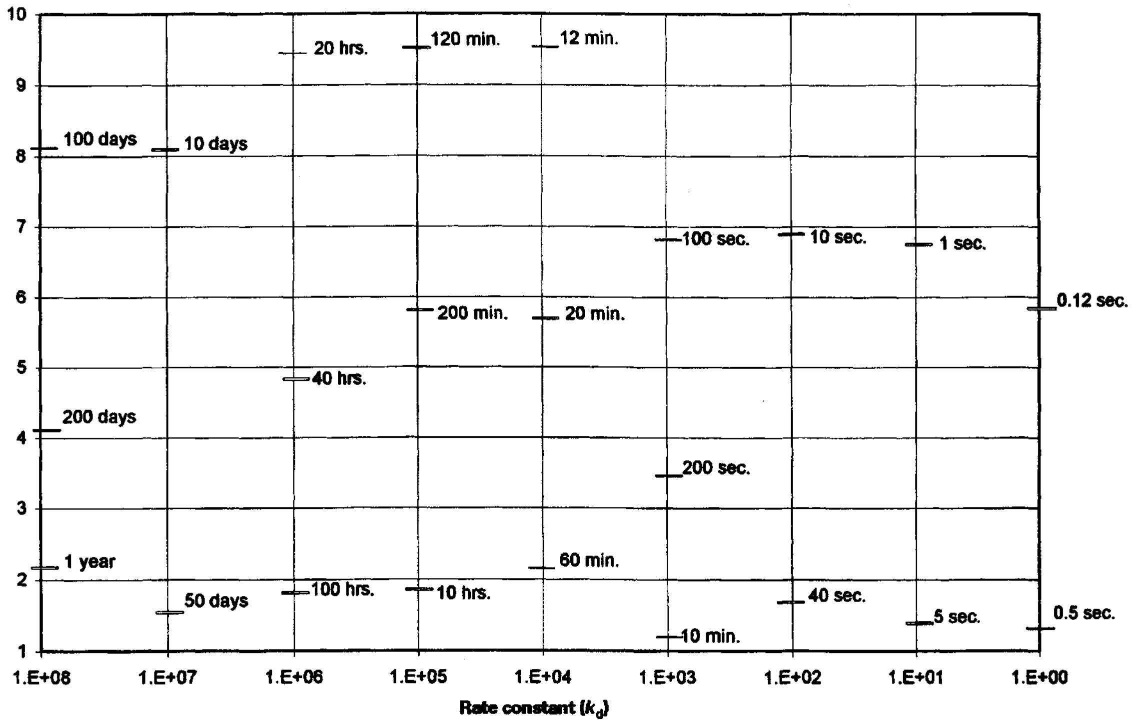

Figure 1. Relationship of half life to rate constant (k_d) (half lives are to the right of each vertical line)

B. TABLES OF DECOMPOSITION RATES OF ORGANIC FREE RADICAL INITIATORS

TABLE 1. AZONITRILES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
5	*N*-Acetyl *N*′-α-cyanoethyl diimide	Toluene	60.8	2.46×10^{-5}	110.2		322
			68.6	5.45×10^{-5}			322
			82.0	2.49×10^{-4}			322
	2-Cyano-2-propyl-azo-formamide	Chlorobenzene	100	1.5×10^{-5}			93
		Toluene	100	2.1×10^{-5}	144.3		93
			110	6.8×10^{-5}			93
			104	1.9×10^{-5}		a	339
		Xylene	100	2.1×10^{-5}	144.3		93
			120	2.4×10^{-4}			93
	2-(Carbamoylazo)isobutyronitrile	Toluene	104	1.93×10^{-5}		a	340
8	*N*-Acetyl *N*′-α-cyanocyclopentyl-diimide	Toluene	65.7	1.82×10^{-5}	120.3		322
			76.8	7.29×10^{-5}			322
			91.5	3.65×10^{-4}			322
	2,2′-Azo-bis-isobutyronitrile (2,2′-azo-bis-2-methylpropionitrile)	Acetic acid	79.9	1.43×10^{-4}			146
			79.9	1.48×10^{-4}		v2	146
			79.9	1.62×10^{-4}		v3	146
			80	1.52×10^{-4}		a	62
			82	1.50×10^{-4}		a	2
			82	1.49×10^{-4}		a	175
		Acetonitrile	79.9	1.25×10^{-4}			146
			79.9	1.24×10^{-4}		v2	146
		tert-Amyl alcohol	80.2	1.40×10^{-4}			61
		Aniline	80.2	1.68×10^{-4}			61
		Benzene	40.0	5.44×10^{-7}	128.4	a,t2	69
			45.2	1.12×10^{-6}		a,t2	69
			50.0	2.64×10^{-6}		a,t2	69
			55.0	5.19×10^{-6}		a,t2	69
			60.5	1.16×10^{-5}		a,t2	69
			69.5	3.78×10^{-5}		a,t2	69

TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	2,2′-Azo-bis-isobutyronitrile	Benzene	40	4.83×10^{-7}	123.4		66
			50	2.085×10^{-6}			66
			60	8.45×10^{-6}			66
			70	3.166×10^{-5}			66
			78	8.023×10^{-5}			66
		Benzene or Toluene	37	2.83×10^{-7}	128.9		39
			43	7.35×10^{-7}			39
			50	2.16×10^{-6}			39
			60	9.15×10^{-6}			19
			100	1.52×10^{-3}			39
			T (K)	1.58×10^{15}	$\exp[-128.9/RT]$		39
		n-Butanol	82	1.54×10^{-4}		a	175
			82	1.55×10^{-4}		a	2
		Isobutanol	82	1.66×10^{-4}		a	2,175
			80.2	$(1.67-1.76) \times 10^{-4}$			61
		Di-*n*-butyl phthalate	80	2.64×10^{-4}	122.2	y_4	236
			90	6.47×10^{-4}		y_4	236
			100	1.78×10^{-3}		y_4	236
			110	4.88×10^{-3}		y_4	236
			120	1.43×10^{-2}		y_4	236
			127	2.48×10^{-2}		y_{16}	236
			137	5.43×10^{-2}		y_{16}	236
			145	1.24×10^{-1}		y_{32}	236
			80	2.22×10^{-4}			375
			90	4.23×10^{-4}			375
			100	1.99×10^{-3}			375
			110	5.3×10^{-3}			375
			120	1.48×10^{-2}			375
		Carbon tetrachloride	40	2.15×10^{-7}	128.4	a,t_2	69
			60	4.00×10^{-6}		a,t_2	69
			77	1.21×10^{-4}		a	62
		Chlorobenzene	64	1.93×10^{-5}			344
			82	1.93×10^{-4}			344
			101	1.93×10^{-3}			344
			T (K)	2.89×10^{15}	$\exp[-130.23/RT]$		344
		Cyclohexanone	82	1.43×10^{-4}		a	2,175
		Dichloroethane	70	2.01×10^{-5}			293
				1.64×10^{-5}		m_8	293
		Dichloroethane: propionitrile (1 : 1)	70	1.94×10^{-5}			293
		Diethylene glycol monobutylether	66.82	2.442×10^{-5}			26
		DMF	71.2	6.2096×10^{-5}			294
		DMF	60	6.45×10^{-4}			355
		DMF/methyl methacrylate (9/1)	60	5.55×10^{-4}			355
		(8/2)	60	5.10×10^{-4}			355
		(7/3)	60	5.10×10^{-4}			355
		(6/4)	60	5.30×10^{-4}			355
		(5/5)	60	5.65×10^{-4}			355
		(4/6)	60	5.35×10^{-4}			355
		(3/7)	60	5.65×10^{-4}			355
		(2/8)	60	6.25×10^{-4}			355
		(1/9)	60	6.50×10^{-4}			355
		N,N-Dimethylaniline	66.82	3.483×10^{-5}			26
			72.27	6.914×10^{-5}			26
			80	1.83×10^{-4}		a	62
		Dioxane/Water (80/20) pH 7.0	65.3	2.53×10^{-5}	141.0		186
			70.0	3.20×10^{-5}			186
			75.0	8.5×10^{-5}			186
			80.0	1.62×10^{-4}			186
		Dioxane/Water (80/20) pH 10.7	75.0	1.72×10^{-4}			186
		Dodecanethiol	80	1.46×10^{-4}		a	62

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TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	2,2′-Azo-bis-isobutyronitrile	Ethyl acetate	40	4.7×10^{-7}	128.5	a,t_2	69
			60	9.36×10^{-6}		a,t_2	69
		Ethyl acetate/ $SnCl_4$ (1 : 1)	T (K)	8.56×10^{15}	exp[− 127.4/RT]		290
		Glycerol/DMF 95/5, (v/v)	71.2	2.6054×10^{-5}			294
		Maleimide (solid state)	65	4.97×10^{-5}		a	185
			72	2.07×10^{-4}		a	185
		Methyl methacrylate	50	9.7×10^{-7}		a	289
			50	7.5×10^{-6}		a,v_{20}	289
			60	7.20×10^{-4}			355
			70	3.1×10^{-5}			216
			70	1.27×10^{-4}		v_4	216
		Nitrobenzene	80	1.98×10^{-4}	132.2	a	226
			100	2.24×10^{-3}		a	226
		1-Nitrobutane	82	1.45×10^{-4}		a	2,175
		Propionitrile/$SnCl_4$ (1 : 1)	T (K)	9.10×10^{15}	exp[− 127.0/RT]		290
		Propylene carbonate	72.27	5.821×10^{-5}			26
		Styrene	50	2.97×10^{-6}	127.6	a	132
			70	4.72×10^{-5}		a	132
			T (K)	1.29×10^{15}	exp[− 127.6/RT]		132
			68.4	3.8×10^{-5}			234
		Toluene	60.00	9.03×10^{-6}		c,m_3	291
			60	9.8×10^{-6}			290
			65	1.9×10^{-5}		a	339
			70	4.0×10^{-5}	121.3		47
			80.4	1.55×10^{-4}			47
			90.0	4.86×10^{-4}			47
			100.0	1.60×10^{-3}			47
			105.0	2.61×10^{-3}			47
			69.8	3.8×10^{-5}	142.3		61
			80.2	$(1.72\text{–}1.60) \times 10^{-4}$			61
			80.3	1.30×10^{-4}		m_2	234
		Toluene/$SnCl_4$ (1 : 1)	60	4.0×10^{-5}			290
		Xylene	50	2.0×10^{-6}		a	175
			77	9.46×10^{-5}		a	175
			82	1.44×10^{-4}		a	175
			80	1.53×10^{-4}	131.0	a	62
			80	1.50×10^{-4}		a,t_4	62
			82	1.45×10^{-5}		a	2
		o-Xylene	85	2.751×10^{-4}	131.8		332
			95	9.581×10^{-4}			332
			105	2.782×10^{-3}			332
			T (K)	3.16×10^{15}	exp[− 131.8/RT]		332
		Water	50	1.56×10^{-6}			285
	3,6-Dicyano-3,6-dimethyl-1,2-diazacyclohexene-1	Dichloromethane	− 6.06	4.60×10^{-4}	88.8	h	252
			0.03	1.14×10^{-3}			252
			2.52	1.64×10^{-3}			252
	2,2′-Azo-bis[2-(hydroxymethyl)-propionitrile	Methyl cellosolve	77	1.93×10^{-5}		a	339
9	*N*-Acetyl *N*′-α-cyanocyclohexyl-diimide	Toluene	82.0	5.21×10^{-5}	114.8		322
			92.8	1.70×10^{-4}			322
			100.6	3.74×10^{-4}			322
10	*N*-Acetyl *N*′-α-cyanocycloheptyl-diimide	Toluene	59.4	4.44×10^{-5}	112.0		322
			66.1	9.82×10^{-5}			322
			79.6	4.51×10^{-4}			322
	4,4′-Azo-bis-(4-cyanopentanol)	Acetone	70	4.26×10^{-5}		m_7	305
	4,4′-Azo-bis-(4-cyanovaleric acid)	Acetone	70	4.58×10^{-5}		m_7	305
	1,1′-Azo-bis-1-cyclobutanenitrile	Mesitylene	130.4	5.20×10^{-5}	134.3		101
			141.6	1.60×10^{-4}			101
		Xylene	120.4	2.05×10^{-5}			101
	2,2′-Azo-bis-2-methylbutyronitrile	Toluene	69.8	2.3×10^{-5}	129.7		61
			80.2	$8.4\text{–}9.0 \times 10^{-5}$			61
		Xylene	80	9.97×10^{-5}	123.0	a	62

TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
10 (*cont'd*)	2,2′-Azo-bis-2-ethylpropionitrile	Nitrobenzene	80	8.3×10^{-5}	143.1	a	226
			100	1.08×10^{-3}		a	226
	2,2′-Azo-bis-2-methylbutyronitrile	Cyclohexanone	79.9	1.06×10^{-4}	131.6	h	336
			90.0	3.71×10^{-4}			336
			100.1	1.27×10^{-3}			336
		Chlorobenzene	66	1.93×10^{-5}			344
			84	1.93×10^{-4}			344
			104	1.93×10^{-3}			344
			T (K)	1.38×10^{15}	exp[− 129.93/RT]		344
		Ethanol	80.0	1.05×10^{-4}	119.8	h	336
			90.0	3.23×10^{-4}			336
			100.0	9.87×10^{-4}			336
		Ethylbenzene	80.0	8.22×10^{-5}	134.9	h	336
			90.0	2.94×10^{-4}			336
			100.0	1.02×10^{-3}			336
		Toluene	67	1.9×10^{-5}		a	339
	N-benzoyl *N′*-α-cyanoethyldiimide	Toluene	69.2	1.31×10^{-5}	127.9		322
			83.2	7.96×10^{-5}			322
			90.0	1.744×10^{-4}			322
	4-Bromophenyl-azo-2-methyl-2-propionitrile	DCB	160	2.85×10^{-5}			329
	4-Bromophenyl-azo-(methyl-propanedinitrile)	DCB	80	2.4×10^{-5}	145.0		329
			85	4.8×10^{-5}			329
			90	9.4×10^{-5}			329
			T (K)	7.23×10^{16}	exp[− 145.0/RT]		329
	4-Nitrophenyl-azo-2-methyl-2-propionitrile	DCB	160	2.3×10^{-5}			329
	4-Nitrophenyl-azo-2-(methyl-propanedinitrile)	DCB	80	3.1×10^{-5}	139.1		329
			85	6.0×10^{-5}			329
			90	1.14×10^{-4}			329
			T (K)	1.35×10^{16}	exp[− 139.1/RT]		329
	Phenyl-azo-2-methyl-2-propionitrile	DCB	160	5.65×10^{-5}			329
		DMF	160	6.9×10^{-5}			329
		1,2,4-Trimethylbenzene	160	5.35×10^{-5}			329
	Phenyl-azo-2-(methyl-propanedinitrile)	DCB	80	4.45×10^{-5}	123.2		329
			85	8.0×10^{-5}			329
			90	1.42×10^{-4}			329
			T (K)	8.48×10^{13}	exp[− 123.2/RT]		329
	Phenyl-azo-2-(methyl-propanedinitrile)	DCB	80	2.4×10^{-5}	145.0		329
			85	4.8×10^{-5}			329
			90	9.4×10^{-5}			329
			T (K)	7.23×10^{16}	exp[− 145.0/RT]		329
11	4-Bromophenyl-azo-2-(ethyl-propanedinitrile)	DCB	80	1.85×10^{-5}	142.9		329
			85	3.65×10^{-5}			329
			90	7.05×10^{-5}			329
			T (K)	3.00×10^{16}	exp[− 142.9/RT]		329
	4-Methoxyphenylazo-2-(methylpropanedinitrile)	Butanol	85	2.9×10^{-4}	110		331
		Chlorobenzene	85	9.5×10^{-5}	71		331
		DCB	85	8.35×10^{-5}	115		331
		Decane	85	3.8×10^{-5}	142		331
		DMSO	85	4.87×10^{-4}	114		331
		Heptane	85	5.15×10^{-5}	136		331
		Hexanol	85	1.6×10^{-4}	102		331
		Octane	85	4.4×10^{-5}	140		331
		Octanol	85	1.5×10^{-4}	112		331
		Propanol	85	3.1×10^{-4}	103		331
		Toluene	85	6.75×10^{-5}	137		331
	4-Methoxyphenyl-azo-2-(methylpropanedinitrile)	Chlorobenzene	78.1	5.76×10^{-5}	71.5		330
			85.3	9.52×10^{-5}			330
			90.2	1.307×10^{-4}			330
		DCB	75.0	2.73×10^{-5}	116		330
			85.1	8.35×10^{-5}			330
			95.1	2.236×10^{-4}			330
			104.9	6.397×10^{-4}			330

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TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
11 (*cont'd*)	4-Methoxyphenyl-azo-2-(methylpropanedinitrile)	DCB	T (K)	5.67×10^{12}	exp[− 116/*RT*]		330
			80	4.7×10^{-5}	114.8		329
			85	8.1×10^{-5}			329
			90	1.38×10^{-4}			329
			T (K)	2.94×10^{12}	exp[− 114.8/*RT*]		329
	Phenyl-azo-2-(2-methyl-butyronitrile)	DCB	160	5.0×10^{-5}			329
		DMF	160	5.2×10^{-5}			329
		1,2,4-Trimethylbenzene	160	5.05×10^{-5}			329
	4-Tolyl-azo-2-(methyl-propanedinitrile)	DCB	80	4.5×10^{-5}	117.7		329
			85	7.9×10^{-5}			329
			90	1.365×10^{-5}			329
			T (K)	1.21×10^{13}	exp[− 117.7/*RT*]		329
12	4,4′-Azo-bis-(1-bromo-4-cyanopentane)	Toluene	T (K)	1.0×10^{11}	exp[− 104.7/*RT*]		307
	4,4′-Azo-bis-4-cyano-pentanoic acid	Water	69	1.9×10^{-5}		a	339
			80	8.97×10^{-5}	142.3	a	62
	4,4′-Azo-bis-(4-cyanopentanol)	Di-*n*-butyl phthalate	80	2.55×10^{-4}			375
			90	7.99×10^{-4}			375
			100	2.81×10^{-3}			375
			110	8.99×10^{-3}			375
			120	2.6×10^{-2}			375
			130	5.2×10^{-2}			375
	1,1′-Azo-bis-1-cyclo-pentanenitrile	Toluene	80.3	7.45×10^{-5}	141.4		101
			89.2	2.43×10^{-4}			101
			95.1	5.18×10^{-4}			101
	2,2′-Azo-bis-2-cyclopropyl-propionitrile (mp 64–65)	Toluene	44.2	3.50×10^{-5}	117.2	w	57
			49.5	7.53×10^{-5}		w	57
			59.2	2.68×10^{-4}		w	57
	2,2′-Azo-bis-2-cyclopropyl-propionitrile (mp 76–77)	Toluene	44.2	3.90×10^{-5}	108.8	w	57
			49.5	8.17×10^{-5}		w	57
			59.3	2.46×10^{-4}		w	57
	2,2′-Azo-bis-2,3-dimethylbutyronitrile	Toluene	69.8	2.6×10^{-5}	133.9		61
			80.2	1.02×10^{-4}			61
	2,2′-Azo-bis-2-methyl-valeronitrile	Toluene	69.8	4.2×10^{-5}	138.1		61
			80.2	$(1.65–1.74) \times 10^{-4}$			61
	4-Bromophenyl-azo-2-(isopropylpropanedinitrile)	DCB	80	1.4×10^{-5}	142.0		329
			85	2.80×10^{-5}			329
			90	5.4×10^{-5}			329
			T (K)	1.73×10^{16}	exp[− 142.0/*RT*]		329
	2,6-Dimethylphenyl-azo-2-methylpropanedinitrile	DCB	60.1	3.06×10^{-5}	130.5		330
			70.0	1.177×10^{-4}			330
			80.6	4.594×10^{-4}			330
			84.5	7.320×10^{-4}			330
			T (K)	2.06×10^{17}	exp[− 130.5/*RT*]		330
13	*N*-Benzoyl *N*′-α-cyanocyclo-pentyl diimide	Toluene	76.7	1.62×10^{-5}	131.9		322
			82.0	3.17×10^{-5}			322
			98.4	2.252×10^{-4}			322
	4-Bromophenyl-azo-isobutylpropanedinitrile	DCB	80	1.12×10^{-4}	141.6		329
			85	2.21×10^{-4}			329
			90	4.26×10^{-4}			329
			T (K)	1.19×10^{17}	exp[− 141.6 kJ/*RT*]		329
	4-Bromophenyl-azo-2-(2-*tert*-butylpropionitrile)	DCB	160	4.85×10^{-5}			329
	4-Nitrophenyl-azo-2-(2-*tert*-butylpropionitrile)	DCB	160	1.8×10^{-5}			329
	Phenyl-azo-2-(2-*tert*-butyl-propionitrile)	DCB	160	9.35×10^{-5}			329
		1,2,4-Trimethylbenzene	160	9.65×10^{-5}			329
		Hexamethyl-phosphoramide	160	9.5×10^{-5}			329
14	2,2′-Azo-bis-2-cyclobutyl-propionitrile (mp 38–42)	Toluene	80.5	1.51×10^{-4}		w	104
	2,2′-Azo-bis-2-cyclobutyl-propionitrile (mp 81.5–82.5)	Toluene	80.5	1.51×10^{-4}		w	104

TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	1,1′-Azo-bis-1-cyclohexane nitrile	Chlorobenzene	79.97	8.42×10^{-6}	140.2		179
			100.12	1.107×10^{-4}			179
		DMSO	80	1.01×10^{-5}	135.6	h	135
			85	2.01×10^{-5}			135
			90	3.89×10^{-5}			135
			95	6.83×10^{-5}			135
		Nitrobenzene	100	1.14×10^{-4}			226
		Toluene	80.3	6.5×10^{-6}	121.3		101
			95.2	5.44×10^{-5}			101
			102.4	1.26×10^{-4}			101
			88	1.9×10^{-5}		a	339
		Xylene	77	5.31×10^{-6}		a	175
	2,2′-Azo-bis-2,4-dimethyl-valeronitrile	Toluene	51	1.9×10^{-5}	121	a	343
			68	1.9×10^{-4}		a	343
			T (K)	6.98×10^{14}	$\exp[-121/RT]$		343
		Xylene	77	5.77×10^{-4}		a	175
	Dimethyl-4,4′-azo-bis-cyano-pentanoate (meso)	DMAC	77.9	1.43×10^{-4}	133.9	a	205
			85.0	3.76×10^{-4}		a	205
			90.2	6.80×10^{-4}		a	205
			99.7	2.05×10^{-3}		a	205
	(n_{D+})		77.6	1.46×10^{-4}	133.5	a	205
			85.9	4.03×10^{-4}		a	205
			90.0	6.90×10^{-4}		a	205
			99.2	2.04×10^{-3}		a	205
	(n_{D-})		77.9	1.49×10^{-4}	133.5	a	205
			85.4	3.90×10^{-4}		a	205
			90.2	6.95×10^{-4}		a	205
			99.0	1.97×10^{-3}		a	205
	4,4′-Azo-bis-4-cyano-1-methyl-piperidine	DMSO	80	9.7×10^{-6}	136.4	h	135
			85	1.75×10^{-5}			135
			90	3.64×10^{-5}			135
			95	6.47×10^{-5}			135
	2,2′-Azo-bis-2-propylbutyronitrile	Nitrobenzene	80	2.55×10^{-4}	128.9	a	226
			100	2.72×10^{-5}		a	226
	2,2′-Azo-bis-2,3,3-trimethylbutyro-nitrile (mp 114–116)	Toluene	79.9	7.42×10^{-5}	146.4	w	57
			89.0	2.59×10^{-4}		w	57
	2,2′-Azo-bis-2,3,3-trimethylbutyro-nitrile (mp 116–118)	Toluene	79.9	1.05×10^{-4}	125.5	w	57
			88.9	3.09×10^{-4}		w	57
	2,2′-Azo-bis-2-methylhexylnitrile	Toluene	80.2	1.58×10^{-4}			61
	2,2′-Azo-bis-2,4-dimethylvaleronitrile	Toluene	69.8	1.98×10^{-4}	121.3		61
			80.2	7.1×10^{-4}			61
	2,2′-Azo-bis-2,4-dimethylvaleronitrile (mp 56–57)	Toluene	59.7	8.05×10^{-5}	121.3	w	57
			69.9	2.89×10^{-4}		w	57
	2,2′-Azo-bis-2,4-dimethylvaleronitrile (mp 74–76)	Toluene	69.8	1.98×10^{-4}	121.3	w	57
			80.2	7.1×10^{-4}		w	57
	2,2′-Azo-bis-2-isopropylbutyronitrile	Toluene	80.5	1.01×10^{-4}			50
	N-(4-Chlorobenzoyl) *N*′-α-cyanocyclohexyl diimide	Toluene	79.1	8.6×10^{-6}	132.7		322
			86.4	2.01×10^{-5}			322
			99.7	1.044×10^{-4}			322
	N-(1-Cyanocyclohexyl)-pentamethyleneketenimine	Chlorobenzene	100	3.85×10^{-5}		p,z (1)	299
			100	2.07×10^{-5}		p,z (3950)	299
		Cumene	100	3.93×10^{-5}		p,z (1)	299
			100	1.42×10^{-5}		p,z (3950)	299
		Toluene	100	3.10×10^{-5}		p,z (1)	299
			100	1.83×10^{-5}		p,z (3950)	299
		tert-Butylbenzene	100	2.39×10^{-5}		p,z (l)	299
			100	1.22×10^{-5}		p,z (3950)	299
	2-Phenyl-azo-2,4-dimethyl-4-methoxyvaleronitrile	Xylene	122	1.9×10^{-5}			339
15	*N*-Benzoyl *N*′-α-cyanocyclo-heptyl diimide	Toluene	74.6	6.43×10^{-5}	122.8		322
			82.8	1.781×10^{-4}			322
			89.2	3.519×10^{-4}			322

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TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
15 (*cont'd*)	*N*-(4-Methoxybenzoyl) *N'*-α-cyanocyclohexyldiimide	Toluene	80.8	7.1×10^{-6}	142.8		322
			87.9	1.71×10^{-5}			322
			101.2	9.73×10^{-5}			322
	N-(4-Methylbenzoyl) *N'*-α-cyanocyclohexyl diimide	Toluene	81.4	1.06×10^{-5}	134.1		322
			87.3	2.20×10^{-5}			322
			101.9	1.255×10^{-4}			322
	N-Phenylacetyl *N'*-α-cyano-cyclohexyl diimide	Toluene	74.3	3.08×10^{-5}	133.9		322
			82.9	9.76×10^{-5}			322
			91.2	2.77×10^{-4}			322
	4-Cyano-1-methylpiperidine-4,4'-azo-4'-cyano-1,1'-dimethylpiperidinium nitrate	DMSO	80	1.76×10^{-5}	132.6	h	135
			85	3.31×10^{-5}			135
			90	6.23×10^{-5}			135
			95	1.156×10^{-4}			135
16	4,4'-Azo-bis-4-cyano-1,1'-dimethyl-piperidinium nitrate	DMSO	80	2.84×10^{-5}	124.7	h	135
			85	5.11×10^{-5}			135
			90	9.87×10^{-5}			135
			95	1.626×10^{-4}			135
	4,4'-Azo-bis(4-cyanopentanoyl)bis-2-aminoethanol	DMF	65	1.76×10^{-5}			357
			69	2.85×10^{-5}			357
			74	4.66×10^{-5}			357
		DMAC	65	1.73×10^{-5}			357
			69	2.73×10^{-5}			357
			74	4.53×10^{-5}			357
	1,1'-Azo-bis-1-cycloheptane-nitrile	Acetic acid	69.5	3.28×10^{-4}			101
		Toluene	48.9	2.69×10^{-5}	115.1		101
			58.9	9.72×10^{-5}			101
			67.3	2.69×10^{-4}			101
	2,2'-Azo-bis-(4-methoxy-2,4-dimethylvaleronitrile)	Toluene	30	1.9×10^{-5}		a	343
			47	1.9×10^{-4}		a	343
			T (K)	1.03×10^{15}	$\exp[-115/RT]$		343
	2,2'-Azo-bis-2-methylheptylonitrile	Toluene	80.0	1.63×10^{-4}			50
		Xylene	80.0	1.78×10^{-4}	126.4	a	62
	1,1'-Azo-bis-1-(2-methylcyclohexane)-nitrile	Toluene	80.2	7.43×10^{-6}			101
	1,1'-Azo-bis-1-cyclohexane-carbonitrile	Xylene	80	4.7×10^{-6}	166.9	a	62
	2,2'-Azo-bis-cyclopentylpropio-nitrile (mp 72.2–74.5)	Toluene	80.5	1.31×10^{-4}		w	104
	2,2'-Azo-bis-2-cyclopentyl-propionitrile (mp 96.3–97.6)	Toluene	80.5	1.30×10^{-4}		w	104
	2,2'-Azo-bis-2,4,4-trimethyl-valeronitrile (mp 67.5–69)	Toluene	40	1.175×10^{-4}	113.5	w	50
			50	4.45×10^{-4}		w	50
	2,2'-Azo-bis-2,4,4-trimethylvalero-nitrile (mp 94.5–95.5)	Toluene	40	6.95×10^{-5}	121.3	w	50
			50	2.89×10^{-4}		w	50
	2,2'-Azo-bis-2-isopropyl-3-methyl-butyronitrile	Toluene	80.5	$(1.325 \pm 0.35) \times 10^{-4}$			50
18	1,1'-Azo-bis-1-cyano-4,4'-dimethyl cyclohexane	DMSO	80	1.51×10^{-5}	132.2	h	135
			85	2.79×10^{-5}			135
			90	5.40×10^{-5}			135
			95	9.77×10^{-5}			135
	2,2'-Azo-bis-2-cyclohexyl-propionitrile	Toluene	80.3	8.3×10^{-6}			61
			80.5	2.27×10^{-4}			104
	1,1'-Azo-bis-1-cyclooctanenitrile	Toluene	36.6	5.35×10^{-5}	108.4		101
			45.4	1.45×10^{-4}			101
			49.7	2.60×10^{-4}			101
20	4,4'-Azo-bis(4-cyanopentanoyl)bis-2-(2-aminoethoxy)ethanol	DMF	65	1.77×10^{-5}			357
			69	2.90×10^{-5}			357
			74	4.90×10^{-5}			357
		DMAC	65	1.74×10^{-5}			357
			69	2.83×10^{-5}			357
			74	4.65×10^{-5}			357
	2,2'-Azo-bis-2-benzylpropionitrile	Toluene	80	1.16×10^{-4}			54

TABLE 1. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
20 (*cont'd*)	2,2′-Azo-bis-2-isobutyl-4-methyl-valeronitrile	Toluene	60.1	3.78×10^{-4}			50
			80.5	5.28×10^{-3}			50
	2,2′-Azo-bis-2-(4-chlorobenzyl)-propionitrile	Toluene	80	8.8×10^{-5}			54
	2,2′-Azo-bis-2-(4-nitrobenzyl)-propionitrile	Toluene	80	1.00×10^{-4}			54
22	1,1′-Azo-bis-1-cyclodecanenitrile	Toluene	50.8	5.40×10^{-5}			101
			60.2	1.70×10^{-4}			101
			69.5	5.69×10^{-4}			101
34	4,4′-Azo-bis-(4-cyanopentanyl)-bis(heptadecafluorododecanoate)	Di-*n*-butyl phthalate	90	9.86×10^{-4}			375
			100	2.11×10^{-3}			375
			110	4.4×10^{-3}			375
			120	1.1×10^{-2}			375
			130	1.42×10^{-2}			375

TABLE 2. MISCELLANEOUS AZO-DERIVATIVES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
2	1,1′-Azo-bis-formamide	DMF	86.0	1.56×10^{-5}		c_2	268
			100.3	5.73×10^{-5}		c_2	268
			115.3	1.14×10^{-4}		c_2	268
		DMSO	86.0	5.48×10^{-6}		c	268
			100.3	2.72×10^{-5}		c	268
			115.3	1.01×10^{-4}		c	268
		Formamide	86.0	9.25×10^{-5}			268
			115.3	$\sim 2.0 \times 10^{-3}$			268
		Hexamethyl-phosphoramide	115.3	3.83×10^{-5}			268
4	Methyl-azo-3-propene	Vapor	163.3	5.88×10^{-4}	148	h	298
			169.8	1.110×10^{-3}			298
			182.8	3.36×10^{-3}			298
			T (K)	3.2×10^{14}	$\exp[-148/RT]$		298
5	2,3-Diazobicyclo[2,2,1]hept-2-ene	Isooctane	131.5	5.44×10^{-6}	157.7		180
			142.3	1.82×10^{-5}			180
			164.1	1.66×10^{-4}			180
			180.8	8.35×10^{-4}			180
		Toluene	164.1	1.64×10^{-4}			180
6	2,2′-Azo-bis-propane	Vapor	250	7.67×10^{-3}	171.1	a	110
			260	1.67×10^{-2}		a	110
			270	3.35×10^{-2}		a	110
			280	6.52×10^{-2}		a	110
			290	1.28×10^{-1}		a	110
	3,3′-Azo-bis-1-propene	Vapor	142.65	3.88×10^{-4}	151.3		319
			152.68	1.10×10^{-3}			319
			167.12	4.45×10^{-3}			319
	2,2′-Dichloro-2,2′-azo-bis-propane	Diphenyl ether	158.5	1.03×10^{-4}	138.3	h,u_4	297
			167.9	4.54×10^{-4}		u_4	297
			178.5	8.08×10^{-4}		u_4	297
		Silicone oil	185	4.8×10^{-4}			240
			199	2.1×10^{-3}			240
			221	1.6×10^{-2}			240
	Methyl-azo-1,1-dimethyl-2-propene (*cis*)	Acetone	−13.89	3.62×10^{-5}	96.8	h	252
			−5.04	1.70×10^{-4}			252
			4.00	6.82×10^{-4}			252
	(*trans*)	*p*-Diisopropyl-Benzene	114.55	1.02×10^{-4}	147.9	h	252
			123.83	2.68×10^{-4}			252
			133.33	8.44×10^{-4}			252
	Perfluoroazo-2-propane	Vapor	T (K)	5.01×10^{16}	$\exp[-189.0/RT]$		360

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TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
6 (*cont'd*)	1-Propyl-azo-3′-propene	Vapor	101.32	1.10×10^{-6}	149.2	v_{21}	298
			114.10	5.60×10^{-6}		v_{21}	298
			126.02	2.11×10^{-5}		v_{21}	298
			T (K)	6.3×10^{14}	$\exp[-149.2/RT]$		298
	Triazobenzene	Nitrobenzene	105	3.5×10^{-7}	140.2		45
			115	1.20×10^{-6}			45
			130	6.25×10^{-6}			45
			145	2.50×10^{-5}			45
		Tetralin	105	4.0×10^{-7}	136.0		45
			115	1.34×10^{-6}			45
			130	6.01×10^{-6}			45
			145	2.47×10^{-5}			45
7	*tert*-Butyl-azo-3-propene	Vapor	80.88	2.13×10^{-6}	124.9	v_{21}	298
			90.90	7.27×10^{-6}		v_{21}	298
			106.81	3.89×10^{-5}		v_{21}	298
			T (K)	5.4×10^{12}	$\exp[-124.9/RT]$	v_{21}	298
8	2,2′-Azo-isobutyramide	Water	88	1.9×10^{-5}		a	342
	Azo-bis-isobutyramidine	Water	60	3.15×10^{-5}		q_2	288
			60	2.80×10^{-5}		q_3	288
		Chloroform	60	7.1×10^{-6}			184
		DMSO	70	3.68×10^{-6}			21
		Methanol	60	1.45×10^{-6}			184
	Azo-bis-isobutyramidine 2HCl (AIBA)	Water (pH 1.9)	50	8.3×10^{-6}	126.5		341
			60	3.42×10^{-5}			341
		Water (pH 5.8)	50	8.0×10^{-6}	124.4		341
			60	3.22×10^{-5}			341
		Water (pH 9.5)	50	4.7×10^{-6}	151.7		341
			60	2.53×10^{-5}			341
		Water	60.0	3.70×10^{-5}	128.9	h	233
			70.0	1.33×10^{-4}			233
			75.0	2.58×10^{-4}			233
			80.0	5.13×10^{-4}			233
	AIBA	Water	40.15	2.49×10^{-6}	122.6	h	237
			50.05	9.79×10^{-6}			237
			60.20	4.03×10^{-5}			237
			70.10	1.52×10^{-4}			237
			100.10	4.96×10^{-3}			237
			70	1.52×10^{-4}			21
	AIBA-kaolin adduct	Water	50.0	1.37×10^{-5}	133.9	h	233
			60.0	6.16×10^{-5}			233
			70.0	2.28×10^{-4}			233
			80.0	9.53×10^{-4}			233
	AIBA-bentonite adduct	Water	50.0	1.80×10^{-5}	126.4	h	233
			55.0	3.97×10^{-5}			233
			65.0	1.53×10^{-4}			233
			70.0	3.21×10^{-4}			233
			80.0	1.04×10^{-3}			233
	Azo-bis(2-amidinopropane) 2HCl	Methanol	50	1.45×10^{-5}			356
		Water	50	8.1×10^{-6}			356
	2,2′-Azo-bis(2-amidinopropane) 2HCl	Water	56	1.93×10^{-5}		a	340
	Azo-bis-isobutyramidine $2HNO_3$	DMSO–cumene	60	4.86×10^{-5}			21
			70	1.53×10^{-4}			21
	2,2′-Azo-bis-isobutane	Vapor	160	1.9×10^{-5}		a	339
			180	5.01×10^{-5}		m_4	221
			190	1.53×10^{-4}		m_4	221
			210	1.05×10^{-3}		m_4	221
			174.8	6.8×10^{-5}			243
			188.3	1.75×10^{-4}			243
			188.8	1.14×10^{-4}		m_4	243
	2,2′-Azo-bis-isobutane	Diphenyl ether/iso-quinoline (90/10)	165	2.782×10^{-5}	176.6	h	171
			175	8.74×10^{-5}			171
			185	2.513×10^{-4}			171
			190	4.143×10^{-4}			171

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	2,2′-Azo-bis-isobutane	Diphenyl ether/iso-	195	6.731×10^{-4}			171
		quinoline (90/10)	200	1.093×10^{-3}			171
	2,2′-Dimethoxy-2,2′- azopropane	Diphenyl ether	150.1	4.02×10^{-5}	171.8		297
			159.9	1.50×10^{-4}			297
			174.6	6.67×10^{-4}			297
	2,2′-Dimethylmercapto-2,2′-	Diphenyl ether	125.0	3.40×10^{-4}	84.6	h,u_5	297
	azopropane		135.0	7.10×10^{-4}		u_5	297
			145.0	1.15×10^{-3}		u_5	297
	Isopropyl-azo-1,1-dimethyl-2-	Acetone	− 25.09	6.30×10^{-5}	91.3	h	252
	propene (*cis*)		− 16.65	2.87×10^{-4}			252
			− 8.20	1.10×10^{-3}			252
	(*trans*)	Diisopropylbenzene	97.41	1.15×10^{-4}	137.8	h	252
			106.06	3.19×10^{-4}			252
			115.06	9.22×10^{-4}			252
	2,2′-Azo-bis(2-methylpropane)	Vapor	160	1.93×10^{-5}		a	340
9	2-(4-Bromophenyl-azo)-2-	DCB	130	1.62×10^{-4}	130		325
	nitropropane		135	2.59×10^{-4}			325
			140	4.30×10^{-4}			325
			T (K)	1.1×10^{13}	$\exp[-130/RT]$		325
	tert-Butyl-azo-1,1-dimethyl-	Diisopropylbenzene	73.72	8.69×10^{-5}	112.3	h	252
	2-propene (trans)		80.31	1.83×10^{-4}			252
			87.08	3.80×10^{-4}			252
	2-(4-Nitrophenylazo)-2-nitro-	DCB	130	1.00×10^{-4}	134		325
	propane		140	2.44×10^{-4}			325
			145	4.06×10^{-4}			325
			T (K)	1.1×10^{13}	$\exp[-134/RT]$		325
	α-Phenylethyl-azo-methane	Diphenyl ether	151	4.35×10^{-5}	161.5		149
			161	1.16×10^{-4}			149
			171	3.48×10^{-4}			149
		Hexadecane	161	1.20×10^{-4}			149
10	2,2′-Diacetylthio-2,2′-azopropane	Diphenyl ether	130.0	1.33×10^{-4}	151.3	h	297
			140.0	4.40×10^{-4}			297
			149.4	1.19×10^{-5}			297
	2,2′-Diacetoxy-2,2′-azopropane	Diphenyl ether	190.0	8.23×10^{-5}	171.4	h	297
			200.1	2.61×10^{-4}			297
			210.3	6.38×10^{-4}			297
		Silicone oil	258	1.46×10^{-2}			240
	Azo-bis(1,1-dimethyl-2-propene)						
	(*trans*)	Xylene	42.03	5.95×10^{-5}	109.4	h	252
			49.98	1.73×10^{-4}			252
			57.39	4.54×10^{-4}			252
	Azo-bis-(1,1-dimethyl)-2-propyne	Xylene	41.32	5.37×10^{-5}	111.9	h	252
	(*trans*)		48.20	1.30×10^{-4}			252
			57.19	4.39×10^{-4}			252
	2,2′-Azo-bis-2-methylbutane	Ethylbenzene	180.0	1.36×10^{-4}	176.4	h	336
			190.0	3.89×10^{-4}			336
			200.0	1.03×10^{-3}			336
		Isoamyl alcohol	180.0	1.14×10^{-4}	176.0	h	336
			190.0	3.51×10^{-4}			336
			200.0	9.26×10^{-4}			336
	2,2′-Azo-bis-2-methylbut-3-ene	*n*-Decane	44.90	6.73×10^{-5}	107.3	h	278
			55.44	2.631×10^{-4}			278
			63.74	7.045×10^{-4}			278
	2,2′-Azo-bis-2-(methylcarboxy)-	Water	50	3.51×10^{-6}			285
	propane						
	2,2′-Azo-bis-methyl-2-methyl-	Collidine	80	1.67×10^{-4}		a	226
	propionate	1,2-Dichlorobenzene	80	1.44×10^{-4}		a	226
		Diethyl oxalate	80	1.52×10^{-4}		a	226
		Ethylene glycol	80	1.24×10^{-4}		a	226
		Nitrobenzene	80	1.61×10^{-4}	129.3	a	226
			100	1.73×10^{-3}		a	226
	2,2′-Azo-bis-methyl-2-methyl-	Undecane	80	1.04×10^{-4}		a	226
	propionate	Xylene	80	1.09×10^{-4}	149.8	a	62

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TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
10 (*cont'd*)	N,N′-Azo-piperidine	Silicone oil	181	1.7×10^{-3}			240
			228	4.3×10^{-2}			240
	2-(4-Methoxyphenylazo)-2-nitropropane	DCB	135	7.4×10^{-5}	153		325
			140	1.30×10^{-4}			325
			150	3.67×10^{-4}			325
			T (K)	2.5×10^{15}	$\exp[-153/RT]$		325
	Dimethyl 2,2′-azo-isobutyrate	Acetic acid	40	8.61×10^{-7}		a	326
			50	3.16×10^{-6}		a	326
			60	1.56×10^{-5}		a	326
			70	5.49×10^{-5}		a	326
		Acetonitrile	40	5.44×10^{-7}		a	326
			50	2.68×10^{-6}		a	326
			60	1.01×10^{-5}		a	326
			70	3.57×10^{-5}		a	326
		Benzene	50	2.22×10^{-6}		a	326
			60	8.85×10^{-6}		a	326
			70	3.27×10^{-5}		a	326
		Cyclohexane	40	2.89×10^{-7}		a	326
			50	1.38×10^{-6}		a	326
			60	5.85×10^{-6}		a	326
			80	2.22×10^{-5}		a	326
	Dimethyl-2,2′-azo-isobutyrate	Methanol	40	6.86×10^{-7}		a	326
			50	3.12×10^{-6}		a	326
			60	1.44×10^{-5}		a	326
		Methanol/$SnCl_4$	40	1.20×10^{-6}		a	326
			50	4.46×10^{-6}			326
			60	1.98×10^{-5}		a	326
		Methanol/$ZnCl_2$	60	1.51×10^{-5}		a	326
		Paraffin	99.2	1.02×10^{-3}			240
		Toluene	60	8.9×10^{-6}			290
			60	8.11×10^{-6}	131.6		340
			66	1.93×10^{-5}		a	340
			70	3.17×10^{-5}			340
			80	1.19×10^{-4}			340
		Toluene/$SnCl_4$	60	1.63×10^{-4}			290
	2,3,7,8-Tetraazahexacyclo-[7.4.1.0^{4,12}.0^{6,11}.0^{10,13}]tetradeca-2,7-diene	Acetonitrile-d_3	215	1.18×10^{-5}	188.7	x_1	174
			230	6.65×10^{-5}		x_1	174
			250	3.40×10^{-4}		x_1	174
11	2-(2,6-Dimethylphenylazo)-2-nitropropane	DCB	135	9.0×10^{-5}			325
			140	1.44×10^{-4}			325
			150	3.86×10^{-4}			325
			T (K)	4.8×10^{13}	$\exp[-138/RT]$		325
	α-Phenylethyl-azo-2-propane	Diphenyl ether/benzoquinone	143.2	1.50×10^{-4}			220
		Diphenyl ether	143.0	1.54×10^{-4}		t_{13}	310
			152.0	4.24×10^{-4}		t_{13}	310
			165.5	1.570×10^{-3}		t_{13}	310
12	Azo-bis-isobutanoldiacetate	Cyclohexane	170.0	4.86×10^{-5}			189
			180.0	1.27×10^{-4}			189
			189.0	3.47×10^{-4}			189
			199.0	1.01×10^{-3}			189
	Azo-bis-(l-carbomethoxy-3-methyl-propane)	Benzene	36	3.05×10^{-7}			68
			45	1.31×10^{-6}			68
			55	4.54×10^{-6}			68
			65	1.82×10^{-5}			68
		Carbon tetrachloride	45	7.18×10^{-7}			68
			55	3.79×10^{-6}			68
			65	1.02×10^{-5}			68
	4,4′-Azo-bis-(4-cyanopentanoic acid) (meso)	DMAC	77.6	1.33×10^{-4}	133.5	a	205
			85.3	3.70×10^{-4}		a	205
			90.9	7.17×10^{-4}		a	205
			99.8	2.02×10^{-3}		a	205

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 (*cont'd*)	4,4′-Azo-bis-(4-cyanopentanoic acid)						
	($n_{D\pm}$)		77.9	1.53×10^{-4}	134.3	a	205
			85.8	4.11×10^{-4}		a	205
			90.1	7.00×10^{-4}		a	205
			99.1	2.09×10^{-3}		a	205
	(n_{D+})		78.0	1.55×10^{-4}	134.3	a	205
			85.4	4.05×10^{-4}		a	205
			90.0	6.98×10^{-4}		a	205
			99.0	2.00×10^{-3}		a	205
	(n_{D-})		77.7	1.51×10^{-4}	134.3	a	205
			86.0	4.34×10^{-4}		a	205
			90.5	7.33×10^{-4}		a	205
			99.7	2.24×10^{-3}		a	205
	2,2-Azo-bis-(ethyl-2-methyl-propionate)	Chlorobenzene	70	4.13×10^{-5}	123.0	a	139
			92.6	5.93×10^{-4}		a	139
		Nitrobenzene	80	1.56×10^{-4}		a	226
	2,2-Azo-bis-[2-methyl-*N*-(2-hydroxyethyl) propionamide]	Water	86	1.9×10^{-5}		a	342
	Azo-bis-(*N*,*N*′-dimethyleneisobutyr-amidine) $2HNO_3$	DMSO	60	2.06×10^{-4}			21
			70	6.64×10^{-4}			21
			75	1.08×10^{-3}			21
		DMSO–cumene	70	6.97×10^{-4}			21
		DMSO–tetralin	60	2.13×10^{-4}			21
	Azo-bis-(*N*,*N*′-dimethylene isobutyramidine) 2HCl	Water	44	1.9×10^{-5}		a	339
	Azo-bis-(*N*,*N*′-dimethyleneisobutyr-amidine)	DMSO	80	1.79×10^{-4}			21
		DMSO–cumene	75	8.04×10^{-5}			21
			80	1.39×10^{-4}			21
			85	2.6×10^{-4}			21
		DMSO–tetralin	60	1.09×10^{-5}			21
		Methanol	61	1.9×10^{-5}		a	339
	tert-Butyl(2,2,4-trimethyl-2-pentyl)diazene	Diphenyl ether	155	1.61×10^{-4}	159.6	h	314
			165.7	4.75×10^{-4}			314
			180.0	1.98×10^{-3}			314
	α-Cumyl-azo-isopropane	Diphenyl ether	120.0	1.06×10^{-4}			310
			135.0	5.94×10^{-4}			310
			143.0	1.421×10^{-3}			310
	2,2′-Dicyclopropyl-2,2′-azopropane	Diphenyl ether/isoquinoline (90/10)	145.0	7.56×10^{-5}	158.2	h	171
			150.0	1.273×10^{-4}			171
			155.0	2.147×10^{-4}			171
			160.0	3.771×10^{-4}			171
			165.0	6.07×10^{-4}			171
			170.0	1.033×10^{-3}			171
	Di-(2-hydroxyethyl)-2,2′-azo-bis-isobutyrate	Dioxane	60	1.61×10^{-5}	125.7		292
			70	5.88×10^{-5}			292
			80	2.02×10^{-4}			292
		DMF	60	1.53×10^{-5}	129.9		292
			70	5.62×10^{-5}			292
			80	2.0×10^{-4}			292
		Toluene	60	1.62×10^{-5}	129.9		292
			70	5.83×10^{-5}			292
			80	2.066×10^{-4}			292
	2,2′-Azo-bis[*N*-(2-hydroxyethyl)-2-methylpropionamidine] 2HCl	Water	58	1.93×10^{-5}		a	339
	2,2′-Azo-bis[2-(imidazoline-2-yl)-propane 2HCl	Methanol	50	4.83×10^{-5}			356
		Water	50	4.02×10^{-5}			356
	2,2′-Azo-bis[2-(imidazoline-2-yl)-propane	Methanol	50	4.7×10^{-6}			356
14	2,2′-Azo-bis-(2-cyclobut-1-enylpropane)	*n*-Decane	39.21	1.286×10^{-4}	112.3	h	278
			50.71	5.678×10^{-4}			278
			58.95	1.762×10^{-3}			278

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	2,2′-Azo-bis-(2-methylhex-3-ene)	*n*-Decane	39.25	5.33×10^{-5}	115.2	h	278
			49.52	2.256×10^{-4}			278
			58.95	7.584×10^{-4}			278
	Di-(2-chloroethyl)-2,2′-azo-bis-isobutyrate	Dioxane	60	1.56×10^{-5}	129.9		292
			70	5.55×10^{-5}			292
			80	1.9672×10^{-4}			292
		DMF	60	1.25×10^{-5}	134.1		292
			70	4.902×10^{-5}			292
	Di-(2-chloroethyl)-2,2′-azo-bis-		80	1.9125×10^{-4}			292
	isobutyrate	Toluene	60	1.666×10^{-5}	129.9		292
			70	5.018×10^{-5}			292
			80	1.99×10^{-4}			292
	1,1′-bis-(4-Chlorophenyl) azomethane	Diphenyl ether	145.56	2.30×10^{-4}	146.6	h	297
			155.56	7.60×10^{-4}			297
			165.56	1.49×10^{-3}			297
			175.56	4.40×10^{-3}			297
	Di-(2-hydroxypropyl)-2,2′-azo-bis-isobutyrate	Dioxane	60	1.80×10^{-5}	121.5		292
			70	7.6×10^{-5}			292
			80	2.22×10^{-4}			292
		DMF	60	1.97×10^{-5}	121.5		292
			70	6.55×10^{-5}			292
			80	2.30×10^{-4}			292
		Toluene	60	1.90×10^{-5}	121.5		292
			70	7.72×10^{-5}			292
			80	2.365×10^{-4}			292
	2,2′,3,3,3′,3′-Hexamethyl-2,2′-azo-butane	Diphenyl ether	170.0	2.37×10^{-4}	156.7	h	297
			180.0	5.29×10^{-4}			297
			190.0	1.00×10^{-3}			297
	1,1′-Diphenyl-azo-methane	Diphenyl ether	145.0	1.72×10^{-4}	119.0	h	297
			155.0	4.93×10^{-4}			297
			165.0	1.12×10^{-3}			297
			175.0	2.34×10^{-3}			297
	2,2′-Azo-bis[2-methyl-*N*-(phenyl-methyl)propionamidine] 2HCl	Water	53	1.93×10^{-5}		a	339
	2,2′-Azo-bis[2-(4-methyl-imidazoline-2-yl)-propane	Methanol	50	1.23×10^{-5}			356
	2,2′-Azo-bis[2-(4-methylimidazoline-2-yl)-propane 2HCl	Methanol	50	7.48×10^{-5}			356
		Water	50	6.73×10^{-5}			356
	2,2′-Azo-bis[2-(3,4,5-trihydro-pyrimidine-2-yl)propane	Methanol	50	1.1×10^{-6}			356
	2,2′-Azo-bis[2-(3,4,5-trihydro-pyrimidine-2-yl)propane 2HCl	Methanol	50	7.8×10^{-6}			356
		Water	50	5.9×10^{-6}			356
15	1-Methylcyclopentyl-azo-α-cumene	*tert*-Butyl benzene	88.3	5.00×10^{-5}	132.0	h	327
			107.3	4.95×10^{-4}			327
			117.6	1.43×10^{-3}			327
16	1,1′-Azo-bis-1-chloro-1-phenylethane	Acetophenone	74.8	8.6×10^{-4}			240
			83	1.95×10^{-3}			240
		Benzophenone	67.8	2.8×10^{-4}			240
			86.2	3.3×10^{-3}			240
			98.2	1.40×10^{-2}			240
		Paraffin	94.5	2.4×10^{-3}			240
			112.3	5.2×10^{-2}			240
			120.5	1.03×10^{-1}			240
			129.3	1.6×10^{-1}			240
			137	5.0×10^{-1}			240
		Toluene	64	1.8×10^{-4}			240
			74	7.2×10^{-4}			240
			64	1.79×10^{-4}	135.1	a	239
			74	7.20×10^{-4}		a	239
	1,1′-Azo-bis-1-chloro-1-(3-bromophenyl)ethane	Toluene	59	1.64×10^{-4}	131.8	a	239
			69	6.64×10^{-4}		a	239
	1,1′-Azo-bis-1-chloro-1-(4-bromophenyl)ethane	Toluene	59	1.77×10^{-4}	127.2	a	239
			69	6.75×10^{-4}		a	239

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
16 (*cont'd*)	1,1′-Azo-bis-1-chloro-1-(4-chlorophenyl)ethane	Toluene	59	1.97×10^{-4}	118.8	a	239
			69	6.93×10^{-4}		a	239
	2,2′-Azo-bis-(2-cyclopent-1-enylpropane)	*n*-Decane	39.21	9.98×10^{-5}	116.9	h	278
			49.52	4.593×10^{-4}			278
			58.95	1.528×10^{-3}			278
	1,1′-Azo-bis-1,1-dicyclo-propylethane	Diphenyl ether/ isoquinoline (90/10)	120	6.33×10^{-5}	149.0	h	171
			130	2.03×10^{-4}			171
			140	6.07×10^{-4}			171
			150	1.695×10^{-3}			171
	2,2′-Azo-bis-{2-methyl-*N*-[1,1-(bis-hydroxymethyl)-2-hydroxyethyl] propionamide}	Water	80	1.9×10^{-5}		a	342
	2,2′-Azo-bis-{2-methyl-*N*-[1,1-(bis-hydroxymethyl)ethyl] propionamide}	Water	82	1.9×10^{-5}		a	342
	2,2′-Azo-bis[2-(4, 4-dimethylimidazoline-2-yl) propane	Methanol	50	9.3×10^{-6}			356
	2,2′-Azo-bis[2-(4,4-dimethyl-imidazoline-2-yl)propane 2HCl	Methanol	50	9.55×10^{-5}			356
		Water	50	9.30×10^{-5}			356
	2,2′-Azo-bis[2-(4,5-dimethyl-imidazoline-2-yl)propane 2HCl	Methanol	50	9.21×10^{-5}			356
		Water	50	8.94×10^{-5}			356
	2,2′-Azo-bis[2-(4,5,6,7-tetrahydro-1H-1,3-diazepine-2-yl)propane 2HCl	Methanol	50	1.23×10^{-5}			356
		Water	50	1.04×10^{-5}			356
	2,2′-Azo-bis-(2,2,4-trimethyl-pentane)	Diphenyl ether	110	1.9×10^{-5}		a	339
	1,1′-Azo-bis-1-phenylethane	Dodecane	97.3	3.175×10^{-5}			26
	1,1′-Azo-bis-1-phenylethane	Ethylbenzene	100.4	$(5.45 \pm 0.05) \times 10^{-5}$	136.4		107,98
		Toluene	110.3	$(1.69 \pm 0.01) \times 10^{-4}$			107,98
		Ethylbenzene	105.02	8.473×10^{-5}			152
			105.28	9.02×10^{-5}			183
	(1,1'-d_2)		105.28	7.62×10^{-5}			183
	(1,1,1,1′,1′,1′-d_6)		105.02	7.623×10^{-5}			152
		N-Methyl-*N*-benzyl aniline	97.3	4.135×10^{-5}			26
		N-Methyl propionamide	97.3	3.688×10^{-5}			26
		Diphenylmethane	97.3	3.995×10^{-5}			26
		Propylene carbonate	97.3	3.294×10^{-5}			26
	tert-Butyl-(2,2,4,6,6-penta-methyl-4-heptyl)-diazine	Diphenyl ether	140.0	1.93×10^{-4}	141.6	h	314
			150.1	5.29×10^{-4}			314
			164.8	2.18×10^{-3}			314
	1,1′-Di-(3-chlorophenyl)-1,1′-azo-ethane	*p*-Cymene	95	4.13×10^{-5}	122.3	h	266,313
			105	1.218×10^{-4}			266,313
	1,1′-Di-(4-chlorophenyl)-1,1′-azo-ethane	*p*-Cymene	85	1.45×10^{-5}	134.1	h	266.313
			95	4.82×10^{-5}			266,313
			105	1.650×10^{-4}			266,313
	α,α-Diethylbenzyl-azo-3-pentane	Diphenyl ether	120.05	7.8×10^{-5}			310
			130.0	2.63×10^{-4}			310
			139.0	7.38×10^{-4}			310
			147.0	1.906×10^{-3}			310
	1,1'-Di-(3-fluorophenyl)-1,1′-azo-ethane	*p*-Cymene	105	1.121×10^{-4}			266,313
	1,1′-Di-(4-fluorophenyl)-1,1′-azo-ethane	*p*-Cymene	85	5.5×10^{-6}	147.0	h	266,313
			95	2.35×10^{-5}			266,313
			105	7.85×10^{-5}			266,313
	Di-(3-hydroxybutyl)-2,2′-azo-bis-isobutyrate	Dioxane	60	2.22×10^{-5}	117.3		292
			70	7.84×10^{-5}			292
			80	2.413×10^{-4}			292
		DMF	60	1.83×10^{-5}	121.5		292
			70	7.69×10^{-5}			292
			80	2.424×10^{-4}			292

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TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
16 (*cont'd*)	Di-(3-hydroxybutyl)-2,2′-azo-bis-isobutyrate	Toluene	60	2.43×10^{-5}	117.3		292
			70	8.18×10^{-5}			292
			80	2.461×10^{-4}			292
	Di-(4-hydroxybutyl)-azo-bis-isobutyrate	Dioxane	60	2.12×10^{-5}	125.7		292
			70	6.57×10^{-5}			292
			80	2.539×10^{-4}			292
		DMF	60	1.97×10^{-5}	125.7		292
			70	6.19×10^{-5}			292
			80	2.50×10^{-4}			292
		Toluene	60	2.59×10^{-5}	121.5		292
			70	6.66×10^{-5}			292
			80	2.628×10^{-4}			292
	1,1′-Bis-(4-methoxyphenyl)-azo-methane	Diphenyl ether	145.0	2.23×10^{-4}	145.0	h	297
			155.0	5.67×10^{-4}			297
			165.0	1.61×10^{-3}			297
			175.0	3.79×10^{-3}			297
	2,2′,4,4,4′,4′-Hexamethyl-2,2′-azo-pentane	Diphenyl ether	130.2	1.82×10^{-4}	132.8	h	297
			140.0	4.51×10^{-4}			297
			150.0	1.28×10^{-3}			297
	1-Methylcyclohexyl-azo-α-cumene	*tert*-Butylbenzene	102.2	2.58×10^{-4}	131.1	h	327
			113.1	9.81×10^{-4}			327
			122.0	2.20×10^{-3}			327
	1,1′-Diphenyl-1,1′-azo-ethane	*p*-Cymene	95	2.74×10^{-5}	124.0	h	266,313
			105	8.21×10^{-5}			266,313
	2-(Phenylazo)-2-propyl perbenzoate	Chlorobenzene	10	4.5×10^{-4}			372
			35	1.9×10^{-3}			372
		Chloroform-d	10	5.1×10^{-4}			372
		Chlorotoluene	10	6.4×10^{-4}			372
	(1-Phenylethyl)-azo-diphenylmethane	Ethylbenzene	58	1.9×10^{-5}		a	339
	1,1′-Bis(*p*-tolyl)-azo-methane	Diphenyl ether	145.0	2.00×10^{-4}	145.4	h	297
			155.0	4.69×10^{-4}			297
			165.0	1.22×10^{-3}			297
			175.0	3.45×10^{-3}			297
17	3,7-Diphenyl-1,2-diaza-1-cycloheptene	Xylene	61.0	3.80×10^{-5}			138
			70.0	1.34×10^{-4}			138
			80.0	4.27×10^{-4}			138
			89.3	1.59×10^{-3}			138
			100.2	4.04×10^{-3}			138
			80	4.26×10^{-4}		a	44
			100.2	3.94×10^{-3}		a	44
18	1,1′-Azo-bis-cumene	Benzene	58.91	1.94×10^{-4}		v_5	217
		tert-Butylbenzene	60	1.03×10^{-4}			333
			60	4.03×10^{-5}		z (1256)	333
			60	4.44×10^{-6}		z (3890)	333
		Chlorobenzene	55	8.50×10^{-5}			280
			55	6.88×10^{-5}		z (1013)	280
			55	4.42×10^{-5}		z (4154)	280
		Cumene	55	8.10×10^{-5}			280
			55	6.75×10^{-5}		z (1013)	280
			55	3.83×10^{-5}		z (4154)	280
			60	1.16×10^{-4}			333
			60	4.73×10^{-5}		z (1256)	333
			60	7.23×10^{-6}		z (3890)	333
		Dodecane	60.23	1.47×10^{-4}			217
		n-Octane	60	1.14×10^{-4}			333
			60	4.44×10^{-5}		z (1256)	333
			60	8.32×10^{-6}		z (3890)	333
		Toluene	40.04	9.46×10^{-6}		h	217
			49.52	4.33×10^{-5}			217
			59.42	1.62×10^{-4}			217
			69.23	5.80×10^{-4}			217
			41.0	9.6×10^{-6}	122.8		309
			44.8	1.98×10^{-5}			309
			58.5	1.280×10^{-4}			309

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
18 (*cont'd*)	1,1′-Azo-bis-4-bromocumene	Toluene	42.8	2.72×10^{-5}	117.7		309
			48.6	6.28×10^{-5}			309
			58.0	2.189×10^{-4}			309
	1,1′-Azo-bis-3-chlorocumene	Toluene	36.0	8.8×10^{-6}	115.9		200
			42.8	2.46×10^{-5}			200
			48.2	5.55×10^{-5}			200
			61.1	2.796×10^{-4}			200
	1,1′-Azo-bis-4-chlorocumene	Toluene	36.0	1.11×10^{-5}	112.5		200
			42.8	2.90×10^{-5}			200
			48.2	6.52×10^{-5}			200
	1,1′-Azo-bis-1-chloro-1-(4-tolyl)-ethane	Acetophenone	74.8	2.1×10^{-3}			240
			79.5	3.0×10^{-3}			240
			86	7.4×10^{-3}			240
		Paraffin	105	1.66×10^{-3}			240
			109.5	2.5×10^{-2}			240
			126	6.4×10^{-2}			240
			135.5	1.7×10^{-1}			240
		Toluene	59	1.03×10^{-4}			240
			69	4.0×10^{-4}			240
			59	1.03×10^{-4}	126.8	a	239
			69	3.93×10^{-4}			239
	2,2′-Azo-bis[2-(4-ethyl-4-methyl-imidazoline-2-yl)propane 2HCl	Methanol	50	6.80×10^{-5}			356
		Water	50	7.38×10^{-5}			356
	2,2′-Azo-bis[2-(4-ethyl-5-methyl-imidazoline-2-yl)propane 2HCl	Methanol	50	9.48×10^{-5}			356
		Water	50	1.1×10^{-4}			356
	2,2′-Azo-bis[2-(5,5-dimethyl-3,4,5-tri-hydropyrimidine-2-yl)propane	Methanol	50	9×10^{-7}			356
	2,2′-Azo-bis[2-(5,5-dimethyl-3,4,5-tri-hydropyrimidine-2-yl)propane 2HCl	Methanol	50	8.0×10^{-6}			356
		Water	50	7.9×10^{-6}			356
	1,1′-Azo-bis-4-fluorocumene	Toluene	36.0	5.7×10^{-6}	115.9		200
			42.8	1.31×10^{-5}			200
			48.2	2.94×10^{-5}			200
			61.1	1.880×10^{-4}			200
	1,1′-Di-3-trifluoromethyl-phenyl)-1,1′-azo-ethane	*p*-Cymene	95	4.13×10^{-5}	134.9	h	266,313
			105	1.357×10^{-4}			266,313
	1,1′-Azo-bis-(2-methoxyphenyl)-ethane	*p*-Cymene	84.6	1.69×10^{-5}	135.6	h	266
			95	6.11×10^{-5}			266,313
			105	1.975×10^{-4}			266,313
	1,1′-Azo-bis-(2-methoxyphenyl)-ethane	Ethylbenzene	106.06	2.29×10^{-5}		a	300
			113.81	5.52×10^{-5}		a	300
			133.66	4.87×10^{-4}		a	300
	1,1′-Azo-bis-(3-methoxyphenyl)-ethane	*p*-Cymene	95	1.53×10^{-5}	171.8	h	266,313
			105	6.91×10^{-5}			266,313
	1,1′-Azo-bis-(4-methoxyphenyl)-ethane	*p*-Cymene	95	3.56×10^{-5}	126.5	h	266,313
			105	1.090×10^{-4}			266,313
	1,1′-Azo-bis-1-(4-methoxyphenyl)-ethane	Ethylbenzene	100.4	$(7.15 \pm 0.1) \times 10^{-5}$	149.8		98
			110.3	$(2.48 \pm 0.02) \times 10^{-4}$			98
	1,1′-Azo-bis-1-phenylpropane	Ethylbenzene	100.4	$(2.35 \pm 0.1) \times 10^{-5}$	135.1		98
			110.3	$(7.2 \pm 0.2) \times 10^{-5}$			98
	2,2′-Azo-bis-2-phenyl-hexafluoro-propane	Toluene	45.0	8.36×10^{-6}	137.2	h	173
			50.0	2.16×10^{-5}			173
			55.0	4.92×10^{-5}			173
			60.0	8.81×10^{-5}			173
			67.0	2.46×10^{-4}			173
			43.8	6.3×10^{-5}	115.5		42
			53.8	2.4×10^{-4}			42
	1,1′-Dimethyl-azo-cyclooctane	Benzene	130.0	1.09×10^{-4}	145.8	h	327
			140.0	3.05×10^{-4}			327
			150.0	8.96×10^{-4}			327
	1,1′-Diphenyl-azo-cyclopropane	Benzene	165.0	9.6×10^{-5}	135.3	h	323
			175.0	2.21×10^{-4}			323
			185.0	5.09×10^{-4}			323
		Ethylbenzene	170.0	1.67×10^{-4}			323
			180.0	3.48×10^{-4}			323

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TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
18 (*cont'd*)	3,8-Diphenyl-1,2-diaza-1-	Tetralin	143	9.52×10^{-5}	153.6		137
	cyclooctene		151	2.09×10^{-4}			137
			165	8.77×10^{-4}			137
			173	1.82×10^{-3}			137
	1,1′-Di-(3-tolyl)-1,1′-azo-ethane	*p*-Cymene	105	8.17×10^{-5}			266,313
	1,1′-Di-(4-tolyl)-1,1′-azo-ethane	*p*-Cymene	95	3.06×10^{-5}	126.5	h	266,313
			105	9.35×10^{-5}			266,313
19	Phenyl-azo-diphenylmethane	Decalin	124.5	3.44×10^{-5}	142.3		46
			144.5	2.69×10^{-4}			46
	2-(2-Pheny1-4-methylpentyl)-	Diphenyl ether	103.0	1.17×10^{-4}			310
	azo-2-(4-methylpentane)		110.0	2.52×10^{-4}			310
			120.0	8.51×10^{-4}			310
			130.0	2.611×10^{-3}			310
20	1,1′-Azo-bis-1-acetoxy-	Paraffin	131	3.2×10^{-2}			240
	1-phenylethane		142	4.3×10^{-2}			240
			149.5	8.0×10^{-2}			240
	1,1′-Azo-bis-1,1-dicyclopropyl-	Diphenyl ether/	120.0	4.26×10^{-5}	159.0	h	171
	butane	isoquinoline (90/10)	125.0	7.94×10^{-5}			171
			130.0	1.49×10^{-4}			171
			135.0	2.697×10^{-4}			171
			140.0	4.774×10^{-4}			171
			147.0	1.055×10^{-3}			171
	9-Azo-bis-decalin (*cis*)	Ethylbenzene	180.0	1.41×10^{-4}	175.1	h	335
			190.0	3.95×10^{-4}			335
			200.0	1.05×10^{-3}			335
	(*trans*)		180.0	1.90×10^{-4}	175.1	h	335
			190.0	5.35×10^{-4}			335
			200.0	1.41×10^{-3}			335
	α,α′-Azo-bis(α-methylbenzyl) diacetate	Dichlorobenzene	65	1.86×10^{-5}			366
			70	4.00×10^{-5}			366
			80	1.592×10^{-4}			366
			90	5.525×10^{-4}			366
	Azo-bis-4-methylcumene	Cumene	55	8.86×10^{-5}			280,333
			55	7.54×10^{-5}		z (1013)	280,333
			55	4.47×10^{-5}		z (4154)	280,333
		Toluene	41.0	1.33×10^{-5}	120.7		309
			49.5	5.02×10^{-5}			309
			58.5	1.690×10^{-4}			309
	2,2′-Azo-bis[2-(4-ethyl-5-isopropyl-	Methanol	50	7.72×10^{-5}			356
	imidazoline-2-yl)propane 2HCl	Water	50	1.01×10^{-4}			356
	2,2′-Azo-bis-2-(4-tolyl)-propane	Toluene	36.0	8.4×10^{-6}	110.0		200
			42.8	1.62×10^{-5}			200
			61.1	2.08×10^{-4}			200
	1,1′-Azo-bis-1,1,1-tricyclopropyl-	Diphenyl ether/	105.0	7.89×10^{-5}	143.5	h	171
	methane	isoquinoline (90/10)	110.0	1.374×10^{-4}			171
			115.0	2.36×10^{-4}			171
			120.0	4.58×10^{-4}			171
			125.0	7.76×10^{-4}			171
			130.0	1.38×10^{-3}			171
			135.0	2.39×10^{-3}			171
		Decalin/					
		isoquinoline (90/10)	118.5	3.60×10^{-4}			171
		Isoquinoline	118.5	3.30×10^{-4}			171
		Cumene/					
		isoquinoline (90/10)	118.5	445×10^{-4}		h	171
	1,1′-Di-(4-ethylphenyl)-	*p*-Cymene	95	3.02×10^{-5}	125.3		266,313
	1,1-azo-ethane		105	9.14×10^{-5}		a	266,313
	1,1′-Diphenyl-azo-butane	Ethylbenzene	93.88	1.67×10^{-5}		a	300
			105.68	6.96×10^{-5}		a	300
			119.55	3.39×10^{-4}		h	300
	1,1′-Diphenyl-azo-cyclobutane	Ethylbenzene	63.2	8.2×10^{-6}	122.3		323
			73.8	3.5×10^{-5}			323
			79.1	6.9×10^{-5}			323
			87.7	1.69×10^{-4}		b,h	323

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
20 (*cont'd*)	(−)-(*s*)-1,1′-Diphenyl-1-methyl-azo-methane	Cumene	106.0	8.26×10^{-6}	149.2	b	318
			127.9	1.18×10^{-4}			318
	2,2′-Azo-bis(2-methyl-*N*-phenyl-propionamidine) 2HCl	Water	45	1.93×10^{-5}		a	339
	2,2′-Azo-bis[*N*-(4-chlorophenyl)-2-methylpropionamidine] 2HCl	Water	45.5	1.93×10^{-5}		a	339
	2,2′-Azo-bis[*N*-(4-hydroxyphenyl)-2-methylpropionamidine] 2HCl	Water	47.5	1.93×10^{-5}		a	339
22	1,1′-Azo-bis-1-phenyl-3-methylbutane	Ethylbenzene	100.4	7.6×10^{-5}	139.3		98
			110.3	2.42×10^{-4}			98
	1,1′-Azo-bis-4-ethylcumene	Toluene	42.8	1.29×10^{-5}	108.9		309
			48.6	3.29×10^{-5}			309
			58.0	1.240×10^{-4}			309
	1,1′-Azo-bis-4-isopropylcumene	Toluene	42.8	1.13×10^{-5}	124.4		309
			51.2	4.26×10^{-5}			309
			58.0	1.078×10^{-4}			309
	1,1′-Diisopropyl-1,1′-diphenyl-azo-ethane	Ethylbenzene	50	3.52×10^{-5}	113.6	h	324
	1,1′-Diphenyl-azo-cyclopentane	Benzene	29.5	3.16×10^{-4}	103.1		323
			40.0	1.24×10^{-3}			323
			50.0	4.68×10^{-3}			323
	2,2′-Azo-bis[2-methyl-*N*-(phenyl-methyl)propionamidine] 2HCl	Water	52	1.93×10^{-5}		a	339
	2,2′-Azo-bis[2-(4-methyl-4-isobutyl-imidazoline-2-yl)propane 2HCl	Methanol	50	5.54×10^{-5}			356
		Water	50	7.08×10^{-5}			356
	2,2′-Azo-bis[2-(4-methyl-5-isobutyl-imidazoline-2-yl)propane 2HCl	Methanol	50	7.72×10^{-5}			356
		Water	50	9.78×10^{-5}			356
	2,2′-Azo-bis[2-(4-ethyl-5-propyl-imidazoline-2-yl)propane 2HCl	Methanol	50	1.06×10^{-4}			356
		Water	50	1.41×10^{-4}			356
24	1,1′-Azo-bis-4-*tert*-butylcumene	Toluene	42.8	1.16×10^{-5}	123.6		309
			48.6	2.58×10^{-5}			309
			58.0	1.080×10^{-4}		h	309
	α,α′-Azo-bis(α-methylbenzyl)-dimethacrylate	Dichlorobenzene	65	3.65×10^{-5}			366
			70	7.98×10^{-5}			366
			80	2.313×10^{-4}			366
			90	1.344×10^{-3}			366
	Bis(2,2,4,6,6-pentamethyl-4-heptyl)diazine	Diphenyl ether	100.1	3.03×10^{-4}	125.7		314
			109.2	7.62×10^{-4}			314
			125.0	3.90×10^{-3}		h	314
	1,1′-Diphenyl-azo-cyclohexane	Benzene	45.5	2.52×10^{-5}	125.7		323
			54.0	8.74×10^{-5}			323
			69.7	7.12×10^{-4}			323
25	3-Bromophenyl-azo-triphenyl-methane	Toluene	53.8	1.14×10^{-4}	125.1		42
			64.0	4.58×10^{-4}			42
	4-Bromophenyl-azo-triphenyl-methane	Toluene	53.35	1.05×10^{-4}	117.2		52
			64.30	4.28×10^{-4}			52
	4-Hydroxyphenyl-azo-triphenyl-methane	Acetic acid	54.00	1.42×10^{-4}	133.9		52
			64.00	6.2×10^{-4}			52
		Pyridine	54.00	1.52×10^{-4}	133.9		52
			64.00	6.7×10^{-4}			52
		Toluene	54.00	1.70×10^{-4}	121.3		52
			64.00	6.4×10^{-4}			52
	2-Nitrophenyl-azo-9-phenylfluorene	Toluene	45.45	1.01×10^{-4}	119.7		75
			55.55	3.71×10^{-4}			75
	4-Nitrophenyl-azo-9-phenylfluorene	Toluene	45.45	2.06×10^{-4}	111.7		75
			55.55	7.53×10^{-4}			75
	2,4-Dinitrophenyl-azo-9-phenyl-fluorene	Toluene	55.55	2.06×10^{-4}	119.2		75
			64.94	6.92×10^{-4}			75
	2-Nitrophenyl-azo-triphenylmethane	Toluene	64.94	1.46×10^{-4}	123.8		75
			75.06	5.26×10^{-4}			75
	3-Nitrophenyl-azo-triphenylmethane	Toluene	53.8	5.8×10^{-5}	110.9		42
			64.0	1.99×10^{-4}			42
		Benzene	60	9.92×10^{-5}			263
		tert-Butylbenzene	60	9.18×10^{-5}			263

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TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
25 (*cont'd*)	3-Nitrophenyl-azo-triphenylmethane	Cumene	60	1.04×10^{-4}			263
		Ethylbenzene	60	1.10×10^{-4}			263
		Octane	60	1.01×10^{-4}			263
		Toluene	45	1.25×10^{-5}			263
			60	1.22×10^{-4}			263
	4-Nitrophenyl-azo-triphenylmethane	Benzene	60	1.09×10^{-4}			263
		tert-Butylbenzene	60	9.7×10^{-5}			263
			60	4.03×10^{-5}		z (1256)	263
			60	4.44×10^{-6}		z (3890)	263
		Chlorobenzene	55	8.50×10^{-5}			333
			55	6.88×10^{-5}		z (1013)	333
			55	4.42×10^{-5}		z (4154)	333
		Cumene	55	8.10×10^{-5}			333
			55	6.75×10^{-5}		z (1013)	333
			55	2.62×10^{-5}		z (6180)	333
			60	1.15×10^{-4}			263
			60	4.73×10^{-5}		z (1256)	263
			60	7.23×10^{-6}		z (3890)	263
		Decane	50	2.017×10^{-5}			168,263
			60	9.988×10^{-4}			168,263
			70	3.350×10^{-4}			168
			77.5	1.16×10^{-3}			168
		1-Decene	60	1.038×10^{-4}			168
		Dodecane	50	1.933×10^{-5}			168,263
			60	9.166×10^{-5}			168,263
			70	3.250×10^{-4}			168
		1-Eicosene	60	7.60×10^{-5}			168
		Heptane	50	2.716×10^{-5}			168
			60	1.043×10^{-4}			168,263
			70	3.900×10^{-4}			168
		Hexadecane	50	1.716×10^{-5}			168,263
			60	8.133×10^{-5}			168,263
			70	2.966×10^{-4}			168
			77.5	1.09×10^{-3}			168
		1-Hexadecene	60	8.25×10^{-5}			168
		Hexane	50	2.750×10^{-5}			168,263
			60	1.195×10^{-4}			168,263
		1-Hexene	60	1.143×10^{-4}			168
		Nonane	50	2.200×10^{-5}			168,263
			60	9.900×10^{-5}			168,263
			70	3.710×10^{-4}			168
		Octadecane	60	7.780×10^{-5}			168,263
			70	2.783×10^{-4}			168
		1-Octadecene	60	7.58×10^{-5}			168
		Octane	60	1.015×10^{-4}			168,263
			70	3.650×10^{-4}			168
			77.5	1.78×10^{-3}			168
		1-Octene	60	1.123×10^{-4}			168
		Pentane	50	3.600×10^{-5}			168,263
			60	1.280×10^{-4}			168,263
		Tetradecane	50	1.866×10^{-5}			168,263
			60	8.800×10^{-5}			168,263
			70	3.116×10^{-4}			168
	4-Nitrophenyl-azo-triphenylmethane	1-Tetradecene	60	9.02×10^{-5}			168
		Toluene	64.94	2.58×10^{-4}	123.0		75
			75.06	9.19×10^{-4}			75
			53.35	5.7×10^{-5}	113.0		52
			64.30	2.25×10^{-4}			52
	2,4-Dinitrophenyl-azo-triphenyl-methane	Toluene	75.06	1.90×10^{-4}	122.6		75
			84.98	6.13×10^{-4}			75
	Phenyl-azo-triphenylmethane	Acetic acid	43.30	5.7×10^{-5}	117.2		52
			64.00	8.4×10^{-4}			52
		Anisole	25.0	2.58×10^{-6}	120.5	b,h	103

TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
25 (*cont'd*)	Phenyl-azo-triphenylmethane	Anisole	50.2	1.31×10^{-4}		b	103
			74.7	3.03×10^{-3}		b	103
			25.0	3.0×10^{-6}	118.3		114
			74.5	2.9×10^{-3}			114
			80.1	6.8×10^{-3}			114
			85.9	1.1×10^{-2}			114
		Benzene	25.0	4.29×10^{-6}	112.1	b,h	103
			49.6	1.24×10^{-4}			103
			74.7	3.12×10^{-3}		b	103
			50	1.37×10^{-4}			263
		Benzonitrile	25.0	2.62×10^{-6}	121.3	b,h	103
			50.3	1.56×10^{-4}		b	103
			74.7	3.14×10^{-3}			103
		tert-Butylbenzene	50	1.33×10^{-4}			263
			50	3.83×10^{-5}		z (1140)	263
			50	9.53×10^{-6}		z (4265)	263
		Chlorobenzene	25.0	3.77×10^{-6}	118.4	b,h	103
			49.6	1.67×10^{-4}		b	103
			74.7	3.93×10^{-3}		b	103
		Cumene	50	1.50×10^{-4}			263
			50	6.82×10^{-5}		z (1140)	263
			50	7.65×10^{-6}		z (4265)	263
		Cyclohexane	25.0	4.22×10^{-6}	102.5	h	103
			49.6	9.90×10^{-5}		b	103
			74.7	1.75×10^{-3}		b	103
		Decane	60	5.72×10^{-4}			263
		Dodecane	60	5.35×10^{-4}			263
		Diethyl malonate	25.1	3.1×10^{-6}	116.6		114
			74.5	2.8×10^{-3}			114
			80.1	5.9×10^{-3}			114
			85.9	1.0×10^{-2}			114
		Ethylbenzene	50	1.58×10^{-4}			263
		Heptane	60	6.60×10^{-4}			263
		Hexadecane	60	4.76×10^{-4}			263
		Hexane	60	7.60×10^{-4}			263
		Nitrobenzene	25.0	2.6×10^{-6}	118.7		114
			74.5	3.0×10^{-3}			114
			80.1	5.8×10^{-3}			114
			85.9	9.8×10^{-3}			114
		Octane	50	1.59×10^{-4}			263
			50	7.53×10^{-5}		z (1140)	263
			50	1.17×10^{-5}		z (4265)	263
			60	6.41×10^{-4}			263
		Pyridine	53.35	1.74×10^{-4}	129.7		52
			64.00	8.0×10^{-4}			52
		Tetradecane	60	4.99×10^{-4}			263
		Toluene	43.8	6.3×10^{-5}	115.5		42
			53.8	2.4×10^{-4}			42
			45	9.23×10^{-5}			263
			50	1.73×10^{-4}			263
			45.45	8.48×10^{-5}	122.6		75
			55.55	3.51×10^{-4}			75
			43.30	6.0×10^{-5}	113.0		52
			53.35	2.25×10^{-4}			52
			53.3	2.25×10^{-4}	113.0		46
26	2,2′-Azo-bis[2-(4-ethyl-5-propyl-imidazoline-2-yl)propane 2HCl	Methanol	50	9.75×10^{-5}			356
		Water	50	1.33×10^{-4}			356
	Azo-bis-diphenylmethane	Toluene	54.0	1.01×10^{-4}			107,312
			64.0	3.40×10^{-4}	111.3		46,107,312
	1,1′-Bis-biphenyl-azo-methane	Diphenyl ether	135.0	1.23×10^{-4}	134.1	h	297
			145.0	3.58×10^{-4}			297
			155.0	7.76×10^{-4}			297
			165.0	2.09×10^{-3}			297
	1,1′-Azo-bis-1-(4-tolyl)-cyclohexane	Toluene	36.0	8.7×10^{-6}	107.1		200

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TABLE 2. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
26 (*cont'd*)	1,1′-Azo-bis-1-(4-tolyl)-cyclohexane	Toluene	42.8	2.01×10^{-5}			200
			61.1	2.009×10^{-4}			200
	1,1′-Diisopropyl-2,2′-dimethyl-1,1′-Diphenyl-azo-propane	Ethylbenzene	50.0	6.24×10^{-5}			324
			60.0	2.49×10^{-4}			324
			70.0	7.77×10^{-4}			324
	4-Methoxyphenyl-azo-triphenyl-methane	Toluene	54.00	2.13×10^{-4}	117.2		52
			64.00	7.6×10^{-4}			52
	1,1′-Diphenyl-azo-cycloheptane	Benzene	16.2	1.65×10^{-4}			323
			24.8	5.52×10^{-4}			323
			33.4	1.66×10^{-3}			323
			41.1	4.52×10^{-3}			323
	3-Tolyl-azo-triphenylmethane	Benzene	50	1.30×10^{-4}			263
		tert-Butylbenzene	50	1.30×10^{-4}			263
		Cumene	50	1.51×10^{-4}			263
		Ethylbenzene	50	1.72×10^{-4}			263
		Octane	45	8.9×10^{-5}			263
		Toluene	43.8	7.4×10^{-5}	113.8		42
			53.8	2.77×10^{-4}			42
			45	9.74×10^{-5}			263
			50	1.81×10^{-4}			263
	4-Tolyl-azo-triphenylmethane	Benzene	50	1.26×10^{-4}			263
		tert-Butylbenzene	50	1.35×10^{-4}			263
		Cumene	50	1.40×10^{-4}			263
		Ethylbenzene	50	1.62×10^{-4}			263
		Octane	45	8.6×10^{-5}			263
		Toluene	43.30	6.9×10^{-5}	100.4		52
			53.35	2.25×10^{-4}			52
			45	9.3×10^{-5}			263
			50	1.52×10^{-4}			263
27	4-Acetaminophenyl-azo-triphenyl-methane	Toluene	54.00	1.46×10^{-4}	125.5		52
			64.00	5.9×10^{-4}			52
28	1,1′-Azo-bis-1,2-diphenyl-ethane (meso)	Ethylbenzene	96.56	2.75×10^{-5}	138.5	a,h	162
			106.47	9.03×10^{-5}		a	162
			115.28	2.42×10^{-4}		a	162
	(D,L)		96.56	3.22×10^{-5}	138.9	a,h	162
			106.47	1.04×10^{-4}		a	162
			115.28	2.84×10^{-4}		a	162
30	1,1′-Dibutyl-1,1′-diphenyl-azo-pentane	Ethylbenzene	50.0	5.05×10^{-5}	108.9	h	324
			60.0	2.03×10^{-4}			324
			70.0	6.24×10^{-4}			324
34	1,1′-Azo-bis-(1,3-diphenyl-pentane)	Bromobenzene	89.7	1.5×10^{-5}			311
		Xylene	118.8	5.6×10^{-4}			311
40	3,10,13,20-Tetraphenyl-1,2,11,12-tetra-aza-l,11-cycloeicosadiene	Xylene	110	7.20×10^{-5}	145.6		38
			120	2.30×10^{-4}			38
			130	6.90×10^{-4}			38
44	3,12,15,24-Tetraphenyl-1,2,13,14-tetra-aza-1,13-cyclotetracosadiene	Ethylbenzene	112.95	8.761×10^{-5}			158
		Xylene	110.8	8.9×10^{-5}	126.4		48
			119.8	2.2×10^{-4}			48
			110	7.63×10^{-5}	143.9		38
			120	2.46×10^{-4}			38
			130	7.12×10^{-4}			38
	Poly[oxyethylenexoxy-(1-oxo-2,2-dimethylethylene)-azo-(2-oxo-1,1-dimethyl-ethylene)	*o*-Xylene	85	2.106×10^{-4}	124.0		332
			95	7.312×10^{-4}			332
			105	1.995×10^{-3}			332
			T (K)	1.99×10^{14}	$\exp[-124.0/RT]$		332

TABLE 3. ALKYL PEROXIDES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
2	Methyl peroxide	Vapor	T (K)	1.6×10^{15}	exp[− 147.7/RT]		72
		Methanol	T (K)	4.1×10^{15}	exp[− 153.9/RT]		225
4	Ethyl peroxide	Styrene	60	1.2×10^{-9}	147.3		92
		Vapor	140.2	1.75×10^{-4}	131.8	a	127
			147.8	3.60×10^{-4}		a	127
			160.0	1.08×10^{-3}		a	127
			176.5	3.78×10^{-3}		a	127
			184.5	7.16×10^{-3}		a	127
			145.9	6.69×10^{-4}			187
			145.9	5.02×10^{-4}		t_8	187
		Vapor (toluene)	200	3.58×10^{-2}	132.6		87
			210	6.76×10^{-2}			87
			218	1.47×10^{-1}			87
			226	2.23×10^{-1}			87
			234	3.86×10^{-1}			87
			245	6.43×10^{-1}			87
5	2,4-Pentanedione peroxide	Triethyl phosphate	100	1.9×10^{-6}	92	a	337
			115	6.1×10^{-6}		a	337
			125	1.4×10^{-5}		a	337
6	Propyl peroxide	Vapor	146.5	2.50×10^{-4}	132.2	a	128
			155.3	6.00×10^{-4}		a	128
			166.8	1.95×10^{-3}		a	128
			175.4	4.10×10^{-3}		a	128
	Isopropyl peroxide	Styrene	60	$6. \times 10^{-10}$	154.8		92
7	Allyl *tert*-butylperoxide	Toluene	130	5.76×10^{-5}	139.1	h,m_6	321
			140	1.785×10^{-4}			321
			150	4.800×10^{-4}			321
			160	1.270×10^{-3}			321
	Dimethylaminomethyl *tert*-butyl peroxide		110	5.5×10^{-5}	134.5		303
			120	1.9×10^{-4}			303
			130	4.76×10^{-4}			303
8	*tert*-Butyl peroxide	Acetic acid	115	1.2×10^{-5}	139.7	h	192
			120	2.19×10^{-5}			192
			125	2.98×10^{-5}			192
			130	6.29×10^{-5}			192
		Acetonitrile	95	9.53×10^{-7}			208
			125	3.89×10^{-5}		d	208
			115	1.19×10^{-5}	129.7	h	192
			120	2.21×10^{-5}			192
			125	3.47×10^{-5}			192
			130	5.63×10^{-5}			192
		Benzene	80	7.81×10^{-8}	142.3	m_2,u_2	129
			130	$(2.48–3.04) \times 10^{-5}$		m_2,u_2	129
			100	8.8×10^{-7}	146.9	a	126,337
			100	8.75×10^{-7}			197
			115	5.66×10^{-6}		a	126,337
			130	3.00×10^{-5}		a	126,337
			120	1.39×10^{-5}		z (0.98)	33
			120	7.6×10^{-6}		z (864)	33
			120	7.5×10^{-6}		z (1620)	33
			120	3.7×10^{-6}		z (3480)	33
			120	1.10×10^{-5}	147.7	h	192
			125	1.99×10^{-5}			192
			130	3.22×10^{-5}			192
			135	6.19×10^{-5}			192
		Benzhydrol	125	8.7×10^{-5}			140
		tert-Butanol	120	1.41×10^{-5}	143.5	h	192
			125	2.49×10^{-5}			192
			130	4.30×10^{-5}			192
			135	7.32×10^{-5}			192
		2-Butanol	125	4.8×10^{-5}			140
		n-Butyl mercaptan	125	1.5×10^{-5}			140
		Tri-*n*-butylamine	125	$(1.7 \pm 0.3) \times 10^{-5}$			64
			135	$(4.2 \pm 0.4) \times 10^{-5}$			64

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TABLE 3. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	*tert*-Butyl peroxide	Tri-*n*-butylamine	145	$(1.60 \pm 0.21) \times 10^{-4}$			64
			T (K)	2.8×10^{14}	$\exp[-146.4/RT]$		123
		tert-Butylbenzene	125	$(1.5 \pm 0.2) \times 10^{-5}$			64
			135	$(5.0 \pm 0.3) \times 10^{-5}$			64
			145	$(1.51 \pm 0.22) \times 10^{-4}$			64
			T (K)	2.8×10^{14}	$\exp[-146.4/RT]$		123
			125	2.10×10^{-6}		u_1	301
			125	2.49×10^{-6}		s	301
			125	2.03×10^{-6}		s,t_6	301
		Carbon tetrachloride	120	9×10^{-6}		z (0.98)	33
			120	2.4×10^{-6}		z (1930)	33
			120	2.3×10^{-6}		z (2890)	33
			120	8.6×10^{-7}		z (5525)	33
			125	1.40×10^{-6}		u_1,t_6	301
		Chlorobenzene	150	4.45×10^{4}			346
			121	1.93×10^{-5}			344
			141	1.93×10^{-4}			344
			164	1.93×10^{-3}			344
			T (K)	4.20×10^{15}	$\exp[-153.46/RT]$		344
		Cumene	125	$(1.6 \pm 0.1) \times 10^{-5}$			64
			135	$(5.2 \pm 0.3) \times 10^{-5}$			64
			145	$(1.56 \pm 0.13) \times 10^{-4}$			64
			T (K)	2.8×10^{14}	$\exp[-146.4/RT]$		123
		Cyclohexane	95	2.48×10^{-7}	170.7	h	208
			120	6.3×10^{-6}			192
			125	1.52×10^{-5}			192
			130	2.59×10^{-5}			192
			135	4.64×10^{-5}			192
		Cyclohexanol	125	2.4×10^{-5}			140
		Cyclohexene	120	7.6×10^{-6}	156.1	h	192
			125	1.38×10^{-5}			192
			130	2.81×10^{-5}			192
			135	4.41×10^{-5}			192
			120	8.3×10^{-6}		z (0.98)	33
			120	6.2×10^{-6}		z (1275)	33
			120	3.77×10^{-6}		z (2890)	33
			120	2.65×10^{-6}		z (5725)	33
		Cyclohexylamine	125	5.50×10^{-5}	157.3	h	143
		Decane	80	1.39×10^{-8}			270
			110	2.01×10^{-6}			270
			130	2.48×10^{-5}			270
			115	3.00×10^{-6}	163	a	337
			130	2.16×10^{-5}		a	337
			140	6.66×10^{-5}		a	337
		Dodecane	80	1.29×10^{-8}			270
			110	1.87×10^{-6}			270
			130	2.44×10^{-5}			270
		Dimethylaniline	120	9.6×10^{-6}			192
			125	1.89×10^{-5}			192
			130	3.41×10^{-5}			192
			135	5.84×10^{-5}			192
		Ethyl benzoate	120	1.07×10^{-5}	148.5	h	192
			125	1.92×10^{-5}			192
			130	3.39×10^{-5}			192
			135	5.90×10^{-5}			192
		N-Ethylcyclohexyl amine	125	4.01×10^{-5}			143
		Heptane	80	1.44×10^{-8}			270
			110	2.19×10^{-6}			270
		Hexadecane	80	1.07×10^{-8}			270
			110	1.82×10^{-6}			270
			130	2.33×10^{-5}			270
		Hexane	80	1.64×10^{-8}			270
			110	2.17×10^{-6}			270

TABLE 3. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	*tert*-Butyl peroxide	2-Methyl-2-butanol	120	1.26×10^{-5}	149.4	h	192
			125	2.34×10^{-5}			192
			130	4.47×10^{-5}			192
			135	6.80×10^{-5}			192
		Methyl methacrylate	T (K)	2.8×10^{14}	exp[− 146.4/RT]		123
		N-Methylpipendine	125	1.54×10^{-5}			143
		Mineral oil	T (K)	1.31×10^{15}	exp[− 154.6/RT]		376
		Nonane	80	1.36×10^{-8}			270
			110	2.01×10^{-6}			270
			130	2.54×10^{-5}			270
		Norbornanol	125	4.4×10^{-5}			140
		Nujol	125	7.8×10^{-7}		u	301
		Octane	80	1.48×10^{-8}			270
			110	2.19×10^{-6}			270
		2-Octanol	125	5.5×10^{-5}			140
		Piperidine	125	3.49×10^{-5}			143
		1-Propanol	125	2.8×10^{-5}			140
		Styrene	T (K)	2.8×10^{14}	exp[− 146.4/RT]		123
		Tetradecane	80	1.12×10^{-8}			270
			110	1.82×10^{-6}			270
			130	2.38×10^{-5}			270
		Tetrahydrofuran	120	9.7×10^{-6}	155.2	h	192
			125	1.84×10^{-5}			192
			130	3.39×10^{-5}			192
			135	5.76×10^{-5}			192
			125	1.5×10^{-5}			140
		Toluene	100	6.82×10^{-7}			197
			120	1.34×10^{-5}		z (0.98)	33
			120	9.5×10^{-6}		z (2000)	33
			120	8.0×10^{-6}		z (2850)	33
			120	5.7×10^{-6}		z (5170)	33
			125	1.6×10^{-5}			140
			125	1.62×10^{-5}			143
			T (K)	1.30×10^{16}	exp[− 158.3/RT]		376
		Triethylamine	120	7.9×10^{-6}	169.9	h	192
			125	1.69×10^{-5}			192
			130	3.15×10^{-5}			192
			135	5.55×10^{-5}			192
		Vapor (acetone)	127.5	7.4×10^{-6}			238
			131	1.13×10^{-5}			238
			146	6.0×10^{-5}			238
			151.5	1.03×10^{-4}			238
			162	3.6×10^{-4}			238
			167	5.2×10^{-4}			238
			145	1.3×10^{-4}	165.3		125
			T (K)	5.9×10^{16}	exp[− 165.3/RT]		125
		Vapor (carbon tetrachloride)	150	8.58×10^{-4}		1	130
		Vapor (chloroform)	150	1.167×10^{-3}		1	130
		Vapor (dichloro-difluoromethane)	150	$>(2.00 \times 10^{-4})$			130
		Vapor (trichloro ethylene)	150	2.35×10^{-3}		1	130
		Vapor (methylene chloride)	150	1.017×10^{-3}		1	130
		Vapor (3-pentanone)	145	1.5×10^{-4}	165.3		125
			T (K)	6.8×10^{16}	exp[− 165.3/RT]		125
		Vapor (silicon tetrafluoride)	160	1.05×10^{-3}	113.0	a,i(2.6)	117
			160	1.25×10^{-3}		a,i(33)	117
			160	1.27×10^{-3}		a,i(100)	117
		Vapor (toluene)	148	9.0×10^{-5}			88
			158	2.5×10^{-4}			88
		Vapor	103.2	5.6×10^{-7}			227
			111.9	2.03×10^{-6}			227

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TABLE 3. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	*tert*-Butyl peroxide	Vapor	120.2	6.39×10^{-6}			227
			129.5	1.98×10^{-5}			227
			138.5	6.00×10^{-5}			227
			145.4	1.24×10^{-4}			227
			125	1.1×10^{-5}			64
			135	3.6×10^{-5}			64
			145	1.15×10^{-4}			64
			129.6	1.64×10^{-5}			86
			141.0	6.28×10^{-5}			86
			152.5	2.25×10^{-4}			86
			166.8	8.92×10^{-4}			86
			130	1.82×10^{-5}	159.0	a	96
			140	5.75×10^{-5}		a	96
			150	1.75×10^{-4}		a	96
			160	4.88×10^{-4}		a	96
			170	1.35×10^{-3}		a	96
			129	1.97×10^{-5}			88
			138	4.3×10^{-5}			88
			149	1.30×10^{-4}			88
			152	1.62×10^{-4}			88
			139.7	6.0×10^{-5}	163.6		63
			147.2	1.43×10^{-4}			63
			154.6	3.22×10^{-4}			63
			159.8	5.53×10^{-4}			63
			T (K)	3.2×10^{16}	$\exp[-163.6/RT]$		63
			145	1.3×10^{-4}	161.5		125
			T (K)	1.9×10^{16}	$\exp[-161.5/RT]$		175,125
			149.5	1.79×10^{-4}	156.5	i(37-132)	83
			160	4.00×10^{-4}	154.8	a,i(2.6)	117
			160	4.53×10^{-4}		a,i(33)	117
			160	4.83×10^{-4}		a,i(100)	117
			130	1.91×10^{-5}	156.7	u_3	277
			140	5.95×10^{-5}		u_3	277
			150	1.78×10^{-4}		u_3	277
			160	4.96×10^{-4}		u_3	277
		Vapor (He)	280	7.7	154.8	i(10)	111
			290	1.51×10^{1}		i(10)	111
			300	2.77×10^{1}		i(10)	111
			310	4.87×10^{1}		i(10)	111
			320	8.34×10^{1}		i(10)	111
			330	1.38×10^{2}		i(10)	111
			340	2.13×10^{2}		i(10)	111
			350	3.22×10^{2}		i(10)	111
		KBr pellets	109	3.8×10^{-7}	159.0	h	241
			127	2.96×10^{-5}			241
			149	4.4×10^{-4}			241
	tert-Butyl 2-chloro-1,1-dimethylethyl-peroxide	Cumene	120	8.82×10^{-6}			363
			130	2.80×10^{-5}			363
			140	9.26×10^{-5}			363
			150	2.78×10^{-4}			363
	sec-Butyl peroxide	Toluene	100	2.7×10^{-6}			197
		Vapor	100	1.5×10^{-6}			197
	Butyl peroxide	Decane	80	1.43×10^{-8}		t_6	270
		Dodecane	80	1.17×10^{-8}		t_6	270
		Heptane	80	2.04×10^{-8}		t_6	270
		Hexadecane	80	8.8×10^{-9}		t_6	270
		Octane	80	1.58×10^{-8}		t_6	270
		Styrene	60	3.3×10^{-9}	142.3		92
		Tetradecane	80	9.6×10^{-9}		t_6	270
	Bromo-*tert*-butyl peroxide	Chlorobenzene	150	3.63×10^{-4}			346
	Chloro-*tert*-butyl peroxide	Chlorobenzene	150	4.15×10^{-4}			346
	Bis(chloro-*tert*-butyl) peroxide	Chlorobenzene	150	3.11×10^{-4}			346
	2-*tert*-Butyl peroxy-2-methyl-1-propanol	Chlorobenzene	150	1.16×10^{-3}			346

TABLE 3. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	2-*tert*-Butyl peroxy-2-methyl-1-propanol-d_1	Chlorobenzene	150	1.23×10^{-3}			346
	1-Hydroxybutyl-*n*-butyl peroxide	α-Methylstyrene	79.4	1.7×10^{-5}	102.9		32
			99.4	1.06×10^{-4}			32
			109.9	2.9×10^{-4}			32
	1-Hydroxyisobutyl-isobutyl peroxide	α-Methylstyrene	79.4	3.7×10^{-5}	83.7	c	32
			99.4	2.0×10^{-4}		c	32
			109.9	4.8×10^{-4}		c	32
	1-Hydroxyisobutyl-1-di-isobutyl-1,1-d_2 peroxide	α-Methylstyrene	99.5	6.9×10^{-5}	89.5		25
			109.8	1.8×10^{-4}			25
			122.0	4.2×10^{-4}			25
	Dimethylaminomethyl-*tert*-amyl peroxide	Styrene	110	4.9×10^{-5}	130.7	t_{11}	303
			120	1.19×10^{-4}		t_{11}	303
			130	3.76×10^{-4}		t_{11}	303
	Diethylaminomethyl-*tert*-butyl peroxide	Styrene	110	4.1×10^{-5}	132.4	t_{11}	303
			120	1.35×10^{-4}		t_{11}	303
			130	3.25×10^{-4}		t_{11}	303
	N-Piperidinomethyl-*tert*-butyl peroxide	Styrene	110	5.5×10^{-5}	130.7	t_{11}	303
			120	2.66×10^{-4}		t_{11}	303
			130	4.16×10^{-4}		t_{11}	303
9	*tert*-Butyl *tert*-amyl peroxide	Cumene	110	3.86×10^{-6}			363
			120	1.287×10^{-5}			363
			130	4.30×10^{-5}			363
			140	1.406×10^{-4}			363
10	*tert*-Amyl peroxide	Bulk	125	5.7×10^{-5}			202
			132.2	1.15×10^{-4}			202
		Chlorobenzene	108	1.93×10^{-5}			344
			128	1.93×10^{-4}			344
			150	1.93×10^{-3}			344
			T (K)	4.02×10^{15}	$\exp[-148.35/RT]$		344
		Decalin	125	2.8×10^{-5}			202
		Octane	125	3.0×10^{-5}			202
		Triethylamine	125	3.5×10^{-5}			202
		Vapor	132.2	7.2×10^{-5}	154.8–171.5	i(200–225)	63
			136.7	1.15×10^{-4}		i(200–225)	63
			142.2	2.16×10^{-4}		i(200–225)	63
			149.2	4.8×10^{-4}		i(100–200)	63
			136.7	1.34×10^{-4}		i(440–610)	63
			142.2	2.41×10^{-4}		i(440–610)	63
			149.7	5.61×10^{-4}		i(440–610)	63
	tert-Butyl 1,1-dimethylbutyl peroxide	Cumene	110	4.38×10^{-6}			363
			120	1.537×10^{-5}			363
			130	4.99×10^{-5}			363
			140	1.544×10^{-4}			363
	tert-Butyl 1,1,2-trimethylpropyl peroxide	Cumene	110	7.07×10^{-6}			363
			120	2.374×10^{-5}			363
			130	7.62×10^{-5}			363
			140	2.308×10^{-4}			363
	2-Methyl-2-*tert*-butyl-peroxyacetate	Chlorobenzene	150	4.12×10^{-4}			346
	Ethyl 2-*tert*-butylperoxymethyl-propenoate	Triisopropylbenzene	127.5	1.63×10^{-4}		c_2	353
			130	1.95×10^{-4}		c_2	353
			132.5	2.16×10^{-4}		c_2	353
			135	2.56×10^{-4}		c_2	353
			137.5	3.47×10^{-4}		c_2	353
			140	3.92×10^{-4}		c_2	353
			142.5	4.68×10^{-4}		c_2	353
			145	5.37×10^{-4}		c_2	353
			147.5	6.30×10^{-4}		c_2	353
			150	7.76×10^{-4}		c_2	353
11	Apocamphane-1- formyl peroxide	Benzene	80	2.3×10^{-4}			244
12	2,2-Bis(*tert*-butylperoxybutane)	Benzene	85	3.0×10^{-6}	151	a	337
			100	1.9×10^{-5}		a	337
			115	9.36×10^{-5}		a	337

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TABLE 3. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 (*cont'd*)	*tert*-Butyl 1,1,3,3-tetramethylbutyl peroxide	Cumene	110	1.085×10^{-5}			363
			120	3.73×10^{-5}			363
			130	1.141×10^{-4}			363
			140	3.40×10^{-4}			363
	1-Hydroxy-1-hydroperoxy-dicyclohexyl peroxide	Benzene	85	9.6×10^{-6}		a,c_2	337
			100	5.1×10^{-5}		a,c_2	337
			115	1.9×10^{-4}		a,c_2	337
			130	5.2×10^{-4}		a,c_2	337
	Di-(1-hydroxycyclohexyl)-peroxide	Chlorobenzene	105	$\sim 1.9 \times 10^{-5}$			344
			120	$\sim 1.9 \times 10^{-4}$			344
	Diisopropylaminomethyl-*tert*-amyl peroxide	Styrene	110	3.9×10^{-5}	132.4	t_{11}	303
			120	1.21×10^{-4}		t_{11}	303
			130	3.0×10^{-4}		t_{11}	303
	1-Phenylethyl *tert*-butyl peroxide	Chlorobenzene	129.2	3.09×10^{-5}			282
13	*tert*-Butylα-cumyl peroxide	*tert*-Butylbenzene	138	1.48×10^{-4}		a	80
			158	9.62×10^{-4}		a	80
		Chlorobenzene	115	1.93×10^{-5}			344
			136	1.93×10^{-4}			344
			159	1.93×10^{-3}			344
			T (K)	1.17×10^{15}	$\exp[-146.98/RT]$		344
		Cumene	138	1.44×10^{-4}		a	80
			158	8.88×10^{-4}		a	80
			125	3.04×10^{-5}			352
		Dodecane	128	4.44×10^{-5}	146.4	a	80
			138	1.39×10^{-4}		a	80
			148	3.21×10^{-4}		a	80
			158	8.88×10^{-4}		a	80
	tert-Butyl *p*-chlorocumyl peroxide	Cumene	125	2.42×10^{-5}			352
	tert-Butyl *p*-nitrocumyl peroxide	Cumene	125	2.20×10^{-5}			352
14	*tert*-Butyl 1,1-dimethyl-2-phenyl-ethyl peroxide	Cumene	110	4.35×10^{-6}			363
			120	1.458×10^{-5}			363
			130	4.70×10^{-5}			363
			140	1.463×10^{-4}			363
	1,1-Di-(*tert*-butylperoxy)-cyclohexane	Benzene	93	1.9×10^{-5}		a	338
	Ethyl-3,3-di-*tert*-butylperoxy)-butyrate	Benzene	111	1.9×10^{-5}		a	338
	1-[4-(Dimethylamino)phenyl]-ethyl *tert*-butyl peroxide	Chlorobenzene	100.4	1.82×10^{-6}	151.7		282
			110.8	6.97×10^{-6}			282
			120.9	2.18×10^{-5}			282
			129.2	6.18×10^{-5}			282
			129.2	5.22×10^{-5}		m_2	282
	tert-Butyl *p*-methoxycumyl peroxide	Cumene	125	3.72×10^{-5}			352
	tert-Butyl *p*-methylcumyl peroxide	Cumene	125	3.22×10^{-5}			352
	tert-Butyl *m*-methoxycumyl peroxide	Cumene	125	2.84×10^{-5}			352
	Bis(1,1,2,2-tetramethylpropyl) peroxide	Cumene	125	4.84×10^{-4}			352
15	2-[4-(Dimethylamino)phenyl]-propyl *tert*-butyl peroxide	Chlorobenzene	129.2	1.51×10^{-4}		m_2	282
16	1,1-Di-(*tert*-amylperoxy)-cyclohexane	Benzene	90	1.9×10^{-5}		a	338
	tert-Butyl 3-isopropenyl-cumyl peroxide	Chlorobenzene	104	1.93×10^{-5}			344
			126	1.93×10^{-4}			344
			152	1.93×10^{-3}			344
			T (K)	1.161×10^{13}	$\exp[-128.33/RT]$		344
	2,5-Dimethyl-2,5-di(*tert*-butyl-peroxy)-hexane	Benzene	115	1.15×10^{-5}	166.9	a	126,337
			130	6.86×10^{-5}		a	126,337
			145	4.75×10^{-4}		a	126,337
		Chlorobenzene	115	1.93×10^{-5}			344
			134	1.93×10^{-4}			344
			156	1.93×10^{-3}			344
			T (K)	1.68×10^{16}	$\exp[-155.49/RT]$		344
	2,5-Dimethyl-2,5-di(*tert*-butyl-peroxy)-3-hexyne	Benzene	115	3.91×10^{-6}	156.9	a	126,337
			130	2.35×10^{-5}		a	126,337
			145	1.14×10^{-4}		a	126,337
			160	6.17×10^{-4}		a	126,337

TABLE 3. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
16 (*cont'd*)	2,5-Dimethyl-2,5-di(*tert*-butyl-peroxy)-3-hexyne	Chlorobenzene	120	1.93×10^{-5}			344
			141	1.93×10^{-4}			344
			164	1.93×10^{-3}			344
			T (K)	1.90×10^{15}	exp[− 150.67/RT]		344
17	*n*-Butyl-4,4-bis(*tert*-butylperoxy)-valerate	Dodecane	100	5.83×10^{-6}		a	8
			115	3.53×10^{-5}		a	8
			130	2.91×10^{-4}		a	8
	1,1-Bis-(*tert*-butylperoxy)-3,3,5-trimethylcyclohexane	Benzene	85	6.9×10^{-6}	138	a	337
			100	5.05×10^{-5}		a	337
			115	2.71×10^{-4}		a	337
18	Cumyl peroxide	Benzene	115	2.05×10^{-5}	159	a	337
			130	1.05×10^{-4}		a	126,337
			145	6.86×10^{-4}		a	126,337
		tert-Butylbenzene	158	1.72×10^{-3}		a	80
		Chlorobenzene	112	1.93×10^{-5}			344
			132	1.93×10^{-4}			344
			154	1.93×10^{-3}			344
			T (K)	9.24×10^{15}	exp[− 152.67/RT]		344
		Cumene	T (K)	4.31×10^{14}	exp[− 144.3/RT]		67
			138	2.57×10^{-4}		a	80
			158	1.52×10^{-3}		a	80
		Dodecane	128	8.75×10^{-5}		a	80
			138	2.31×10^{-4}		a	80
			148	5.37×10^{-4}		a	80
			158	1.83×10^{-3}		a	80
		Diisopropylcarbinol	138	3.16×10^{-4}		a	80
		Neat	150	3.98×10^{-3}		a	371
			155	4.81×10^{-3}		a	371
			160	9.63×10^{-3}		a	371
			165	1.16×10^{-2}		a	371
	Bicyclo[2.2.2]octane-1-formyl peroxide	Carbon tetrachloride	30	1.71×10^{-4}			244
				1.73×10^{-3}		n	244
				1.68×10^{-4}		v_1	244
		Chlorobenzene	30	6.20×10^{-4}			244
		Cyclohexane	30	6.1×10^{-5}			244
		Isooctane	30	5.0×10^{-5}			244
		Toluene	30	3.66×10^{-4}			244
20	α,α′-Bis(*tert*-butylperoxy)-diisopropyl benzene	Benzene	115	1.9×10^{-5}	147	a	337
			125	4.91×10^{-5}		a	337
			130	9.61×10^{-5}		a	337
		Chlorobenzene	114	1.93×10^{-5}			344
			134	1.93×10^{-4}			344
			156	1.93×10^{-3}			344
			T (K)	7.65×10^{15}	exp[− 152.69 kJ/RT]		344
		Neat	155	3.61×10^{-3}		a	371
			160	4.44×10^{-3}		a	371
			165	4.62×10^{-3}		a	371
24	2,5-Dimethyl-2,5-di-(2-ethyl-hexanoylperoxy) hexane	Benzene	68	1.9×10^{-5}		a	338

TABLE 4. ACYL PEROXIDES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4	Acetyl peroxide	Acetic acid	55.2	2.8×10^{-6}	126.4	d,e	106,176
			64.9	9.9×10^{-6}		d,e	106,176
			75.2	3.75×10^{-5}		d,e	106,176
			85.2	1.30×10^{-4}		d,e	106,176
			73.2	2.62×10^{-5}		a	100

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4 (*cont'd*)	Acetyl peroxide	Benzene	35	9.5×10^{-7}			68
			55	3.14×10^{-6}			68
			65	1.27×10^{-5}			68
			50	1.1×10^{-6}	134	a	337
			70	2.39×10^{-5}		a	126,337
			85	1.73×10^{-4}		a	126,337
			70	2.38×10^{-5}		a	16
			60.3	5.0×10^{-6}			4
			80	8.7×10^{-5}			20
			55.2	2.6×10^{-6}	135.1	c,e	106,176
			64.9	1.07×10^{-5}		c,e	106,176
			75.2	4.65×10^{-5}		c,e	106,176
			85.2	1.62×10^{-4}		c,e	106,176
		n-Butanol	60.3	3.4×10^{-5}			4
		sec-Butanol	60.3	3×10^{-5}			4
		tert-Butanol	60.3	3.1×10^{-6}	133.9		4
			80.3	4.9×10^{-5}			4
		Carbon tetrachloride	26	1.08×10^{-7}			68
			46	4.84×10^{-7}			68
			65	2.11×10^{-6}			68
			80	5.5×10^{-5}			20
		Chloroform	80.3	~ 5			4
		Cyclohexane	55.2	2.1×10^{-6}	131.4	c,e	106,176
			64.9	8.3×10^{-6}		c,e	106,176
			75.2	3.60×10^{-5}		c,e	106,176
			85.2	1.27×10^{-4}		c,e	106,176
		Cyclohexene	60	4.5×10^{-6}	133.5		20
			70	1.77×10^{-5}			20
			80	7.0×10^{-5}			20
			90	2.28×10^{-4}			20
			100	7.61×10^{-4}			20
		Cyclopentene	70	1.60×10^{-5}	137.2		20
			80	7.0×10^{-5}			20
			90	2.55×10^{-4}			20
			100	7.25×10^{-4}			20
		Cumene	80	7.6×10^{-5}			20
		Decane	80	6.85×10^{-5}			168
		n-Dodecane	60	2.3×10^{-6}			70
			80	6.15×10^{-5}			168
		Ethanol	60.3	1.01×10^{-4}	129.7		4
			80.3	1.40×10^{-3}			4
		Heptane	80	7.72×10^{-5}			168
		Hexadecane	80	5.39×10^{-5}			168
		n-Hexane	60	3.4×10^{-6}			70
		1-Hexene	70	2.35×10^{-5}	132.6		20
			80	8.7×10^{-5}			20
			90	3.05×10^{-4}			20
			100	9.83×10^{-4}			20
		2-Methyl-1-pentene	80	9.0×10^{-5}	126.8		20
			90	3.12×10^{-4}			20
			100	9.81×10^{-4}			20
		n-Octadecane	60	1.9×10^{-6}			70
		n-Octane	60	2.9×10^{-6}			70
			80	7.34×10^{-5}			168
		Isooctane	60	2.9×10^{-6}			70
			55.2	2.35×10^{-6}	134.7	c,e	106,176
			64.9	9.4×10^{-6}		c,e	106,176
			75.2	4.03×10^{-5}		c,e	106,176
			85.2	1.49×10^{-4}		c,e	106,176
		1-Pentene	70	2.45×10^{-5}			20
			80	9.4×10^{-5}			20
			90	3.22×10^{-4}			20
		Propionic acid	64.9	1.4×10^{-5}			106,176
			85.2	1.66×10^{-4}		d,e	106,176

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4 (*cont'd*)	Acetyl peroxide	*n*-Tetradecane	60	2.0×10^{-6}			70
			80	5.90×10^{-5}			168
		Toluene	60.3	5×10^{-6}	129.7		4
			55.2	2.7×10^{-6}	133.9	c,e	106,176
			64.9	1.14×10^{-5}		c,e	106,176
			75.2	4.70×10^{-5}		c,e	106,176
			85.2	1.59×10^{-4}		c,e	106,176
			73.2	3.06×10^{-5}	138.1	a	100
			85.5	1.72×10^{-4}		a	100
			90	7.33×10^{-5}	129.7	a	113
		Vapor (toluene)	88.0	3.12×10^{-4}	123.4		105
			134.7	3.1×10^{-2}			105
			150.7	1.18×10^{-1}			105
			161.7	2.77×10^{-1}			105
			170.7	6.10×10^{-1}			105
			184.2	1.76			105
6	Propionyl peroxide	Acetic acid	65.0	3.8×10^{-5}	123.0	c,e	51
			85.0	4.3×10^{-4}		c,e	51
		Acetic anhydride	65.0	3.5×10^{-5}	128.9	d,e	51
			85.0	4.5×10^{-4}		c,e	51
		Benzene	65.0	1.88×10^{-5}	129.3	c,e	51
			85.0	2.40×10^{-4}		c,e	51
			50	2.72×10^{-6}	127.6	a	126,337
			70	4.30×10^{-5}		a	126,337
			85	2.89×10^{-4}		a	126,337
		Benzonitrile	65.0	3.9×10^{-5}	130.5	d,e	51
			85.0	5.1×10^{-4}		d,e	51
		Dioxane	65.0	4.5×10^{-5}	116.7	c,e	51
			85.0	4.5×10^{-4}		c,e	51
		n-Hexane	65.0	1.50×10^{-5}	123.8		51
			85.0	1.72×10^{-4}			51
		Isooctane	65.0	9.8×10^{-6}	130.5	c,e	51
			86.5	1.44×10^{-4}		c,e	51
		Nitrobenzene	65.0	3.7×10^{-5}	120.9	c,e	51
			85.0	4.1×10^{-4}			51
		Toluene	65.0	1.87×10^{-5}	130.1		51
			85.0	2.54×10^{-4}			51
		Vapor	65.0	1.0×10^{-5}	125.5		51
			85.0	1.6×10^{-4}			51
			99.4	8×10^{-4}	125.5		85
			134.4	2.6×10^{-2}			85
			152.2	1.22×10^{-1}			85
			176.4	8.0×10^{-1}			85
			190.9	2.33			85
			T (K)	2.5×10^{-4}	exp[− 125.5/*RT*]		85
	2-Iodopropionyl peroxide	Acetone	56	2.19×10^{-4}		s	77
		Benzene	62.5	$(2.40–2.81) \times 10^{-4}$		s	77
			62.5	7.12×10^{-4}		n,s	77
			62.5	$(2.36 \pm 0.07) \times 10^{-4}$	108.8	p	77
		n-Butyl vinyl ether	62.5	2.47×10^{-4}		s	77
		Cyclohexene	62.5	2.7×10^{-4}		s	77
		95% Ethanol	62.5	4.0×10^{-4}		s	77
	Perfluoropropionyl peroxide	Freon 113	20	2.19×10^{-5}	100.1	h	283
			30	8.50×10^{-5}			283
			40	3.26×10^{-4}			283
			T (K)	1.8×10^{9}	exp[− 83.8/*RT*]		304
		Isooctane	*T* (K)	1.5×10^{17}	exp[− 121.5/*RT*]		304
	2,2,3,3-Tetrafluoropropionyl peroxide	Freon 113	25	2.26×10^{-4}	86.3	h	283
			35	7.17×10^{-4}			283
8	*tert*-Butyl permaleic acid	Acetone	87	1.9×10^{-5}		a	338
	Butyryl peroxide	Acetic acid	65.0	4.7×10^{-5}	125.1	c,e	51
			85.0	5.6×10^{-4}		c,e	51
		Acetic anhydride	65.0	4.3×10^{-5}			51
			85.0	5.5×10^{-4}		c,e	51

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Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	Butyryl peroxide	Benzene	65.0	2.24×10^{-5}	131.4	d,e	51
			85.0	3.02×10^{-4}		c,e	51
		Benzonitrile	65.0	4.3×10^{-5}	131.4	d,e	51
			85.0	5.8×10^{-4}			51
		Dioxane	65.0	4.6×10^{-5}	116.3	c,e	51
			85.0	4.6×10^{-4}		c,e	51
		Hexane	65.0	1.14×10^{-5}	131.4	c,e	51
			85.0	1.53×10^{-4}		c,e	51
		Isooctane	65.0	1.11×10^{-5}	133.5	c,e	51
			85.0	1.56×10^{-4}		c,e	51
		Toluene	65.0	2.14×10^{-5}	130.5	d,e	51
			85.0	2.87×10^{-4}		c,e	51
		Vapor	65.0	1.6×10^{-5}	123.8		51
			85.0	2.0×10^{-4}			51
			96.7	8.6×10^{-4}	123.8		85
			127.4	1.5×10^{-2}			85
			158.9	3.0×10^{-1}			85
			178.9	1.27			85
			T (K)	1.9×10^{-4}	$\exp[-123.8/RT]$		85
	Isobutyryl peroxide	Acetonitrile	40	6.81×10^{-4}		m_3	167
		Benzene	20	1.6×10^{-5}	109	a	337
			30	6.75×10^{-5}		a	337
			40	2.59×10^{-4}		a	337
			40	2.38×10^{-4}		m_3	167
			40	2.40×10^{-4}			148,244
		Benzonitrile	40	4.2×10^{-4}			148
		tert-Butanol	40	2.51×10^{-4}			148
		Carbon tetrachloride	40	7.8×10^{-5}			148
			45	1.58×10^{-4}			148
			50	3.05×10^{-4}			148
			55	5.61×10^{-4}			148
			60	7.67×10^{-4}			148
		Chlorobenzene	40	1.73×10^{-4}			148
			23	1.93×10^{-5}			344
			39	1.93×10^{-4}			344
			57	1.93×10^{-3}			344
			T (K)	3.37×10^{14}	$\exp[-109.06/RT]$		344
		Chloroform	40	7.5×10^{-5}			148
		Cyclohexane	40	4.5×10^{-5}			148
			40	4.70×10^{-5}			167
		Fluorobenzene	40	1.23×10^{-4}			148
		Isooctane	25	3.35×10^{-6}	114.2		84
			35	1.54×10^{-5}			84
			45	6.14×10^{-5}			84
			55	2.26×10^{-4}			84
			T (K)	2.8×10^{14}	$\exp[-114.2/RT]$		84
			40	3.2×10^{-5}			148
		Isopropanol	40	3.05×10^{-4}			148
		Nitrobenzene	40	5.80×10^{-4}			148
		Nujol	40	4.63×10^{-5}			167
		Tetralin	40	1.75×10^{-4}			148
		Toluene	40	1.43×10^{-4}			148
		Vapor	40	$\sim 1 \times 10^{-5}$			167
		p-Xylene	40	1.40×10^{-4}			148
	Cyclopropane formyl peroxide	Carbon tetrachloride	64.5	4.4×10^{-6}			34
			70.4	9.3×10^{-6}			34
			77.8	2.31×10^{-5}			34
	Diacetyl succinoyl diperoxide	Styrene	60	5.2×10^{-6}	125.5		215
			73.5	2.3×10^{-5}			215
			85	9.3×10^{-5}			215
	Succinoyl peroxide	Acetone	70	2.80×10^{-5}	99.6	a	126,337
			85	1.21×10^{-4}		a	126,337
			100	4.36×10^{-4}		a	126,337

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
9	Acetyl benzoyl peroxide	Chlorobenzene	70	2×10^{-5}			155
			96	5.12×10^{-4}		z(25),v_{13}	284
			96	4.08×10^{-4}		z(19),v_{13}	284
10	5-Bromo-2-thenoyl peroxide	Carbon tetrachloride	75	1.53×10^{-5}		a,m_1	232
	4-Bromo-2-thenoyl peroxide	Carbon tetrachloride	75	1.14×10^{-5}		a,m_1	232
	5-Chloro-2-thenoyl peroxide	Carbon tetrachloride	75	1.58×10^{-5}		a,m_1	232
	α-Chloropropionyl m-chlorobenzoyl-peroxide	Acetonitrile	41	3.05×10^{-5}		m_3	167
		Cyclohexane	41	1.51×10^{-5}		m_3	167
	Cyclobutane formyl peroxide	Carbon tetrachloride	65	5.15×10^{-5}			34
			70	$8.95,6.63 \times 10^{-5}$			34
			75	1.41×10^{-4}			34
	Cyclopropane acetyl peroxide	Carbon tetrachloride	14	9.45×10^{-5}			34
			25	$9.75,10.57 \times 10^{-4}$			34
			44.5	5.01×10^{-5}	101.7		24
			56.5	2.64×10^{-4}			24
			44.5	$6.5\text{-}8.0 \times 10^{-4}$		n	24
	Diacetyladipoyl diperoxide	Styrene	60	6.6×10^{-6}			215
			73.5	4.73×10^{-5}			215
			85	1.84×10^{-4}			215
	Difuroyl peroxide	styrene	50	7.0×10^{-7}	125.7	h	287
			60	2.9×10^{-6}			287
			70	1.03×10^{-5}			287
	2,2,3,3,4,4,5,5-Octafluoropentanoyl peroxide	Freon 113	20	3.29×10^{-5}	100.6	h	283
			30	1.27×10^{-4}			283
			40	5.01×10^{-4}			283
	Perfluoro-2-(2-ethoxysulfinic acid) propionyl peroxide	Freon 113	T (K)	2.8×10^{14}	$\exp[-95.1/RT]$		304
	Pivaloyl peroxide	Carbon tetrachloride	10	1.9×10^{-4}			244
	2-Thenoyl peroxide	Carbon tetrachloride	75	2.21×10^{-5}		a,m_1	232
	3-Thenoyl peroxide	Carbon tetrachloride	75	2.14×10^{-5}		a,m_1	232
11	Benzoyl isobutyryl peroxide	Acetonitrile	41	4.06×10^{-4}			167
		Cyclohexane	41	1.63×10^{-5}			167
			70	3.05×10^{-4}			167
			40	1.45×10^{-5}	112.5	h,j	164
			50	5.398×10^{-5}		j	164
			60	1.924×10^{-4}		j	164
			70	6.872×10^{-4}		j	164
	m-Chlorobenzoyl isobutyryl peroxide	Acetonitrile	41	1.03×10^{-3}			167
		Cyclohexane	40	3.486×10^{-5}	111.3	h,j	164
			50	1.362×10^{-4}		j	164
			41	4.40×10^{-5}			167
	p-Chlorobenzoyl isobutyryl peroxide	Cyclohexane	50	1.029×10^{-4}		j	164
			55	1.651×10^{-4}			164
			60	3.21×10^{-4}			164
			65	5.638×10^{-4}			164
	p-Fluorobenzoyl isobutyryl peroxide	Cyclohexane	55	1.117×10^{-4}			164
			60	2.038×10^{-4}			164
			65	4.893×10^{-4}			164
			70	9.603×10^{-4}			164
	5-Methyl-bis-2-thenoyl peroxide	Carbon tetrachloride	75	2.92×10^{-5}		a	232
	p-Nitrobenzoyl isobutyryl peroxide	Cyclohexane	40	8.1×10^{-5}			164
			45	1.336×10^{-4}			164
			50	2.889×10^{-4}			164
			55	4.725×10^{-4}			164
			60	8.921×10^{-4}			164
12	β-Allyloxypropionyl peroxide	Toluene	70	2.01×10^{-5}		a	191
			80	8.62×10^{-5}		a	191
			90	2.53×10^{-4}		a	191
		p-Xylene	70	2.32×10^{-5}		a	191
			80	8.88×10^{-5}		a	191
			90	2.95×10^{-4}		a	191
	m-Chlorobenzoyl 2-methyl-butanoyl peroxide	Acetic acid	40	1.60×10^{-3}			256
		Acetonitrile	40	1.72×10^{-3}			256

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Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 *(cont'd)*	*m*-Chlorobenzoyl 2-methyl-butanoyl peroxide	2-Butanol	40	9.0×10^{-4}			256
		Carbon tetrachloride	40	1.32×10^{-4}			256
		Cyclohexane	40	6.0×10^{-5}			256
	Cyclobutane acetyl peroxide	Carbon tetrachloride	65	1.37×10^{-5}			34
			70	$2.13, 3.08 \times 10^{-5}$			34
			75	3.83×10^{-5}			34
	Cyclopentane formyl peroxide	Carbon tetrachloride	40	1.50×10^{-5}			34
			45	2.55×10^{-5}			34
			50	4.96×10^{-5}			34
			55	$8.17, 7.85 \times 10^{-5}$			34
	Hexanoyl peroxide	Toluene	77	1.186×10^{-4}			209
	5-Hexenoyl peroxide	Toluene	60.1	1.06×10^{-5}	129.3	c	209
			70.4	4.15×10^{-5}		c	209
			76.4	8.59×10^{-5}		c	209
			85.0	2.668×10^{-4}		c	209
	4-Methoxybenzoyl isobutyryl-peroxide	Cyclohexane	55	5.465×10^{-5}			164
			60	1.024×10^{-4}			164
			65	1.876×10^{-4}			164
			70	3.208×10^{-4}			164
	4-Methylbenzoyl isobutyryl-peroxide	Cyclohexane	40	9.61×10^{-6}		j	164
			50	3.619×10^{-5}		j	164
			60	1.305×10^{-4}		j	164
			70	4.772×10^{-4}		j	164
	4-Methyl-2-thenoyl peroxide	Carbon tetrachloride	75	2.92×10^{-5}		a,m_1	232
	5-Methyl-2-thenoyl peroxide	Carbon tetrachloride	75	4.21×10^{-5}		a,m_1	232
	Perfluoro-2-furnanacetyl peroxide	Freon 113	T (K)	1.2×10^{11}	$\exp[-77.1/RT]$		304
	Perfluoro-2-propoxypropionyl-peroxide	Freon 113	T (K)	4.4×10^{14}	$\exp[-98.5/RT]$		304
		perF–ether mix.	T (K)	8.9×10^{16}	$\exp[-110.2/RT]$		304
	Perfluoro-2-*n*-propoxypropionyl-peroxide	Freon 113	20	4.81×10^{-5}	100.1	h	283
			30	1.96×10^{-4}			283
			40	7.16×10^{-4}			283
	Perfluoro-2-iso-propoxypropionyl-peroxide	Freon 113	20	8.32×10^{-5}	102.7	h	283
			30	3.43×10^{-4}			283
			40	1.34×10^{-3}			283
14	2-Azidobenzoyl peroxide	Benzene	50	2.5×10^{-5}		d_2	161
			80	9.4×10^{-4}		d_2	161
	Benzoyl peroxide	Acetic acid	75	7.53×10^{-5}		a,r	74
		Acetone	50	2.25×10^{-6}	111.3	a	126
			70	2.63×10^{-5}		a	126
			85	1.34×10^{-4}		a	126
			100	5.83×10^{-4}		a	126
		Acetonitrile	70	1.76×10^{-5}		t_1	124
		Acetophenone	70	1.15×10^{-5}	126.4	a	5
			80	4.32×10^{-5}		a	5
			94.5	2.30×10^{-4}		a	5
		Allyl alcohol	80	3.80×10^{-4}		a,r	74
		Anisole	30	1.42×10^{-7}		a	109
		Benzaldehyde	80	5.50×10^{-5}		a,r	74
			90	1.71×10^{-4}		a,r	74
		Benzene	25	6.4×10^{-5}		p_2	279
			30	4.80×10^{-8}	116.3	a	109
			55	1.14×10^{-6}		a,r	74
			60	2.76×10^{-6}		a,r	74
			60	2.0×10^{-6}	124.3	m_2	14
			80	2.5×10^{-5}		m_2	14
			70	1.38×10^{-5}		a	213
			78	2.30×10^{-5}		c	230
			78	1.67×10^{-5}		t_9	230
			79.8	3.48×10^{-5}			170
			80	4.8×10^{-5}			20
			66	7.72×10^{-6}	129.7	a	131
			72.5	1.87×10^{-5}		a	131
			78	3.77×10^{-5}		a	131
			70	1.17×10^{-5}	133.9	a	73

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	Benzoyl peroxide	Benzene	75	2.62×10^{-5}		a	73
			80	4.39×10^{-5}		a	73
			80	3.27×10^{-5}		a,b_2	347
			50.8	4.28×10^{-7}	123.8	a,t_2	69
			54.9	8.53×10^{-7}		a,t_2	69
			60.9	1.66×10^{-6}		a,t_2	69
			65.6	3.22×10^{-6}		a,t_2	69
			71.0	5.94×10^{-6}		a,t_2	69
			75.8	1.19×10^{-5}		a,t_2	69
			70	1.27×10^{-5}	130	a	337
			85	8.94×10^{-5}		a	126,337
			100	4.96×10^{-4}		a	126,337
			70	1.03×10^{-5}		a,m_2	16
			70	1.18×10^{-5}		t_1	124
			75	1.48×10^{-5}	128.0		12
			75	1.66×10^{-5}	124.3	m_3	12
			85	4.7×10^{-5}			12
			85	5.5×10^{-5}		m_3	12
			100	2.28×10^{-4}			12
			100	2.56×10^{-4}		m_3	12
			79	2.58×10^{-5}		a,t_6	120
			80	3.35×10^{-5}		a	7
		Benzyl alcohol	80	4.44×10^{-4}		a,r	74
		Bromobenzene	80.2	8.15×10^{-5}			231
				2.19×10^{-5}		t_9	231
				3.84×10^{-5}	m_1		231
				3.55×10^{-5}	m_3		231
				4.34×10^{-5}	m_5		231
		Butanol	80	6.06×10^{-4}		a,r	74
		Butanone	80	4.64×10^{-5}		a,r	74
		Di-*n*-butyl phthalate	117	2.78×10^{-3}	120.1	y_{16}	236
			127	7.44×10^{-3}			236
			137	1.72×10^{-2}			236
			147	3.89×10^{-2}			236
		Carbon tetrachloride	75	1.07×10^{-5}		a,r	74
			79	1.69×10^{-5}		t_6,a	121
		Chlorobenzene	70	1.35×10^{-5}		t_1	124
			80	4.64×10^{-5}		a,r	74
			80.2	2.85×10^{-5}			231
			80.2	2.36×10^{-5}		t_9	231
			80.2	3.52×10^{-5}		c,m_1	231
			80.2	2.62×10^{-5}		c,m_3	231
			71	1.93×10^{-5}			344
			91	1.93×10^{-4}			344
			113	1.93×10^{-3}			344
			T (K)	6.94×10^{13}	$\exp[-122.35/RT]$		344
		Chloroform	30	5.47×10^{-8}		a	109
		Cumene	80	3.69×10^{-5}		a,r	74
			85	6.39×10^{-5}		a,r	74
			90	1.19×10^{-4}		a,r	74
			30	7.30×10^{-8}		a	109
			45	1.85×10^{7}	120.5		67
			60	1.45×10^{-6}			67
			80	1.70×10^{-5}			67
			T (K)	1.20×10^{13}	$\exp[-120.5/RT]$		67
			100	2.5×10^{-4}		a,t_7	122
		Cyclohexane	80	7.72×10^{-5}		a,r	74
		Decane	80	2.53×10^{-5}			270
		Decalin	80	2.26×10^{-4}		a,r	74
		Dioxane	70	1.30×10^{-5}		t_1	74
			80	6.72×10^{-4}		a,r	74
			80	4.20×10^{-4}		a,r	6
			80	4.18×10^{-5}		a,m_1	232

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	Benzoyl peroxide	Ethanol	25	3.02×10^{-8}		a	351
			40	2.77×10^{-7}		a	351
			50	4.72×10^{-7}		a	351
		Ethylbenzene	30	3.61×10^{-8}		a	109
			75	1.81×10^{-5}		a,r	74
			80	3.33×10^{-5}		a,r	74
			85	5.56×10^{-5}		a,r	74
			90	1.01×10^{-4}		a,r	74
			80	3.15×10^{-5}		c	239
		90% Formic acid	80	6.94×10^{-4}		a,r	74
		n-Heptane	80	3.11×10^{-5}		a,r	74
			80	2.71×10^{-5}			270
			130	5.73×10^{-3}		z (1500)	377
			135	1.02×10^{-2}		z (1500)	377
			140	1.54×10^{-2}		z (1500)	377
			145	2.25×10^{-2}		z (500)	377
			145	2.22×10^{-2}		z (1000)	377
			145	2.21×10^{-2}		z (1500)	377
			145	2.12×10^{-2}		z (2000)	377
			150	3.47×10^{-2}		z (1500)	377
			155	5.21×10^{-2}		z (1500)	377
			160	7.87×10^{-2}		z (1500)	377
		Hexadecane	80	2.51×10^{-5}			270
		Hexane	80	2.85×10^{-5}			270
		Isooctane	80	2.79×10^{-5}			270
			80	2.70×10^{-5}		m_2	308
		Isopropylbenzene	80	3.34×10^{-5}		c	229
		Methyl acetate	49.2	6.28×10^{-7}	123.8	a,t_2	69
			53.9	1.0×10^{-6}		a,t_2	69
		Methylcyclohexane	80	5.25×10^{-5}		a,r	74
		4-Methyl-2pentanone	80	4.28×10^{-5}		a,r	74
		α-Methylstyrene	70	3.02×10^{-5}		a	213
		Mineral oil	80	2.89×10^{-5}		m_2	308
		Neat	105	7.22×10^{-3}		a	371
		Nitrobenzene	80	4.58×10^{-5}		a,r	74
			30	6.61×10^{-8}	117.6	a	109
		PEG 400	25	5.01×10^{-7}		a	351
			40	5.73×10^{-6}		a	351
			50	1.15×10^{-5}		a	351
			70	1.15×10^{-4}		a	351
		90% aq. PEG 400	25	3.65×10^{-7}		a	351
			40	5.35×10^{-6}		a	351
			50	1.15×10^{-5}		a	351
			70	1.15×10^{-4}		a	351
		80% aq. PEG 400	25	2.77×10^{-7}		a	351
			40	3.09×10^{-6}		a	351
			50	7.29×10^{-6}		a	351
			70	1.15×10^{-4}		a	352
		70% aq. PEG 400	25	1.71×10^{-7}		a	351
			40	2.11×10^{-6}		a	351
			50	5.01×10^{-6}		a	351
			70	1.15×10^{-4}		a	351
		n-Pentanol	80	1.48×10^{-4}		a,r	74
		Phenol	80	6.25×10^{-4}		a,r	74
		Propionic acid	80	3.19×10^{-5}		a,r	74
		Propylene glycol	25	3.25×10^{-8}		a	351
			40	1.51×10^{-7}		a	351
			50	3.16×10^{-7}		a	351
		Styrene	34.8	3.89×10^{-8}		a	10
			49.4	5.28×10^{-7}		a	10
			61.0	2.58×10^{-6}		a	10
			74.8	1.83×10^{-5}		a	10
			100.0	4.58×10^{-4}		a	10

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	Benzoyl peroxide	Poly(styrene)	56.4	3.8×10^{-7}		a	17
			64.6	1.47×10^{-6}		a	17
			76.7	9.27×10^{-6}		a	17
			83.4	2.50×10^{-5}		a	17
			98.5	1.41×10^{-4}		a	17
			70.9	2.86×10^{-6}		a	15
			80.1	1.11×10^{-5}		a	15
			89.5	3.33×10^{-5}		a	15
		Tetradecane	80	2.64×10^{-5}			270
		Tetralin	80	3.72×10^{-5}		a,r	74
		Toluene	30	4.94×10^{-8}	120.5	a	109
			49.0	6.0×10^{-7}	123.8	a,t_2	69
			55.1	1.31×10^{-6}		a,t_2	69
			60.2	2.83×10^{-6}		a,t_2	69
			65.1	5.69×10^{-6}		a,t_2	69
			70.3	1.10×10^{-5}		a,t_2	69
			60.00	2.24×10^{-6}		e,m_3	291
		Poly(vinylchloride)	64.6	6.3×10^{-7}		a	17
			76.7	5.11×10^{-6}		a	17
			83.4	1.44×10^{-5}		a	17
			98.5	9.33×10^{-5}		a	17
		Styrene	50	7×10^{-7}	125.7		287
			60	7.7×10^{-6}			287
			70	9.9×10^{-6}			287
		p-Xylene	80	3.10×10^{-5}		c	229
	3-Bromobenzoyl peroxide	Benzene	60	1.1×10^{-6}			116
			80	1.22×10^{-5}			116
			80	2.60×10^{-5}		a	7
		Dioxane	80	2.57×10^{-5}		a,m_1	6,232
	4-Bromobenzoyl peroxide	Dioxane	80	3.23×10^{-5}		a,m_1	6,232
	4-*tert*-Butylbenzoyl peroxide	Dioxane	80	6.06×10^{-5}		a,m	232
	2-Chlorobenzoyl peroxide	Acetophenone	80	3.88×10^{-4}	123.0	a	5
		Benzene	80	3.12×10^{-4}		a	7
	3-Chlorobenzoyl peroxide	Acetophenone	80	2.85×10^{-5}	128.4	a	5
		Dioxane	80	2.63×10^{-5}		a,m_1	6
	4-Chlorobenzoyl peroxide	Acetophenone	80	3.83×10^{-5}	127.2	a	5
		Benzene	80	2.17×10^{-5}		a	7
			50	6.2×10^{-7}	128.9	a	126
			85	6.64×10^{-5}		a	126
			100	3.86×10^{-4}		a	126
		Dioxane	80	3.62×10^{-5}		a,m_1	6
		Styrene	34.8	8.3×10^{-8}		a	10
			49.4	8.3×10^{-7}		a	10
			61.0	3.33×10^{-6}		a	10
			74.8	2.22×10^{-5}		a	10
			100.0	4.17×10^{-4}		a	10
	Cyclohexane formyl peroxide	Benzene	30	9.64×10^{-5}	84.5	a,h	219
			35	1.46×10^{-4}			219
			40	3.10×10^{-4}			219
			45	5.11×10^{-4}			219
			50	7.77×10^{-4}			219
		Carbon tetrachloride	35	6.6×10^{-5}			148
			45	2.11×10^{-4}			148
			50	4.45×10^{-4}			148
			60	1.30×10^{-3}			148
			35	2.87×10^{-5}			34
			40	$5.22,5.29 \times 10^{-5}$			34
			45	9.67×10^{-5}			34
	Cyclopentane acetyl peroxide	Carbon tetrachloride	65	1.48×10^{-5}			34
			70	3.20×10^{-5}			34
			75	4.97×10^{-5}			34
	Diacetylsebacoyl diperoxide	Carbon tetrachloride	60	1.04×10^{-5}		x_1	215
			73.5	5.20×10^{-5}		x_1	215
			85	2.30×10^{-4}		x_1	215

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	2,4-Dichlorobenzoyl peroxide	Benzene	70	9.70×10^{-5}		a,j	16
			70	1.24×10^{-4}		a,k	16
			50	1.08×10^{-5}	117.6	a	126,337
			70	1.37×10^{-4}		a	126,337
			85	7.69×10^{-4}		a	126,337
		Styrene	34.8	3.88×10^{-6}		a	10
			49.4	2.39×10^{-5}		a	10
			61.0	7.78×10^{-5}		a	10
			74.8	2.78×10^{-4}		a	10
			100.0	4.17×10^{-3}		a	10
	2,2,3,3,4,4,5,5,6,6,7,7-Dodeca-fluoroheptanoyl peroxide	Freon 113	30	1.14×10^{-4}	100.6	h	283
			40	4.06×10^{-4}			283
	Heptanoyl peroxide	Toluene	77	1.24×10^{-4}		a	19
	6-Heptenoyl peroxide	Toluene	70	5.33×10^{-5}		a,k	19
			70	5.01×10^{-5}		a,j	19
			77	1.07×10^{-4}		a,j	19
			85	2.88×10^{-4}		a,k	19
	2-Iodobenzoyl peroxide	Chloroform	22	1.86×10^{-3}			82
	2-Iodobenzoyl 4-nitrobenzoyl peroxide	Acetone	25	3.0×10^{-4}			78
		Acetonitrile	25	2.1×10^{-4}			78
		Benzene	25	5.7×10^{-5}			78
		Carbon tetrachloride	25	3.4×10^{-5}			78
		Chloroform	25	2.8×10^{-4}			78
		Nitrobenzene	25	6.2×10^{-4}			78
	3-Methylbenzoyl peroxide	Dioxane	80	4.38×10^{-5}		a,m_1	232
	4-Methylbenzoyl peroxide	Dioxane	80	6.11×10^{-5}		a,m_1	232
	2-Nitrobenzoyl peroxide	Acetophenone	59.3	5.80×10^{-5}	119.7	a	5
			80	1.34×10^{-3}		a	5
		Methyl iodide	24.95	1.78×10^{-5}	81.2	h	82
			45.05	1.50×10^{-4}			82
	3-Nitrobenzoyl peroxide	Acetophenone	80	3.80×10^{-5}	126.4	a	5
	4-Nitrobenzoyl peroxide	Acetophenone	80	4.33×10^{-5}	126.8	a	5
	3,5-Dinitrobenzoyl peroxide	Acetophenone	80	1.87×10^{-5}	130.5	a	5
	Perfluoroheptanoyl peroxide	Freon 113	20	3.01×10^{-5}	98.0		283
			30	1.11×10^{-4}			283
			40	4.20×10^{-4}			283
15	Benzoyl phenylacetyl peroxide	Benzene	20	1.10×10^{-4}	90.8		222
			25	2.05×10^{-4}			222
			25	3.15×10^{-4}		v_1	222
			25	6.38×10^{-4}		n	222
			30	3.88×10^{-4}			222
			35	6.67×10^{-4}			222
	4-*tert*-Butylbenzoyl isobutyryl peroxide	Cyclohexane	55	6.543×10^{-5}		t_{10}	164
			60	1.171×10^{-4}		t_{10}	164
			65	2.663×10^{-4}		t_{10}	164
			70	5.016×10^{-4}		t_{10}	164
	3-Cyanobenzoyl benzoyl peroxide	Dioxane	80	2.73×10^{-2}		a,m_1	6
	3-Methoxybenzoyl benzoyl peroxide	Dioxane	80	4.82×10^{-2}		a,m_1	6
	4-Methoxybenzoyl benzoyl peroxide	Dioxane	80	7.57×10^{-5}		a,m_1	6
	4-Methoxybenzoyl 3-bromobenzoyl peroxide	Dioxane	80	4.43×10^{-2}		a,m_1	6
	4-Methoxybenzoyl-3,5-dinitro-benzoyl peroxide	Benzene	51	1.02×10^{-5}			108
		Nitrobenzene	51	9.61×10^{-4}			108
			51	1.67×10^{-3}		t_5	108
	4-Methoxybenzoyl 4-nitrobenzoyl peroxide	Benzene	70	2.08×10^{-5}		a	89
			70	8.03×10^{-5}		a	89
16	3,5-Dibromo-4-methoxybenzoyl peroxide	Benzene	60	9.5×10^{-7}			95
			60	6.1×10^{-7}			116
			80	9.4×10^{-6}			116
	Caprylyl peroxide	Benzene	50	3.44×10^{-6}	128.9	a	126
			70	5.78×10^{-5}		a	126
			85	3.78×10^{-4}		a	126

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
16 (*cont'd*)	Caprylyl peroxide	Mineral oil	T (K)	9.8×10^{15}	exp[− 140.1/RT]		1
	p-(Chloromethyl)benzoyl peroxide	Acetone	70	2.07×10^{-5}			307
			70	1.82×10^{-5}		m_7	307
		THF	70	1.15×10^{-5}			307
		Toluene	70	8.8×10^{-6}			307
	3-Cyanobenzoyl peroxide	Dioxane	80	1.70×10^{-2}		a,m_1	6
	4-Cyanobenzoyl peroxide	Acetophenone	80	2.43×10^{-5}		a	5
		Dioxane	80	2.03×10^{-5}		a,m_1	6
	Cycloheptane formyl peroxide	Carbon tetrachloride	35	7.85×10^{-5}			34
			40	$1.63,1.34 \times 10^{-5}$			34
			45	2.02×10^{-4}			34
	Cyclohexane acetyl peroxide	Carbon tetrachloride	65	1.27×10^{-5}			34
			70	2.76×10^{-5}			34
			75	3.61×10^{-5}			34
			54.4	3.1×10^{-6}			24
			64.3	1.19×10^{-5}			24
			71.8	2.95×10^{-5}			24
	2-Ethyl-4-methyl-2-pentenoyl peroxide	Mineral oil	T (K)	7.1×10^{16}	exp[− 138.4/RT]		1
	2-Ethylhexanoyl peroxide	Mineral oil	T (K)	1.2×10^{14}	exp[− 106.4/RT]		1
	2-Ethyl-2-hexenoyl peroxide	Mineral oil	T (K)	1.6×10^{16}	exp[− 136.3/RT]		1
	2-Iodophenylacetyl peroxide	Acetone	0	2.60×10^{-5}			79
		Chloroform	0	3.98×10^{-5}		c,e,q	79
		Toluene	0	1.3×10^{-5}		q	79
	2-Methoxybenzoyl peroxide	Acetophenone	50	6.0×10^{-5}	113.8	a	5
			80	2.15×10^{-3}		a	5
	3-Methoxybenzoyl peroxide	Acetophenone	80	6.42×10^{-5}	120.9	a	5
		Dioxane	80	5.75×10^{-5}		a,m_1	6
	4-Methoxybenzoyl peroxide	Acetophenone	80	1.56×10^{-4}	120.1	a	5
		Dioxane	80	1.18×10^{-4}		a,m_1	6
	2-Methylbenzoyl peroxide	Acetophenone	70	9.02×10^{-5}	126.4	a	5
	3-Methylbenzoyl peroxide	Acetophenone	80	4.70×10^{-5}	126.4	a	5
		Dioxane	80	4.40×10^{-5}		a,m_1	6
	4-Methylbenzoyl peroxide	Acetophenone	80	5.92×10^{-5}	125.1	a	5
		Dioxane	80	6.13×10^{-5}		a,m_1	6
	Endo-norbornane-2-carbonyl-peroxide	Carbon tetrachloride	44.5	6.1×10^{-6}		j	23
			53.9	2.83×10^{-5}		j	23
			65.9	1.25×10^{-4}		j	23
			44.5	9.1×10^{-6}		j,m_2	23
			53.9	4.33×10^{-5}		j, m_2	23
			65.9	1.28×10^{-4}		j,m_2	23
	Exo-norbornane-2-carbonyl-peroxide	Carbon tetrachloride	44.5	4.68×10^{-5}		j	23
			53.9	2.05×10^{-4}		j	23
			65.9	8.18×10^{-4}		j	23
			44.5	7.2×10^{-5}		j, m_2	23
			53.9	1.60×10^{-4}		j,m_2	23
			65.9	8.48×10^{-4}		j, m_2	23
	Endo-norbornene-5-carbonyl-peroxide	Carbon tetrachloride	44.5	6.30×10^{-5}		j	23
			53.9	1.21×10^{-4}		j	23
			65.9	7.18×10^{-4}		j	23
			445	2.22×10^{-5}		j,m_2	23
			53.9	4.52×10^{-5}		j,m_2	23
			65.9	2.37×10^{-4}		j,m_2	23
	Exo-norbornene-5-carbonyl-peroxide	Carbon tetrachloride	44.5	6.58×10^{-5}		j	23
			53.9	1.21×10^{-4}		j	23
			65.9	8.42×10^{-4}		j	23
			44.5	2.58×10^{-5}		j,m_2	23
			53.9	1.20×10^{-4}		j,m_2	23
			65.9	7.10×10^{-4}		j,m_2	23
	Dioctanoyl peroxide	*n*-Heptane	70	1.70×10^{-5}		z (1500)	377
			80	7.01×10^{-5}		z (500)	377
			80	6.80×10^{-5}		z (1000)	377

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
16 (*cont'd*)	Dioctanoyl peroxide	*n*-Heptane	80	6.27×10^{-5}		z (1500)	377
			80	6.01×10^{-5}		z (2000)	377
			80	5.77×10^{-5}		z (2500)	377
			90	2.13×10^{-4}		z (1500)	377
			95	3.80×10^{-4}		z (1500)	377
			100	6.79×10^{-4}		z (1500)	377
	Dioctanoyl peroxydicarbonate	Chlorobenzene	63	1.93×10^{-5}			344
			80	1.93×10^{-4}			344
			100	1.93×10^{-3}			344
			T (K)	2.30×10^{15}	exp[− 129.05/RT]		344
	Phenylacetyl peroxide	Acetonitrile	20	1.02×10^{-3}			167
		Benzene	20	4.76×10^{-4}			167
		Carbon tetrachloride	20	1.86×10^{-4}			167
		Cyclohexane	20	1.60×10^{-4}			167
		Styrene	0	7.8×10^{-5}			316
		Toluene	0	2.50×10^{-5}	96.2	f,u_1	59
			18	3.34×10^{-4}		f,u_1	59
	Triptoyl peroxide	Benzene	80	1.42×10^{-4}			102
			80	1.4×10^{-4}			244
18	Apocamphoyl peroxide	Benzene	80	2.3×10^{-4}			102
	cis-5-*tert*-Butylcyclohexylformyl-*m*-chlorobenzoyl peroxide	Acetonitrile	40	5.9×10^{-3}			256
		2-Butanol	40	4.4×10^{-3}			256
		Carbon tetrachloride	40	6.7×10^{-4}			256
		Cyclohexane	40	4.4×10^{-4}			256
	trans-4-*tert*-Butylcyclohexylformyl-*m*-chlorobenzoyl peroxide	Acetonitrile	40	4.2×10^{-3}			256
		2-Butanol	40	2.8×10^{-3}			256
		Carbon tetrachloride	40	6.5×10^{-4}			256
		Cyclohexane	40	3.9×10^{-4}			256
	5-*tert*-Butylthenoyl peroxide	Carbon tetrachloride	75	4.03×10^{-5}		a,m_1	232
	Cinnamoyl peroxide	Styrene	50	1.20×10^{-5}			316
			70	1.67×10^{-4}			316
	Dibenzoyl succinoyl diperoxide	Unknown	70	7.7×10^{-6}	125.5	x_1	214
			75	1.42×10^{-5}		x_1	214
			85	5.4×10^{-5}		x_1	214
	Nonanoyl peroxide	Mineral oil	T (K)	8.4×10^{14}	exp[− 127.1/RT]		1
	Isononanoyl peroxide (3,5,5-trimethylhexanoyl peroxide)	Benzene	50	6.1×10^{-6}	126	a	337
			70	8.02×10^{-5}		a	337
			85	5.30×10^{-4}		a	337
			60	1.9×10^{-5}		a	338
		Chlorobenzene	59	1.93×10^{-5}			344
			77	1.93×10^{-4}			344
			96	1.93×10^{-3}			344
			T (K)	2.84×10^{15}	exp[− 128.34/RT]		344
		n-Heptane	60	5.28×10^{-6}		z (1500)	377
			70	2.06×10^{-5}		z (1500)	377
			80	9.53×10^{-5}		z (1)	377
			80	9.10×10^{-5}		z (500)	377
			80	8.62×10^{-5}		z (1000)	377
			80	8.24×10^{-5}		z (1500)	377
			80	7.86×10^{-5}		z (2000)	377
			80	7.46×10^{-5}		z (2500)	377
			90	2.52×10^{-4}		z (1500)	377
			100	8.81×10^{-4}		z (1500)	377
			120	6.98×10^{-3}		z (1500)	377
			125	1.27×10^{-2}		z (1500)	377
			130	2.15×10^{-2}		z (1500)	377
			135	2.60×10^{-2}		z (1500)	377
			140	5.71×10^{-2}		z (1500)	377
			145	8.62×10^{-2}		z (1500)	377
			150	1.17×10^{-1}		z (1500)	377
	2-Nonenoyl peroxide	Mineral oil	T (K)	1.6×10^{15}	exp[− 128.8/RT]		1

Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
18 (*cont'd*)	3-Nonenoyl peroxide	Mineral oil	T (K)	3.7×10^{14}	exp[− 108.0/*RT*]		1
	2-Phenylpropionyl peroxide	Cyclohexane	55.8	6.8×10^{-6}			258
		On silica	49.4	7.5×10^{-5}			258
		Styrene	70	5.5×10^{-5}			316
19	Dibenzoyl itaconyl diperoxide	Unknown	70	5.63×10^{-4}	83.7	x_2	214
				1.87×10^{-5}	115.1	x_2	214
			75	8.63×10^{-4}		x_2	214
				3.62×10^{-5}		x_2	214
			85	1.69×10^{-3}		x_2	214
				1.00×10^{-4}		x_2	214
	Dibenzoyl α-methylsuccinoyl-diperoxide	Unknown	70	2.74×10^{-4}	82.8	x_2	214
				1.26×10^{-5}	116.3	x_2	214
			75	4.26×10^{-4}		x_2	214
				2.40×10^{-5}		x_2	214
			85	9.60×10^{-4}		x_2	214
				8.7×10^{-5}		x_2	214
20	Decanoyl peroxide	Benzene	60	1.53×10^{-5}	127.2	a	126,337
			70	5.67×10^{-5}		a	126,337
			85	3.80×10^{-4}		a	126,337
		Chlorobenzene	63	1.93×10^{-5}			344
			80	1.93×10^{-4}			344
			100	1.93×10^{-3}			344
			T (K)	3.64×10^{15}	exp[− 130.48/*RT*]		344
		Mineral oil	T (K)	2.7×10^{15}	exp[− 131.9/*RT*]		1
	Dioctanoyl α-bromosuccinoyl-diperoxide	Unknown	70	1.52×10^{-4}	96.2	x_2	214
				1.82×10^{-5}	126.4	x_2	214
			75	2.74×10^{-4}		x_2	214
				3.83×10^{-5}		x_2	214
			85	6.97×10^{-4}		x_2	214
				1.15×10^{-4}		x_2	214
	Dioctanoyl α-chlorosuccinoyl-diperoxide	Unknown	70	2.02×10^{-4}	95.4	x_2	214
				2.42×10^{-5}	126.4	x_2	214
			75	3.23×10^{-4}		x_2	214
				4.83×10^{-5}		x_2	214
			85	8.50×10^{-4}		x_2	214
	Dioctanoyl α-chlorosuccinoyl-diperoxide	Unknown	85	1.58×10^{-4}		x_2	214
	4-Ethyl-2-octenoyl peroxide	Mineral oil	T (K)	8.2×10^{14}	exp[− 127.4/*RT*]		1
21	Dioctanoyl itaconoyl diperoxide	Unknown	70	3.23×10^{-4}	92.9	x_2	214
				2.80×10^{-5}	127.6	x_2	214
			75	5.47×10^{-4}		x_2	214
				5.60×10^{-5}		x_2	214
			85	1.28×10^{-3}		x_2	214
				1.92×10^{-4}		x_2	214
	Dioctanoyl α-methyl succinoyl-diperoxide	Unknown	70	5.48×10^{-4}	96.2	x_2	214
				5.88×10^{-5}	131.0	x_2	214
			75	9.58×10^{-4}		x_2	214
				1.06×10^{-4}		x_2	214
			85	2.61×10^{-3}		x_2	214
				3.84×10^{-4}		x_2	214
22	Benzoyl 2-[*trans*-2-(3-nitrophenyl)-vinyl]benzoyl peroxide	Chlorobenzene	70	1.87×10^{-4}		t_9	175
	Benzoyl 2-[*trans*-2-(4-nitrophenyl)-vinyl]benzoyl peroxide	Chlorobenzene	70	1.18×10^{-4}		t_9	175
		THF	70	6.2×10^{-5}		t_9	175
	Benzoyl 2-[*trans*-2-(4-nitrophenyl)-vinyl]-4-nitrobenzoyl peroxide	Chlorobenzene	70	1.54×10^{-5}		t_9	175
	Benzoyl 2-[*trans*-2-(phenyl)vinyl]-benzoyl peroxide	Chlorobenzene	35	9.42×10^{-5}	84.5	h,t_9	175
			70	3.02×10^{-3}		t_9	175
		Methanol	35	9.77×10^{-4}		t_9	175
	4-Benzylidenebutyryl peroxide	Acetophenone	50	7.92×10^{-5}	99.6		133
			55	1.45×10^{-4}			133
			65	4.13×10^{-4}			133
			T (K)	1.07×10^{12}	exp[− 99.6/*RT*]		133
			55	1.38×10^{-4}	98.7	m_2	133

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Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
22 (*cont'd*)	4-Benzylidenebutyryl peroxide	Acetophenone	65	4.02×10^{-4}		m_2	133
			T (K)	7.14×10^{11}	exp[−98.7/RT]	m_2	133
		Benzene	50	2.40×10^{-5}	91.2	h	194
			60	6.80×10^{-5}			194
			70	1.845×10^{-4}			194
		Carbon tetrachloride	60	3.47×10^{-5}	112.5	m_2	133
			70	1.06×10^{-4}		m_2	133
			T (K)	1.42×10^{13}	exp[−112.5/RT]	m_2	133
		Nitrobenzene	60	3.38×10^{-4}			133
		Propylene carbonate	40	7.36×10^{-5}	89.5		133
			50	2.13×10^{-4}			133
			T (K)	5.93×10^{10}	exp[−89.5/RT]		133
			50	2.08×10^{-4}		m_2	133
			40	7.23×10^{-5}	82.0	h	194
			50	2.093×10^{-4}			194
			60	5.117×10^{-4}			194
		Toluene	70	1.64×10^{-4}			133
	4-*tert*-Butylbenzoyl peroxide	Dioxane	80	6.08×10^{-2}		a,m_1	6
	cis-4-*tert*-Butylcyclohexane formyl-peroxide	Butane	40	1.25×10^{-5}		z (0.98)	145
			40	1.69×10^{-5}		z (1010)	145
		Carbon tetrachloride	40.0	$(8.65 \pm 0.35) \times 10^{-5}$	76.1	h	35
			45.45	$(1.32 \pm 0.04) \times 10^{-4}$			35
			50.7	$(2.35 \pm 0.05) \times 10^{-4}$			35
	trans-4-*tert*-Butylcyclohexane formyl-peroxide	Carbon tetrachloride	40.0	$(4.25 \pm 0.23) \times 10^{-5}$	81.6	h	35
			44.7	$(7.10 \pm 0.38) \times 10^{-5}$			35
			48.9	$(1.14 \pm 0.04) \times 10^{-4}$			35
	trans-4-(4-Chlorobenzylidene)-butyryl peroxide	Benzene	50	2.10×10^{-5}	95.0	h	194
			60	6.56×10^{-5}			194
			70	1.75×10^{-4}			194
		Propylene carbonate	40	5.33×10^{-5}			194
			50	1.448×10^{-4}			194
			60	2.791×10^{-4}			194
	trans-4-(4-Fluorobenzylidene)-butyryl peroxide	Benzene	50	2.67×10^{-5}	94.1	h	194
			60	8.44×10^{-5}			194
			70	2.119×10^{-4}			194
		Propylene carbonate	40	6.53×10^{-5}			194
			50	1.685×10^{-4}			194
			60	4.540×10^{-4}			194
	1-Naphthoyl peroxide	Benzene	54.6	1.01×10^{-4}			170
			59.9	1.86×10^{-4}			170
			64.5	3.0×10^{-4}			170
	4-Nitrobenzoyl-2-[*trans*-2-(4-nitro-phenyl)vinyl] benzoyl peroxide	Chlorobenzene	70	6.06×10^{-5}		t_9	175
	2-Phenylisovaleryl peroxide	Acetonitrile	55.0	2.27×10^{-5}			258
		Cyclohexane	55.0	6.4×10^{-6}			258
		On silica	50	2.56×10^{-4}		n_2	258
	5-Phenylpenta-2,4-dienoyl-peroxide	Styrene	70	2.18×10^{-4}			316
	5-Phenylpentanoyl peroxide	Acetophenone	77	2.37×10^{-4}			133
		Benzene	77	1.054×10^{-5}	127.6	h,m_2	194
		Carbon tetrachloride	70	2.76×10^{-5}	130.1	m_2	133
			77	7.19×10^{-5}		m_2	133
			85	1.87×10^{-4}		m_2	133
			T (K)	1.76×10^{15}	exp[−130.1/RT]	m_2	133
		Propylene carbonate	60	4.41×10^{-5}			133
			60	2.80×10^{-5}		m_2	133
24	Dibenzoyl 2-bromosebacoyl-diperoxide	Unknown	70	4.80×10^{-4}	87.9	x_2	214
				3.87×10^{-5}	110.8	x_2	214
			75	7.64×10^{-4}		x_2	214
				7.22×10^{-5}		x_2	214
			85	2.00×10^{-3}		x_2	214
				2.02×10^{-4}		x_2	214
	Dioctanoyl 2-bromosebacoyl-diperoxide	Unknown	70	6.46×10^{-4}	99.6	x_2	214
				5.23×10^{-5}	129.7	x_2	214
			75	1.171×10^{-3}		x_2	214

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Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
24 (*cont'd*)	Dioctanoyl 2-bromosebacoyl-diperoxide	Unknown		1.08×10^{-4}		x_2	214
			85	3.00×10^{-3}		x_2	214
				3.72×10^{-4}		x_2	214
	Lauroyl peroxide	Benzene	30	2.56×10^{-7}		a	99
			40	4.91×10^{-7}			68
			50	2.19×10^{-6}			68
			60	9.17×10^{-6}			68
			70	2.86×10^{-5}			68
			60	1.51×10^{-5}	127.2	a	126,337
			70	5.58×10^{-5}		a	126,337
			85	3.75×10^{-4}		a	126,337
			70	4.33×10^{-5}		a,j	16
		Carbon tetrachloride	40	2.91×10^{-7}			68
			50	1.15×10^{-6}			68
			60	4.75×10^{-6}			68
			70	1.87×10^{-5}			68
		Chlorobenzene	61	1.93×10^{-5}			344
			79	1.93×10^{-4}			344
			99	1.93×10^{-3}			344
			T (K)	3.92×10^{14}	exp[− 123.37/*RT*]		344
		Ethyl acetate	40	6.03×10^{-7}			68
			50	2.70×10^{-6}			68
			61	1.05×10^{-5}			68
			70	3.99×10^{-5}			68
		Ethyl ether	30	1.97×10^{-6}		a	99
		Mineral oil	T (K)	2.2×10^{16}	exp[− 137.9/*RT*]		1
		Styrene	34.8	2.06×10^{-7}		a	10
			49.4	2.25×10^{-6}		a	10
			61.0	1.42×10^{-5}		a	10
			74.8	1.00×10^{-4}		a	10
			100.0	2.39×10^{-3}		a	10
			50	3.1×10^{-6}	121.1		287
			60	1.20×10^{-5}			287
			65	2.22×10^{-5}			287
			70	4.32×10^{-5}			287
	trans-4-(4-Methoxybenzylidene)-butyryl peroxide	Benzene	50	2.03×10^{-4}			194
	trans-4-(4-Methylbenzylidene)-butyryl peroxide	Benzene	50	6.58×10^{-5}	90.4	c,h	194
			60	1.815×10^{-4}		c	194
			70	4.729×10^{-4}		c	194
26	2-Phenoxybenzoyl peroxide	Acetophenone	65	8.18×10^{-5}	121.3	a	5
28	Myristoyl peroxide	Benzene	70	3.38×10^{-5}		a	16
36	Menthylphthaloyl peroxide	Dioxane	55	1.15×10^{-4}			65
x	Aliphatic polymeric diacyl peroxide	Chlorobenzene	75	9.04×10^{-5}		v_{14}	302
			75	9.00×10^{-5}		v_{15}	302
			80	1.720×10^{-4}		v_{15}	302

TABLE 5. HYDROPEROXIDES AND KETONE PEROXIDES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4	*sec*-Butyl hydroperoxide	Toluene	172.0	2.65×10^{-5}			199
			182.3	4.9×10^{-5}			199
	tert-Butyl hydroperoxide	Benzene	130	3×10^{-7}	138	a	337
			145	1.6×10^{-6}		a	337
			160	6.6×10^{-6}		a	337
			154.5	4.29×10^{-6}	170.7	h	76
			161.7	9.27×10^{-6}			76
			169.3	2.0×10^{-5}			76
			174.6	4.0×10^{-5}			76

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Table 4. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
24 (*cont'd*)	Dioctanoyl 2-bromosebacoyl-diperoxide	Unknown		1.08×10^{-4}		x_2	214
			85	3.00×10^{-3}		x_2	214
				3.72×10^{-4}		x_2	214
	Lauroyl peroxide	Benzene	30	2.56×10^{-7}		a	99
			40	4.91×10^{-7}			68
			50	2.19×10^{-6}			68
			60	9.17×10^{-6}			68
			70	2.86×10^{-5}			68
			60	1.51×10^{-5}	127.2	a	126,337
			70	5.58×10^{-5}		a	126,337
			85	3.75×10^{-4}		a	126,337
			70	4.33×10^{-5}		a,j	16
		Carbon tetrachloride	40	2.91×10^{-7}			68
			50	1.15×10^{-6}			68
			60	4.75×10^{-6}			68
			70	1.87×10^{-5}			68
		Chlorobenzene	61	1.93×10^{-5}			344
			79	1.93×10^{-4}			344
			99	1.93×10^{-3}			344
			T (K)	3.92×10^{14}	$\exp[-123.37/RT]$		344
		Ethyl acetate	40	6.03×10^{-7}			68
			50	2.70×10^{-6}			68
			61	1.05×10^{-5}			68
			70	3.99×10^{-5}			68
		Ethyl ether	30	1.97×10^{-6}		a	99
		Mineral oil	T (K)	2.2×10^{16}	$\exp[-137.9/RT]$		1
		Styrene	34.8	2.06×10^{-7}		a	10
			49.4	2.25×10^{-6}		a	10
			61.0	1.42×10^{-5}		a	10
			74.8	1.00×10^{-4}		a	10
			100.0	2.39×10^{-3}		a	10
			50	3.1×10^{-6}	121.1		287
			60	1.20×10^{-5}			287
			65	2.22×10^{-5}			287
			70	4.32×10^{-5}			287
	trans-4-(4-Methoxybenzylidene)-butyryl peroxide	Benzene	50	2.03×10^{-4}			194
	trans-4-(4-Methylbenzylidene)-butyryl peroxide	Benzene	50	6.58×10^{-5}	90.4	c,h	194
			60	1.815×10^{-4}		c	194
			70	4.729×10^{-4}		c	194
26	2-Phenoxybenzoyl peroxide	Acetophenone	65	8.18×10^{-5}	121.3	a	5
28	Myristoyl peroxide	Benzene	70	3.38×10^{-5}		a	16
36	Menthylphthaloyl peroxide	Dioxane	55	1.15×10^{-4}			65
x	Aliphatic polymeric diacyl peroxide	Chlorobenzene	75	9.04×10^{-5}		v_{14}	302
			75	9.00×10^{-5}		v_{15}	302
			80	1.720×10^{-4}		v_{15}	302

TABLE 5. HYDROPEROXIDES AND KETONE PEROXIDES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4	*sec*-Butyl hydroperoxide	Toluene	172.0	2.65×10^{-5}			199
			182.3	4.9×10^{-5}			199
	tert-Butyl hydroperoxide	Benzene	130	3×10^{-7}	138	a	337
			145	1.6×10^{-6}		a	337
			160	6.6×10^{-6}		a	337
			154.5	4.29×10^{-6}	170.7	h	76
			161.7	9.27×10^{-6}			76
			169.3	2.0×10^{-5}			76
			174.6	4.0×10^{-5}			76

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TABLE 5. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4 (*cont'd*)	*tert*-Butyl hydroperoxide	Benzene	172.3	1.09×10^{-5}			199
			182.6	3.1×10^{-5}			199
		Chlorobenzene	171	1.93×10^{-5}			344
			199	1.93×10^{-4}			344
			231	1.93×10^{-3}			344
		Cumene	182.6	8.1×10^{-5}		c	199
		Cyclohexane	100	1.2×10^{-7}			199
			172	1.41×10^{-4}		c	199
		Dodecane	86.1	1.32×10^{-6}	128.4	b	41
			98.5	5.55×10^{-6}		b	41
		Heptane	172	1.41×10^{-4}			199
		n-Octane	149.8	8×10^{-6}	163.2	f	118
			159.9	2.5×10^{-5}		f	118
			169.6	6.9×10^{-5}		f	118
			179.6	1.82×10^{-5}			118
		Toluene	100	5.7×10^{-8}			199
			172.5	9.2×10^{-6}			199
			181.5	2.69×10^{-5}			199
			192.6	8.3×10^{-5}			199
			204.5	1.52×10^{-4}		c	199
			214.9	3.24×10^{-4}			199
		Vapor	570	3.4×10^{1}			188
			670	4.95			188
			773	8.4×10^{1}			188
			873	5.66×10^{2}			188
			973	2.58×10^{3}			188
	tert-Butyl hydroperoxide/cobalt 2-Ethyl hexanoate	Chlorohenzene	0	1.01×10^{-3}			190
			0	8.29×10^{-5}		v_{10}	190
			0	5.40×10^{-4}		v_7	190
			25	2.3×10^{-3}			198
			25	1.1×10^{-3}		v_1	198
	tert-Butyl hydroperoxide/cobalt stearate		45	1.4×10^{-3}			198
			45	1.0×10^{-3}		v_1	198
	Methyl ethyl ketone peroxides	Benzene	100	1.3×10^{-5}	101	a	337
			115	4.80×10^{-5}		a	337
			130	1.60×10^{-4}		a	337
		Ethyl acetate	70	1.28×10^{-6}			13
5	*tert*-Amyl hydroperoxide	Chlorobenzene	153	1.93×10^{-5}			344
			190	1.93×10^{-4}			344
			228	1.93×10^{-3}			344
6	Acetone cyclic diperoxide	Benzene	135.5	6.25×10^{-7}	147.1	h	286
			145.5	2.09×10^{-6}			286
			165.0	1.41×10^{-5}			286
		Toluene	165.0	1.37×10^{-5}			286
	3,3,6,6-Tetramethyl-1,2,4,5-tetroxane	Benzene	135.5	6.25×10^{-7}			373
			140.5	1.19×10^{-6}			373
			145.5	2.09×10^{-6}			373
			150.5	2.83×10^{-6}			373
			165.0	1.41×10^{-5}			373
		Toluene	165.0	1.37×10^{-5}			373
		Vapor	130.1	1.8×10^{-6}			365
			150.1	3.4×10^{-6}			365
			170.1	3.5×10^{-6}			365
			177.1	4.6×10^{-6}			365
			185.1	1.3×10^{-5}			365
			194.1	2.4×10^{-5}			365
			207.1	8.5×10^{-5}			365
			215.1	1.66×10^{-4}			365
			250.1	4.88×10^{-4}			365
	Cyclohexyl hydroperoxide	Benzene	70	0		a	91
		Benzene/styrene (50/50)	70	1.27×10^{-3}		a	91
		Cyclohexane	130	2.38×10^{-3}		a	91
			140	1.16×10^{-2}		a	91
			150	3.20×10^{-2}		a	91

TABLE 5. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
6 (*cont'd*)	Cyclohexyl hydroperoxide	Benzene	80	Reaction order varies from 1.5 to 2.0			119
		Cyclohexane	80	Reaction order varies from 1.5 to 2.0			119
		Cyclohexene	80	Reaction order varies from 1.5 to 2.0			119
		Dimethylheptadiene	80	Reaction order varies from 1.5 to 2.0			119
		1-Octene	80	Reaction order varies from 1.5 to 2.0			119
7	Benzyl hydroperoxide	Styrene	60	9×10^{-6}		c_3	276
			60	1.8×10^{-5}		c_4	276
8	1,4-Dimethylcyclohexane-hydroperoxide	1,4-Dimethylcyclohexane	120	1.4×10^{-5}	137.2	c	224
	1,1,3,3-Tetramethylbutyl-hydroperoxide	Benzene	130	1.7×10^{-5}	134	a	337
			145	7.41×10^{-5}		a	337
			160	2.83×10^{-4}		a	337
		Chlorobenzene	135	1.93×10^{-5}			344
			153	1.93×10^{-4}			344
			173	1.93×10^{-3}			344
	2,5-Dimethyl-2,5-di(hydro-peroxy)hexane	Benzene	130	2.7×10^{-6}	113	a	337
			145	1.0×10^{-5}		a	337
			160	3.16×10^{-5}		a	337
	n-Octyl hydroperoxide	White oil	150	9.29×10^{-5}	112.5	a	177
	2,4,4-Trimethylpentyl-2-hydroperoxide	White oil	150	9.29×10^{-5}	112.5	a	177
$(8)_x$	Poly(phenyleneethyl hydro-peroxide)/manganese resinate	Chlorobenzene	26	2.00×10^{-4}	46.0	t_3	212
			30	2.75×10^{-4}		t_3	212
			35	3.67×10^{-4}		t_3	212
9	Cumene hydroperoxide	Benzene	115	4×10^{-7}	122	a	337
			130	1.7×10^{-6}		a	337
			145	6.6×10^{-6}		a	337
		Chlorobenzene	159	1.93×10^{-5}			344
			193	1.93×10^{-4}			344
			253	1.93×10^{-3}			344
		Cumene	110	2.742×10^{-6}			367
			120	5.194×10^{-6}			367
			132	9.305×10^{-6}			367
			T (K)	2.10×10^{11}	$\exp[-80.0/RT]$		367
		Mesitylene			98.7		58
		Styrene			101.3		58
		Toluene	125	9×10^{-6}			199
			139	3×10^{-5}			199
			182.3	6.45×10^{-5}			199
		White oil	150	1.34×10^{-4}	121.3	a	177
	Cumyl hydroperoxide	Acetone-d_6	−33.0	7.0×10^{-5}	62.0		264
			−23.0	2.28×10^{-4}			264
			−12.0	1.21×10^{-3}			264
			−18.0	8.3×10^{-5}	110.2	t_{14}	264
			−8.0	4.23×10^{-4}		t_{14}	264
			−3.0	1.65×10^{-3}		t_{14}	264
10	*p*-Cymene hydroperoxide	*p*-Cymene	110	5.500×10^{-6}			367
			120	1.200×10^{-5}			367
			132	2.089×10^{-5}			367
			T (K)	1.23×10^{12}	$\exp[-85.48/RT]$		367

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TABLE 5. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
10 (*cont'd*)	Decalin hydroperoxide	Acetic acid	130	5.5×10^{-4}			228
		Chlorobenzene	130	10% in 3 h			228
		Decalin	130	1.41×10^{-5}	124.3		228
		1,2-Dichlorobenzene	130	4.48×10^{-5}	176.4		228
		Ethylene glycol	130	1.65×10^{-4}	117.2		228
		Nitrobenzene	130	4.73×10^{-5}			228
		Pyridine	130	$(2.31–2.89) \times 10^{-4}$			228
	Pinane hydroperoxide	Benzene	130	7.08×10^{-6}	123.8	a	18
			145	2.72×10^{-5}		a	18
			160	9.17×10^{-5}		a	18
	2-Phenylbutyl 2-hydroperoxide	*sec*-Butylbenzene	110	2.944×10^{-6}			367
			120	6.611×10^{-6}			367
			132	1.089×10^{-5}			367
			T (K)	4.06×10^{12}	$\exp[-87.15/RT]$		367
	1-Phenyl-2-methylpropyl-hydroperoxide	Benzene	133.8	3.18×10^{-6}	122.2	h	76
			143.9	8.95×10^{-6}			76
			153.9	2.0×10^{-5}			76
			163.7	4.03×10^{-5}			76
			174	9.77×10^{-5}			76
	1-Phenyl-2-methylpropyl-2-hydroperoxide	Benzene	144.2	5.04×10^{-6}	125.5	h	76
			154.5	1.21×10^{-5}			76
			165.6	2.92×10^{-5}			76
			176.0	6.97×10^{-5}			76
	Tetralin hydroperoxide	Poly(butene)	170	2.17×10^{-3}	78.2	t_3	71
		n-Butyl stearate	170	1.47×10^{-4}	125.5	t_3	71
		2-Ethyl-1-hexene	130	1.08×10^{-4}	82.8	e,t_3	71
			170	1.26×10^{-3}		t_3	71
		1-Hexadecene	170	7.92×10^{-4}	117.2	t_3	71
		Mineral oil	135.6	4.2×10^{-5}	131.4	t_3	71
			150.6	1.00×10^{-4}		e,t_3	71
			170	4.82×10^{-4}		t_3	71
		n-Octadecane	170	2.54×10^{-4}	119.2	t_3	71
		Isooctane	170	$1\ 31 \times 10^{-4}$		t_3	71
		Octyl ether	170	1.45×10^{-3}	121.3	t_3	71
		Poly(propylene)	170	2.50×10^{-3}		t_3	71
		n-Tetradecane	170	2.32×10^{-4}		t_3	71
		Tetralin	T (K)	2.27×10^{9}	$\exp[-102.1/RT]$		112
		2,2,4-Trimethyl-1-pentene	170	1.67×10^{-3}		t_3	71
		white oil	150	1.34×10^{-4}	121.3		177
$(10)_n$	Poly(cumyleneethylhydroperoxide) (MW 1100)	Toluene	130	2.79×10^{-5}			210
			140	4.0×10^{-5}			210
			150	5.78×10^{-5}			210
11	2,2-Bis(*tert*-butyldioxy)propane	Cumene	90	2.16×10^{-6}			361
			100	9.14×10^{-6}			361
			110	2.97×10^{-5}			361
			120	9.56×10^{-5}			361
	1-Methoxy-1-(*tert*-butylperoxy) cyclohexane	Cumene	80	4.79×10^{-6}			348
			90	1.898×10^{-5}			348
			100	6.57×10^{-5}			348
			110	2.139×10^{-4}			348
	sec-Butyltoluene hydroperoxide	*sec*-Butyl toluene	100	4.111×10^{-6}			367
			110	8.194×10^{-6}			367
			120	1.9555×10^{-5}			367
			T (K)	1.02×10^{16}	$\exp[-110.2/RT]$		367
12	2,2-Di-(*tert*-butylperoxy)butane	Chlorobenzene	98	1.93×10^{-5}			344
			116	1.93×10^{-4}			344
			136	1.93×10^{-3}			344
			T (K)	9.30×10^{16}	$\exp[-154.08/RT]$		344
	2,2-Bis(*tert*-butyldioxy)butane	Cumene	100	1.84×10^{-5}			361
	Diisopropylbenzene monohydroperoxide	Chlorobenzene	150	1.93×10^{-5}			344
			182	1.93×10^{-4}			344
			218	1.93×10^{-3}			344
	1-Methoxy-1-(*tert*-amylperoxy) cyclohexane	Cumene	80	7.82×10^{-6}			348
			90	3.07×10^{-5}			348

TABLE 5. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 (*cont'd*)	1-Methoxy-1-(*tert*-amylperoxy) cyclohexane	Cumene	100	1.058×10^{-4}			348
			110	3.450×10^{-4}			348
13	1-Methoxy-1-(*tert*-hexylperoxy) cyclohexane	Cumene	80	8.34×10^{-6}			348
			90	3.17×10^{-5}			348
			100	1.120×10^{-4}			348
			110	3.653×10^{-4}			348
	1,1-Bis(*tert*-butylperoxy)-cyclopentane	Cumene	80	4.98×10^{-6}			349,364
			90	1.80×10^{-5}			349,364
			100	6.67×10^{-5}			349,364
			110	2.17×10^{-4}			349,364
	2,2-Bis(*tert*-butyldioxy)-3-methyl-butane	Diphenylmethane	90	1.08×10^{-5}			358
			100	3.75×10^{-5}			358
			110	1.29×10^{-4}			358
			120	4.11×10^{-4}			358
		Cumene	100	3.17×10^{-5}			361
14	1,1-Bis(*tert*-butylperoxy)-cyclohexane	Cumene	80	3.47×10^{-6}			349,350
			90	1.45×10^{-5}			349,350
			100	5.06×10^{-5}			349,350
			110	1.62×10^{-4}			348,349,350
		Chlorobenzene	94	1.93×10^{-5}			344
			113	1.93×10^{-4}			344
			134	1.93×10^{-3}			344
			T (K)	3.47×10^{15}	$\exp[-142.4/RT]$		344
		n-Dodecane	100	3.51×10^{-5}			364
		n-Hexadecane	100	3.15×10^{-5}			364
		n-Hexane	100	3.82×10^{-5}			364
		n-Nonane	100	3.62×10^{-5}			364
	1,1-Bis(*tert*-butylperoxy)-2-methyl-cyclopentane	Cumene	80	1.55×10^{-5}			349
			90	5.82×10^{-5}			349
			100	1.85×10^{-4}			349
			110	6.00×10^{-4}			349
	1,1-Diphenylethyl hydroperoxide	Chlorobenzene	90	2.0×10^{-9}			374
			110	1.007×10^{-6}			374
			130	1.034×10^{-6}			374
			150	1.223×10^{-6}			374
			T (K)	1.38×10^{8}	$\exp[-105.4/RT]$		374
15	1-Methoxy-1-(*tert*-octylperoxy)-cyclohexane	Cumene	70	5.9×10^{-6}			348
			80	2.30×10^{-5}			348
			90	8.18×10^{-5}			348
			100	2.840×10^{-4}			348
	1,1-Bis(*tert*-butylperoxy)-2-methyl-cyclohexane	Cumene	80	1.29×10^{-5}			349
			90	4.51×10^{-5}			349
			100	1.43×10^{-4}			349
			110	4.58×10^{-4}			349
16	1,1-Bis(*tert*-amylperoxy)-cyclohexane	Cumene	80	5.34×10^{-6}			348
			90	2.02×10^{-5}			348
			100	7.32×10^{-5}			348
			110	2.44×10^{-4}			348
	1,1-Bis(*tert*-butylperoxy)-cyclooctane	Cumene	90	1.11×10^{-5}			364
			100	4.15×10^{-5}			364
			110	1.36×10^{-4}			364
			120	4.24×10^{-4}			364
17	1,1-Bis(*tert*-butylperoxy)-2-*n*-propyl-cyclohexane	Cumene	80	1.20×10^{-5}			349
			90	4.19×10^{-5}			349
			100	1.38×10^{-4}			349
	1,1-Bis(*tert*-butylperoxy)-2-isopropylcyclohexane	Cumene	70	2.59×10^{-5}			349
			80	4.86×10^{-5}			349
			90	1.98×10^{-4}			349
			100	7.46×10^{-4}			349
	1,1-Bis(*tert*-butylperoxy)-3,3,5-trimethylcyclohexane	Cumene	80	3.82×10^{-6}			349,364
			90	1.50×10^{-5}			349,364
			100	5.31×10^{-5}			349,364
			110	1.75×10^{-4}			349,364

TABLE 5. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
17 (*cont'd*)	1,1-Bis(*tert*-butylperoxy)-3,3,5-trimethylcyclohexane	Chlorobenzene	85	1.93×10^{-5}			344
			105	1.93×10^{-4}			344
			128	1.93×10^{-3}			344
			T (K)	7.59×10^{13}	exp[− 127.52/RT]		344
	n-Butyl 4,4-di-(*tert*-butylperoxy) valerate	Chlorobenzene	102	1.93×10^{-5}			344
			121	1.93×10^{-4}			344
			143	1.93×10^{-3}			344
			T (K)	1.91×10^{15}	exp[− 143.51/RT]		344
18	1,1-Bis(*tert*-hexylperoxy)-cyclohexane	Cumene	80	5.38×10^{-6}			348
			90	2.06×10^{-5}			348
			100	7.48×10^{-5}			348
			110	2.48×10^{-4}			348
20	1,1-Bis(*tert*-butylperoxy)-cyclododecane	Cumene	90	8.14×10^{-6}			364
			100	3.22×10^{-5}			364
			110	9.93×10^{-5}			364
22	1,1-Bis(*tert*-octylperoxy)-cyclohexane	Cumene	80	1.513×10^{-5}			348
			90	5.62×10^{-5}			348
			100	1.983×10^{-4}			348
			110	6.26×10^{-4}			348
31	2,2-Bis[4,4-di-(*tert*-butyl-peroxycyclohexyl)propane	Chlorobenzene	87	1.93×10^{-5}			344
			106	1.93×10^{-4}			344
			128	1.93×10^{-3}			344
			T (K)	8.79×10^{14}	exp[− 135.56/RT]		344

TABLE 6. PERESTERS AND PEROXYCARBONATES

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
4	Dimethyl peroxalate	Pentane	25	1.7×10^{-5}			203
5	*tert*-Butyl percarbamate	Chlorobenzene	90	6.6×10^{-6}			141
	tert-Butyl performate	Chlorobenzene	130.8	5.43×10^{-5}	159.0	h	218
			140.8	1.70×10^{-4}			218
			140.6	1.80×10^{-4}		m_2	218
			140	2.12×10^{-3}	64.0	v_8	218
			140	5.06×10^{-4}		v_1	218
		4-Chlorotoluene	140.6	1.61×10^{-4}			218
			140	1.62×10^{-3}		v_8	218
		Cumene	140.6	1.77×10^{-4}		b	218
			140	1.02×10^{-3}		b,v_6	218
6	Isobutyl peracetate	α-Methylstyrene	79.5	1.36×10^{-5}	115.2		253
			88.4	3.61×10^{-5}			253
			92.8	5.58×10^{-5}			253
	n-Butyl peracetate	α-Methylstyrene	64	$\sim 9.6 \times 10^{-3}$		g_2,v_{16}	253
			64	8.2×10^{-3}		g_2,v_{17}	253
			64	6.5×10^{-4}		g_2,v_{18}	253
			64	1.2×10^{-3}		g_2,v_{19}	253
			79.6	1.57×10^{-5}	101.0		253
			87.8	3.27×10^{-5}			253
			92.6	5.38×10^{-5}			253
	sec-Butyl peracetate	α-Methylstyrene	88.2	1.79×10^{-5}	104.3		253
			92.8	3.19×10^{-5}			253
			99.4	5.37×10^{-5}			253
	tert-Butyl peracetate	*tert*-Amyl alcohol	75	2.8×10^{-6}			193
		Benzene	85	1.2×10^{-6}			193
			85	2.18×10^{-6}	151.9	a	126,337
			100	1.54×10^{-5}		a	126,337
			115	1.02×10^{-4}		a	126,337
			130	5.69×10^{-4}		a	126,337
		n-Butanol	75	2.65×10^{-5}			193

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
6 (*cont'd*)	*tert*-Butyl peracetate	2-Butanol	75	1.13×10^{-4}		c	193
			75	5.3×10^{-5}		t_7	193
			75	4×10^{-7}		m_3	193
		Chlorobenzene	60	2.31×10^{-8}	159.0	a,h	81
			100	1.93×10^{-5}			344
			119	1.93×10^{-4}			344
			139	1.93×10^{-3}			344
			T (K)	1.57×10^{16}	exp[− 149.36/*RT*]		344
		Decane	100	1.5×10^{-5}	134		337
			115	7.91×10^{-5}			337
			125	2.45×10^{-4}			337
			100	1.95×10^{-5}			270
		Dodecane	100	1.78×10^{-5}			270
		Hexadecane	100	1.55×10^{-5}			270
		Hexane	130.1	5.08×10^{-4}			169
		Octane	100	2.07×10^{-5}			270
		Paraffin	130.1	3.13×10^{-4}			169
		Tetradecane	100	1.55×10^{-5}			270
	tert-Butyl trichloroperacetate	Chlorobenzene	60	1.19×10^{-5}	125.9	a,h	81
			66.8	2.75×10^{-5}	126.8	h	28
			77.0	1.00×10^{-4}			28
	Diethyl peroxydicarbonate	*tert*-Butanol	45	1.25×10^{-5}	133.9–138.1	c	18
			55	5.7×10^{-5}		c	18
		2,2′-Oxydiethylene bis(allyl carbonate)	40	6.94×10^{-6}	127.2	a	90
			50	2.86×10^{-5}		a	90
			60	1.28×10^{-4}		a	90
	Diethyl peroxalate	Pentane	25	2.6×10^{-5}			203
7	*tert*-Amyl peracetate	Chlorobenzene	90	1.93×10^{-5}			344
			108	1.93×10^{-4}			344
			129	1.93×10^{-3}			344
			T (K)	4.13×10^{15}	exp[− 141.1/*RT*]		344
	tert-Butyl methoxyperacetate	Ethylbenzene	40.0	2.2×10^{-4}	104.7	a,h	315
			39.6	1.94×10^{-4}	103.9	h	328
			50.2	8.24×10^{-4}			328
			60.1	2.35×10^{-3}			328
	tert-Butyl peracrylate	Benzene	90	1.12×10^{-5}	86.2	a	211
			100	1.51×10^{-5}		a	211
			110	4.85×10^{-5}		a	211
	tert-Butylperoxy isopropyl	Chlorobenzene	98	1.93×10^{-5}			344
			117	1.93×10^{-4}			344
			137	1.93×10^{-3}			344
			T (K)	2.49×10^{16}	exp[− 150.15/*RT*]		344
	tert-Butyl perpropionate carborate	Benzene	80	1.53×10^{-6}		a	213
			90	6.04×10^{-6}		a	213
		Decane	100	1.82×10^{-5}			270
		Dodecane	100	1.78×10^{-5}			270
		Hexadecane	100	1.58×10^{-5}			270
		α-Methylstyrene	70	3.02×10^{-7}		a	213
			90	4.85×10^{-6}		a	213
		Octane	100	2.03×10^{-5}			270
		Tetradecane	100	1.68×10^{-5}			270
8	*tert*-Butyl 2-acetoxyperacetate	Ethylbenzene	91.8	2.73×10^{-5}		b	328
	tert-Butyl cyclopropane-percarboxylate	*n*-Dodecane	113.0	5.48×10^{-5}			255
		n-Hexadecane	102.6	1.28×10^{-5}	153.8	h	255
			113.0	4.92×10^{-5}			255
		2,2,4-Trimethyl-pentane	102.6	1.71×10^{-5}	146.2	h	255
			113.0	6.19×10^{-5}			255
			120.4	1.505×10^{-4}			255
	tert-Butyl ethoxyperacetate	Ethylbenzene	40.0	2.96×10^{-4}	105	a	315
			40.6	2.89×10^{-4}	102.7	m_2,h	328
			46.0	5.58×10^{-4}			328
			55.6	1.94×10^{-3}			328

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TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	*tert*-Butyl heptafluoroperoxy-butyrate	Benzene	65.0	1.56×10^{-5}		v_{24}	370
			70.0	3.09×10^{-5}		v_{24}	370
			75.0	5.27×10^{-5}		v_{24}	370
			80.0	9.08×10^{-5}		v_{24}	370
			60.0	9.5×10^{-6}		v_{25}	370
			65.0	1.61×10^{-5}		v_{25}	370
			70.0	2.70×10^{-5}		v_{25}	370
			75.0	5.23×10^{-5}		v_{25}	370
			80.0	9.18×10^{-5}		v_{25}	370
			60.0	9.6×10^{-6}		v_{26}	370
			65.0	1.93×10^{-5}		v_{26}	370
			70.0	3.57×10^{-5}		v_{26}	370
			75.0	6.35×10^{-5}		v_{26}	370
		Methanol	10.0	7.19×10^{-5}			369
			15.0	9.37×10^{-5}			369
			19.6	1.304×10^{-4}			369
			30.0	2.604×10^{-4}			369
		Methoxybenzene	55.0	5.01×10^{-5}			370
			60.2	8.56×10^{-5}			370
			65.0	1.378×10^{-4}			370
			70.0	2.444×10^{-4}			370
		Nitrobenzene	40.0	3.26×10^{-5}			370
			45.0	6.36×10^{-5}			370
			50.0	9.31×10^{-5}			370
		Octane	85.0	5.1×10^{-6}			370
			90.0	9.5×10^{-6}			370
			95.0	1.75×10^{-5}			370
			100.0	3.41×10^{-5}			370
		Pyridine	30.0	2.74×10^{-5}			370
			40.0	7.66×10^{-5}			370
			50.0	1.868×10^{-4}			370
		Toluene	65.0	1.88×10^{-5}			369
			75.0	4.66×10^{-5}			369
			80.0	7.06×10^{-5}			369
			85.0	1.203×10^{-4}			369
	tert-Butyl methoxyperpropionate	Ethylbenzene	40.3	4.30×10^{-3}			328
	tert-Butyl perisobutyrate	Benzene	78	3.77×10^{-5}		a	37
			70	6.69×10^{-5}	140.6	a	126,337
			85	5.33×10^{-5}		a	126,337
			100	3.50×10^{-4}		a	126,337
		Bulk	70	4.12×10^{-5}		a	37
		Chlorobenzene	90.6	8.13×10^{-5}	140.6	h	136
			100.7	2.75×10^{-4}			136
			110.0	8.92×10^{-4}			136
			79	1.93×10^{-5}			344
			98	1.93×10^{-4}			344
			118	1.93×10^{-3}			344
			T (K)	2.07×10^{15}	$\exp[-135.16/RT]$		344
		Cumene	90.6	6.9×10^{-5}	133.1	h	136
			100.7	2.35×10^{-4}			136
			110.0	6.57×10^{-4}			136
		Decane	70	4.7×10^{-6}	122	a	337
			85	2.6×10^{-5}		a	337
			100	1.55×10^{-4}		a	337
			100	1.46×10^{-4}			270
		Dodecane	100	1.56×10^{-4}			270
		Hexadecane	100	1.47×10^{-4}			270
		Iso-octane	103.4	2.16×10^{-4}			251
		Nujol	103.4	2.23×10^{-4}			251
		Octane	100	1.59×10^{-4}			270
		Tetradecane	100	1.52×10^{-4}			270
	tert-Butyl percrotonate	Benzene	100	2.5×10^{-5}	138	a	337
			115	1.50×10^{-4}		a	337
			130	7.39×10^{-4}		a	337

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
8 (*cont'd*)	*tert*-Butyl permaleic acid	Acetone	70	2.7×10^{-6}	113	a	337
			85	1.6×10^{-5}		a	337
			101	6.77×10^{-5}		a	337
	tert-Butyl permethacrylate	Benzene	90	1.92×10^{-5}	137.0	a	211
			100	7.66×10^{-5}		a	211
			110	1.92×10^{-4}		a	211
	tert-Butyl peroxyisopropyl carbonate	Benzene	90	6.64×10^{-6}		a	9
			100	2.21×10^{-5}		a	9
			110	6.87×10^{-5}		a	9
	Cyclohexyl peracetate	α-Methylstyrene	88.6	1.63×10^{-5}	109.4		253
			93.0	2.30×10^{-5}			253
			99.3	4.75×10^{-5}			253
	Diisopropyl peroxalate	Pentane	25	6.0×10^{-5}			203
	Diisopropyl peroxydicarbonate	Benzene	54.0	5.0×10^{-5}		m_2	60
		Di-*n*-butyl phthalate	77	1.39×10^{-3}		y_{16}	236
			87	4.09×10^{-3}		y_{16}	236
			97	1.25×10^{-2}		y_{16}	236
			107	3.54×10^{-2}		y_{16}	236
			117	7.98×10^{-2}		y_{16}	236
		Decane	35	6.3×10^{-6}	113	a	337
			45	2.7×10^{-5}		a	337
			60	1.85×10^{-4}		a	337
		Ethylbenzene	54.3	4.5×10^{-5}			60
			54.3	5.2×10^{-5}		m_2	60
		Mineral spirits	30	2×10^{-6}	113	a	337
			45	1.8×10^{-5}		a	337
			60	1.28×10^{-4}		a	337
			75	7.55×10^{-4}		a	337
		2,2′-Oxydiethylene-bis(allyl carbonate)	40	6.39×10^{-6}	117.6	a	90
			50	2.28×10^{-5}		a	90
			60	9.44×10^{-5}		a	90
		Toluene	50	3.03×10^{-5}		a	90
	Ethyl *tert*-butyl peroxalate	Benzene	45	4.48×10^{-5}	112.5	c,h	31
			55	1.63×10^{-4}			31
			65	5.93×10^{-4}			31
9	*tert*-Butyl 2-acetoxyperpropionate	Ethylbenzene	91.4	3.60×10^{-4}			328
	tert-Butyl 5-bromo-2-perthenoate	Carbon tetrachloride	99.2	2.24×10^{-6}	143.5	a	176
			112.0	1.18×10^{-5}		a	176
			124.5	4.30×10^{-5}		a	176
	tert-Butyl 5-chloro-2-perthenoate	Carbon tetrachloride	99.2	2.29×10^{-6}	143.5	a	176
			112.0	9.56×10^{-6}		a	176
			124.5	4.42×10^{-5}		a	176
	tert-Butyl cyclobutane-percarboxylate	*n*-Hexadecane	102.6	4.33×10^{-5}			255
		2,2,4-Trimethyl-pentane	92.9	1.21×10^{-5}	150.4	h	255
			102.6	4.84×10^{-5}			255
			113.0	1.668×10^{-4}			255
	tert-Butyl 2,2-dimethyl-3-bromoperpropionate	Cyclohexane	55	9.50×10^{-6}	118.2	h,t_6	320
			65	3.58×10^{-5}		t_6	320
			75	1.23×10^{-4}		t_6	320
	tert-Butyl 2,2-dimethyl-3-chloroperpropionate	Cyclohexane	55	3.55×10^{-6}	128.6	h,t_6	320
			65	1.48×10^{-5}		t_6	320
			75	5.65×10^{-5}		t_6	320
	tert-Butyl 2,2-dimethyl-3-iodoperpropionate	Cyclohexane	55	2.91×10^{-5}	116.9	h,t_6	320
			75	3.76×10^{-4}		t_6	320
	tert-Butyl isopropoxyperacetate	Ethylbenzene	40.0	4.8×10^{-4}	100.6	a,h	315
			39.9	4.22×10^{-4}	98.9	h,m_2	328
			49.9	1.39×10^{-3}			328
			55.3	2.68×10^{-3}			328

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
9 (*cont'd*)	*tert*-Butyl 1-methylcyclopropyl-percarboxylate	2,2,4-Trimethylpentane	102.6	2.30×10^{-5}	133.7	h	255
			113.0	7.47×10^{-5}			255
	Di-(*tert*-butylperoxy)-carbonate	Chlorobenzene	99.95	6.72×10^{-5}	133.1		27
			110.1	2.13×10^{-4}			27
			120.1	6.05×10^{-4}			27
		1,2-Dichlorobenzene	120.1	5.98×10^{-4}			27
		Cumene	99.95	6.72×10^{-5}			27
		Isopropyl ether	99.95	2.76×10^{-4}			27
	tert-Butylperoxy isopropyl carbonate	Benzene	85	3.3×10^{-6}	138	a	337
			100	2.2×10^{-5}		a	337
			115	1.36×10^{-4}		a	337
	tert-Butyl perpivalate	Benzene	50	9.77×10^{-6}	119.7	a	126,337
			70	1.24×10^{-4}		a	126,337
			85	7.64×10^{-4}		a	126,337
			50	1.03×10^{-5}			359
			55	1.94×10^{-5}			359
			60	3.92×10^{-5}			359
			65	7.31×10^{-5}			359
			70	1.30×10^{-4}			359
		Chlorobenzene	48.9	8.4×10^{-6}		k	249
			58.6	3.35×10^{-5}	125.5	h	28
			64.3	7.01×10^{-5}			28
			57	1.93×10^{-5}			344
			75	1.93×10^{-4}			344
			94	1.93×10^{-3}			344
			T (K)	7.09×10^{14}	exp[− 123.59/*RT*]		344
			74.8	2.79×10^{-4}			28
			60	3.85×10^{-5}	128.0	a,h	81
			60.6	4.00×10^{-5}		t_9	156
			74	1.93×10^{-4}		t_9	156
		Cumene	45	3.53×10^{-6}	106.7	h	160
			55	1.73×10^{-5}			160
			60	2.95×10^{-5}			362
			65	4.53×10^{-5}			160
			64.6	5.81×10^{-5}	115.5		159
			75.6	2.10×10^{-4}			159
			84.6	5.94×10^{-4}			159
			70.3	1.11×10^{-4}			267
		Cyclohexane	55	1.03×10^{-5}	122.8	h	320
			65	4.02×10^{-5}			320
			75	1.45×10^{-4}			320
		Decane	50	4.1×10^{-6}	117	a	337
			70	5.52×10^{-5}		a	337
			80	2.18×10^{-4}			270
		Dioxane/water (90/10)	60.6	6.26×10^{-5}		t_9	156
		Dodecane	80	2.38×10^{-4}			270
		Hexadecane	80	2.39×10^{-4}			270
		Hexane	55	8.42×10^{-6}			359
			60	1.59×10^{-5}			359
			65	3.39×10^{-5}			359
			70	6.19×10^{-5}			358
		Heptane	80	2.33×10^{-4}			270
		Isooctane	60.6	1.97×10^{-5}		t_9	165
			73.9	8.82×10^{-5}		t_9	165
		Mineral spirits	55	1.01×10^{-5}			359
			60	2.15×10^{-5}			359
			65	4.14×10^{-5}			359
			70	7.58×10^{-5}			359
			75	1.47×10^{-4}			359
			T (K)	3.56×10^{14}	exp[− 123/*RT*]		376
		Octane	80	2.34×10^{-4}			270
		Tetradecane	80	2.27×10^{-4}			270
	tert-Butyl perpivalate-d_6	Chlorobenzene	60.6	3.24×10^{-5}		t_9	156
			74.0	1.57×10^{-4}		t_9	156

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
9 (*cont'd*)	*tert*-Butyl perpivalate-d_6	Dioxane/water (90/10)	60.6	5.05×10^{-5}		t_9	156
		Isooctane	60.6	1.62×10^{-5}		t_9	165
			73.9	8.82×10^{-5}		t_9	165
	tert-Butyl 2-perthenoate	Carbon tetrachloride	99.2	3.3×10^{-6}	147.3	m_2	176
			112.0	1.66×10^{-5}		m_2	176
			124.5	6.87×10^{-5}		m_2	176
	tert-Butyl 1-pyrollidine-percarboxylate	Chlorobenzene	90	7.59×10^{-5}			141
	tert-Butyl *N*-succinimido-percarboxylate	Acetonitrile	100	9.9×10^{-4}			142
		Benzene	100	3.79×10^{-5}	113.4	h,m_2	142
		Chlorobenzene	90	1.32×10^{-5}			141
			100	4.91×10^{-5}		m_2	142
		Cumene	90	3.3×10^{-6}			141
		Cyclohexane	100	1.10×10^{-5}		t_9	142
		Cyclohexene	100	9.0×10^{-6}			142
		Methanol	100	6.00×10^{-3}			142
		Methylene chloride	90	9.24×10^{-5}			141
		Nitrobenzene	100	3.41×10^{-4}		m_2	142
10	*tert*-Amyl perpivalate	Benzene	51	1.9×10^{-5}		a	338
		Chlorobenzene	55	1.93×10^{-5}			344
			72	1.93×10^{-4}			344
			91	1.93×10^{-3}			344
			T (K)	4.12×10^{15}	exp[− 127.76/*RT*]		344
		Cumene	50	1.05×10^{-5}			362
			60	3.51×10^{-5}			362
			70	1.309×10^{-4}			362
			80	4.239×10^{-4}			362
	Di-(*sec*-butyl)peroxy-dicarbonate	Decane	35	6.9×10^{-6}	113	a	337
			45	2.6×10^{-5}		a	337
			60	1.80×10^{-4}		a	337
		Chlorobenzene	47	1.93×10^{-5}			344
			63	1.93×10^{-4}			344
			82	1.93×10^{-3}			344
			T (K)	3.19×10^{15}	exp[− 123.85/*RT*]		344
		Mineral spirits	30	2×10^{-6}	113	a	337
			40	1.0×10^{-5}		a	337
			60	1.34×10^{-4}		a	337
	Di-*n*-butyl peroxydicarbonate	Chlorobenzene	49	1.93×10^{-5}			344
			65	1.93×10^{-4}			344
			83	1.93×10^{-3}			344
			T (K)	7.00×10^{15}	exp[− 126.65/*RT*]		344
	tert-Butyl 2-acetoxy-2-methyl perpropionate	Ethylbenzene	74.7	1.98×10^{-4}		m_2	328
			80.7	4.37×10^{-4}			328
			90.8	1.25×10^{-3}			328
	tert-Butyl *tert*-butoxyperacetate	Ethylbenzene	40.3	2.91×10^{-4}			328
	tert-Butyl 4-carbomethoxy-perbutyrate	Cumene	99.8	1.65×10^{-5}	151.3	h	257
			116.6	1.38×10^{-4}			257
			129.9	6.83×10^{-4}			257
	tert-Butyl cyclopentyl-percarboxylate	*n*-Hexadecane	113.0	3.02×10^{-4}			255
		2,2,4-Trimethyl-pentane	92.9	2.47×10^{-5}	140.8	h	255
			102.6	8.87×10^{-5}			255
			113.0	2.89×10^{-4}			255
	tert-Butyl peroxydiethyl acetate	Chlorobenzene	75	1.93×10^{-5}			344
			93	1.93×10^{-4}			344
			113	1.93×10^{-3}			344
			T (K)	2.45×10^{15}	exp[− 134.00/*RT*]		344
	tert-Butyl 2,2-dimethylperbutenoate	Cumene	42.42	9.04×10^{-5}	100.7	h	274
			50.30	2.349×10^{-5}			274
			57.95	5.660×10^{-5}			274
	tert-Butyl 2,2-dimethylperbutyrate	Cumene	44.85	1.874×10^{-5}			274
			50.10	3.609×10^{-5}			274
			60.20	1.306×10^{-4}			274

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TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
10 (*cont'd*)	Di(*tert*-butylperoxy)-oxalate	Benzene	35.0	6.77×10^{-5}	106.7	c,h	30
			45.0	2.61×10^{-4}		c	30
			55.0	9.3×10^{-4}		c	30
		tert-Butanol	25.0	1.83×10^{-5}			197
		Decane	41	1.75×10^{-4}			270
		Dodecane	41	1.81×10^{-4}			270
		Octane	41	1.79×10^{-4}			270
		n-Pentane	37.8	1.01×10^{-4}			197
		Tetradecane	41	1.71×10^{-4}			270
		Styrene	35	5.5×10^{-5}	75.3		215
			45	1.71×10^{-4}			215
			55	6.01×10^{-4}			215
	tert-Butyl 5-methyl-7-perthenoate	Carbon tetrachloride	99.2	4.6×10^{-6}	137.7	a,m_2	176
			112.0	1.94×10^{-5}		a,m_2	176
			124.5	7.95×10^{-5}		a,m_2	176
	β-Methyl-β-phenyl-β-peroxy-propiolactone	Carbon tetrachloride	106.8	5.65×10^{-6}	131.8	h,v_9	195
			126	4.59×10^{-5}			195
			134	9.71×10^{-5}		c,v_9	195
	Bis(2-nitro-2-methylpropyl)-peroxy-dicarbonate	Toluene	50	2.22×10^{-5}		a	90
	1-Phenylethylperacetate	Benzene	100	1.14×10^{-4}	138.7	h	259
11	*tert*-Butyl 4-chloroperbenzoate	Phenyl ether	100.0	3.89×10^{-6}	164.4	a	53
			110.1	1.85×10^{-5}		a	53
			120.2	6.39×10^{-5}		a	53
			130.9	2.42×10^{-4}		a	53
		Carbon tetrachloride	80	4.2×10^{-7}			354
	tert-Butyl-*N*-(2-chlorophenylperoxy)-carbamate	Toluene	87.0	3.5×10^{-5}	157.3	h	36
			95.5	1.48×10^{-4}			36
			103.3	3.3×10^{-4}			36
	tert-Butyl-*N*-(3-chlorophenylperoxy)-carbamate	Toluene	78.0	2.6×10^{-5}	115.5	h	36
			87.0	7.8×10^{-5}			36
			96.6	2.03×10^{-4}			36
			102.7	4.62×10^{-4}			36
	tert-Butyl-*N*-(4-chlorophenylperoxy)-carbamate	Toluene	73.0	5.57×10^{-5}	119.7	h	36
			78.5	1.42×10^{-4}			36
			87.0	2.75×10^{-4}			36
			92.5	5.37×10^{-4}			36
	tert-Butyl cyclohexylperoxy-carboxylate	*n*-Hexadecane	92.9	6.70×10^{-5}	136.6	h	255
			102.6	2.046×10^{-4}			255
		2,2,4-Trimethyl-pentane	82.2	1.57×10^{-5}	135.8	h	255
			92.9	6.13×10^{-5}			255
			102.6	2.046×10^{-4}			255
			113.0	6.58×10^{-4}			255
	tert-Butyl-*N*-(2,5-dichlorophenyl-peroxy) carbamate	Toluene	88.0	2.75×10^{-5}	128.9	h	36
			95.0	5.58×10^{-5}			36
			103.3	1.48×10^{-4}			36
			114.5	4.82×10^{-4}			36
	tert-Butyl 2,2-dimethylperpentanoate	Cyclohexane	55	1.66×10^{-5}	120.7	h	320
			65	6.31×10^{-5}			320
			75	2.23×10^{-4}			320
		Cumene	45	6.2×10^{-6}	105.4	h	160
			55	2.15×10^{-5}			160
	tert-Butyl 5-ethyl-2-perthenoate	Carbon tetrachloride	99.2	5.39×10^{-6}	130.5		176
			112.0	2.12×10^{-5}			176
			124.5	7.91×10^{-5}			176
	tert-Butyl 2-iodoperbenzoate	Chlorobenzene	85.0	4.02×10^{-5}			134
			102.4	2.58×10^{-4}			134
			118.8	1.32×10^{-3}			134
	tert-butyl 4-nitroperbenzoate	Phenyl ether	110.1	7.56×10^{-6}	172.8		53
			120.2	3.19×10^{-5}			53
			130.9	1.11×10^{-4}			53
			141.5	3.92×10^{-4}			53
		Carbon tetrachloride	80	2.9×10^{-7}			354
	tert-Butyl 3,5-dinitroperbenzoate	Carbon tetrachloride	80	1.1×10^{-7}			354

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
11 (*cont'd*)	*tert*-Butyl-*N*-(3-nitrophenylperoxy)-carbamate	Toluene	78.0	8.4×10^{-6}	133.1	h	36
			88.7	2.43×10^{-5}			36
			98.0	1.01×10^{-4}			36
			106.0	2.36×10^{-4}			36
	tert-Butyl-*N*-(4-nitrophenylperoxy)-carbamate	Toluene	73.0	6.4×10^{-6}	113.8	h	36
			87.0	3.11×10^{-5}			36
			98.0	8.75×10^{-5}			36
			106.0	2.38×10^{-4}			36
	tert-Butyl perbenzoate	Acetic acid	100.0	3.83×10^{-5}	130.1	a	56
			110.0	1.14×10^{-4}		a	56
		Benzene	100	1.07×10^{-5}	145.2	a	126,337
			115	6.22×10^{-5}		a	126,337
			130	3.50×10^{-4}		a	126,337
			110.0	3.50×10^{-5}	144.3	a	56
			119.4	1.04×10^{-4}		a	56
			130.0	3.30×10^{-4}		a	56
		Bromobenzene	119.4	1.37×10^{-4}		a	56
		n-Butanol	90.0	9.27×10^{-5}	120.5	a	56
			100.0	2.70×10^{-4}		a	56
		n-Butyl acetate	110.0	1.06×10^{-4}	123.4	a	56
			119.4	2.67×10^{-4}		a	56
			110.0	3.61×10^{-5}	148.5	a,m_2	56
			1194	1.10×10^{-4}		a,m_2	56
		tert-Butylbenzene	119.4	1.03×10^{-4}		a	56
		n-Butyl ether	100.0	7.80×10^{-5}	99.2	a	56
			110.0	1.80×10^{-4}		a	56
		Carbon tetrachloride	80	8.8×10^{-7}			354
		Chlorobenzene	110.0	3.83×10^{-5}	141.8	a	56
			119.4	1.11×10^{-4}		a	56
			120	1.31×10^{-4}		m_2	22
			135	6.74×10^{-4}		m_2	22
			150	3.12×10^{-3}		m_2	22
			103	1.93×10^{-5}			344
			122	1.93×10^{-4}			344
			142	1.93×10^{-3}			344
			T (K)	2.23×10^{16}	$\exp[-151.59/RT]$		344
		4-Chlorotoluene	110.0	3.25×10^{-5}	144.3	c	55
			119.4	9.80×10^{-5}		c	55
			130.0	3.06×10^{-4}		c	55
			60	3.85×10^{-7}	140.2	a,h	81
		Cumene	79.6	7.21×10^{-5}			272
			85.0	1.320×10^{-6}			345
			99.3	9.37×10^{-6}			345
			115.0	5.81×10^{-5}			345
			130.2	3.24×10^{-4}			345
		Decane	100	1.4×10^{-5}	134	a	337
			115	8.05×10^{-5}		a	337
			130	3.56×10^{-4}		a	337
			115	6.77×10^{-5}			270
		Dodecane	115	6.44×10^{-5}			270
		Ethylbenzene	119.4	1.07×10^{-4}		a	56
		Heptane	115	7.21×10^{-5}			270
		Hexadecane	115	5.97×10^{-5}			270
		Methyl benzoate	119.4	7.80×10^{-5}		a	56
		Octane	115	7.06×10^{-5}			270
		Phenyl ether	100.0	6.94×10^{-6}	156.9	a	53
			110.1	2.28×10^{-5}		a	53
			120.2	9.00×10^{-5}		a	53
			130.9	2.92×10^{-4}		a	53
		Tetradecane	115	6.03×10^{-5}			270
		Trimethylbenzene	T (K)	2.62×10^{16}	$\exp[-152.0/RT]$		376
		Xylene	119.4	1.09×10^{-4}	141.4	a	56
			130.0	3.42×10^{-4}		a	56

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
11 (*cont'd*)	*tert*-Butyl-*N*-(4-bromophenylperoxy)-carbamate	Toluene	70.8	3.32×10^{-5}	177.6	h	36
			79.8	1.04×10^{-4}			36
			84.0	1.75×10^{-4}			36
			96.0	7.70×10^{-4}			36
	tert-Butyl percarboxycyclohexane	Chlorobenzene	100.1	2.75×10^{-4}	131.0	h	181
			111.4	9.65×10^{-4}			181
			120.0	2.39×10^{-3}			181
		Cumene	79.6	1.86×10^{-5}		z (1)	163
			79.6	1.42×10^{-5}		z (2030)	163
			79.6	1.15×10^{-5}		z (4050)	163
	tert-Butyl per-2-methylphenylacetate	Isooctane	60.6	6.60×10^{-5}		m_2	165
			73.9	3.233×10^{-4}		m_2	165
	tert-Butyl-*N*-(phenylperoxy) carbamate	Toluene	51.2	3.4×10^{-6}	139.7	h	36
			67.7	2.31×10^{-5}			36
			77.7	1.15×10^{-4}			36
			90.7	6.41×10^{-4}			36
		Chlorobenzene	T (K)	1.51×10^{16}	exp[− 136.0/*RT*]		40
	tert-Hexyl peroxypivalate	Cumene	40	2.39×10^{-6}			362
			50	8.83×10^{-6}			362
			60	3.37×10^{-5}			362
			70	1.226×10^{-4}			362
			80	4.166×10^{-4}			362
	1,1,2-Trimethylpropyl perpivalate	Cumene	40	3.6×10^{-6}			362
			50	1.59×10^{-5}			362
			60	5.14×10^{-5}			362
			70	1.921×10^{-4}			362
	Cumyl peracetate	Carbon tetrachloride	100	4.68×10^{-5}		c	271
		Toluene	100	3.43×10^{-5}		p	271
12	*tert*-Amyl peroxybenzoate	Chlorobenzene	99	1.93×10^{-5}			344
			118	1.93×10^{-4}			344
			139	1.93×10^{-3}			344
			T (K)	8.38×10^{15}	exp[− 147.02/*RT*]		344
	4-Bromocumyl perpropionate	Benzene	70	1.48×10^{-6}	129.7	a	213
			80	5.73×10^{-6}		a	213
			90	1.81×10^{-5}		a	213
		α-Methylstyrene	70	1.99×10^{-6}	121.3	a	213
			80	4.93×10^{-6}		a	213
			90	1.55×10^{-5}			213
	tert-Butyl bicyclo[2.2.1]lheptane-2-percarboxylate	Cumene	85	1.16×10^{-6}	155.2	h	160
			100	1.02×10^{-5}	160		
			110	3.76×10^{-5}			160
			110	4.6×10^{-5}	150.2	h	223
			120	1.56×10^{-4}			223
			130	4.99×10^{-4}			223
	tert-Butyl endo-bicyclo[2.2.1]-heptane percarboxylate	Chlorobenzene	94.0	1.75×10^{-5}	137.2	h	147
			101.9	6.20×10^{-5}			147
			109.6	1.7×10^{-4}			147
			120.5	5.72×10^{-4}			147
			94.5	9.69×10^{-5}			147
			101.9	1.96×10^{-5}			182
			111.9	6.53×10^{-5}			182
			100.1	4.61×10^{-5}	149.0	h	181
			111.4	1.96×10^{-4}			181
			120.0	5.40×10^{-4}			181
		Cumene	94.0	1.87×10^{-5}	154.0	h	147
			101.9	5.30×10^{-5}			147
			109.6	1.10×10^{-4}			147
			120.3	4.3×10^{-4}			147
			94.5	5.27×10^{-5}	130.1	h	182
			101.9	1.12×10^{-4}			182
			111.9	3.57×10^{-4}			182
	tert-Butyl exo-bicyclo[2.2.11]-heptane-2-percarboxylate	Chlorobenzene	94.5	8.86×10^{-5}			182
			101.9	2.28×10^{-4}			182
			112.1	8.85×10^{-4}			182

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 (*cont'd*)			96.0	1.33×10^{-4}			147
			100.1	1.90×10^{-4}	129.3	h	181
			111.4	6.79×10^{-4}			181
			120.0	1.64×10^{-3}			181
		Cumene	84.4	2.19×10^{-5}	129.3	h	147
			94.7	7.29×10^{-5}			147
			100.1	1.37×10^{-4}			147
			108.6	3.6×10^{-4}			147
			113.5	6.19×10^{-4}			147
			94.5	6.05×10^{-5}	131.4	h	182
			101.9	1.53×10^{-4}			182
			112.1	4.72×10^{-4}			182
	tert-Butyl endo-bicyclo[2.2.1]-hept-5-ene-2-percarboxylate	Cumene	94.5	3.11×10^{-5}	136.4	h	182
			101.9	7.35×10^{-5}			182
			112.0	2.48×10^{-4}			182
	tert-Butyl exo-bicyclo[2.2.1]-hept-5-ene-2-percarboxylate	Chlorobenzene	94.5	5.59×10^{-5}			182
			101.9	$1\ 25 \times 10^{-4}$			182
			112.1	5.00×10^{-4}			182
		Cumene	94.5	4.48×10^{-5}	138.1	h	182
			101.9	1.18×10^{-4}			182
			112.1	3.97×10^{-4}			182
	tert-Butyl 4-bromophenoxyperacetate	Ethylbenzene	70.5	2.6×10^{-4}		a	315
	tert-Butyl 4-chlorophenoxyperacetate	Ethylbenzene	70.5	2.9×10^{-4}		a	315
	tert-Butyl 3-chlorophenylperacetate	Chlorobenzene	79.6	4.05×10^{-5}	123.0	h	178
			90.7	1.44×10^{-4}			178
			100.5	4.38×10^{-4}			178
		Cumene	79.6	2.98×10^{-5}		z (0.98)	207
			79.6	1.99×10^{-5}		z (6090)	207
	tert-Butyl 4-chlorophenyl peracetate	Chlorobenzene	79.6	8.44×10^{-5}	117.2	h	178
			90.7	2.95×10^{-4}			178
			100.5	8.19×10^{-4}			178
		Cumene	79.6	6.54×10^{-5}		z (0.98)	207
			79.6	4.45×10^{-5}		z (6090)	207
	tert-Butylcycloheptyl percarboxylate	*n*-Hexadecane	92.9	1.801×10^{-4}	121.5	h	255
			102.6	5.17×10^{-4}			255
		2,2,4-Trimethylpentane	92.9	1.703×10^{-4}	125.7	h	255
			102.6	5.07×10^{-4}			255
	tert-Butyl 2,4-dichlorophenoxy-peracetate	Ethylbenzene	70.5	9.4×10^{-5}		a	315
	tert-Butyl 2,2-diethyl perbutyrate	Cumene	45	1.23×10^{-5}	100.3	h	160
			55	4.92×10^{-5}			160
			65	1.46×10^{-4}			160
	tert-Butyl per-2-ethylhexanoate	Benzene	72	1.9×10^{-5}		a	338
		Chlorobenzene	72	1.93×10^{-5}			344
			91	1.93×10^{-4}			344
			113	1.93×10^{-3}			344
			T (K)	1.54×10^{14}	exp[$-$ 124.90/RT]		344
	tert-Butyl 2-methoxy-2-methyl-perpropionate	Chlorobenzene	$-$ 14.0	2.05×10^{-5}	86.3	m_2	275
			$-$ 7.0	6.73×10^{-5}		m_2	275
			$-$ 1.0	1.67×10^{-4}		m_2	275
			15.0	1.28×10^{-3}		m_2	275
	tert-Butyl 4-methoxyperbenzoate	Phenyl ether	100.0	1.07×10^{-5}	149.8	a	53
			110.1	4.17×10^{-5}		a	53
			120.2	1.28×10^{-4}		a	53
			130.9	4.28×10^{-4}		a	53
	tert-Butyl peroxy-2-methyl-benzoate	Chlorobenzene	96	1.93×10^{-5}			344
			115	1.93×10^{-4}			344
			136	1.93×10^{-3}			344
			T (K)	8.56×10^{15}	expr[$-$ 145.97/RT]		344
	tert-Butyl 4-methoxyperbenzoate	Carbon tetrachloride	80	1.0×10^{-6}			354
	tert-Butyl 4-methylperbenzoate	Phenyl ether	100.0	9.42×10^{-6}	151.0	a	53
			110.1	3.19×10^{-5}		a	53
			120.2	1.06×10^{-4}		a	53

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TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 (*cont'd*)	*tert*-Butyl 4-methylperbenzoate	Phenyl ether	130.9	3.25×10^{-4}		a	53
	tert-Butyl 2-methyl-2-*tert*-butylperoxyperpropionate	Benzene	9.0	6.66×10^{-5}	78.8	m_2	275
			19.0	1.99×10^{-4}			275
			30.0	6.94×10^{-4}			275
			42.0	2.43×10^{-3}			275
	tert-Butyl 2-methylsulfonyl perbenzoate	Chlorobenzene	105	6.68×10^{-6}			22
			120	5.57×10^{-5}			22
			135	2.76×10^{-4}			22
			150.6	2.05×10^{-3}			22
	tert-Butyl 2-(methylthio)perbenzoate	Chlorobenzene	60	8.08×10^{-4}	95.0	a,h	97
			39.4	2.59×10^{-5}		b	134
			50.1	2.42×10^{-4}		c	134
			50.2	1.88×10^{-4}		m_2	134
			69.8	1.96×10^{-3}			134
	tert-Butyl 4-(methylthio)perbenzoate	Chlorobenzene	120.4	1.75×10^{-4}			134
	tert-Butyl 4-nitrophenoxyperacetate	Ethylbenzene	70.5	6.7×10^{-5}	129.9	a,h	315
	tert-Butyl 4-nitrophenylperacetate	Chlorobenzene	79.6	2.5×10^{-5}	124.7	h	178
			90.7	8.9×10^{-5}			178
			100.5	2.83×10^{-4}			178
			80	3.77×10^{-5}			169
		Decane	77.5	6.30×10^{-6}			168
	tert-Butyl 4-nitrophenylperacetate	Dodecane	77.5	5.81×10^{-6}			168
			100	1.31×10^{-4}			168
		Hexadecane	77.5	5.11×10^{-6}			168
		Octane	77.5	6.42×10^{-6}			168
			100	1.60×10^{-4}			168
		Tetradecane	77.5	5.56×10^{-6}			168
	Di-*tert*-butyl per-2-chlorosuccinoate	Unknown	105	2.74×10^{-4}	102.9	x_2	214
				1.22×10^{-5}	143.5	x_2	214
			115	5.90×10^{-4}		x_2	214
				3.83×10^{-5}		x_2	214
			125	1.52×10^{-3}		x_2	214
				1.00×10^{-4}		x_2	214
	tert-Butyl peroctoate	Benzene	70	1.4×10^{-5}	130	a	337
			85	8.55×10^{-5}		a	337
			100	4.55×10^{-4}		a	337
		Decane	70	6.9×10^{-6}	130	a	337
			85	4.39×10^{-5}		a	337
			100	2.64×10^{-4}		a	337
	Di-*tert*-butyl persuccinoate	Styrene	105	1.93×10^{-5}	154.8	x_1	215
			115	6.7×10^{-5}		x_1	215
			125	2.53×10^{-4}		x_1	215
	tert-Butyl phenoxyperacetate	Ethylbenzene	70.5	4.4×10^{-4}	113.1	a,h	315
	tert-Butyl phenylperacetate	Chlorobenzene	60	6.79×10^{-6}	120.1	a,h	81
			77.0	6.85×10^{-5}	117.6	h	28
			88.6	2.45×10^{-4}		m_2	28
			79.6	1.05×10^{-4}	116.7	h	178
			90.7	3.53×10^{-4}			178
			100.5	1.003×10^{-3}			178
			79.6	1.07×10^{-4}		z (0.98)	157
			79.6	9.1×10^{-5}		z (4050)	157
			79.6	1.02×10^{-4}		z (0.98)	163
			79.6	9.0×10^{-4}		z (4050)	163
			85.0	1.945×10^{-4}		m_2	165
		Cumene	79.6	6.6×10^{-5}		z (0.98)	157
			79.6	5.6×10^{-5}		z (4050)	157
			79.6	6.78×10^{-5}		z (0.98)	163,207
			79.6	4.73×10^{-5}		z (6090)	163,207
			79.61	1.1×10^{-5}			274
		Decane	77.5	3.00×10^{-5}			168
		Dodecane	77.5	2.75×10^{-5}			168
		Hexadecane	77.5	2.60×10^{-5}			168
		Isooctane	85.0	1.08×10^{-4}			165
			95.2	3.527×10^{-4}			165

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
12 (*cont'd*)	*tert*-Butyl phenylperacetate	Octane	77.5	3.11×10^{-5}			168
		Paraffin oil	85.0	1.150×10^{-4}			165
		Tetradecane	77.3	2.66×10^{-5}			168
	tert-Butyl 2-propylperpenten-2-oate (*cis*)	Cumene	94.9	2.78×10^{-5}	137.2	h	172
			100.1	5.4×10^{-5}		z (0.98)	172
			100.1	4.26×10^{-5}		z (1100)	172
			100.1	2.31×10^{-5}		z (4000)	172
			110.1	1.72×10^{-4}			172
	(*trans*)	Cumene	94.9	2.47×10^{-5}	143.9	h	172
			100.1	4.7×10^{-5}		z (0.98)	172
			100.1	3.13×10^{-5}		z (1100)	172
			100.1	1.42×10^{-5}		z (3830)	172
			110.1	1.64×10^{-4}			172
	tert-Butyl 2,2,3,3-tetramethyl-perpropionate	Cumene	42.2	8.76×10^{-6}	114	h	267
			54.9	5.84×10^{-5}			267
			70.3	3.36×10^{-4}			267
	tert-Butyl thiophenylperacetate	Ethylbenzene	70.5	3.8×10^{-4}		a	315
	tert-Butyl per-*o*-toluate	Benzene	97	1.9×10^{-5}		a	338
	tert-Butyl per-paratoluate	Cumene	84.0	1.660×10^{-6}			345
			99.3	1.139×10^{-5}			345
			115.0	6.77×10^{-5}			345
	tert-Butyl-*N*-(3-tolylperoxy)-carbamate	Toluene	64.0	4.58×10^{-5}	102.9	h	36
			70.7	9.17×10^{-5}			36
			78.0	2.03×10^{-4}			36
			88.5	5.78×10^{-4}			36
	tert-Butyl 2,4,5-trichloro-phenoxyperacetate	Ethylbenzene	70.5	5.8×10^{-5}		a	315
	4-Chlorocumyl perpropionate	Benzene	70	1.46×10^{-6}	129.3	a	213
			80	5.68×10^{-6}		a	213
			90	1.79×10^{-5}		a	213
		α-Methylstyrene	70	1.50×10^{-6}	118.8	a	213
			80	4.54×10^{-6}		a	213
			90	1.47×10^{-5}		a	213
	Cumyl perpropionate	Benzene	70	2.60×10^{-6}	101.7	a	213
			80	6.15×10^{-6}		a	213
			90	1.90×10^{-5}		a	213
		α-Methylstyrene	70	6.31×10^{-6}	106.7	a	213
			80	1.71×10^{-5}		a	213
			90	4.94×10^{-5}		a	213
	4-Iodocumyl perpropionate	Benzene	70	1.37×10^{-6}	133.1	a	213
			80	5.76×10^{-6}		a	213
			90	1.79×10^{-5}		a	213
		α-Methylstyrene	70	1.54×10^{-6}	125.5	a	213
			80	4.96×10^{-6}		a	213
			90	1.62×10^{-5}		a	213
	4-Nitrocumyl perpropionate	Benzene	70	1.36×10^{-6}	133.5	a	213
			80	5.32×10^{-6}		a	213
			90	1.78×10^{-5}		a	213
		α-Methylstyrene	70	1.35×10^{-6}	124.7	a	213
			80	4.07×10^{-6}		a	213
			90	1.43×10^{-5}		a	213
	1,1,3-Trimethylbutyl perpivalate	Cumene	40	4.80×10^{-6}			362
			50	1.77×10^{-5}			362
			60	6.18×10^{-5}			362
			70	2.344×10^{-4}			362
13	*tert*-Amyl per-2-ethylhexanoate	Benzene	70	1.9×10^{-5}		a	338
		Chlorobenzene	73	1.93×10^{-5}			344
			91	1.93×10^{-4}			344
			111	1.93×10^{-3}			344
			T (K)	1.77×10^{15}	$\exp[-132.11/RT]$		344
	Benzyl(*tert*-butylperoxy)oxalate	Benzene	45	3.65×10^{-5}	111.3	c,h	31
			55	1.33×10^{-4}		c	31
			65	4.69×10^{-4}		c	31

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TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
13 (*cont'd*)	*tert*-Butyl benzyloxyperacetate	Ethylbenzene	40.0	1.3×10^{-4}	100.6	a,h	315
			40.0	1.45×10^{-4}	101.8	h,m_2	328
			51.0	5.03×10^{-4}			328
			60.7	1.62×10^{-3}			328
	tert-Butyl benzylthioperacetate	Ethylbenzene	40.0	2.60×10^{-5}	108.1	h,m_2	328
			60.0	3.31×10^{-4}			328
			70.0	1.14×10^{-3}			328
	tert-Butyl bicyclo[2.2.2]octane-1-percarboxylate	Cumene	65	7.5×10^{-6}	119.2	h	160
			75	2.82×10^{-5}			160
			85	8.47×10^{-5}			160
			80	5.1×10^{-5}	120.1	h	223
			90	1.67×10^{-4}			223
			100	4.86×10^{-4}			223
	tert-Butyl endo-bicyclo[2.2.1]-2-methylheptane-2-percarboxylate	Cumene	75	7.35×10^{-5}	126.8	h	206
			80	1.39×10^{-4}			206
			85	2.64×10^{-4}			206
			90	4.81×10^{-4}			206
			95	8.41×10^{-4}			206
	tert-Butyl exo-bicyclo[2.2.1]-2-methylheptane-2-percarboxylate	Cumene	60	7.78×10^{-5}	116.7	h	206
			65	1.44×10^{-4}			206
			70	2.75×10^{-4}			206
			75	4.89×10^{-4}			206
			80	8.93×10^{-4}		c	206
	tert-Butyl 1,4-dimethylcyclohexane-1-percarboxylate (*cis*)	Cumene	60.0	7.52×10^{-5}	115.2	h	206
			70.0	2.66×10^{-4}			206
			80.0	8.49×10^{-4}		c	206
	(*trans*)	Cumene	60.0	6.93×10^{-5}	116.3	c,h	206
			70.0	2.52×10^{-4}		c	206
			80.0	7.79×10^{-4}			206
	tert-Butyl 3-methoxyphenyl-peracetate	Chlorobenzene	79.6	9.9×10^{-5}	122.2	h	178
			90.7	3.45×10^{-4}			178
			100.5	1.051×10^{-3}			178
	tert-Butyl 4- methoxyphenyl-peracetate	Chlorobenzene	56.0	4.57×10^{-5}	105.4	h	178
			60.3	9.9×10^{-5}			178
			70.2	3.06×10^{-4}			178
			79.3	7.99×10^{-4}			178
			48.9	1.93×10^{-5}		k	249
		Cumene	60	6.85×10^{-5}		z (0.98)	207
			60	5.31×10^{-5}		z (4050)	207
			79.6	5.942×10^{-4}	207		
		Decane	77.5	2.52×10^{-4}			168
		Dodecane	77.5	2.60×10^{-4}			168
		Ethylbenzene	70.5	1.4×10^{-3}	104.8	a,h	315
		Isooctane	60.5	4.72×10^{-5}			169
		Octane	77.5	2.53×10^{-4}			168
		Paraffin oil	60.5	4.20×10^{-5}			169
		Tetradecane	77.5	2.68×10^{-4}			168
	tert-Butyl 4-methylphenyl peracetate	Chlorobenzene	70.4	8.67×10^{-5}	110.9	h	178
			79.6	2.37×10^{-4}			178
			90.7	7.95×10^{-4}			178
		Cumene	79.6	1.649×10^{-4}		z (0.98)	207
			79.6	1.180×10^{-4}		z (6080)	207
		Decane	77.5	9.08×10^{-5}			168
		Dodecane	77.5	8.57×10^{-5}			168
		Ethylbenzene	70.5	7.2×10^{-4}		a	315
		Hexadecane	77.5	1.032×10^{-4}			168
		Octane	77.5	8.83×10^{-5}			168
		Tetradecane	77.5	7.75×10^{-5}			168
	Di-*tert*-butyl perglutarate	Styrene	105	2.65×10^{-5}		x_1	215
			115	1.06×10^{-4}		x_1	215
			125	3.00×10^{-4}			215
	tert-Butylperoxy 2-ethylhexyl-carbonate	Chlorobenzene	99	1.93×10^{-5}			344
			117	1.93×10^{-4}			344
			137	1.93×10^{-3}			344

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
13 (*cont'd*)	*tert*-Butylperoxy 2-ethylhexyl-carbonate	Chlorobenzene	T (K)	4.07×10^{16}	exp[− 151.72/RT]		344
	tert-Butyl 2-phenylperpropionate	Cumene	40.7	7.88×10^{-6}			273
			60.1	8.44×10^{-5}			273
			80.1	8.10×10^{-4}			273
	tert-Butyl 2,2,4,4-tetra-methylperbutyrate	Cumene	40.8	6.15×10^{-6}	111	h	267
			54.7	3.82×10^{-5}			267
			70.7	2.73×10^{-4}			267
	tert-Butylthiobenzylperacetate	Ethylbenzene	40.0	2.62×10^{-5}	100.6	a,h	315
	tert-Butyl peroxy-3,5,5-tri-methylhexanoate	Chlorobenzene	95	1.93×10^{-5}			344
			114	1.93×10^{-4}			344
			135	1.93×10^{-3}			344
			T (K)	1.94×10^{15}	exp[− 140.78/RT]		344
	4-Nitrobenzyl(*tert*-butylperoxy)-oxalate	Benzene	45	1.30×10^{-5}	116.7	c,h	31
			55	4.89×10^{-5}		c	31
			65	1.89×10^{-4}		c	31
14	*tert*-Amylperoxy 2-ethylhexyl-carbonate	Chlorobenzene	95	1.93×10^{-5}			344
			113	1.93×10^{-4}			344
			134	1.93×10^{-3}			344
			T (K)	2.22×10^{16}	exp[− 148.41/RT]		344
	tert-Butyl di-*tert*-butylperacetate	Cumene	54.7	4.38×10^{-6}	125.3	h	245
			70.2	3.56×10^{-5}			245
			85.4	2.44×10^{-4}			245
	tert-Butyl 2-carbomethoxyphenyl-peracetate	Cumene	70.8	1.48×10^{-5}	116.9	h	257
			85.4	8.07×10^{-5}			257
			101.0	4.38×10^{-4}			257
	tert-Butyl 2-(4-chlorophenoxy)-2-methylperpropionate	Ethylbenzene	40.0	7.2×10^{-4}		a	315
	tert-Butyl 2-(4-chlorophenyl)-2-methylperpropionate	Acetonitrile	50.0	2.55×10^{-4}			265
		Benzene	50.0	2.03×10^{-4}			265
		Dodecane	50.0	7.98×10^{-5}	108.1	h	265
			60.0	2.68×10^{-4}			265
			67.0	6.36×10^{-4}			265
		Hexadecane	50.0	8.00×10^{-5}			265
			60.0	2.56×10^{-4}			265
			67.0	5.96×10^{-4}			265
		Octane	50.0	8.10×10^{-5}			265
			60.0	2.65×10^{-4}			265
			67.0	5.95×10^{-4}			265
	tert-Butyl α-methylpercinnamate (*cis*)	Cumene	99.6	1.23×10^{-4}	128.0	f,h	150
			109.8	3.70×10^{-4}		f	150
	(*trans*)	Cumene	99.6	3.5×10^{-5}	125.5	f,h	150
			109.8	1.03×10^{-4}		f	150
	tert-Butyl 2-methyl-2-phenylper-propionate	Chlorobenzene	34.1	3.26×10^{-5}			249
		Cumene	39.7	5.63×10^{-5}			249
	tert-Butyl perneodecanoate	Benzene	47	1.9×10^{-5}			338
		Chlorobenzene	46	1.93×10^{-5}			344
			64	1.93×10^{-4}			344
			84	1.93×10^{-3}			344
			T (K)	1.52×10^{14}	exp[− 115.47/RT]		344
	tert-Butyl 2-(4-nitrophenyl)-2-methylperpropionate	Acetonitrile	50.0	7.50×10^{-5}	105.2	h	265
		Benzene	50.0	6.40×10^{-5}			265
		Dodecane	50.0	2.63×10^{-5}			265
			60.0	9.27×10^{-5}			265
			67.0	2.03×10^{-4}			265
		Octane	67.0	1.98×10^{-4}			265
	tert-Butyl permesitoate	Cumene	84.0	1.464×10^{-5}			345
			99.3	9.94×10^{-5}			345
			115.0	6.7×10^{-5}			345
	tert-Butyl 1-phenylcyclo-propylpercarboxylate	*n*-Dodecane	113.0	8.67×10^{-5}			255
		Ethylbenzene	120.0	2.49×10^{-4}	147.5	h,t_1	323
			130.0	7.49×10^{-4}		t_1	323
			140.0	2.22×10^{-3}		t_1	323

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TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	*T* (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
14 (*cont'd*)	*tert*-Butyl 1-phenylcyclo-propylpercarboxylate	2,2,4-Trimethyl pentane	102.6	2.53×10^{-5}	141.2	h	255
			113.0	8.96×10^{-5}			255
			120.4	2.04×10^{-4}			255
	tert-Butyl phenyldimethylperacetate	Chlorobenzene	60	9.6×10^{-4}	109.2	c,h	81
		Isooctane	40.6	2.95×10^{-5}		t_9	165
			60.6	3.059×10^{-4}		t_9	165
			60.6	4.064×10^{-4}		m_2	165
	tert-Butyl 2-phenyl-3-perbutenoate	Chlorohenzene	60	2.9×10^{-3}	96.2	c,h	81
	tert-Butyl 4-phenyl-3-perbutenoate	Chlorobenzene	60	1.15×10^{-4}	98.3	c,h,g	81
	tert-Butyl 2-phenyl-2-methyl-perpropionate	Acetonitrile	50.0	3.08×10^{-4}			265
		Benzene	50.0	2.18×10^{-4}			265
		Benzophenone	60	7.73×10^{-4}			334
		Benzyl benzoate	60	7.92×10^{-4}			334
		Butyl phthalate	60	6.5×10^{-4}			334
		Chlorobenzene	60	7.00×10^{-4}			334
		Cumene	60	5.25×10^{-4}			334
		Dodecane	50.0	8.77×10^{-5}	109.3	h	265
			60.0	3.00×10^{-4}			265
			67.0	7.13×10^{-4}			265
			60	2.88×10^{-4}			334
		Hexadecane	60	3.53×10^{-4}			334
		Methyl benzoate	60	7.55×10^{-4}		t_{12}	334
		Octyl phthalate	60	5.70×10^{-4}			334
		Toluene	60	5.66×10^{-4}			334
	tert-Butyl 4-vinylphenylperacetate	Cumene	70.9	5.54×10^{-5}	116.5	h,k	254
			85.4	3.00×10^{-4}		k	254
			100.3	1.48×10^{-3}			254
	Dibenzyl peroxalate	Pentane	25	6.7×10^{-5}			203
	Di-*tert*-butyl adipate	Styrene	105	3.50×10^{-5}	151.0	x_1	215
			115	1.23×10^{-4}		x_1	215
			125	3.05×10^{-4}		x_1	215
	Dicyclohexyl peroxydicarbonate	Benzene	50	5.4×10^{-5}		c	201
		Chlorobenzene	44	1.93×10^{-5}			344
			60	1.93×10^{-4}			344
			77	1.93×10^{-3}			344
			T (K)	3.3×10^{16}	$\exp[-129.0/RT]$		344
		α-Methylstyrene	50	5.9×10^{-5}			201
		Mineral spirits	45	2.78×10^{-5}	117	a	337
			50	5.58×10^{-4}		a	337
			60	2.07×10^{-4}		a	337
	4-Methoxybenzyl (*tert*-butylperoxy)-oxalate	Benzene	45	6.69×10^{-5}	109.6	c,h	31
			55	2.48×10^{-4}		c	31
			65	8.27×10^{-4}		c	31
	1-Methyl-1-phenylethyl 2,2-dimethyl-peroxyporpionate	Cumene	40	6.91×10^{-6}			368
			50	2.80×10^{-5}			368
			60	1.032×10^{-4}			368
			70	3.57×10^{-4}			368
15	*tert*-Amyl perneodecanoate	Benzene	45	1.9×10^{-5}		a	338
		Chlorobenzene	43	1.93×10^{-5}			344
			61	1.93×10^{-4}			344
			81	1.93×10^{-3}			344
			T (K)	1.47×10^{14}	$\exp[-114.38/RT]$		344
	Dibenzoyl monopercarbonate	Benzene	60.00	8.05×10^{-5}	116.5	h	280
	tert-Butyl 1-adamantyl-percarboxylate	Cumene	45	5.15×10^{-5}	115.5	h	160
			55	2.05×10^{-5}			160
			65	7.40×10^{-5}			160
			64.6	6.87×10^{-5}	116.7	h	159
			74.6	2.44×10^{-4}			159
			84.6	7.78×10^{-4}			159
			60	5.4×10^{-5}	124.7	h	223
			70	2.12×10^{-4}			223
			80	7.20×10^{-4}			223

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
15 (*cont'd*)	*tert*-Butyl 4-(carboethoxy)-phenoxyperacetate	Ethylbenzene	70.5	1.6×10^{-4}		a	315
	tert-Butyl α,β-dimethyl-percinnamate (*cis*)		95.0	1.02×10^{-4}	118.8	a,h	151
			103.2	2.29×10^{-4}		a	151
			110.1	5.15×10^{-4}		a	151
	(*trans*)		85.1	3.9×10^{-5}	122.6	a,h	151
			95.0	1.17×10^{-4}		a	151
			103.7	2.84×10^{-4}		a	151
			110.0	6.05×10^{-4}		a	151
			110.0	7.90×10^{-4}		a,v_6	151
	tert-Butyl 1-pernaphthoate	Chlorobenzene	110.1	8.69×10^{-5}			154
	tert-Butyl 2,2-dimethyl-3-phenylthio perpropionate	Cyclohexane	55	1.63×10^{-5}	116.9	h,t_6	320
			65	1.61×10^{-5}			320
			75	1.98×10^{-4}		t_6	320
	tert-Butyl 2-(4-methoxyphenyl)-2-methylperpropionate	Acetonitrile	50	1.675×10^{-3}			265
		Benzene	50	9.96×10^{-4}			265
		Dodecane	40	1.49×10^{-4}	93.0	h	265
			50	4.21×10^{-4}			265
			57	1.028×10^{-3}			265
		Octane	50	4.18×10^{-4}			265
	tert-Butyl 1-phenylcyclo-*n*-Dodecane	52.3	7.89×10^{-5}			255	
	butylpercarboxylate	Ethylbenzene	60.0	3.62×10^{-4}		t_1	323
		n-Hexadecane	52.3	8.80×10^{-5}			255
		2,2,4-trimethyl pentane	52.3	7.69×10^{-5}	110.6	h	255
			61.6	2.46×10^{-4}			255
	tert-Butyl 4-*tert*-butylperbenzoate	Chlorobenzene	100.1	3.81×10^{-5}			134
			119.8	4.50×10^{-4}			134
			135.9	2.38×10^{-3}			134
	Di-*tert*-butyl perpimelate	Styrene	105	4.45×10^{-5}	150.6	x_1	215
			115	1.05×10^{-4}		x_1	215
			125	5.06×10^{-4}		x_1	215
	tert-Butyl 2-(4-tolyl)-2-methylperpropionate	Acetonitrile	50.0	6.00×10^{-4}			265
		Benzene	50.0	3.85×10^{-4}			265
		Dodecane	50.0	1.90×10^{-4}	100.6	h	265
			60.0	5.58×10^{-4}			265
			67.0	1.320×10^{-3}			265
		Octane	60.0	5.43×10^{-4}			265
	tert-Butyl triisopropylperacetate	Cumene	24.8	5.32×10^{-6}	111.5	h	267
			41.6	6.84×10^{-5}			267
			55.2	3.78×10^{-4}			267
	1,1-Dimethyl-2-phenylethyl-perpivalate	Cumene	40	4.56×10^{-6}			362
			50	1.833×10^{-5}			362
			60	6.1×10^{-5}			362
			70	2.51×10^{-4}			362
	1-Phenylethyl 4-methoxyperacetate	Benzene	99.7	3.50×10^{-4}	134.1	h	259
	1-Phenylethyl 3-nitroperbenzoate	Benzene	100	5.97×10^{-4}	136.2	h	259
	1-Phenylethyl 4-nitroperbenzoate	Benzene	100	4.10×10^{-4}	146.2	h	259
	1-Phenylethyl perbenzoate	Benzene	100	4.03×10^{-4}	123.6	h	259
16	Dibenzyl peroxydicarbonate	Benzene	40	2.0×10^{-5}	117	a	337
			50	6.25×10^{-5}		a	337
			60	2.67×10^{-4}		a	337
	Di-*tert*-butyl 2-iodoperisophthalate	Chlorobenzene	68.4	8.24×10^{-5}	93.9	h	248
			85.4	4.45×10^{-4}			248
			101.6	1.68×10^{-3}			248
	Di-*tert*-butyl perphthalate	Benzene	100	1.1×10^{-5}	159	a	337
			115	7.81×10^{-5}		a	337
			130	4.81×10^{-4}		a	337
		Di-*n*-butyl phthalate	100	1.08×10^{-5}	155.0	h	269
			115	7.8×10^{-5}			269
			130	4.8×10^{-4}			269
		Chlorobenzene	107	1.93×10^{-5}			344
			125	1.93×10^{-4}			344
			146	1.93×10^{-3}			344
			T (K)	9.39×10^{16}	exp[− 157.85/RT]		344

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
16 (*cont'd*)	Di-*tert*-butyl perphthalate	Cumene	99.9	8.34×10^{-6}	140.8	h	269
			115.0	4.68×10^{-5}			269
			130.1	2.60×10^{-4}			269
	tert-Butyl l-phenyl-l-cyclo-pentane percarboxylate	Ethylbenzene	60.0	1.52×10^{-3}		t_1	323
	tert-Butyl 2,3-dimethyl-2-phenylperbutyrate	Ethylbenzene	50	4.30×10^{-5}			324
	Cumyl *N*-phenylperoxy carbamate	Xylene	T (K)	1.26×10^{14}	$\exp[-117.6/RT]$		40
	Dibenzyl peroxydicarbonate	Toluene	50	2.92×10^{-5}		a	90
	Di-*tert*-butyl perphthalate	Benzene	100	1.08×10^{-5}	157.7	a	126
			115	7.83×10^{-5}		a	126
			130	4.80×10^{-4}		a	126
	Di-*tert*-butyl persuberate	Styrene	115	7.86×10^{-5}	159.0	x_1	215
			125	2.81×10^{-4}		x_1	215
	tert-Butyl 1-phenylcyclopentyl-percarboxylate	2,2,4-Trimethyl-pentane	43.5	1.184×10^{-4}	103.5	h	255
			52.3	3.51×10^{-4}			255
	1,1,3,3-Tetramethylbutyl-per-2-ethylhexanoate	Benzene	60	1.9×10^{-5}	101	a	337
			70	5.30×10^{-5}		a	337
			80	1.38×10^{-4}		a	337
	2-Phenylazo-2-propylperbenzoate	Chlorobenzene	10	4.5×10^{-4}			260
			35	1.9×10^{-3}			260
		p-Chlorotoluene	10	6.4×10^{-4}			260
		Chloroform-d_1	10	5.1×10^{-4}			260
	1-Phenylethyl 4-dimethyl-aminoperbenzoate	Benzene	100	2.16×10^{-3}	111.5	h	259
17	Di-*tert*-butylperhomoterephthalate	Cumene	79.6	2.38×10^{-5}			272
		Toluene	70.6	9.44×10^{-6}	122.3	h	272
			80.3	2.80×10^{-5}			272
			100.5	3.09×10^{-4}			272
	tert-Butyl 1-phenylcyclo-hexanepercarboxylate	Ethylbenzene	60.0	1.90×10^{-3}			323
		2,2,4-Trimethyl-pentane	43.5	1.27×10^{-4}	107.7	h	255
			52.3	3.91×10^{-4}			255
			61.6	1.218×10^{-3}			255
	tert-Butyl 2-(phenylthio)perbenzoate	Acetone	25	1.89×10^{-5}		m_2	22
			40	1.22×10^{-4}		m_2	22
		Acetonitrile	25	1.01×10^{-4}		m_2	22
			40	5.44×10^{-4}		m_2	22
		tert-Butanol	25	5.26×10^{-5}		m_2	22
			40	3.24×10^{-4}		m_2	22
		Chlorobenzene	39.3	4.98×10^{-5}		b	134
			53.8	5.23×10^{-4}			134
			53.8	4.58×10^{-4}		m_2	134
			70.0	2.62×10^{-3}			134
			25	1.76×10^{-5}		m_2	22
			40	1.03×10^{-4}		m_2	22
		Cyclohexane	25	9.8×10^{-7}		m_2	22
			40	6.9×10^{-6}		m_2	22
		DMSO	25	1.11×10^{-4}		m_2	22
			40	6.02×10^{-4}		m_2	22
		Ethanol	25	2.31×10^{-4}		m_2	22
			40	1.65×10^{-3}		m_2	22
		Isopropanol	25	1.33×10^{-4}		m_2	22
			40	7.25×10^{-4}		m_2	22
		Methanol	25	8.21×10^{-4}		m_2	22
			40	4.75×10^{-3}		m_2	22
	tert-Butyl dibenzothiophene-4-per-carboxylate	Chlorobenzene	105	2.79×10^{-5}	128.0	h	22
			119.4	1.29×10^{-4}			22
			135.1	6.07×10^{-4}			22
	Di-*tert*-butyl perazelate	Styrene	105	5.13×10^{-5}	154.8		215
			115	1.20×10^{-4}			215
			125	5.10×10^{-4}			215
		Chlorobenzene	98	1.93×10^{-5}			344
			116	1.93×10^{-4}			344
			137	1.93×10^{-3}			344
			T (K)	1.35×10^{16}	$\exp[-147.95/RT]$		344

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
18	*tert*-Butyl 4-benzoylperbenzoate	Benzene	25	1.84×10^{-4}		p_2	279
		Chlorobenzene	110	2.88×10^{-5}			279
	tert-Butyl diphenylperacetate	Chlorobenzene	60	4.44×10^{-4}	101.7	a,h	81
		Cumene	40.3	2.75×10^{-5}	104.6	h	136
			49.6	9.81×10^{-5}			136
			59.9	3.10×10^{-4}			136
			70.4	1.04×10^{-3}			136
		Decane	77.5	1.66×10^{-3}			168
		Dodecane	77.5	1.688×10^{-3}			168
		Hexadecane	77.5	1.632×10^{-3}			168
		Octane	77.5	1.651×10^{-3}			168
		tetradecane	77.5	1.627×10^{-3}			168
	2,4,4-Trimethylpentyl-2-perneodecanoate	Chlorobenzene	40	1.93×10^{-5}			344
			57	1.93×10^{-4}			344
			76	1.93×10^{-3}			344
			T (K)	3.97×10^{14}	$\exp[-115.79/RT]$		344
	α,ω-Di-*O,O-tert*-butyl-(bis-persuccinyl)ethylene glycol	Ethylbenzene	95	2.68×10^{-6}	147.5		306
			105	9.10×10^{-6}			306
			115	2.97×10^{-5}			306
	tert-Butyl 1-phenyl-1-cyclo-heptanepercarboxylate	Ethylbenzene	60.0	2.75×10^{-3}			323
	Di-*tert*-butyl *p*-phenylene-diperacetate	Cumene	70.9	3.69×10^{-5}	112.7	h,k	254
			85.4	2.08×10^{-4}		k	254
			100.3	8.83×10^{-4}		k	254
	tert-Butyl 2-(phenylthiomethyl)-perbenzoate	Chlorobenzene	98.7	4.64×10^{-5}	134.7	h	154
			120.1	4.20×10^{-4}			154
	tert-Butyl thioxanthone-4-per-carboxylate	Chlorobenzene	120	1.89×10^{-4}	156.5	h,m_2	22
			135	1.15×10^{-3}		m_2	22
	Di-*tert*-butyl persebacate	Styrene	105	5.10×10^{-5}	154.8	x_1	215
			115	1.20×10^{-4}		x_1	215
			125	5.00×10^{-4}		x_1	215
	Di-(2-ethylhexyl)peroxy-dicarbonate	Benzene	40	1.9×10^{-5}		a	338
		Chlorobenzene	47	1.93×10^{-5}			344
			64	1.93×10^{-4}			344
			83	1.93×10^{-3}			344
			T (K)	1.83×10^{15}	$\exp[-122.45/RT]$		344
		Decane	30	5.3×10^{-6}	105	a	337
			45	3.31×10^{-5}		a	337
			60	2.32×10^{-4}		a	337
		Mineral spirits	40	1.3×10^{-5}	126	a	337
			50	6.14×10^{-5}		a	337
			60	2.31×10^{-4}		a	337
	Di-*n*-heptyl persuccinate	Styrene	60	6.1×10^{-6}	131.0	x_1	215
			73.5	3.85×10^{-5}		x_1	215
			85	1.70×10^{-4}		x_1	215
19	*tert*-Butyl diphenylmethyl-peracetate	Chlorobenzene	60	1.9×10^{-3}	103.3	a,h	81
	tert-Butyl diphenylperglycidate (*cis*)	Cumene	60.0	2.8×10^{-5}	112.1	h	204
			70.0	5.5×10^{-5}			204
			80.0	1.68×10^{-4}			204
	(*trans*)	Cumene	60.0	1.6×10^{-5}	117.2	h	204
			70.0	3.9×10^{-5}			204
			80.0	1.20×10^{-4}			204
	tert-Butyl 2,2-diphenylperpropionate	Chlorobenzene	34.1	7.76×10^{-5}			249
	tert-Butyl 4-hydroxy-3,5-di-(*tert*-butyl)perbenzoate	Benzene	100	3.18×10^{-5}		c,e	246
		Carbon tetrachloride	100	3.60×10^{-5}		c,e	246
	tert-Butyl 4-(4-methylbenzoyl)-perbenzoate	Benzene	25	1.45×10^{-4}		p_2	279
		Chlorobenzene	110	3.03×10^{-5}			279

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TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
19 (*cont'd*)	*tert*-Butyl α-phenylpercinnamate	Cumene	99.6	1.52×10^{-4}	136.8	h	150
	(*cis*)		109.8	4.41×10^{-4}			150
	(*trans*)	Cumene	99.6	8.2×10^{-5}	133.9	h	150
			109.8	2.59×10^{-4}			150
	Cumyl perneodecanoate	Benzene	39	1.9×10^{-5}		a	338
		Chlorobenzene	39	1.93×10^{-5}			344
			56	1.93×10^{-4}			344
			75	1.93×10^{-3}			344
			T (K)	3.12×10^{14}	$\exp[-114.59/RT]$		344
20	Di-*n*-heptyl peradipate	Styrene	60	1.02×10^{-5}	133.1	x_1	215
			73.5	6.57×10^{-5}		x_1	215
			85	2.98×10^{-4}		x_1	215
	tert-Butyl 2-carbobenzoxy-phenylperacetate	Cumene	71.0	8.84×10^{-6}	129.5	h	257
			85.4	5.46×10^{-5}			257
			102.4	4.23×10^{-4}			257
	tert-Butyl 2-methyl-2-phenyl-perhexanoate	Ethylbenzene	50	5.01×10^{-5}			324
	α,ω-Di-*O,O*-*tert*-butyl-(bis-persuccinyl)diethylene glycol	Ethylbenzene	95	2.34×10^{-6}	155.0	h	306
			105	8.88×10^{-6}			306
			115	3.27×10^{-5}			306
21	*tert*-Butyl 8-(phenylthio)-1-pernaphthoate	Chlorobenzene	50	3.83×10^{-5}	99.2	h,m_2	154
			70	3.44×10^{-4}		m_2	154
			70	3.12×10^{-4}			154
			80	9.82×10^{-4}		m_2	154
	tert-Butyl 4-(2,4,6-trimethyl-benzoyl)perbenzoate	Benzene	25	1.34×10^{-4}		p_2	279
		Chlorobenzene	110	1.80×10^{-5}			279
22	*tert*-Butyl 2,2-diphenyl-3,3-dimethylperbutanoate	Toluene (?)	30	2.76×10^{-5}	114.8	j_2	250
			39.7	1.15×10^{-4}		j_2	250
			50	5.45×10^{-4}		k	250
	Di-*tert*-butyl 2-thiophenyl-perisophthalate	Chlorobenzene	12.1	1.68×10^{-4}	73.7	h	248
			25.0	6.45×10^{-4}			248
			40.0	3.09×10^{-3}			248
	2,5-Dimethylhexyl 2,5-di(peroxybenzoate)	Benzene	100	1.87×10^{-5}	154.0	a	126,337
			115	1.25×10^{-4}		a	126,337
			130	7.14×10^{-4}		a	126,337
	Di-(4-*tert*-butylcyclohexyl)-peroxydicarbonate	Chlorobenzene	48	1.93×10^{-5}			344
			64	1.93×10^{-4}			344
			82	1.93×10^{-3}			344
			T (K)	7.44×10^{15}	$\exp[-126.39/RT]$		344
23	*tert*-Butyl 2,6-di(phenylthio)-perbenzoate	Chlorobenzene	40.1	7.07×10^{-5}			154
	tert-Butylperoxy stearyl carbonate	Chlorobenzene	98	1.93×10^{-5}			344
			117	1.93×10^{-4}			344
			137	1.93×10^{-3}			344
			T (K)	3.94×10^{16}	$\exp[-151.59/RT]$		344
	tert-Butyl 2,4,6-tri-*tert*-butyl-perbenzoate	Cumene	70.4	5.84×10^{-6}			345
			84.0	3.54×10^{-5}			345
			99.3	2.67×10^{-4}			345
			115.0	1.656×10^{-3}			345
24	*tert*-Butyl triphenylperacetate	Chlorobenzene	34.9	7.8×10^{-4}			153
		Cumene	25.7	1.7×10^{-4}	100.8	h	153
			34.9	5.8×10^{-4}			153
			45.5	2.3×10^{-3}			153
	Di-*tert*-butyl 2,3-diphenyl-persuccinate	Cumene	70.1	9.83×10^{-5}	125.5	c,h	196
			79.9	3.29×10^{-4}		c	196
			90.0	1.20×10^{-3}		c	196
	Di-*n*-heptyl persebacate	Styrene	60	1.17×10^{-5}	131.0	x_1	215
			73.5	7.13×10^{-5}		x_1	215
			85	3.03×10^{-5}		x_1	215
	2,5-Dimethyl-2,5-bis(2-ethyl-hexanoylperoxy)hexane	Benzene	60	6.7×10^{-6}	142	a	337
			70	2.92×10^{-5}		a	337
			80	1.14×10^{-4}		a	337
		Chlorobenzene	68	1.93×10^{-5}			344
			86	1.93×10^{-4}			344

TABLE 6. *cont'd*

Number of C atoms	Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
24 (*cont'd*)	2,5-Dimethyl-2,5-bis(2-ethyl-hexanoylperoxy)hexane	Chlorobenzene	106	1.93×10^{-3}			344
			T (K)	2.19×10^{15}	exp[− 130.88/*RT*]		344
25	*tert*-Butyl 2-(2,2-diphenylvinyl)-perbenzoate	Chlorobenzene	90.0	1.32×10^{-4}			175
			90.3	7.45×10^{-5}		t_9	175
			100.0	3.27×10^{-4}			175
			105.5	4.64×10^{-4}		t_9	175
			119.3	1.54×10^{-3}		t_9	175
		Cyclohexane	90.0	3.5×10^{-5}			175
		Methanol	90.4	2.3×10^{-3}		t_9	175
	tert-Butyl 2-percarboxybenzal-fluorene	Chlorobenzene	90	3.75×10^{-4}			175
		Methanol	90	2.47×10^{-3}			175
26	α,ω-Di-*O*,*O*-caprylyl-(bis succinyl)ethylene glycol	Ethylbenzene	65	1.48×10^{-5}	120.7	h	306
			75	4.10×10^{-5}			306
			85	2.19×10^{-4}			306
			95	6.92×10^{-4}			306
30	α,ω-Di-*O*,*O*-caprylyl-(bis-persuccinyl)triethylene glycol	Ethylbenzene	65	2.74×10^{-5}	116.9		306
			75	8.47×10^{-5}			306
			85	2.95×10^{-4}			306
			95	8.92×10^{-4}			306
	Dimyristyl peroxydicarbonate	Chlorobenzene	48	1.93×10^{-5}			344
			65	1.93×10^{-4}			344
			84	1.93×10^{-3}			344
			T (K)	2.82×10^{15}	exp[− 124.10/*RT*]		344
34	Dicetyl peroxydicarbonate	Chlorobenzene	48	1.93×10^{-5}			344
			65	1.93×10^{-4}			344
			84	1.93×10^{-3}			344
			T (K)	3.02×10^{15}	exp[− 124.30/*RT*]		344
36	α,ω-Di-*O*,*O*-heptanoyl-(bis-perphthaloyl)triethylene glycol	Ethylbenzene	65	5.02×10^{-5}	124.4		306
			75	1.420×10^{-4}			306
			85	5.19×10^{-4}			306
			95	1.410×10^{-3}			306
42	α,ω-Di-*O*,*O*-caprylyl-(bis-persuccinyl)nonaethylene glycol	Ethylbenzene	65	1.66×10^{-5}	116.9		306
			75	6.57×10^{-5}			306
			85	1.78×10^{-4}			306
			95	9.72×10^{-4}			306
46	α,ω-Di-*O*,*O*-heptanoyl-(bis-perphthaloyl)tridecaethylene glycol	Ethylbenzene	75	1.130×10^{-4}	122.3		306
			85	3.50×10^{-4}			306
			95	8.80×10^{-4}			306
50	α,ω-Di-*O*,*O*-caprylyl-(bis-persuccinyl)tridecaethylene glycol	Ethylbenzene	65	1.28×10^{-5}	128.2		306
			75	4.46×10^{-5}			306
			85	1.91×10^{-4}			306

TABLE 7. MISCELLANEOUS INITIATORS

Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
Acetyl cyclohexyl sulfonyl peroxide	Benzene	30	1.4×10^{-5}	147	a	337
		40	9.42×10^{-5}		a	337
		45	2.10×10^{-4}		a	337
N-(1-Cyanocyclohexyl)pentamethylene keteneimine	Chlorobenzene	80.0	3.25×10^{-6}			179
		89.2	1.007×10^{-5}			179
		100.1	4.025×10^{-5}			179
Dibenzyl hyponitrite	Paraffin	61.5	6.5×10^{-4}			240
		68.5	3.7×10^{-3}			240
		75.5	8.3×10^{-3}			240
		80.5	1.45×10^{-2}			240
		132	8.7×10^{-1}			240

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TABLE 7. *cont'd*

Initiator	Solvent	T (°C)	k_d (s^{-1})	E_a (kJ/mol)	Notes	Refs.
Di-*tert*-butyl hyponitrite	*tert*-Butanol	65	4.68×10^{-4}			317
	n-Butyl ether	65	4.50×10^{-4}			317
	Ethanol (95%)	65	3.93×10^{-4}			317
	Isooctane	45	2.72×10^{-5}	116.9	h	317
		55	1.07×10^{-4}			317
		65	4.00×10^{-4}			317
		75	1.330×10^{-3}			317
	Nujol	65	5.17×10^{-4}			317
Peroxybenzoylnitrate	Vapor	7.6	2.79×10^{-6}	69.1	h	261
		19.9	1.05×10^{-5}			261
		30.4	2.02×10^{-5}			261
		40.6	3.64×10^{-5}			261
		50.1	1.21×10^{-4}			261
		60.5	2.74×10^{-4}			261
		T (K)	1×10^{7}	$\exp[-69.1/RT]$		261
	Vapor + NO	18.1	8.18×10^{-5}	108.5	h	261
		30.4	3.62×10^{-4}			261
		40.6	1.42×10^{-3}			261
		T (K)	1.6×10^{15}	$\exp[-108.5/RT]$		261
	Vapor + NO	30.4	1.34×10^{-5}	79.2	h	261
		50.2	7.22×10^{-5}			261
		68.5	3.41×10^{-4}			261
		T (K)	6.3×10^{-8}	$\exp[-79.2/RT]$		261
2,3-Dimethyl-2,3-diphenylbutane	Chlorobenzene	237	1.93×10^{-5}			344
		259	1.93×10^{-4}			344
		284	1.93×10^{-3}			344
		T (K)	7.34×10^{18}	$\exp[-230.19/RT]$		344
3,4-Dimethyl-3,4-diphenylhexane	Chlorobenzene	201	1.93×10^{-5}			344
		226	1.93×10^{-4}			344
		254	1.93×10^{-3}			344
		T (K)	1.45×10^{15}	$\exp[-180.32/RT]$		344
1,4-Dimethyl-1,4-diphenyl-tetrazene-2	Benzophenone	121	3.3×10^{-4}			240
		149	3.45×10^{-3}			240
	Cumene	120	2.3×10^{-4}			240
		130	6.5×10^{-4}			240
		140	1.67×10^{-3}			240
	Paraffin	164.2	2.6×10^{-2}			240
		174.3	5.6×10^{-2}			240
		186	1.43×10^{-1}			240
		194	2.5×10^{-1}			240
	Silicone oil	126	3.7×10^{-4}			240
		139	1.92×10^{-3}			240
Potassium persulfate	0.1 M NaOH	50	9.5×10^{-7}	140.2	a	242
		60	3.16×10^{-6}		a	242
		70	2.33×10^{-5}		a	242
		80	9.16×10^{-5}		a	242
		90	3.5×10^{-4}		a	242
	Water (pH 3)	50	1.66×10^{-6}		a	242
	Water	80	6.89×10^{-5}		a,v_{11}	115
		80	5.78×10^{-5}		a,v_{11}	115
		40	1.65×10^{-2}	83.4	d_3,v_{22}	262
		50	4.02×10^{-2}		d_3,v_{22}	262
		60	1.08×10^{-1}		d_3,v_{22}	262
		50	3.78×10^{-3}	121.5	d_3,v_{23}	262
		60	2.18×10^{-2}		d_3,v_{23}	262
		70	5.01×10^{-2}		d_3,v_{23}	262
		50	1.1×10^{-6}			262
1-Pentanesulfonylazide	Diphenyl ether	166	4.46×10^{-4}			166
1,4-Butanedisulfonyl azide	Diphenyl ether	163	5.02×10^{-4}			166
1,6-Hexanedisulfonyl azide	Diphenyl ether	163	5.02×10^{-4}			166
1,9-Nonanedisulfonyl azide	Diphenyl ether	150	8.84×10^{-5}			166
		160	2.25×10^{-4}			166
		170	4.45×10^{-4}			166
1,10-Decanedisulfonyl azide	Diphenyl ether	163	4.45×10^{-4}			166
1,4-Dimethylcyclohexane-α,α′-disulfonyl azide	Diphenyl ether	163	4.82×10^{-4}			166

m-Xylene-α,α′-disulfonyl azide	Diphenyl ether	163	6.09×10^{-4}			166
p-Xylene-α,α′-disulfonyl azide	Diphenyl ether	163	5.78×10^{-4}			166
Benzenesulfonyl azide	Naphthalene	110	3.6×10^{-6}	152.3		235
		120	1.07×10^{-5}			235
		125	1.97×10^{-5}			235
		130	3.41×10^{-5}			235
		175	6.08×10^{-5}			235
p-Bromobenzenesulfonyl azide	Naphthalene	120	1.36×10^{-5}			235
p-Chlorobenzenesulfonyl azide	Naphthalene	120	1.15×10^{-5}			235
p-Methoxybenzenesulfonylazide	Naphthalene	120	1.31×10^{-5}			235
p-Nitrobenzenesulfonyl azide	Naphthalene	120	1.60×10^{-5}			235
p-Toluenesulfonyl azide	1,4-Dichlorobutane	145	1.70×10^{-4}			166
	Dimethyl terephthalate	155	3.23×10^{-4}			166
	Diphenyl ether	130	3.30×10^{-5}			166
		145	1.44×10^{-4}			166
		155	3.43×10^{-4}			166
	Hexanoic acid	155	2.97×10^{-4}			166
	Naphthalene	120	1.12×10^{-5}			235
	Nitrobenzene	155	3.97×10^{-4}			166
	1-Octanol	155	3.63×10^{-4}			166
	Tetradecane	155	3.80×10^{-4}			166
p-Toluenesulfonyl-*p*-tolylsulfone	Acetonitrile	29.3	3.9×10^{-5}	103.8	h	144
		39.1	1.45×10^{-4}			144
		49.3	5.4×10^{-4}			144
	Dioxane	29.3	2.1×10^{-5}	115.5	h	144
		39.5	1.01×10^{-4}			144
		49.3	3.9×10^{-4}			144

C. NOTES

- a k_d converted to s^{-1} from author's units
- b k_d values for several concentrations averaged
- b_2 analyzed from nonisothermal conditions
- c k_d increases with increasing initiator concentration
- c_2 rate non-linear
- c_3 hydroperoxide concentration 7.83×10^{-3} mol/l
- c_4 hydroperoxide concentration 2.50×10^{-3} mol/l
- d k_d decreases with increasing initiator concentration
- d_2 after 1st half life; rate slower initially
- d_3 rate is second order: units are 1/mol sec.
- e k_d listed is for lowest initiator concentration
- f k_d is extrapolated value for zero initiator concentration
- g $k_d \neq$ has been corrected for induced decomposition
- g_2 corrected for uncatalysed reaction ($7 \times 10^{-5}\ s^{-1}$)
- h ΔH (not E_a)
- i pressure (number gives mbar)
- j iodometric analysis
- j_2 manometer measurement
- k infrared analysis
- l k_d is limiting value with respect to additive concentration
- m_1 3,4-dichlorostyrene added to minimize induced decomposition
- m_2 styrene added to minimize induced decomposition
- m_3 methyl methacrylate added to minimize induced decomposition
- m_4 isobutene added to minimize induced decomposition
- m_5 acenaphthalene added to minimize induced decomposition
- m_6 1 mol/l α-methylstyrene added to minimize induced decomposition
- m_7 butadiene added to minimize induced decomposition
- m_8 acrylonitrile added to minimize induced decomposition
- n trichloroacetic acid added
- n_2 3.2 wt.% or about 0.1 monolayer
- o addition of trichloroacetic acid did not affect k_d
- p degassed
- p_2 photochemical benzophenone added: 6.56×10^{17} quants/min @ 366 nm
- q addition of trichloroacetic acid increased k_d several fold
- q_2 pH 2.90
- q_3 pH 7.05
- r not inhibited, but initiator concentration low enough (0.01–0.09 M) so that higher order decomposition is unimportant
- s solvent not degassed
- t_1 2,6-di-*tert*-butylphenol added to inhibit induced decomposition
- t_2 α,α-diphenyl-β-picrylhydrazyl added to inhibit induced decomposition
- t_3 phenyl-α-naphthylamine added to inhibit induced decomposition
- t_4 tetrachloroquinone added to inhibit induced decomposition
- t_5 1,3,5-trinitrobenzene added to inhibit induced decomposition
- t_6 I_2 added to inhibit induced decomposition
- t_7 O_2 added to inhibit induced decomposition
- t_8 5–20% NO_2 added to inhibit decomposition

t_9 galvanoxyl added to inhibit induced decomposition
t_{10} α,γ-bisdiphenylene-β-phenylallyl added to inhibit induced decomposition
t_{11} α-naphthylamine added to minimize induced decomposition
t_{12} 2,3′,5′,6′-tetra-*tert*-butyl indophenoxy added
t_{13} benzoquinone added
t_{14} 2,6-di-*tert*-butyl-4-methylphenol added
u_1 in absence of oxygen
u_2 from initiation data
u_3 in multisurface reaction vessel
u_4 rate reduced when nujol layer used to exclude Hg vapor
u_5 rate increased when nujol layer used to exclude Hg vapor
v_1 acetic acid added
v_2 $CuCl_2$ added
v_3 CuCl added
v_4 0.1 mol $AgClO_4$/mol AIBN added
v_5 3.9 mol thiophenol added
v_6 *tert*-butyl mercaptan added
v_7 2.5 mol cyclohexane added
v_8 $\sim 4 \times 10^{-2}$ mol pyridine added
v_9 2×10^{-2} mol pyridine added
v_{10} 2.5 mol cumene added
v_{11} buffered with sodium pyrophosphate
v_{12} saturated with ethyl acetate
v_{13} 3.11 mol CCl_4 present
v_{14} peroxide in P(MMA)
v_{15} peroxide in P(sty.)
v_{16} 0.26 mol piperidine
v_{17} 0.24 mol triethylamine
v_{18} 0.21 mol *N,N*-diethylaniline
v_{19} 0.22 mol pyridine
v_{20} 0.9 mol $ZnCl_2$
v_{21} in presence of ^{15}NO
v_{22} 0.12 mol 18 crown 6 added
v_{23} 0.24 mol diglyme added
v_{24} 0.02 M pyridine added
v_{25} 0.10 M pyridine added
v_{26} 0.10 M 2,6-lutidine added
w stereoisomers
x_1 actual rate divided by 2 because of two identical peroxide groups
x_2 each peroxide group has different k_d
y measured in differential scanning calorimeter: subscript is heating rate in deg/min
z pressure (in bar)

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Propagation and Termination Constants in Free Radical Polymerization

M. Kamachi
Department of Applied Physics and Chemistry, Fukui University of Technology, Gakuen, Fukui, Japan

B. Yamada
Department of Applied Chemistry, Faculty of Technology Osaka City University, Sumiyoshi, Osaka, Japan

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A. INTRODUCTION

In free radical polymerization the propagation and termination rate constants describe the reactions

$$P_n^\bullet + M \xrightarrow{k_p} P_{n+1}^\bullet \quad \text{(A1)}$$

$$2P_n^\bullet \xrightarrow{k_t} \text{dead polymer} \quad \text{(A2)}$$

where $P_n^\bullet$ is a propagating chain of any length n and M is the monomer. The rate constants are defined by the following equations:

$$R_p = -\frac{d[M]}{dt} = k_p[P^\bullet][M] \quad \text{(A3)}$$

$$R_t = -\frac{d[P^\bullet]}{dt} = k_t[P^\bullet]^2 \quad \text{(A4)}$$

where

$$[P^\bullet] = \sum_{n=1}^{\infty}[P_n^\bullet] \quad \text{(A5)}$$

The rate constants k_p and k_t have usually been assumed to be independent of chain length. In this chapter termination constants depending on the length of the polymer radicals are also reported. In American literature the right hand side of (A4) is written as $2k_t[P^\bullet]^2$. In this chapter the definition given in Eq. (A4) has been used.

Simultaneous determination of absolute values of both k_p and k_t from a single experiment has not been reported. In practice, the ratio k_p^2/k_t is determined from measurements of molecular weight as a function of rate of polymerization for a low conversion polymerization or from measurements of initiation rate and polymerization rate in a low conversion. The ratio k_p/k_t is determined from nonsteady-state measurements of the average lifetime, τ, of the growing polymer chain in a photochemically initiated polymerization. This lifetime may be defined by noting that the concentration of chains present must be related to their average lifetime and rate of disappearance by

$$[P^\bullet]/\tau = R_t \quad \text{(A6)}$$

which, from (A3) and (A4), yields

$$\frac{k_p}{k_t} = \frac{\tau R_p}{[M]} \quad \text{(A7)}$$

By combining the separately determined ratios, k_p^2/k_t and k_p/k_t, the individual propagation and termination rate constants may be calculated. Alternatively, the rate of initiation, R_i, may be measured as the rate of initiator disappearance and equated to R_t. This gives (from (A6) and (A3))

$$k_p = \frac{R_p}{R_i\tau[M]} \quad \text{(A8)}$$

There is a large degree of imprecision inherent in measuring τ and in combining data from different experiments, which helps to explain the scatter in the data tabulated here.

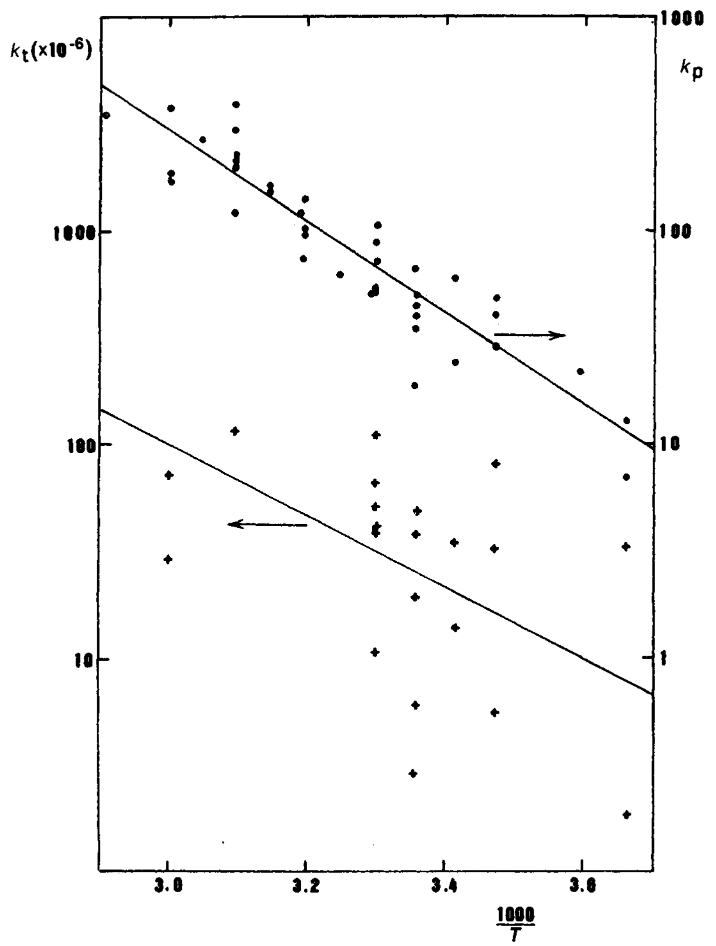

Figure 1. Arrhenius plots of all bulk polymerization data for styrene for k_p (•) and k_t (+). Solid lines are least squares obtained by assuming all points to be of equal value.

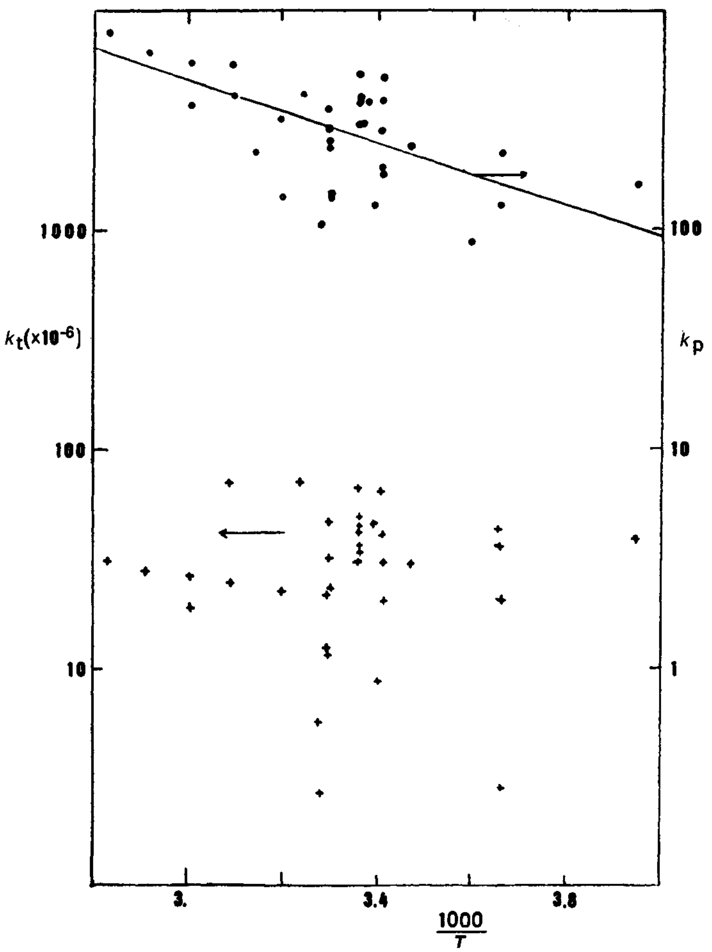

Figure 2. Arrhenius plots of all bulk polymerization data for methyl methacrylate for k_p (•) and k_t (+). Solid lines are least squares obtained by assuming all points to be of equal value. The line for k_t is not shown since a horizontal line for a temperature independent k_t could be a better representation.

The two monomers styrene and methyl methacrylate have been so extensively studied that their data are presented as Arrhenius plots (Figs. 1 and 2). Because of the influence of solvents on the rates, only data of bulk polymerizations are shown. It remains a wide scatter, which should serve as a warning against casual acceptance of any single number. Solid lines are the least squares that have been calculated assuming all points to be of equal value.

For the termination rate of methyl methacrylate the least-squares line results in a positive slope and is not shown. In this case a temperature-independent k_t could be a better representation of the experiments.

The pulse laser polymerization (PLP) method has been developed as a new method of obtaining k_p. In the PLP method, the value of k_p can be estimated from the degree of polymerization of polymer formed, ν_p, a knowledge of the monomer concentration, [M], and t_f the time between pulses:

$$\nu_p = k_p[M]t_f \qquad \text{(A9)}$$

The reproducibility of the PLP method has been recognized by an IUPAC Working Party on Modeling of Kinetic and Process of Polymerization, which is establishing a critical review of the literature values of k_p.

Classification of the methods for the determination of rate constants

The tabulated data refer to seven different methods.

Method A uses the following four methods for the measurement of the lifetime τ:

A1 – rotating sector or a "flashing" laser
A2 – flow through a tube with spatially separated light and dark sections
A3 – spacial intermittent polymerization (SIP)
A4 – intermittent illumination method

Method B effectively measures only a single decrease (increase), in the radical concentration by the following methods:

B1 – dilatometry
B2 – dielectric constant
B3 – interferomety
B4 – temperature change
B5 – viscosity
B6 – light scattering
B7 – monomer pressure

B8 – cathetometer
B9 – inhibitor
B10 – scavenger

Method C uses electron spin resonance (ESR) for the determination of the radical concentration

Method D refers to values obtained in emulsion polymerization by application of the Smith–Ewart theory

Method E refers to recalculated values

Method F uses pulse laser photopolymerization (PLP) method

F1 – PLP
F2 – PLP-GPC (MWD)
F3 – PLP-MALDI TOF (-GPC)

Method G refers to the method of measuring molecular weight (MW) and molecular weight distribution (MWD) by

G1 – gel permeation chromatography (GPC)
G2 – high performance liquid chromatography (HPLC)

B. TABLES OF PROPAGATION AND TERMINATION CONSTANTS

TABLE 1. DIENES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
1-Acetoxybutadiene	18.0	281	25	A1		152
Butadiene	$k_p = 1.2 \times 10^8 \times \exp(-39000/RT)$		10	D		23
	150 ± 40	–	5	C		223
		$k_t = 1.13 \times 10^4 \times \exp(-711/T)$	45–60	G1		202
	$\ln k_p = \ln(3.873 \times 10^{10}) - 53400/RT$		50	F1		221
	111.6	–	50	F1	Solvent: chlorobenzene	221
	$k_p = 8.05 \times 10^7 \times \exp(-35710/RT)$			F2	Solvent: chlorobenzene	187
Chloroprene	220	–	40	D	Quoted in Ref. 86	59
	$k_p = 2.9 \times 10^9 \times \exp(-41000/RT)$			D		84
	$k_p = 1.95 \times 10^7 \times \exp(-26630/RT)$			F1		198
2,3-Dimethyl-1,3-butadiene	$k_p = 8.9 \times 10^7 \times \exp(-38000/RT)$			D		71
Ethyl 4-ethoxy-2,4-pentadienoate	9.9	9.3	25	A1		152
Ethyl 4-methyl-2,4-pentadienoate	29.7	23	25	A1		152
Ethyl pentadienoate	30.9	19	25	A1		152
1,3-Hexadiene	20 ± 10	–	5	C		223
2,4-Hexadiene	16 ± 12	–	5	C		223
Isoprene	2.8	–	5	D	Calalyst system: diisopropylbenzene, monohydroperoxide-tetraethylenepentamine	24
	125 ± 30	–	5	C		223
2-Methyl-1,3-pentadiene	35 ± 10	–	5	C		223

TABLE 2. OLEFINS

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Ethylene	470 ± 30	1050 ± 50	83	A1	Solvent: benzene	53
	18.6 ± 2	455 ± 50	−20.01	A1		66
	5400	200	130	A1	Pressure 1.8×10^8 Pa	139
	$k_p = 4.8 \times 10^7 \times \exp[(-4450 + 3.1 \times 10^{-6} p)/T]$				Pressure $(5–17.5) \times 10^7$ Pa, using results of Ref. 141	142
	1.2×10^4	$3.9\ (7.8) \times 10^2$	130	A1	Pressure 1.9×10^8 Pa	135
	1.09×10^4	1.99×10^2	190	C	Initial pressure 2.27×10^8 Pa	151
	3.08×10^4	–	230	F1	Pressure 2.55×10^8 Pa, at low or moderate conversion	167
	–	3.2×10^3	190	F1	Pressure 2.50×10^8 Pa, at conversion 0	167
Propylene	$k_p = 2 \times 10^6 \times \exp(-32000/RT)$		50–150		Radical telomerization	129

TABLE 3. ACRYLIC DERIVATIVES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Acrylamide	6000 ± 1000	3.3 ± 0.6		A1, B1	Solvent: water, pH 5.5	79
	18000 ± 1500	14.5 ± 2.0	25	A1	Solvent: water	41
	8200	5.5	19	A	Solvent: water	89
	220	1.0	26	A	Solvent: DMSO	89
	$(7.9 \pm 0.5) \times 10^4$	660 ± 40	30	A1	Solvent: water 0.38 M	126
	$(4.3 \pm 0.2) \times 10^4$	350 ± 20	30	A1	H_2O : DMSO (90 : 10)	119
	$(3.3 \pm 0.2) \times 10^4$	230 ± 20		A1	H_2O : dioxane (90 : 10)	119
	$(2.3 \pm 0.1) \times 10^4$	160 ± 10		A1	H_2O : THF (92 : 8)	119
	$k_p = 7 \times 10^6 \times \exp[(-21000 \pm 2000)/RT]$			F1		197
Acrylic acid						
	650	2.6	23	A1	Solvent: Water, pH 7.9, (with 1.2 M NaOH)	99
	3150	2.6		A1	Solvent: water, pH 7.9 (with 1.5 N NaCl)	99
	6600	2.7		A1	Solvent: water, pH 11	99
–, butyl ester	13	0.018	25	A1		10
	2100	330	25	B4		57
	1977	3.84		A1	Pressure 5.0×10^7 Pa	107
	679 ± 66	6.4 ± 0.6	30	A1	Solvent: benzene 1.76 M	137
	$\log_{10} k_p = 6.0123 - 748.4/T$		25–80	F1		201
		$\ln[(k_t[p])/(1.00 + 0.06p)] = \ln k_t [1] - 0.60p$	30	B5	k_t [p]; k_t for pressure p (bar), k_t [1] $= 3.5 \times 10^6$	122
	1360	1.28	30	A1	Solvent: anisole 2.00 M	138
	963	1.18			Solvent: benzene 2.00 M	138
	1320	1.07			Solvent: chlorobenzene 2.00 M	138
	360	0.36			Solvent: benzonitrile 2.00 M	138
–, cyclohexyl ester	2722 ± 248	3.2 ± 0.3	30	A1	Solvent: benzene 1.76 M	137
–, ethyl ester	800	1.76	50	A1	Solvent: toluene 1.84 M	108
	12.39×10^3	139.2	50	A1	Solvent: benzene x; molar fractions of monomer, $x = 0.401$, k_p and k_t also given by other [M]	171
–, 2-ethylhexyl ester	155	0.233	50	A1	Solvent: toluene 1.94 M	108
–, methyl ester	1300	75	15	A1	From unpublished results of Ross and Melville	22
	880	260	15	A1	From unpublished results of Matheson	22
	1580	55	25	A1		19
	580	6.5	25	B1		48
	$k_p = 1.0 \times 10^8 \times \exp(-30000/RT)$	$k_t = 2.8 \times 10^{11} \times \exp(-22000/RT)$		A1		21
	1000	3.5550		A1		50
	11680	194		A1	Solvent: benzene 2.69 M	144
	21300	–		A1		144
	$(1.5 \pm 0.2) \times 10^4$	–	60	G2	Primary propagating step (k_{p1}), Ph-MA$^\bullet$	190
	$(3.7 \pm 0.6) \times 10^4$	–	60	G2	$PhCO_2$-MA$^\bullet$	190
	6.3×10^4	–	60	G2	*tert*-BuO-MA$^\bullet$	190
	$(1.4 \pm 0.2) \times 10^4$	–	60	G2	Secondary propagating step (k_{p2}), Ph-MA-MA$^\bullet$, $PhCO_2$-MA-MA$^\bullet$, *tert*-BuO-MA-MA$^\bullet$	
–, 2-(acetoacetoxy-methyl)-, ethyl ester	300	1.0	60	C	Solvent: benseme	170
–, 2-cyano-, ethyl ester	1622	411	30	A1	AcOH 7 wt.%	143
	1610	404	30	A1	1,3-propanesulfone 0.5 wt.%	143
	1613	411	30	A1	Optimum value, solvent: AcOH	123
	1607	404	30	A1	Optimum value Solvent: propanesulfone	123
–, 2-chloro-, ethyl ester	1660	333	30	A1	AIBN 4.88×10^{-2} M	140
	1408	244	30	A1	Optimum value	123
–, 2-fluoro-, ethyl ester	1120	4.8×10^2	30	A1		146
	978	435	30	A1	Optimum value	123
–, 2-acetoxymethyl-, methyl ester	350	2.1	60	C	Solvent: benzene 1.00 M, MAIB 0.050 M	225

TABLE 3. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
–, 2-acetyloxy-, methyl ester	430	–	60	C	Solvent: 1,1,2-trichloroethane 2.0 M 2,2′-azobis (4-methoxy-2,4-dimethylvaleronitrile) 0.030 M, k_p also given by other temp.	224
–, 2-benzoyloxy-, ethyl ester	990	2.9	60	C	Solvent: benzene 1.56 M	172
–, 2-(benzyloxymethyl)-, methyl ester	182	1.6	60	C	Solvent: benzene 2.0 M, AIBN 5.0×10^{-3} M	206
–, 2-[2,2-bis(carbomethoxy) ethyl], methyl ester	4.0	0.038	60	C	Bulk AVN 0.05 M, k_p and k_t also given by other temp.	228
–, 2-butoxy-, methyl ester	298	8	60	C	Solvent: benzene 2 M	176
	184	–	60	C	Solvent: 1,1,2-trichloroethane 2.0 M 2,2′-azobis (4-methoxy-2,4-dimethylvaleronitrile) 0.030 M, k_p also given by other temp.	224
–, 2-butyroxymethyl-, methyl ester	360	1.4	60	C	Solvent: benzene 1.00 M, MAIB 0.050 M	225
–, 2-(2-carbomethoxy)- ethyl-, methyl ester	19	0.51	60	C	Bulk MAIB 0.05 M, k_p and k_t also given by other temp.	229
–, 2-ethyl-, methyl ester	8.6	21	60	C	Bulk AIBN 0.10 M	230
–, 2-ethyl-, cyclohexyl ester	1.6	1.8	60	C	Bulk AIBN 0.10 M	230
–, 2-isobutyroxymethyl-, methyl ester	300	1.1	60	C	Solvent: benzene 1.00 M, MAIB 0.050 M	225
–, -2-(methoxycarbonylmethyl)-, phenetyl ester	11	0.08	50	C	Solvent: benzene 2.22 M, k_p and k_t also given by other temp. and [M]	157
–, 3-methyl, adamantyl ester	0.57	0.11	60	C	Bulk 4.8 M MAIB 0.05 M	232
	0.76	1.4	60	C	Solvent: benzene 2.4 M, MAIB 0.05 M, k_p also given by other [M]	232
–, 3-methyl, dimethyladamantyl ester	0.41	0.081	60	C	Bulk 4.0 M, MAIB 0.05 M	232
	0.71	1.1	60	C	Solvent: benzene 2.0 M, MAIB 0.05 M	232
–, 3-methyl, *tert*-butyl ester	0.90	2.3	60	C	Bulk 5.9 M, MAIB 0.05 M	232
	1.0	4.7	60	C	Solvent: benzene 2.0 M, MAIB 0.05 M	232
–, 2-naphthoyloxymethyl-, ethyl ester	320	0.37	60	C	Solvent: benzene 1.00 M, MAIB 0.01 M	226
–, 2-pivaroxymethyl-, methyl ester	230	0.59	60	C	Solvent: benzene 1.00 M, MAIB 0.005 M	225
–, *trans*-2-vinyl-, methyl ester	125	–	60	C	Solvent: benzene 1.0 M, AIBN 0.25 M	227
Acrylonitrile	3000–5000	–	0	D		42
	127	12.2	25	B4		49
	52	5	25	B4		63
	51	1.8	25	B4	Solvent: DMF	75
	20000		40	D		42
	24	23	50		Primary radical termination in a precipitating medium	35
	1960	782	60	A1	Solvent: DMF	43
	15400	2700	25	A1	Solvent: water	54
	28000	3700	25	A1	Solvent: water	55
	1910	290	25	A1	Solvent: DMSO	70
	382 ± 230	47.6 ± 22	25	A1	Solvent: DMF	68
	3300 ± 300	1200 ± 170	50	A1	Solvent: DMF 3.8 M	88
	3200 ± 400	300 ± 50	50	A1	Solvent: DMSO 3.8 M	88
	3000 ± 600	240 ± 70	50	A1	Solvent: Ethylene carbonate 3.8 M	88
	$(6.5 \pm 1.3) \times 10^3$	4700 ± 1300	50	A1	Solvent: Mg $(ClO_4)_2 \cdot 12H_2O$ 3.04 M	88
N-Acryloyl-2,2-dimethyl-5 (R)-phenyl-1,3-dioxazoline	28.2	0.20	60	C	Solvent: benzene 1.08 M, MAIB 0.05 M, k_p and k_t also given by other temp.	231
N-Acryloylpiperidine	273	17.9	30	A1		145
	273	11.9	30	A1	Optimum value	123
N-Acryloylpyrrolidine	8267	2200	30	A1	Optimum value	123

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TABLE 3. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
N,N'-Dimethylacrylamide	11000	38	50	A1		74
	27200	3540	30	A1		121
	29198	4080	30	A1	Optimum value	123
	15×10^3	–	25	F1	Solvent: water, pH 1.4	197
3-Dimethyl-(acryloyloxyethyl)-ammonium propane sulfonate	2330 ± 230	0.540 ± 0.053	30	A4	Solvent: formamide : 1,4-dioxane (3 : 1 (v/v))	192
	2760 ± 342	0.452 ± 0.056	30		Solvent: formamide: 1,4-dioxane (3 : 1 (v/v)), NaCl 0.1 M	192
N-Methylacrylamide	9.9×10^3	–	25	F1	Solvent: water, pH 1.9	197

TABLE 4. METHACRYLIC DERIVATIVES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Methacrylamide	79.6 ± 5.6	16.5 ± 1.4	25	A1	Solvent: water	69
	1.1×10^3	–	25	F1	Solvent: water, pH 1	197
Methacrylonitrile	~21	~27	30			26
	26	21	25	A1		39
	$k_p = 10^{6.43 \pm 0.26} \times \exp[(-29700 \pm 1500)/RT]$					
Methacrylic acid						
	670	2.1	23	A1	Solvent: water, pH 8.0 (with 0.22 M NaOH)	99
	1950	2.25		A1	pH = 13.6	99
–, benzyl ester	1410	41.9	30	A1		101
	110	80	32.5	C		153
	895	40	32.5	C		153
	1250	41.9	30	A1		87
	510	2.87	20	A1	k_p and k_t also given as a function of viscosity	103
–, bornyl ester	580	3.3	60	C	Solvent: benzene 1.0 M, AIBN 0.05 M	193
–, *n*-butyl ester	369	10.2	30	A1		27
	573	18.0	30	A1	Pressure: 5.0×10^7 Pa	106
	360	10	30	A1		109
	$\ln k_p = 6.13 + 6.33 \times 10^{-9} p$		30	F2		216
	$\ln k_p = 15.8 - 2751/T$		12–93	F2	Pressure 1.0×10^8 Pa	216
	–	2.6	70	B5	$\eta = 1.92$ cp	212
		$\ln[(k_t[p]/(1.00 + 0.01p)] = \ln k_t[1] - 0.73p$	30	B5	$k_t[p]$; k_t for pressure p (bar), $k_t[1] = 13.4 \times 10^6$	122
	$\ln k_p = (14.41 \pm 0.09) - (2472 \pm 29)/T$		10–90	F1		219
	$k_p = 3.44 \times 10^6 \exp(-23300/RT)$			F1		169
	1576	9.74	30	A3		225
–, *tert*-butyl ester	350	14	25	A1		52
	$k_p = 10^{7.4 \pm 0.4} \times \exp[-(27.7 \pm 2.5) \times 10^3/RT]$		9–66	F1		203
–, *trans*-4-*tert*-butyl-cyclohexyl ester	550	1.9	60	C	Solvent: benzene 1.0 M, AIBN 0.05 M, *trans* 100%	194
	510	1.9	60	C	*trans* 28.9%	194
	570 ± 10	0.5–2.3	60	C	Solvent: benzene	210
–, cetyl ester	300 ± 90	0.16 ± 0.04	30	A1		109
–, *p*-[*p*-(cetyloxy)-benzoyloxy]-phenyl ester	300	0.25	50	A1	Solvent: dioxane 0.2 M	97
	170	0.30	50	A1	Solvent: toluene 0.2 M	97
–, 2-chloroethyl ester	254	6.71	30	A1		87
–, 2-cyclohexyl-ethyl ester	1190	32.8	30	A1		87
–, cyclohexyl ester	510	5.4	60	C	Solvent: benzene 1.0 M, AIBN 0.05 M	193
–, 2-decahydro-naphthyl ester	570	3.1	60	C	Solvent: benzene 1.0 M, AIBN 0.05 M	193

TABLE 4. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
–, 2,6-dimethyl-phenyl ester	68	2.1	30	A1		120
	72	2.4	30	A1	Optimum value	123
–, dodecyl ester	–	0.6	70	B5	$\eta = 3.96$ cp	212
–, ethyl ester	126	7.35	30	A1		87
	–	10	70	B5	$\eta = 0.91$ cp	212
	$k_p = 1.50 \times 10^6 \times \exp(-20460/RT)$			F1		169
	$\ln k_p = (15.11 \pm 0.17) - (2753 \pm 55)/T$		10–90	F1		219
–, hexadecyl ester	–	0.16	70	B5	$\eta = 7.52$ cp	212
–, isobornyl ester	390	3.5	60	C	Solvent: benzene 1.0 M, AIBN 0.05 M	193
–, isobutyl ester	$\ln k_p = (14.72 \pm 0.13) - (2590 \pm 42)/T$		10–90	F1		219
–, isopropyl ester	121	4.52	30	A1		87
–, lauryl ester	460 ± 140	0.6 ± 0.2	30	A1		109
	$k_p = 2.93 \times 10^5 \times \exp(-16190/RT)$			F1		169
–, 2-methoxyethyl ester	249	9.30	30	A1		87
–, methyl ester	310 ± 20	66 ± 4	23.6	A1		9
	$k_p = 5.13 \times 10^6 \times \exp(-26400/RT)$	$k_t = 1.36 \times 10^3 \times \exp(-11900/RT)$		A1		7
	187	72.1	32.5	C		153
	404	17.6	40	B1	Solvent: ethyl acetate	51
	410	24	50	E	Using results of Ref. 7	62
	13.2	0.488	– 30	B1	Solvent: ethyl acetate	72
	390	–	20	A1	k_p also given as a function of temp. and of viscosity for other solvents	92
	517	37	10	B1	Solvent: methanol	94
	527	23	10	B1	Solvent: pyridine	94
	28	4.4	10	B1	Solvent: DMF	94
	260	21	25	A1	Solvent: benzene 4.69 M	85
	270	21	25	A1	Solvent: fluorobenzene 4.69 M	85
	280	19.5	25	A1	Solvent: chlorobenzene 4.69 M	85
	285	17.5	25	A1	Solvent: anisole 4.69 M	85
	310	17	25	A1	Solvent: bromobenzene 4.69 M	85
	330	17	25	A1	Solvent: benzonitrile 4.69 M	85
	340	17	25	B5	Solvent: methyl benzoate 4.69 M	90
	240	11.5	25	B5	Solvent: methylphenyl acetate 4.69 M	90
	335	9	25	B5	Solvent: dimethyl phthalate 4.69 M	90
	270	22	25	B5	Solvent: dimethyl carbonate 4.69 M	90
	330	16	25	B5	Solvent: diethyl oxalate 4.69 M	90
	250	29	25	B5	Solvent: methyl formate 4.69 M	90
	240	25	25	B5	Solvent: methyl propionate 4.69 M	90
	280	14	25	B5	Solvent: diethyl succinate 4.69 M	90
	320	28	25	B5	Solvent: acetonitrile 4.69 M	90
	390 ± 40	42 ± 4	25	A1	Solvent: methanol 50% by vol.	104
	410 ± 40	29 ± 3	25	A1	Solvent: *n*-octane 5% by vol.	104
	410 ± 40	26 ± 3	25	A1	Solvent: *n*-nonane 20% by vol.	104
	180 ± 50	20 ± 6	20	E	$\overline{DP} = (2-8) \times 10^3$ using results of Ref. 86	96
	500 ± 250	63 ± 32	20	B6	$\overline{DP} = (3-5) \times 10^4$	96
	41.6	2.69	0	B5	Assuming biradical initiation	11
	62	–	5	D		65
	200	–	20	B6	k_p found as a linear function of M_w	91
	128	8.44	22	B1		29
	364	41.8	22.5	B4	Rate of initiation; 1.20×10^{-8} (moles/l/s)	60
	512.6	46.6	25	A1		30
	410	42.7	25	A1	k_p and k_t also given as a function of viscosity for other solvents	93
	248	22.7	30	A1		14
	141	11.6	30	A		87
	106	5.7	32	B4		58
	140	–	40	D		65

TABLE 4. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
	0.224	–	45	D		67
	573	2.0	60	E	Termination by combinat. using results of Refs. 7 and 31	33
	573	11.9	60	E	Termination by disprop. using results of Refs. 7 and 31	33
	995 ± 83	43.6 ± 4.9	80		Solvent: benzene 4.7 M	111
	506 ± 48	35.6 ± 3.9	30	A1	Solvent: anisole 2.0 M	133
	450 ± 33	42.0 ± 3.0		A1	Solvent: benzene 2.0 M	133
	456 ± 29	43.8 ± 2.0		A1	Solvent: C_6D_6 2.0 M	133
	448 ± 47	47.2 ± 6.6		A1	Solvent: fluorobenzene 2.0 M	133
	498 ± 39	42.9 ± 4.7		A1	Solvent: chlorobenzene 2.0 M	133
	614 ± 43	39.9 ± 3.3		A1	Solvent: benzonitrile 2.0 M	133
	427 ± 38	30.9 ± 3.7	30	A1	Solvent: benzene 1.0 M	133
	290	21	60	A1		118
	1020	292		A1	Addition of 1×10^{-3} mol pyridine	118
	530	55		A1	Addition of 1×10^{-3} mol acetone	118
	550	68		A1	Addition of 1×10^{-3} mol triethanolamine	118
	$k_p = 4.92 \times 10^5 \times \exp(-18210/RT)$	$k_t = 98 \times \exp(-2930/RT)$	15–30	A2	$\bar{P}_n = 10^4$	114
	315	33.9	25	A2	k_p and k_t also given as a function of $\bar{P}_n$	110
	336 ± 90	28 ± 12	25	A1	Pressure 5.0×10^6 Pa	127
	441	19.7	30	A1	Pressure 5.0×10^7 Pa	105
	$k_p = 2.5 \times 10^6 \times \exp[(-23000 \pm 2500)/RT]$	720	25–60	C		45
	$k_p = k_p^0$ $(0.33 \le w_p \le 0.84)$ $= k_p^0 \exp[-29.8\,(w_p - 0.84)]$ $(0.84 \le w_p \le 0.99)$ $(k_p^0 = 790 \pm 300)$		50	C	w_p (weight fraction of polymer)	150
	130	20.7 ± 1.0	0	A1	At high conversions ($\sim$65%)	148
	705.6	25	60		Special evaluation from steady-state and $\bar{M}_n$	134
	170	–	0.2	F3	Solvent: toluene	222
	306	–	25	F1		196
	292	–	25	F1	Solvent: ethanol (50%) 4.67 M, k_p also given by other [M] and solvents	
	670 ± 30	22	60	C		175
	$\ln k_p = 14.69\text{–}2670/T + 0.201/T \times (1.0 \times 10^{-5} p - 1)$		20–90	F1		207
		$\ln k_t[p] = \ln k_t[1] - 0.57p$	30	B5	$k_t[p]$; k_t for pressure p (bar), $k_t[1] = 15.4 \times 10^6$	122
	26.6	1.4	5	B10	Scavenger DPPH, solvent: DMF, blank polymn.	115
	5.8	0.017	5	B10	Scavenger DPPH, solvent: DMF, template polymn., template; it-MMA	115
		$k_t(m,n) = 1.22 \times 10^2 (n \times m)^{-0.075}$	25	A3	n: n-mer; m: m-mer, coupling with n-mer and m-mer	147
	–	21	70	B5	$\eta = 0.53$ cP	212
	–	0.034	50	D	No addition of chain-transfer agent, Time 7.5–20.5 min.	149
	–	0.16	50	D	Addition of 2% CBr_4, Time 7.5–20.5 min.	149
	$k_p = 10^{6.694} \exp(-23940/RT)$		−1 to −70	F1		217
	$\ln k_p$ (l/mol/min) $= \ln k_{p,0} - (3.86\,[\text{AIBME}]_0 + 0.8) \times (1 - \phi_m) - 1.6\,(1 - \phi_m)^{6.0}$		60	C	AIBME (dimethyl 2,2′-azodiisobutyrate) 0.0434 M, ϕ_m; monomer volume fraction $k_{p,0} = 700$ (l/mol/min)	158
	131	–	−8	F3	Benzoin 7×10^{-4} M	199
	680–820	–	30	F1	Solvent: toluene, pressure 1.0×10^8 Pa, k_p also given by other pressures	208
	690–810	–		F1	Solvent/2-butanone, pressure 1.0×10^8 Pa	208

TABLE 4. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
	313 ± 8.1	39 ± 4	25	F1		161
	794.0	62.4	60	B5	Solvent: benzene 3 M	204
	815.0	51.6			Solvent: chlorobenzene 3 M	204
	957.0	38.2			Solvent: benzonitrile 3 M	204
	–	25($\pm$3)	60	C		166
	510 ± 100	21 ± 2	60	C		191
	299	45	25	A1		160
	431	50	40			160
	$k_p = 2.39 \times 10^6 \times \exp(-22000/RT)$			F1		198
	359	–	25	F1		220
	12	–	50	C	Emulsion polymn., particle size 260 nm, k_p also given by other particle sizes	184
	135	–	0	A1	k_p; average value	159
	292	–	25	F1		164
	200	25.6	28	B1	Values from Chem. Abstr.	83
	135 ± 50	–	0	A1		165
	170	–	50	C	Emulsion polymn., *n*-butyl acrylate: MMA: methacrylic acid (8 : 91 : 1), particle size (p.s.) 50 nm, k_p also given by other temp. and particle sizes	155
	35	–	50		p.s. 500 nm	155
	2960	29.1	30	A3		225
	$k_p = 1.9068 \times 10^6 \times \exp(-21181.07/RT)$			F1		227
	$k_p = 1.2169 \times 10^6 \times \exp(-25203.59/RT)$			F1	30% MMA in benzyl alcohol	227
	$k_p = 3.0598 \times 10^7 \times \exp(-28008.18/\mathrm{RT})$			F1	30% MMA in NMP	227
	35	–	50		p.s. 500 nm	155
–, octyl ester	1710	62.6		A1	Pressure 5.0×10^7 Pa	113
	240 ± 80	2.6 ± 0.9	30	A1		109
		$\ln[(k_t[p]/(1.00-0.19)] = \ln k_t[1] - 1.01p$	30	B5	$k_t[p]$; k_t for pressure p (bar), $k_t[1] = 40.0 \times 10^6$	122
–, phenyl ester	411	11.9	30	A1		87
	230 ± 15	2.02 ± 0.22	30	A1	Solvent: anisole 2.00 M	116
	176 ± 8	2.06 ± 0.21		A1	Solvent: benzene 2.00 M	116
	180 ± 9	2.16 ± 0.19		A1	Solvent: fluorobenzene 2.00 M	116
	223 ± 11	2.26 ± 0.22		A1	Solvent: chlorobenzene 2.00 M	116
	235 ± 8	1.72 ± 0.11		A1	Solvent: bromobenzene 2.00 M	116
	273 ± 8	1.96 ± 0.12		A1	Solvent: benzonitrile 2.00 M	116
–, 2-phenylethyl ester	228	1.88	30	A1		87
–, 3-phenylpropyl ester	149	0.813	30	A1		87
–, *n*-propyl ester	467	45.1	30	A1		28
–, 3-tetracyclo-[4.4.0^{2,5}.1^{7,10}]-dodecyl ester	590	2.6	60	C	Solvent: benzene 1.0 M, AIBN 0.05 M	193
–, triphenylmethyl ester	26	0.301	32.5	C		153
3-Dimethyl-(methacryloyloxy-ethyl) ammonium propane sulfonate	1470 ± 170	0.499 ± 0.058	30	A4	Solvent: formamide: 1,4-dioxane (3 : 1 (v/v))	192
	2760 ± 342	0.452 ± 0.056	30		Solvent: formamide: 1,4-dioxane (3 : 1 (v/v)), NaCl 0.1 M	192
Polyhydroxytetramethylene-α, ω-methacrylate of MW = 700	185	0.034	20	B8	Calcd. from nonstationary state kinetics	125
	230	0.053	20	B8	Calcd. from stationary state kinetics	125

TABLE 5. ITACONIC DERIVATIVES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Itaconic acid						
–, bis (4-*tert*-butyl-cyclohexyl) ester	1.7	2.5×10^{-3}	60	C	Solvent: benzene 0.5 M	213
–, bis (cyclohexyl-methyl) ester	3.9	3.4×10^{-3}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182

TABLE 5. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
–, bis (3,5-dimethyl-1-adamantyl) ester	0.92	0.32×10^{-3}	60	C	Solvent: benzene 1.5 M	213
–, bis (2-ethylhexyl) ester	6.8	–	50	C	Solvent: hexane 1.03 M	185
	3.4	–	50	C	Solvent: cyclohexane 1.03 M	185
	2.0	–	50	C	Solvent: toluene 1.03 M	185
	2.1	–	50	C	Solvent: benzene 1.03 M	185
	2.2	–	50	C	Solvent: chlorobenzene 1.03 M	185
	2.1	–	50	C	Solvent: ethyl acetate 1.03 M	185
	2.1	–	50	C	Solvent: THF 1.03 M	185
	1.4	–	50	C	Solvent: acetone 1.03 M	185
	3.0	0.001	50	C	Solvent: benzene 2.0 M, MAIB 0.05 M	177
–, diadamantyl ester	0.56	0.30×10^{-3}	60	C	Solvent: benzene 1.5 M, k_p and k_t also given by other [M]	213
–, di-*n*-butyl ester	3.5	1.59×10^{-2}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
	13	0.11	50	C	Solvent: cyclohexane 1.33 M, MAIB 5.00×10^{-2} M, k_p and k_t also given by other temp.	162
	11	0.13	50		Solvent: *n*-hexane 1.33 M	162
	6.8	0.07	50		Solvent: chlorobenzene 1.33 M	162
	9.4	0.11	50		Solvent: methyl benzoate 1.33 M	162
	6.7	0.083	50		Solvent: benzene 1.33 M	162
	3.4	0.068	50		Solvent: acetone 1.33 M	162
	3.2	0.13	50		Solvent: acetonitrile 1.33 M	162
	–	1.0×10^{-3}	50	C	Solvent: benzene 0.794 M, AIBN 0.05 M k_t also given by other [M]	154
	5.3	8.5×10^{-2}	50	C	Solvent: benzene 0.794 M, MAIB 0.05 M	154
	5.9	0.053	50	C	Solvent: benzene 2.0 M, MAIB 0.05 M	177
–, di-*sec*-butyl ester	0.6	4.0×10^{-3}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
–, di-*tert*-butyl ester	0.2	5.6×10^{-3}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
–, dicyclohexyl ester	2.3	1.4×10^{-3}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
–, diethyl ester	7.7	0.24	50	C	Solvent: benzene 2.0 M, MAIB 0.05 M	177
	3.7	6.41×10^{-2}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
–, diisobutyl ester	2.7	1.56×10^{-2}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
–, diisopropyl ester	1.1	5.0×10^{-3}	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	182
–, dimethyl ester	5.2	0.36	60	C	Solvent: benzene 1.5 M, MAIB 0.02 M	195
	10	0.59	50	C	Solvent: benzene 2.0 M, MAIB 0.05 M	177
–, α-ethyl-β-hexafluoropropyl ester	5.0	0.28	60	C	Solvent: benzene 2.0 M, MAIB 0.05 M, k_p and k_t also given by other [M] and temp.	233
–, α-methyl-β-isopropyl ester	3.4	0.06	60	C		195
–, α-methyl-β-*tert*-butyl ester	4.2	0.051	60	C		195
–, α-isopropyl-β-methyl ester	1.9	0.07	60	C		195
–, α-*tert*-butyl-β-methyl ester	0.91	0.056	60	C		195
N(2,6-dimethylphenyl) itaconimide	26	0.082	50	C	Solvent: THF 0.44 M, AIBN 0.05 M, k_p and k_t also given by other [M]	234
Methyl *N*-phenyl-itaconamate	15	0.29	60	C	Solvent: DMF 1.4 M, AIBN 0.05 M, k_p and k_t also given by other [M] and temp.	235

TABLE 6. FUMARIC DERIVATIVES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Fumaric acid						
–, bis (2-methoxy-ethyl) ester	0.19	330×10^{-6}	60	C	Solvent: benzene 1.0 M	211
–, bis (2-chloro-ethyl) ester	0.26	320×10^{-6}	60	C	Solvent: benzene 1.0 M	211
–, *tert*-butyl methyl ester	0.23	150×10^{-6}	60	C	Solvent: benzene 1.0 M	211
–, *tert*-butyl isopropyl ester	0.51	26×10^{-6}	60	C	Solvent: benzene 1.0 M	211
	0.35		60	C	AIBN	181
	0.39	1.75×10^{-5}			MAIB	181
–, di-*tert*-butyl ester	0.61	30×10^{-6}	60	C	Solvent: benzene 1.0 M	211
–, dicyclohexyl ester	0.60	40×10^{-6}	60	C	Solvent: benzene 1.0 M	211
–, diethyl ester	0.21	$(510–560) \times 10^{-6}$	60	C	Solvent: benzene 1.0 M	211
	0.015	1.64×10^{-4}	30	A1	AVN (2,2′-azobis-2,4-dimethylvaleronitrile), ACN (1.1′-azobiscyclo-hexane-1-carbonitrile)	173
	0.029 ± 0.003	8×10^{-6}	30	B10	ACN, scavenger TPV (1,3,5-triphenylverdazyl), sovent: benzene	179
–, diisopropyl ester	0.46	$(80–100) \times 10^{-6}$	60	C	Solvent: benzene 1.0 M	211
	0.31 ± 0.07	0.84×10^{-6}	30	B10	ACN, scavenger TPV, solvent: benzene	180
–, dimethyl ester	0.058	430×10^{-6}	60	C	Solvent: benzene 1.0 M	211
–, dineopentyl ester	0.028	44×10^{-6}	60	C	Solvent: benzene 1.0 M	211
Ethyl *o*-formylphenyl fumarate	4.0	1.4	60	C	Solvent: benzene 1.16 M, MAIB 0.100 M, k_p and k_t also given by other [M]	236

TABLE 7. VINYL HALIDES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Tetrafluoroethylene	7400	7.4×10^{-5}	40		Large active chain end concentration measured by addition of inhibitor in aqueous solution polymn.	81
Vinyl bromide	22.7	92	−30	A1		80
	570	385	20		Quoted in Ref. 80	44
Vinyl chloride	$k_p = 3.3 \times 10^6 \times \exp(-15000/RT)$	$k_t = 1.3 \times 10^6 \times \exp(-4200/RT)$		A1		32
	11000	2100	25	A1		56
	3130	2300	25	A1		77
Vinylidene chloride	8.6	0.175	25	A1		18
	$k_p = 10^9 \times \exp(-4540/T)$	$k_t = 10^6 \times \exp(-2670/T)$	22–75	A1	Solvent: *N*-methylpyrrolidone 2.0 M	117

TABLE 8. VINYL ESTERS

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Vinyl acetate	4600	220	25	B5		13
	795	46	15	B1		47
	556–586	2860–3040	15.9	A1		1
	670–770	2500–3100	15.9	A1		3
	700	2600	15.9	A1	Solvent: *n*-hexane	4
	559	51.8	20	B4		37
	1100	80	25	A1		2
	1000	59	25	A1		15
	895	24	25	B4	At 4% conversion	36
	$k_p = 2.43 \times 10^8 \times \exp(-30600/RT)$	$k_t = 4.16 \times 10^5 \times \exp(-21900/RT)$		A1		8
	9500–19000	380–760	60	E	Using results of Refs. 8 and 15	64
	$(15–26) \times 10^2$	25	50	A1		128

TABLE 8. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
	117 ± 12	319 ± 61	30	A1	Solvent: benzene 2.00 M	130
	113 ± 10	351 ± 54		A1	Solvent: C_6D_6 2.00 M	130
	48 ± 5	239 ± 45		A1	Solvent: anisole 2.00 M	130
	97 ± 10	311 ± 59		A1	Solvent: fluorobenzene 2.00 M	130
	61 ± 9	266 ± 75		A1	Solvent: chlorobenzene 2.00 M	130
	37 ± 5	412 ± 104		A1	Solvent: ethyl benzoate 2.00 M	130
	8 ± 1	258 ± 76		A1	Solvent: benzonitrile 2.00 M	130
	637 ± 101	94.2 ± 23.7		A1	Solvent: ethyl acetate 2.00 M	130
	• 78	–			Solvent: ethyl acetate: ethyl benzoate (1 : 1 (v/v))	130
	120	310	32.5	A1	Solvent: benzene	153
	530	630	32.5	C	Solvent: benzene 5.41 M	153
	1900	280	32.5	C	Solvent: ethyl acetate 5.43 M	153
	1400	–	32.5	C		153
	4435	64.4	30	A1	Pressure 5.0×10^7 Pa	112
	$k_p = 2.0 \times 10^6 \times \exp[(-19000 \pm 2900)/RT]$	27.5	15–60	C		45
	$k_p = 2.7 \times 10^8 \times \exp(-27820/RT)$			F1		209
		$\ln[(k_t[p]/(1.00\text{–}0.07p)] = \ln k_t[1] - 0.50p$	30	B5	$k_t[p]$; k_t for pressure p (bar) $k_t[1] = 52.0 \times 10^6$	122
Vinyl benzoate	106 ± 14	253 ± 63	30	A1	Solvent: anisole 1.01 M	116
	185 ± 8	402 ± 32		A1	Solvent: benzene 1.01 M	116
	245 ± 13	522 ± 48		A1	Solvent: fluorobenzene 1.01 M	116
	168 ± 18	383 ± 76		A1	Solvent: chlorobenzene 1.01 M	116
	69 ± 13	257 ± 72		A1	Solvent: ethyl benzoate 1.01 M	116
	33 ± 3	299 ± 44		A1	Solvent: benzonitrile 1.01 M	116
	267 ± 33	451 ± 65		A1	Solvent: ethyl acetate 1.01 M	116

TABLE 9. VINYL ETHERS

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Refs.
Monovinyl ether of ethylene glycol	5.0 ± 1.0	1.5 ± 0.3	50	A1	136
Monovinyl ether of diethylene glycol	3.0 ± 0.8	1.4 ± 0.3	50	A1	136

TABLE 10. STYRENE DERIVATIVES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Styrene	40 ± 20	80 ± 40	15	A1	Dimension of k_p and k_t: kg/mol/s	46
	24	14	20	A1	From copolymn. data with sulfur dioxide	25
	51.9	10.5	30	A1		16
	108	32.5	30	A1		38
	106	108	30	A1		78
	102	–	40	D	Quoted in Ref. 86	59
	390	–	50	D		5
	209	115	50	E	Using results of Ref. 20	61
	18.7	2.79	25	B5		6
	39.5	5.96	25	B1		17
	$k_p = 2.16 \times 10^7 \times \exp(-32500/RT)$	$2k_t = 2.59 \times 10^3 \times \exp(-9920/RT)$		A1		20
	22	–	5	D	Catalyst: cumene hydroperoxide–triethylenetetramine	24
	139	–	40	D	Catalyst: persulfate	24
	223	–	50	D		40
	206	–	50	D		67

TABLE 10. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
	$k_p = 2.24 \times 10^{14} \times \exp(-73510/RT)$			B1		73
	50	–	25	D		65
	80	64	60	A1		118
	370	915			Addition of 1×10^{-3} mol pyridine	118
	25 ± 3	9 ± 1.5	25	A1	Solvent: dodecane 40% by vol	104
	35 ± 7	19 ± 4	25	A1		100
	35 ± 5	19 ± 3	25	A1	Solvent: bromobenzene 20% by vol	100
	29 ± 7	15 ± 4	25	A1	Solvent: diethyl malonate 20% by vol	100
	23 ± 8	11 ± 2	25	A1	Solvent: diethyl phthalate 20% by vol	100
	27 ± 4	31 ± 0.4	25	A1	Solvent: dinonyl phthalate 60% by vol	100
	$k_p = 1.09 \times 10^7 \times \exp(-31380/RT)$	$k_t = 1.703 \times 10^3 \times \exp(-9489/RT)$	15–30	A2	$\overline{DP} = 2500$	114
	66.6	22.4	30	A1	Pressure 5.0×10^7 Pa	102
	66.5	–	25	C		98
	$k_p = 2.4 \times 10^8 \times \exp(-38000 \pm 1700)/RT$		50–90			98
	187.1	29.4	60		Special evaluation from steady-state kinetics and $\bar{M}_n$	134
	$k_p = 10^{7.630} \times \exp(-32510/RT)$		−12–93	F2		215
	84	–	25	F1	k_p also given by other [M] and solvents	196
	76	–	25	F1	Solvent/ethanol (25%) 6.52 M	196
	70	–	25	F1	Solvent: methanol (25%) 6.52 M	196
	380 ± 110	–	40	F1	Pressure 2.0×10^8 Pa	186
	480 ± 10	–	70	C	Over a range of degree of polymn. of the polymer radical from 40 to 410	188
	–	16.6–17.0	100	C	Conversion 0–20% TBP (*tert*-butyl peroxide)	174
	256	190	50	C	k_p and k_t also given by other temp.	189
	107	–	25	G1	Laser-flash-initiated polymn. by benzoin	156
		$k_t\ (m,n) = 1.97 \times 10^2\ (n \times m)^{-0.12}$	30	A3	n: n-mer, m: m-mer, coupling with n-mer and m-mer	147
	180 ± 10	–	5	C		223
	$k_p = 1.99 \times 10^7 \exp(-30780/RT)$			F1		169
	$\ln k_p = 17.14–1.873 \times 10^{-9}\ p - 3748/T + 2.02 \times 10^{-6}\ p/T$		30–90	F2	Pressure 1×10^5–2.8×10^8 Pa	214
	77 ± 4.1	78 ± 12	25	F1		161
	79 ± 5.1	96 ± 9	25	F1	Solvent: toluene 50% (v/v)	161
	187.0	63.2	60	B5	Solvent: benzene 3 M	204
	201.0	51.1			Solvent: chlorobenzene 3 M	204
	167.0	37.9			Solvent: benzonitrile 3 M	204
	641 ± 48	–	91.2	G1	Solvent: toluene	178
	89	132	25	A1		160
	107	–	30	F1	k_p also given by other temp.	198
	92	–	25	F1		220
	78	–	25	F1		164
	23	0.6	28	B1		83
	$\ln k_p = 16.09–28950/RT$ (overall) $= 16.47–3003/RT$ (chain length ≥ 4)			F1	Solvent: benzene 4.33 M	200
	$k_p = 10^{7.1 \pm 0.5} \times \exp[-(29 \pm 3) \times 10^3/RT]$			B1		131
	$k_p = 1.8861 \times 10^7 \times \exp(-30737.52/RT)$			F1		227
	$k_p = 4.2060 \times 10^8 \times \exp(-37468.93/RT)$			F1	30% styrene in benzylalcohol	227
	$k_p = 4.2458 \times 10^8 \times \exp(-39014.90/RT)$			F1	30% styrene in NMP	227
–, *p*-bromo-	186	46	30	A1		78
–, *p*-chloro-	150	77	30	A1		78
–, *p*-cyano-	219	35	30	A1	Solvent: dimethylacetamide	78
–, *p*-fluoro-	112	127	30	A1		78
–, *p*-methoxy-	2.92	1.06	0	B5		12
	71	33	30	A1		78

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TABLE 10. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
–, *o*-methyl-	$k_p = 1.67 \times 10^{11} \times \exp(-58240/RT)$			B1		73
–, *p*-methyl-	84	66	30	A1		78
	$k_p = 2.27 \times 10^7 \times \exp(-32060/RT)$			B1		73
	$k_p = 10^{5.77} \times \exp(-23.0/RT)$		24–55	F1	Solvent: toluene 2 M	226
Styrene-d_8	$k_p = 3.63 \times 10^7 \times \exp(-31500/RT)$	$k_t = 2.55 \times 10^4 \times \exp(-14200/RT)$		A1		168

TABLE 11. VINYL HETEROAROMATICS

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
N-Vinylcarbazole	6.0	0.306	10	A1		80
2-Vinylpyridine	186	33	25	A1		76
	96.6	8.9	25	B4		76
4-Vinylpyridine	12	3	25	B5		34
5-Vinylpyridine	47	3.5	25	B4		75
–, 2-methyl-	122	66	20	B1	Solvent: methanol 1.95 M, k_p also given as a function of [M]	94
	209	43	20	B1	Solvent: 50% (molar) aqueous methanol	94
	17.3	1.2	20	B1	Solvent: acetic acid	94
N-Vinylpyrrolidone	953	65	20	B4		82
	22000 ± 4000	600 ± 200	25	A1	Solvent: water	132

TABLE 12. ALDEHYDES

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Formaldehyde	–	$(7–10) \times 10^{-3}$	– 190	B4	Solid monomer, gamma irradiation	95

TABLE 13. OTHERS

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
Maleimide						
–, *N*-*tert*-amyl-	69	$0.048^a, 0.017^b$	60	C	Solvent: benzene 1 M	205
–, *N*-*tert*-butyl-	100	$0.021^a, 0.023^b$	60	C	(a) Determined from steady-state equation $k_t = (2k_d f[I])/[P^\bullet]^2$, AIBN 0.005 M; (b) determined from second order plot of the decay curve of the radical concentration, ATMP (2,2′-azobis-(2,4,4-trimethyl-pentane)) 0.02 M, for *tert*-BMI, ATMP 0.01 M	205
–, *N*-*tert*-butyl-dimethylsilyl-	120	0.20^a	60	C		205
–, *N*-*tert*-octyl-	23	$0.027^a, 0.015^b$	60	C		205
–, *N*-trimethylsilyl-	120	$0.15^a, 0.23^b$	60	C		205
–, *N*-cyclohexyl-	49	0.054	50	C	Solvent: benzene 0.559 M, AIBN 1.39×10^{-2} M	163
	55	0.069			Solvent: benzene 0.698 M, AIBN 1.00×10^{-2} M, k_p and k_t also given by other [M] and [I]	163

TABLE 13. *cont'd*

Monomer	k_p (l/mol/s)	k_t ($\times 10^{-6}$) (l/mol/s)	Temp. (°C)	Method	Remarks	Refs.
–, *N*-(2,6-diethylphenyl-	2.0	0.0078	60	C	Solvent: benzene 1 M, AIBN 5×10^{-3} M	183
–, *N*-(2,6-dimethylphenyl)-	14	0.034	60	C	Solvent: benzene 1 M, AIBN 5×10^{-3} M	183
–, *N*-(4-ethylphenyl)-	1200	3.9	60	C	Solvent: benzene 1 M, AIBN 5×10^{-3} M	183
–, *N*-(2-methylphenyl)-	190	0.59	60	C	Solvent: benzene 1 M, AIBN 5×10^{-3} M	183
–, *N*-(2-carboethoxyphenyl)-	96	0.10	60	C	Solvent: benzene MAIB 0.005 M	237
–, *N*-dodecyl-	54	0.12	50	C	Solvent: benzene MAIB 0.01 M	238
	104	0.45	50	C	Solvent: toluene MAIB 0.01 M	238
	175	1.0	50	C	Solvent: anisole MAIB 0.01 M	238
	80	0.40	50	C	Solvent: chlorobenzene MAIB 0.01 M	238
	128	0.064	50	C	Solvent: bromobenzene MAIB 0.01 M	238
	149	0.17	50	C	Solvent: methyl benzoate MAIB 0.01 M	238
	386	–	50	C	Solvent: THF, MAIB 0.01 M	238
	250	–	50	C	Solvent: dioxane, MAIB 0.01 M	238
	235	0.55	50	C	Solvent: ethyl acetate MAIB 0.01 M	238
	196	–	50	C	Solvent: methyl ethyl ketone MAIB 0.01 M	238
–, *N*-octadecyl-	33	0.10	50	C	Solvent: benzene AIBN 0.20 M, k_p and k_t also given by other [I]	239
Oligotetramethylene glycol dimethacrylic ester (MW 600)	400	0.07	50	B9		124

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Transfer Constants to Monomers, Polymers, Catalysts and Initiators, Solvents and Additives, and Sulfur Compounds in Free Radical Polymerization†

A. Ueda
Osaka Municipal Technical Research Institute, Osaka, Japan

S. Nagai
Plastics Technical Association, Osaka, Japan

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A. INTRODUCTION

The transfer reaction in radical polymerization describes a process in which the polymer radical reacts with another molecule (monomer, polymer, catalyst, solvent, modifier, etc.) forming a dead polymer and new radical. This new radical can continue the kinetic chain:

$$P_n^{\bullet} + RX \xrightarrow{k_{tr,X}} P_nR + X^{\bullet}$$

$$X^{\bullet} + M \xrightarrow{k_{i,X}} P_1^{\bullet}$$

The dimensionless transfer constant is defined by the ratio

$$C_X = k_{tr,X}/k_p$$

where k_p is the rate constant of propagation.

† Based on the tables in the third edition, by K. C. Berger and G. Brandrup.

If it is assumed that

(a) all new radicals $X^{\bullet}$ react only by formation of growing polymer radicals;
(b) all polymer radicals have equal reactivities independent of their size;
(c) all rate constants are independent of solvent;
(d) the consumption of monomer by initiation and transfer is negligible compared with propagation;
(e) a steady-state concentration of polymer radicals is quickly established ($d[P^{\bullet}]/dt = 0$).

The application of these assumptions to the common reaction scheme results in the following relationship of ideal kinetics (Ref. 145):

$$\frac{1}{P_n} = \frac{1}{P_{n0}} + \sum C_X \frac{[X]}{[M]}$$

P_n, P_{n0} = number-average degree of polymerization obtained in the presence or absence, respectively, of transfer agent X.
[M], [X] = concentration of monomer or transfer agent, respectively.

The left-hand side of this equation is obtained by measuring the number average molecular weight of polymer at different concentrations of the transfer agent X, all other variables being kept constant. In many cases the degree of polymerization was determined by measurement of viscosity (Remark R). It should be noted that the ratio of

viscosimetric to number average molecular weight shows a considerable dependence on the molecular weight distribution.

The first term P_{n0} of the right-hand side of this equation is the number average molecular weight measured in the absence of transfer agent X. This is limited to cases where the transfer agent is a modifier. In all other cases, P_{n0} is calculated by combination of several kinetic expressions and used with its numerical value:

Initiation	$R_i = 2fk_d[I]$ or therm. $R_i = R_t$
Termination	$R_t = k_t[P^\bullet]^2 = (k_{t,d} + k_{t,c})[P^\bullet]^2$
Propagation	$R_p = k_p[M][P^\bullet]$
Number-average molecular weight	$P_{n0} = \dfrac{2(1+\delta)}{1+2\delta}\dfrac{R_p}{R_t}$

where k_t, $k_{t,d}$, and $k_{t,c}$ are the rate constants of termination, termination by disproportionation, and termination by combination, respectively.

$$\delta = k_{t,d}/k_{t,c}$$

The second term of the right-hand side of the above equation is given by the following expression:

$$C_X = C_M + C_I\frac{[I]}{[M]} + C_S\frac{[S]}{[M]} + C_p\frac{[P]}{[M]} + \cdots$$

where C_p is the constant of chain transfer with added polymer before starting polymerization.

The transfer constant of very reactive molecules can be determined from the rate of disappearance of both transfer agent and monomer:

$$C_X = \frac{d\ln([X])}{d\ln([M])}$$

This decrease of the transfer agent concentration with increasing monomer conversion is important in practice because very reactive transfer agents are used up preferentially, giving a broad molecular weight distribution if they cannot be replenished.

In analogy to quickly decomposing initiators with their criterion of "half-life", one can define, in addition to the transfer constant C_X, a "half-conversion" $U_{1/2}$ as that monomer conversion where the transfer agent is half consumed:

$$U_{1/2} = 100(1 - 0.5^{1/C_X})$$

The following table demonstrates (with some examples for a calibration curve) that the "half-conversion" $U_{1/2}$ decreases with increasing transfer constant C_X:

The "Half-Conversion" of Transfer Agents

C_X	$U_{1/2}(\%)$	C_X	$U_{1/2}(\%)$
0.1	99.9	5	13.0
0.2	96.8	10	6.7
0.5	75.0	20	3.4
1	50.0	50	1.4
2	29.3	100	0.7

The transfer agent must be replenished at this monomer conversion at the latest, if polymerization is to proceed, still yielding a narrow molecular weight distribution.

Numerous examples are known of polymerization systems that possibly do not satisfy basic assumptions: retardation (Remark J), induced decomposition and primary radical termination by peroxide or hydroperoxide initiation (Remarks C and B), diffusion control of termination (Remark X), electron donor/acceptor complexes (Remarks JJ), etc. Corresponding data in this table have to be used with caution.

B. TABLES OF TRANSFER CONSTANTS

TABLE 1. TRANSFER CONSTANTS TO MONOMERS

Monomer	T (°C)	C_M (×10^4)	Remarks	Refs.
Acetic acid, allyl ester	80	170		29
		700		27
Acrylamide	25	0.12	D	92
		0.16		74
		0.2		75
		0.2	E	103
	50	0.558	C2, F13, LL	560
	60	0.651	C2, F13, LL	560
	60	0.6	E	103
Acrylamide, *N,N*-dimethyl-	50	1.5		272
Acrylic acid, benzyl ester	55	0.883		291
	60	0.905		291
–, butyl ester	60	0.333	C1, H, KK	561
	60	1.05	C1, H, KK	561

TABLE 1. *cont'd*

Monomer	*T* (°C)	C_M ($\times 10^4$)	Remarks	Refs.
Acetic acid, butyl ester (*cont'd*)	60	1.25	C1, H, KK	561
	65	0.955		291
–, ethyl ester	50	0.193		306
		0.90	F7	510
		0.41	C, F17, R	512
	60	0.579	C, F17, R	512
	65	0.332		306
	70	0.351		306
		0.789	C, F17, R	512
–, -2 ethylhexyl ester	70	6.28	C, F17, R	512
	80	3.79	C, F17, R	512
–, methyl ester	50	0.80	F7	510
	55	0.275	C, AA	221
	60	0.036	B, AA	221
		0.325	C, AA	221
	65	0.10	C, AA	221
		0.11	C, F10	123
		0.11	C, AA	221
		0.37	C, AA	221
	70	0.01	C, F10	322
		0.072	B, AA	221
		0.16	C, AA	221
		0.18	C, AA	221
		0.405	C, AA	221
	75	0.224	C, AA	221
		0.25	C, F10	123
		0.25	C, AA	221
–, tetrahydrofurfuryl ester	40	4.0	C, F2	319
–, 2-chloro-, ethyl ester	60	3.0		342
–, thio-, methyl ester	60	560		140
Acrylonitrile	20	0.18	E	299
	25	0.105		284
	30	1.5	F8	196
	40	0.17		284
	50	0.050	F18	410
		0.27	F17	376
		8.2	F16	362
	60	0.26		95
		0.3		23
	60	0.333	C1, H, KK	561
	60	0.57	C1, H, KK	561
	60	1.02	C1, H, KK	561
Allyl bromide	60	30	C, R, HH	505
Ammonium chloride, *N,N*-diallyl-*N,N*-diethyl-	60	18	C1, F30	538
–, *N,N*-diallyl-*N,N*,-dimethyl-	60	7	C1, F30	538
Anisole, *p*-vinyl	0	0.198		13
	60	0.74		53
Anthranilic acid, vinyl ester	70	80		139
Benzoic acid, vinyl ester	60	6.0		321,393
	80	7.0		26
	95	2.0		321
		4.0		213
1,3-Butadiene, 2-chloro-	50	2.32	F2	153
–, 1,1,2-trichloro-	25	16	E	230
1-Butene	40	3.1		334
	50	5.1		334
	60	7.3		334
2-Butene, *cis*-	40	3.2		334
	50	4.9		334
	60	11.2		334
–, *trans*-	40	3.0		334
	50	5.2		334
	60	10.8		334
3-Butene-2-one, 3-methyl-	80	4.00	C	84

TABLE 1. *cont'd*

Monomer	T (°C)	C_M ($\times 10^4$)	Remarks	Refs.
Butyric acid, vinyl ester	50	26.7		71
	80	22.3		200
Carbamic acid, vinyl-, ethyl ester	60	0.25		117
Carbazole, *N*-vinyl-7H-benzo(2)-	70	11	R, F2	522
Decanoic acid, vinyl ester	50	45.5		71
Ethylene	60	0.4	W5	102
		1.4	W4, W5	102
		4.2	W4	102
	83	5.0	D, W	204
		5.32	D, W	205
	110	1.1	W4, W5	102
		3.5	W4, W5	102
		9.0	W4	102
	130	0.0	C, F21, W5	259
		1.6	W4, W5	102
		4.7	W4, W5	102
		11.2	W4	102
	50–70	5	W3	218
–, chloro-	20	3.2		94
	25	3.2		315
		7.0		425
	30	6.25	Y	58
	40	19.4	F5	463
		50		246
	50	6.4	F3	379
		7.8	F4	379
		8.5		379
		11	C, F26	392
		13.5	Y	58
	60	10.8	F3	379
		12.3		379
		12.8	F4	379
	70	23.8	Y	58
Glutaramic acid, *N,N*-diisobutyl-, vinyl ester	60	42	C, F10	106
–, *N,N*-diisopentyl-, vinyl ester	60	51	C, F10	107
	70	51	C, F10	107
	80	51	C, F10	107
Hexanoic acid, vinyl ester	80	36		200
5-Hexen-3-yn-2-ol, 2-methyl-	60	5.0		226
Isobutyric acid, vinyl ester	80	46		200
Lauric acid, vinyl ester	50	45.5		71
Maleic anyhydride	75	750	C	175
Maleic anhydride/methyl methacrylate	60	100		367
Maleimide, *N*-(3-dimethylamino-6-methyl-phenyl)	50	720	F2	542
Methacrylamide	60	10×10^5	JJ1	515
Methacrylic acid, bornyl ester	60	2.85		162
–, butyl ester	50	0.54		233
	60	120×10^5	JJ1	515
		0.14		264
–, tert-butyl ester	70	0.35		9
–, *o-t*-butylphenyl ester	60	30.41	C	550
–, *p-t*-butylphenyl ester	60	2.01	C	550
–, *n*-dodecyl ester	60	80×10^5	JJ1	515
–, 2,3-epoxypropyl ester	60	0.59		198
–, ethyl ester	45	0.248	CC	193
	60	0.259	CC	193
	80	0.456	CC	193
	90	0.442	CC	193
–, *o*-ethylphenyl ester	60	3.63	C	550
–, *p*-ethylphenyl ester	60	1.36	C	550
–, glycidyl ester	60	45×10^5	JJ1	515
–, hexadecyl ester	70	0.14		138
–, isobornyl ester	60	1.85		162

TABLE 1. *cont'd*

Monomer	T (°C)	C_M (×10^4)	Remarks	Refs.
Methacrylic acid, isobutyl ester	35	0.189	DD	193
	50	0.179	DD	193
	60	0.14		264
		0.165	F2	264
		0.224	DD	193
	80	0.301	DD	193
	100	0.382	DD	193
–, *n*-nonyl ester	60	105 × 10^5	JJ1	515
–, phenyl ester	27	400	R	534
	60	0.61	C	550
–, *o*-tolyl ester	60	1.13	C	550
–, *p*-tolyl ester	60	1.06	C	550
Methacrylonitrile	25	2.08	Z	125
	60	5.81	Z	125
	70	8.00	Z	125
	80	10.05	Z	125
Methyl methacrylate	0	0.128		69
		0.148		18
	30	0.117		69
		0.260	D	224
		0.15		508
		30 × 10^5	JJ2	525
	40	242 × 10^5	JJ1	528
	50	0.10	F2	147,327
		0.15		145
		0.477	D	224
		241 × 10^5	JJ1	528
		0.85		69
	60	0.07		274
		0.10		34,290,317
		0.103	C	316
		0.18		145
		240 × 10^5	JJ0	556
	65	0.20		123
	70	0.17	C, F10	123
		0.20		267
		0.23		145
		0.265		440
		0.29	C, F17	123
		0.30		123
		0.45		104
		0.807	D	224
		1.37		459
		240 × 10^5	JJ1	528
	75	0.27	C, F10	123
		0.33	C	123
		0.60	C, F11	123
		0.70	C, F2	123
	80	0.25		145
		0.40		123
	90	0.10		147
	100	0.38		145
	120	0.58		145
Naphthalene, 1-vinyl-	50	290		216
	60	310		216
	70	300		216
1,4-Pentadiene, 1,1,2,3,3,4,5,5-octafluoro-	110	500	W10	68
Phernol, *o*-vinyl-	70	130		186
2-Picoline, 5-vinyl-	70	6.7		11
1-Propene, 2-chloro-	80	1600		27
–, 2-methyl-	40	2.5		334
	50	4.4		334
	60	6.9		334
Propionic acid, vinyl ester	–	3.6		158
	50	48.9		71

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TABLE 1. *cont'd*

Monomer	T (°C)	C_M (×10^4)	Remarks	Refs.
Pyridine, 2-vinyl-	15–35	0	D	38
–, 4-vinyl-	25	6.7		283
2-Pyrrolidinone, 1-vinyl-	20	4.0		59
Stearic acid, vinyl ester	50	69.8		71
Styrene	0	0	BB	360
		0.108		17,69
	25	0.279		69,245
		0.358		17
	27	0.31	A	145
	30	0.2	BB	318,360
		0.32		245
	45	0.3	BB	360
	50	0.35	H	354,355
		0.40	F2	318,327
		0.50	C, H	388
		0.6	C	145
		0.62	A, K	145
		0.65	B, C, H	388
		0.78	A	146
	60	0.07	C	467
		0.6		34,171,223
		0.6	C	145,240
		0.6	BB	318,360
		0.75		467
		0.79	A	145
		0.85	A, F	145
		0.92		447
		1.1		53
		1.37	C	234
		20×10^5	JJ1	515
	67.8	1.0		34
	70	0	C, F10	123
		0.6		104
		0.6	BB	360
		0.8	B, H	388
		0.96		67
		1.16	A	145
		1.35	A	145
		2.0	C, F2	123
	75	0	C, F10	123
		1.6	C	123
		5.0	C, F2	123
		5.00	C, F11	123
	80	0.7		98
		0.75	BB	360
		1.00		318
	80.3	4.0		34
	90	0.85	BB	360
		1.25	C, F	145
		1.47	A	145
		1.79	A	145
	99	1.5		98
	100	1.72	A	145
		1.8	A, F	145
		1.83	A	145
	110	2.80	A	145
	117	1.40		318
	132	2.45	A	145
		3.0	A, F	145
		3.4	A	145
		5.33	A	145
Styrene, *p*-boromo-	50	23		192
–, *o*-chloro-	30	0.25		62
	50	0.25	C	60
		0.28	C, H	60

TABLE 1. *cont'd*

Monomer	T (°C)	C_M (×10⁴)	Remarks	Refs.
Styrene, *p*-iodo-	50	1.9	F1	56
Succinimide, *N*-vinyl-	55	0.55	C	93
Valeric acid, 4-methyl-, vinyl ester	80	24.8		200
Vinyl acetate	–	1.9		158
	– 60	0.40	D	464
	– 40	0.60	D	464
	– 20	0.70	D	464
	– 20	0.30	D	241
	0	0.50	D	241
		0.90	I4	86
		0.96	D	464
	20	0.94		328
	25	0.90	D	241
		1.3	I7	86
		1.45	I7	86
		2.4	D	202
		10.7		69
	40	1.29		12
		1.32		328
	45	2.0		51
	50	0.25		466
		0.41		265
		0.54	W14	265
		0.61	W15	265
		1.29		12
		2		552
		4.55	C	71
		20		225
	60	1.75		12
		1.8		466
		1.9		124
		1.91		328
		1.93		348
		2.0		231
		2.1	I12	145
		2.4		294
		2.5	C	86
		2.5		167
		2.6		167
		2.8	C	80
	65	2.1	C	466
	70	2.4		403
		2.9	I13	86
Vinylidene chloride	50	22	R	541
	60	38	R	541

TABLE 2. TRANSFER CONSTANTS TO POLYMERS

Polymer	T (°C)	C_P (×10⁴)	Remarks	Refs.
Acrylamide, *N,N*-dimethyl-				
Poly(*N,N*-dimethylacrylamide)	50	0.61		272
Acrylic acid, ethyl ester				
Poly(methyl methacrylate)	60	12800	M6	120
–, methyl ester				
Poly(isoprene)				
–, chlorinated	75	12.6	C, F2	308
Poly(methyl acrylate)	60	0.5	L	212
		1.0	L	105
Poly(methyl methacrylate)	60	18000	M6	120
Acrylonitrile				
Cellulose	60	1.0	L, N	361
		11	L, M4	361
		20	L, M5	361

TABLE 2. *cont'd*

Polymer	*T* (°C)	C_P (×10^4)	Remarks	Refs.
Acrylonitrile, (*cont'd*)				
Poly(acrylonitrile)	50	4.7	F14	376
	60	3.5	L	135
Poly(methyl methacrylate)	60	0.2	N	25
		240	M2	25
		900	M3	25
		1270	M	25
Poly(sarcosine)	60	400		23
1,3-Butadiene				
Poly(1,3-butadiene)	50	11		142
Ethylene	174.8	108.40	C, W20, F32	540
	201.6	150.70	C, W20, F32	540
	215.0	194.81	C, W20, F32	540
	231.2	214.46	C, W20, F32	540
	230.3	337.31	C, W22, F32	540
	229.2	256.85	C, W21, F32	540
	230.3	195.81	C, W20, F32	540
	230.4	199.89	C, W19, F32	540
	230.5	155.78	C, W18, F32	540
	256.0	348.46	C, W20, F32	540
–, chloro-				
Poly(vinyl chloride)	50	5	L	211
Hexanoic acid, vinyl ester				
Poly(oxyethylene), dodecyl ether	60	780		278
Methacrylic acid, butyl ester				
Poly(methyl methacrylate)	60	7700	M6	120
–, dodecyl ester				
Poly(methyl methacrylate)	60	12800	M6	120
–, ethyl ester				
Poly(isoprene), chlorinated	70	18.3	C, F2	308
Poly(vinyl chloride)	70	21.0	C, F28	308
Methyl methacrylate				
Poly(ethylene)	50	0.6		209
Poly(isoprene), chlorinated	80	23.4	C, F17	307
Poly(methyl methacrylate)	40	1.5	N	326
		360	M	326
	50	0.22	N	147
		1.5	N	326
		1.5	M	327
		360	M	326
		360	N	327
		1000	M	147
	60	0.1		105
		1.5	N	326
		2.1		262
		360	M	326
	80	2.48		262
	90	0.22	N	147
		1000	M	147
Poly(propylene)	50	0.04	C	292
		1.0		209
	130	0.42		292
Poly(styrene)	50	0.75		148
	60	2.20		262
	80	2.95		262
Poly(vinyl acetate)	60	2.0		263
	80	2.8		263
Poly(vinyl chloride)	–	11		250
	70	10.0	C, F28	308
Poly(vinyl urethane)	50	17	C, F8	157
Rubber, natural	50	10.9		258
		11.0	C	258
2-Pyrrolidinone, 1-vinyl-dextran				
Dextran	50	5		333
		5.87		203

TABLE 2. *cont'd*

Polymer	T (°C)	C_P (×10⁴)	Remarks	Refs.
Styrene				
Poly(oxyadipoyloxy-2,2-dibromomethyl trimethylene)	60	4.05	L	325
Poly(oxyethylene)	70	19	M10	562
	70	14	M10	562
–, dodecyl ether	60	20		278
Poly(oxythexamethyleneoxy sebacoyl)	80	13	C, N	394
Poly(methyl methacrylate)	50	0.4	N	327
		<0.3	M	326
		1110	N	326
		1140	M	327
	60	16.4	M1	64
		17.5	M1	64
		5.7×10^4	M7	120
		32×10^4	M6	120
	80	3.74		262
	100	6.04		262
Poly(propylene)	60	0.025	C	292
	66	26		486
	130	0.3		292
		0.30		207
Poly(styrene)	50	1.9		144,148
		4.5		327
		14.0		327
		16.6		176
	55	15		177
	60	0.8	L	105
		1.9		73
		3.1		105
		15.4	M1	64
		15.8	M1	64
		16.6		176
	73.5	1.0	C	8
	85	1.4	C	8
	90	5.8		327
	100	2.0	N	276
	110	9.2		177
		10.8		176
	130	1.8		43
	154	1.5		43
Poly(vinyl acetate)	100	6.6		263
	130	9.2		263
Poly(vinyl chloride)	–	160		250
Poly(2-vinylpyridine)	50	8–10		279
Vinyl acetate				
Poly(oxyethylene)	60	17	N	277
		40	M	277
–, dodecyl ether	60	10	M8	277
		40	M9	277
		750		271
Poly(methyl methacrylate)	60	21		263
	75	26		263
Poly(styrene)	40	12		263
	60	15		263
	75	19		263
Poly(vinyl acetate)	– 15	0.36		97
	0	0.5		97
		1.7		350
	11	2	O	145
	21	4	O	145
	31	16	O	145
	40	11.2		12
		30.9		43
		32.0		263
	50	0.06	W15	265

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TABLE 2. *cont'd*

Polymer	T (°C)	C_P ($\times 10^4$)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Poly(vinyl acetate) (*cont'd*)		0.11	W14	265
		0.15		265
		3		43
		10.2		12
	60	1.2		124
		1.4		168,169
		1.8		348
		1.9		328
		2.5		329
		3.0		165
		4.0		105
		6.8		12
		8.0		105
		47.0		263
	60–70	3.5	P	350
	70	2	O	403
		4		403
Poly(vinyl acetate-*co*-vinyl chloride)	60	0.21	VCL-Part	166
		3.0	VOAC-Part	166

TABLE 3. TRANSFER CONSTANTS TO CATALYSTS AND INITIATORS

Catalyst/Initiator	T (°C)	C_I	Remarks	Refs.
Acrylamide				
Bisulfite ion	75	0.17	F13	352
Hydrogen peroxide	25	0.0005	D	92
Potassium persulfate	50	0.0258	F13, LL	560
	60	0.028	F13, LL	560
Acrylic acid, benzyl ester				
Isobutyronitrile, 2,2′-azobis-	55	0		291
	60	0		291
	65	0		291
–, ethyl ester				
Isobutyronitrile, 2,2′-azobis-	65	0		306
–, methyl ester				
Benzoyl peroxide	55	0.0143		221
	60	0.0246		221
	65	0.0375		221
	70	0.01	C, F10	322
		0.05		221
2-Butanone, peroxide	65	0.05	F10	123
		0.05		221
	70	0.077		221
	75	0.113	F10	123
		0.113		221
tert-Butyl hydroperoxide	60	0.01		221
	70	0.0266		221
tert-Butyl peroxide	65	0.00047		221
	70	0.00082		221
	75	0.00111		221
Chloroform/$CuCl_2$	120	600	Q(5–19), F1	551
Acrylonitrile				
Isobutyronitrile, 2,2′-azobis-	50	0	F16	362
	60	0		95
Azodiphenylmethane, benzyl-	50	0.07	R	536
	60	0.07	R	536
	80	0.07	R	536
–, cyclohexyl-	50	0.02	R	536
	60	0.04	R	536
	80	0.05	R	536

TABLE 3. *cont'd*

Catalyst/Initiator	T (°C)	C_I	Remarks	Refs.
Azodiphenylmethane (*cont'd*)				
–, 1-phenylethyl-	50	0.1	R	536
	60	0.1	R	536
	80	0.1	R	536
–, 2-propyl-	50	0.02	R	536
	60	0.04	R	536
	80	0.05	R	536
Benzoic acid, vinyl ester				
Benzoyl peroxide	80	0.0527		26
Isobutyronitrile, 2,2′-azobis-	80	0		26
3-Buten-2-one, 3-methyl-				
Benzoyl peroxide	80	0.0509		84
Ethylene				
Azoethane, 1,1′-dimethyl-	83	0.5	D, W	204
		0.51	D, W	205
Ethylene, chloro-				
Valeronitrile, 2,2′-azobis[2,4,4-trimethyl-	25	0.85		425
Maleic anhydride				
Benzoyl peroxide	75	2.63		175
Methacrylonitrile				
Isobutyronitrile, 2,2′-azobis-	60	0		125
Methyl methacrylate				
Acetophenone, 2-diazo-2-phenyl-	70	0.0		459
p-Anisoyl peroxide	60	0.037		316
Benzoyl peroxide	50	0.01		145
	60	0		34
		0.02	12	145
2-Butanone peroxide	65	0.0025	F2	123
		0.00698		123
	70	0.0033	F17	123
		0.0033	F10	123
		0.0040	F11	123
		0.0092		123
	75	0.00553	F11	123
		0.00667	F2	123
		0.0071	F10	123
		0.0089		123
	80	0.0111	F17	123
		0.0128		123
tert-Butyl hydroperoxide	60	1.27 × [cat]		34
tert-Butyl peroxide	20	<0.0001	C, D	35
Butyronitrile, 2-ethyl-,2,2′-azobis-	60	0		317
–, 2-methyl-, 2,2′-azobis-	60	0		317
–, 2,3,3-trimethyl-, 2,2′-azobis-	60	0	317	
Cinnamoyl peroxide	60	0.009		316
Cobalt, [bis-[μ-[(2,3-butane-dionedioximato)(2-)-*O*,*O*′]]		36000		563
tetrafluorodiborato(2-)-*N*,*N*′,*N*″,*N*″]-				
		2500	F17	563
Cyclohexanecarbonitrile, 1,1′-azodi-	60	0	317	
Cyclopropanecarboxylic acid, 1-methyl-				
2-(9′-anthryl)-, methyl ester	70	0.002	440	
Hydrogen peroxide	60	0.046	F11	290
Hydroperoxide, α,α-dimethylbenzyl	60	0.33		34
Isobutyronitrile, 2,2′-azobis-	50	0	F2	327
	60	0	F10	34,290,317
Methane, diazodiphenyl-	70	0.0		267
Palmitoyl peroxide	60	0		316
		0.16	I11	145
Peroxide, bis(*m*-chlorobenzoyl)	60	0.003		316
–, bis(*o*-chlorobenzoyl)	60	0.019		316
		0.35	F10	290
		0.8	I10	145
–, bis(*p*-chlorobenzoyl)	60	0.009		316
–, bis(*m*-nitrobenzoyl)	60	0.012		316

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TABLE 3. *cont'd*

Catalyst/Initiator	*T* (°C)	C_I	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
–, bis(*p*-nitrobenzoyl)	60	0.144		316
–, bis(*m*-phenylazobenzoyl)	50	0.00001	C	282
2-Tetrazene, 1,1,4,4-tetramethyl-	30	0.038	D	483
o-Toluoyl peroxide	60	0.046		316
		0.06	I11	145
Valeronitrile, 2-methyl, 2,2′-azobis-	60	0		317
Styrene				
Acetyl peroxide	70	0		87,217
p-Anisoyl peroxide	70	0.074		87
Benzoyl peroxide	22	0.1	D	65
	50	0.13		58
	60	0.048		171
		0.055		240
		0.101	C	234
	70	0		217
		0.075		87
		0.12		67
		0.18		58,65
	80	0.13		58,65
		0.813	F17	530
Cobalt, [Bis-[μ-[(2,3-butane-dionedioximato)(2-)-*O,O*′]] tetrafluorodiborato(2-)-*N,N*′,*N*″,*N*″]-		1500		563
Di-3-phenylazo benzoyl peroxide	50	6.7	R	527
	70	5.5	R	527
	90	4.8	R	527
2-Butanone, peroxide	50	0.46	H	388
	70	0.0667	F2	123
		0.1250	F10	123
		0.1670	F11	123
	75	0.1250	F2	123
		0.1670	F10	123
		0.2000	F11	123
		0.243		123
tert-Butyl hydroperoxide	60	0.035		171
	70	0.051	H	388
		0.060		399
		0.063	F6	400
		0.064		400
		0.066	F2, F5	400
	80	0.003		385
Butyl peroxide	60	0.00076	F9	302
		0.00092	F2	302
	80	0.0029	F9	302
sec-Butyl peroxide	60	0.0004	F2	301
	80	0.0021	F2	301
tert-Butyl peroxide	60	0.00023	F9	303
		0.0003		303
		0.0006	F2, F12	303
		0.00086		300
		0.0013		304
	70	0.039	F2	400
	80	0.0022	F2	303
		0.0033		385
Butyryl peroxide	70	0.018		87
Cinnamoyl peroxide	70	1.10		87
Crotonyl peroxide	70	0.146		87
Cyclohexanone peroxide	60	0.062		33
Ethyl peroxide	60	0.00066	F2	301
	80	0.0024	F2	301
Formamide, 2-cyano-2-propylazo-	100	0.17		47
Furoyl peroxide	70	0.23		87
Hexanoyl peroxide	70	0.166		87
Hydroperoxide, α,α-dimethylbenzyl	40	0.052	H	388

TABLE 3. *cont'd*

Catalyst/Initiator	*T* (°C)	C_I	Remarks	Refs.
Styrene (*cont'd*)				
Hydroperoxide, α,α-dimethylbenzyl (*cont'd*)	50	0.069	H	388
	60	0.063		171
	70	0.082	H	388
		0.10		399
–, α,α-dimethylbenzyl, *p*-isopropyl-	70	0.033	H	388
Isobutyronitrile,2,2′-azobis-	50	0	F2	327
		0	H	388
	60	0		171
		0		318
		0.012		468
		0.16		447
Isopropyl peroxide	60	0.0003	F2	301
	80	0.0015	F2	301
Lauroyl peroxide	70	0		217
		0.024		87
	84	0		217
p-Menth-8-yl hydroperoxide	50	0.048	H	388
Myristoyl peroxide	70	0		217
		0.116		87
2-Naphthoyl peroxide	70	0.178		87
Nickel peroxide	60	0.00265	C, F2	266
Octanoyl peroxide	70	0		217
		0.098		87
Oleoyl peroxide	70	0.154		87
Palmitoyl peroxide	70	0.142		87
Peroxide, bis(*p*-acetoxybenzoyl)	70	0.187		87
–, bis(*m*-bromobenzoyl)	70	0.465		87
–, bis(*o*-[bromobenzoyl)	50	1.0		58,65
	70	2.17		87
–, bis(*p*-bromobenzoyl)	70	0.193		87
–, bis(*p*-*tert*-butylbenzoyl)	70	0		87
–, bis(*m*-chlorobenzoyl)	70	0.346		87
Peroxide, bis(*o*-chlorobenzoyl)	22	2.0	D	65
	70	1.91		87
–, bis(*p*-chlorobenzoyl)	70	0.216		217
–, bis(*p*-cyanobenzoyl)	70	0.804		87
–, bis(2,4-dichlorobenzoyl)	60	2.9		217
	70	2.6		217
–, bis(α,α-dimethylbenzyl)	50	0.01	H	388
–, bis(*m*-fluorobenzoyl)	70	0.246		87
–, bis(*o*-fluorobenzoyl)	70	0.40		87
–, bis(*p*-fluorobenzoyl)	70	0.219		87
–, bis(hydroxyheptyl)	50	<0.005	H	388
–, bis(*m*-iodobenzoyl)	70	0.262		87
–, bis(*p*-methoxycarbonyloxy-benzoyl)	70	0.208		87
–, bis(*m*-nitrobenzoyl)	70	6.2		87
–, bis(*p*-nitrobenzoyl)	70	7.4		87
–, bis(*m*-phenylazobenzoyl)	70	5.5	C	281
	90	4.8	C	281
–, bis(5-phenyl-2,4-pentadienoyl)	70	5.24		87
–, bis(2-thiophenecarbonyl)	50	0.23		65
	70	0.38		65
–, *tert*-butoxymaleoyl	70	1.52		87
–, *tert*-butoxyphthaloyl	70	0.018		87
–, butylidenebis[*tert*-butyl	80	0.00077	C	411
	90	0.00140	C	411
–, *sec*-butylidenebis[*tert*-butyl	80	0.00072	C	411
	90	0.00115	C	411
–, isobutylidenebis[*tert*-butyl	80	0.00083	C	411
	90	0.00155	C	411
–, isopropylidenebis[*tert*-butyl	80	0.00040	C	411
	90	0.00105	C	411
Pinanyl hydroperoxide	70	0.026	H	388

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TABLE 3. *cont'd*

Catalyst/Initiator	T (°C)	C_I	Remarks	Refs.
Styrene (*cont'd*)				
Pivalonitrile	60	0.000038		468
Propylene, oxidized	60	1.01		396
	70	1.14		396
Propyl peroxide	60	0.00084		305
Sorboyl peroxide	70	1.19		87
Stearoyl peroxide	70	0.154		87
Succinonitrile, tetramethyl-	60	0.000037		468
2-Tetrazene, 1,1,4,4-tetramethyl-	30	0.038	D	483
o-Toluoyl peroxide	70	0.175		87
p-Toluoyl peroxide	50	0.17		65
	70	0.003		87
		0.19		65
9-Undecenoyl peroxide	70	0.065		87
Valeronitrile, 2,2′-azobis[2,44-trimethyl-	25	0.59		426
Vinyl acetate				
Benzoyl peroxide	60	0.032		465
		0.09		231
		0.15		80
	65	0.040		466
Isobutyronitrile, 2,2′-azobis-	50	0.025		466
	60	0.055		466
Lauroyl peroxide	60	0.10		80
Palmitoyl peroxide	60	0.10		80
		0.17	I3	145
Peroxide, bis(*m*-bromobenzoyl)	60	0.24		80
		0.6	I3	145
–, bis(*o*-bromobenzoyl)	60	0.25		80
		3.5	I3	145
–, bis(*p*-bromobenzoyl)	60	0.17		80
–, bis(*o*-chlorobenzoyl)	60	0.17	I3	145

TABLE 4. TRANSFER CONSTANTS TO SOLVENTS AND ADDITIVES

Solvent/Additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Acetic acid, allyl ester				
Benzene	80	21.0		273
p-Benzoquinone	80	5.2×10^5	J	27
–, 2,3,5,6-tetrachloro-	80	16×10^5	J	27
–, 2,3,5,6-tetramethyl-	80	4.14×10^4	J	27
–, 2,3,5-trichloro-	80	5.5×10^5	J	27
Carbon tetrachloride	100	2.0×10^4	C	210
Phosphorus trichloride	40	1.0×10^4	C, D	214
Acrylamide				
Acetonitrile		5.5	F13	564
tris(2-Carbamoylethyl)amine		85	F13	564
Iron(III) chloride	25	4.26×10^4		75
Isopropyl alcohol	50	19	F13	353
	80	7.2	F13, S	353
Methanol	30	0.13	C, F13	130
Propionamide	25	220	E	103
	60	64	E	103
Water	25	0.204	C, F13	437
	40	5.8	F13	444
Acrylic acid, butyl ester				
Aniline, *N,N*-dimethyl-	50	380		161
Ethanol	80	4.28	A, R	548
Methanol	80	0.47	F31, A, R	548
Propanol	80	3.78	A, R	548
Iso-propanol	80	14.12	A, R	548

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S (×10^4)	Remarks	Refs.
Acrylic acid, ethyl ester				
Acetic acid	50	0.176		472
	80	0.537	A	471
	100	1.05	A	472
Acetone	40	0.207		472
	60	0.27	C	134
	80	1.10	A	471
	100	2.30	A	472
Acetonitrile	50	0.158		472
	60	0.245		472
	80	0.55	A	471
	100	1.43	A	472
Aniline, *N,N*-dimethyl-	50	2300	F16	228
Benzene	50	0.016		472
	60	0.22		472
		0.27	C	133
		0.45	C	134
	80	0.525	A	471
	100	2.2	A	472
–, bromo-	60	0.163		472
	80	0.685	A	471
	100	3.34	A	472
–, chloro-	40	0.054		472
	80	0.37	A	471
	100	1.68	A	472
–, ethyl-	40	0.668		472
	60	11.6		472
	80	16.80	A	471
	100	28.7	A	472
2-Butanone	50	1.44		472
	60	0.151	C	134
	80	1.92		472
		3.29	A	471
	90	4.45	A	472
Butyl alcohol	40	1.28		472
	60	2.91		472
	80	5.85	A	471
	100	12.6	A	472
sec-Butyl alcohol	45	10.6		472
	63	18.5		472
	80	22.20	A	471
	100	31.5	A	472
tert-Butyl alcohol	40	0.068		472
	60	0.17		472
	80	0.712	A	471
	100	1.64	A	472
Butyric acid	80	0.855	A	471
Carbon tetrachloride	40	0.332		472
	60	0.90		472
		3.2		416
	70	1.13	C	134
	80	1.55	A	471
	100	2.80	A	472
Chloroform	40	0.195		472
	60	0.89	C	134
	70	1.57	C	134
	80	1.49	A	471
	100	4.74	A	472
Cumene	50	11.7		472
	60	13.8		472
	80	22.2	A	471
	90	26.0	A	472
Cyclohexane	50	28.9		472
	60	0.48		472
		0.61	C	134

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10⁴)	Remarks	Refs.
Acrylic acid, ethyl ester (*cont'd*)				
cyclohexane (*cont'd*)	80	1.22	A	471
	100	3.08	A	472
Dimethylformamide	50	0.1	F7	510
Ethanol	80	4.38	A, R	548
Ethyl acetate	50	0.298		472
	60	0.448		472
		0.69	C	134
	80	0.89	A	471
	100	1.82	A	472
Formic acid	80	0.046	A	471
Heaxane	50	0.524		472
	60	0.593		472
	80	0.97	A	471
	100	1.46	A	472
Isobutyl alcohol	45	2.1		472
	63	3.31		472
	80	4.65	A	471
	100	8.06	A	472
Isopropyl alcohol	–	21	C	445
	80	28.70	A, R	548
Methanol	60	0.32	C	134
		1.70	4	472
	80	0.36	A, R	548
Propanol	80	4.73	A,R	548
Toluene	40	0.88		472
	50	0.611	C, F17, R	512
	60	0.929	C, F17, R	512
	70	1.37	C, F17, R	512
		1.84	C	134
	80	2.60	A	471
	100	6.80	A	471
–, 2-ethylhexylester				
Toluene	70	28.70	C, F17, R	512
	80	2.13	C, F17, R	512
–, methyl ester				
Acetone	60	0.23	C	470
	80	0.622		332
		1.1	C	111
Acetophenone	50	<2.5		15
Aluminum, triethyl	60	480	F2, S	156
Aniline	50	<1.0		15
–, *N,N*-dimethyl-	50	60	F16	228
–, *m*-nitro-	50	42.1		15
–, *p*-nitro-	50	26.7		15
Anisole, *m*-nitro-	50	72.7		15
Anthracene	50	1000		15
Benzene	80	0.326		332
		0.45	C	111
–, chloro-	80	0.52	C	111
		0.986		332
–, *o*-dichloro-	80	0.71	C	111
–, *m*-dinitro-	50	309		15
–, ethyl-	80	6.056		332
–, nitro-	50	46.4		15
–, 1,3,5-trinitro-	50	2040		15
Benzoic acid, *p*-nitro-	50	107		15
Benzonitrile	50	<1.0		15
Copper(II) chloride	120	600	F34	565
Phosphine, tributyl-	60	1890	F2	156
Phosphorus trichloride	40	1000	C, D	214
Propanol	80	3.92	A, R	548
Silane, dimethyphenyl-	60	400	A, R	539
–, methyldichloro-	60	1200	A, R	539
–, tetraethyl-	60	33.1	F2	156
–, trichloro-	60	1600	A, R	539

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Acrylic acid, methyl ester(*cont'd*)				
–, triethyl-	60	300	A, R	539
–, triphenyl-	60	800	A, R	539
Stearic acid, methyl ester	60	0.751		441
Toluene	60	2.7		21,24
	80	1.775		332
		2.7	C	111
–, *m*-nitro-	50	41.2		15
–, *p*-nitro-	50	48.6		15
Triethylamine	60	400		24
Tripropylamine	60	470	F2	156
–, tetrahydrofurfuryl ester				
Carbon tetrachloride	40	1.0	C, F2	319
Acrylonitrile				
Acetaldehyde	–	14	F	436
	50	47	F7	377
Acetamide, *N,N*-dimethyl-	50	4.945		375
		5.05		197
Acetic acid	50	0.81	F14	377
Acetone	50	1.7	F14	377
	60	1.13	F	95
Acetonitrile	50	0.7	F14	377
	60	2.0	F15	86
Acrolein, bis(2-ethoxyethyl)acetal	60	120	F7	499
–, bis(2-butoxyethyl)acetal	60	90.5	F7	156
Aluminum, hydrodiisobutyl	60	3940	F7	156
–, triethyl	60	590	F7	156
	100	17.0×10^4	F7	247
–, triisobutyl	100	28.0×10^4	F7	247
Aniline	40	32.0	F2, G	229
	50	44.0	F2, J	229
		9600	F16, G, J	227,229
	60	1.22×10^4	F16, G, J	229
–, *N,N*-diethyl-	40	215	F2, J	229
		5.81×10^4	F16, G, J	229
	50	359	F2, J	229
		9.38×10^4	F16, G, J	227,229
	60	547	F2, J	229
		14.3×10^4	F16, G, J	229
Aniline, *N,N*-dimethyl-	40	605	F2, J	229
		1.19×10^4	F16, G, J	229
	50	708	F2, J	229
		1040		161
		1.5×10^4	F16, J	228
		1.54×10^4	F16, G, J	227,229
	60	870	J	24
		964	F2, J	229
		2.18×10^4	F16, G, J	229
Anthracene	50	1.8×10^4		15
Arabinose	60	13.0	F8	361
Benzene	60	2.46	G	95
–, bromo-	60	1.36	G, S	95
–, *tert*-butyl-	60	1.93	G	95
–, chloro-	60	0.79	G, S	95
–, ethyl-	60	35.73	G	95
–, iodo-	60	5.19	G, S	95
Benzoic acid, vinyl ester	65	1400		136
p-Benzoquinone	50	1.3×10^4		15
Borane, tributyl	60	6470	F7	156
2-Butanone	60	6.43	G	95
–, 3-methyl-	60	21.08	G	95
1-Buten-3-yne	50	3800	F7	377
Butyl alcohol	60	15.42	G	95
sec-Butyl alcohol	60	97.55	G	95
tert-Butyl alcohol	60	0.44	G	95

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Acrylonitrile (*cont'd*)				
Butyric acid, 4-hydroxy-γ-lactone	50	0.658		375
		0.74		374
Cadmium, dibutyl	60	5.5×10^4	F7	156
Carbonic acid, cyclic ethylene ester	50	0.073		293
		0.33		197
		0.39		374
		0.474		375
		0.5		404
		0.511	E	458
		1.0		356
	60	0.128		293
Carbon tetrabromide	50	400		493
	60	500		20
		1900	F7, J	24
Carbon tetrachloride	60	0.85	G	96
	80	1.13	C	336
Chloroform	60	5.64	G	95
	80	5.90	C	336
Copper(II) chloride	35	1.8×10^5	U(0.01)	402
		1.9×10^5	U(0.1)	402
		3.2×10^5	U(1.0)	402
	60	10×10^5	F7	37
Copper(II) sulfate	35	1900	F13, J	402
		2800	J, V(0.0001)	402
		3000	J, U(0.01)	402
		1.07×10^4	J, V(0.001)	402
		1.35×10^4	J, U(0.1)	402
		3.93×10^4	J, V(0.01)	402
		13.6×10^4	J, U(1.0)	402
		21.0×10^4	J, V(0.1)	402
Crotonaldehyde	50	47	F7	377
Crotononitrile, *trans-*	50	19	F7	377
Cumene	60	41.41	G	95
Cyclohexane	60	2.06	G	95
–, methyl-	60	2.31	G	95
Dimethylamine	50	175	F7	377
m-Dioxane, 5,5-dimethyl-2-vinyl-	60	2.20	F7	498
m-Dioxane, 5,5-dimethyl-2-vinyl-				
–, 4-methyl-2-vinyl-	60	4.40	F7	498
–, 2-vinyl-	60	2.71	F7	498
1,3,-Dioxolane, 2-vinyl-	60	16.60	F7	498
1,3-Dioxolane-4-methanol, 2-vinyl-	60	2.40	F7	498
Diphenylamine-T	60	700	F7	61
Erythritol	60	12.8	F8	361
Ethane, 1,2-dichloro-	60	1.47	G	95
–, 1,1,2,2-tetrachloro-	60	3.11	G	95
–, 1,1,1-trichloro-	60	1.25	G	95
–, 1,1,2-trichloro-	60	1.68	G	95
Ethanol, 2,2′-iminodi-	30	10.1	F13	476
–, 2,2′,2″-nitrilotri-	30	76.0	F13	476
Ether, dodecyl vinyl	50	4.95	C	4
Ethyl acetate	60	2.54	G	95
Formamide, *N,N*-dimethyl-	20	1.4	C, J, F7	248
	25	4.97	D, J	91
	40	3.24	E	458
	50	1.0		347
		2.70		374
		2.78		197
		2.8	F7	377
		2.83		375
		10		356
	60	2.412		347
		4.494		22
		5.0	F15	86

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S (×10⁴)	Remarks	Refs.
Acrylonitrile (*cont'd*)				
Formamide, *N,N*-dimethyl- (*cont'd*)				
–, *N*-methyl-	50	1.8	F14	377
Formic acid	50	0.5	F14	377
Glucose	60	6.9	F8	361
α,D-Glucoside, methyl-	60	20	F7	220
–, –, 6-deoxy-6-iodo-	60	50	F7	220
–, –, 6-deoxy-6-mercapto-	60	1300	F7	220
–, –, 6-deoxy-6-phthalimido-	60	60	F7	220
–, –, 2,3-di-*O*-benzyl-	60	90	F7	220
–, –, 2,3,4,6-tetra-*O*-acetyl-	60	30	F7	220
–, –, 6,-*O*-(*p*-toluenesulfonyl)-	60	10	F7	220
–, –, 6-*O*-triphenylmethyl-	60	80	F7	220
β,D-Glucoside, methyl-	60	20	F7	220
–, –, 6-deoxy-6-dipropylamino-	60	1100	F7	220
Glutaronitrile, 2,4-dimethyl-	50	0.6	F14	376
Glyceraldehyde	60	32.1	F8	361
Glycerol	60	23.5	F8	361
2,4,6-Heptanetricarbonitrile	50	1.0	F14	376
1-Heptanol, 2,2,3,3,4,4,5,5,6,6,7,7-dodecafluoro-	60	1.9	F2	442
1,5-Hexadien-3-yne	50	1.17×10^4	F7	377
Hydrocyanic acid	50	0.81	F14	377
	–	6.2	F	436
Indium, triethyl	60	2220	F7	156
Iron(III) chloride	60	3.33×10^4	F7	19
Isobutyl alcohol	60	24.06	G	95
Isobutylene	60	70		553
Isobutyronitrile	50	1.3	F14	376
	60	1.8	I6	376
		3.5		135
		4.0	F15	86
Lactonitrile	50	1	F14	377
Lead, tetraethyl	60	243	F7	156
Magnesium perchlorate	50	<0.05		376
Mercury, diethyl	60	72.2	F7	156
Methane, dichloro-	60	3.06	G	95
–, nitro-	60	6.0	F15	86
Methanol	50	0.5	F14	377
Methylamine	50	175	F7	377
2,6-Octadiene, 2,6-dimethyl-	60	450		6
Oxime, acrolein	60	6.26×10^5		555
–, crotonaldehyde-	60	2.05×10^4		555
–, ethylisopropenylketone-	60	1.03×10^4		555
–, methacrolein-	60	9.41×10^4		555
–, methylacrolein-	60	5.35×10^4		555
–, methylvinylketone-	60	1.2×10^4		555
–, methylisopropenylketone-	60	1.71×10^4		555
–, methylisobutenylketone-	60	2.65×10^4		555
1-Pentanol, 2,2,3,3,4,4,5,5-octa-fluoro-	60	1.9	F2	442
1-Pentanol, 4-methyl-	60	11.79	G	95
Piperidine, 1-ethyl-	60	3300	J	24
–, 1-methyl-	60	2300	J	24
1-Propanol, 2,2,3,3-tetrafluoro-	60	1.5	F2	442
Silane, tetraethyl	60	21.0	F7	156
Sorbitol	60	6.1	F8	361
Stibine, tributyl	60	11.1×10^4	F7	156
Succinonitrile	60	0.6		86
Sulfur dioxide	50	0		362
Tin, tetrabutyl	60	80.8	F7	156
Toluene	50	1.153	G	347
	60	2.632	G	347
		3.2		21
		5.83	G	24,95
o-Toluidine, *N,N*-dimethyl-	40	272	F2, J	229
	50	334	F2, J	229

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Acrylonitrile (*cont'd*)				
o-Toluidine, *N,N*-dimethyl- (*cont'd*)		30200	F16, G, J	227,229
	60	463	F2, J	229
Tributylamine	60	6700	J	24
Triethylamine	60	1700	T	20
		1900		20
		3800		22
		5900	F7, J	24
		6600	J	24
Trimethylamine	50	175	F7	377
	60	790	J	24
Tripropylamine	60	4820	F7	156
		1.05×10^4	J	24
Zinc, diethyl	60	1.06×10^4	F7	156
Zinc chloride	50	0.006	F13	410
Acrylonitrile/styrene (38.5–61.5 mol%)				
Methanol	65	1.4		116
Anisole, *p*-vinyl-				
Anisole, *p*-isopropyl-	60	3.40		407
Benzonitrile, *p*-isopropyl-	60	40.9		407
Cumene	60	4.28		407
–, *p*-bromo-	60	11.8		407
–, *p*-tert-butyl-	60	3.64		407
–, *p*-chloro-	60	8.52		407
Benzoic acid, vinyl ester				
Benzene	60	1.5		393
	80	0.4		26
Benzoic acid, isopropyl ester	60	1.0		393
2-Butanone	80	29.0		26
Carbon tetrachloride	80	730		26
Chloroform	80	105		26
Cyclohexane	80	2.3		26
1,3-Butadiene, 2-chloro-				
1-Butene, 3-chloro-3-methyl-	50	5.47	F1	152
2-Butene, 1-chloro-3-methyl-	50	4.57	F2	152
2,6-Octadiene, 2,7-dichloro-	50	5.24	F2	152
3-Buten-2-one, 3-methyl-				
Benzene	80	2.489	C	84
–, ethyl-	80	6.934	C	84
Cyclohexane, methyl-	80	0.500	C	84
Toluene	80	3.282	C	84
Butyraldehyde, divinyl acetal				
Aniline, *N,N*-dimethyl-	50	1060		430
Benzene	50	27.7		430
Butyl alcohol	50	3500		430
tert-Butyl alcohol	50	37.2		430
1,3-Dioxolane, 2-propyl-	50	708		430
Butyric acid, vinyl ester				
Benzene	80	3.28		201
Carbamic acid, vinyl-, ethyl ester				
Acetone	60	8.5		117
Benzene	60	1.25		117
Chloroprene				
3-Chloro-(methyl-^{14}C)-1-butene(4-^{14}C)	50	5.37	F2	509
3-Chloro-2-pentene-(2,4-^{14}C)	50	3.94	F2	509
p-Dioxin, 2,3-dihydro-/maleic anhydride				
Benzene	60	11500	R	169
Carbon tetrabromide	60	100×10^5	R	169
Carbon tetrachloride	60	1.7×10^5	R	169
Chloroform	60	3.6×10^4	R	169
p-Dioxane	60	1.07×10^4	R	169
Toluene	60	6.0×10^4	R	169
m-Xylene	60	9.9×10^4	R	169

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Ethylene				
Acetamide, *N,N*-diethyl-	130	125	C, W5	454
–, *N,N*-diisopropyl-	130	57	C, W5	454
–, *N,N*-dimethyl-	130	182	C, W5	454
–, *N*-ethyl-	130	115	C, W5	454
–, *N*-methyl-	130	61	C, W5	454
Acetic acid, butyl ester	130	89	C, W5	454
–, *tert*-butyl ester	130	40	C, W5	454
–, methyl ester	130	40	C, W5	454
Acetic acid, chloro-				
–, –, methyl ester	90	610	C, Q1	434
		1210	C, Q2	434
		2170	C, Q3	434
		2150	C, Q4	434
		2580	C, Q5	434
	120	630	C, Q1	434
		1160	C, Q2	434
		1880	C, Q3	434
		1990	C, Q4	434
		2090	C, Q5	434
	130	1120	C, W5	454
Acetic acid, cyano-				
–, –, methyl ester	130	6700	C, W5	454
Acetic acid, dichloro-				
–, –, methyl ester	55	1800	C, Q1	435
		7900	C, Q2	435
		11100	C, Q3	435
		13000	C	435
	90	1900	C, Q1	435
		6900	C, Q2	435
		9400	C, Q3	435
		10500	C	435
	120	2000	C, Q1	435
		5900	C, Q2	435
		8100	C, Q3	435
		11100	C	435
Acetic acid, trichloro-				
–, –, methyl ester	55	700	C, Q1	484
		16100	C, Q2	484
		27500	C, Q3	484
		38000	C, Q4	484
		65700	C	484
	90	1000	C, Q1	484
		17000	C, Q2	484
		27700	C, Q3	484
		39000	C, Q4	484
		65200	C	484
	120	1200	C, Q1	484
		15400	C, Q2	484
		23600	C, Q3	484
		33000	C, Q4	484
		54100	C	484
Acetic anhydride	130	130	C, W5	454
Acetone	130	160	C, W17	456
		165	C, F21, W5	259
		168	C, W5	456
	200	282	C, W5	455
Acetonitrile	130	100	C, F21, W5	159
Benzaldehyde	130	1970	C, W5	457
Benzene	20	0.629	E, W	143
	83	20	D	204
		21	D, W	205
	130	9.4	C, W5	260
	50–70	18	W3	218

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Ethylene (*cont'd*)				
–, ethyl-	130	430	C, W17	456
		480	C, W5	52
		520	C, W5	454
		560	C, W5	52
	200	500	C, W5	455
Benzene-D6	130	5.6	C, W5	260
Benzoic acid, butyl ester	130	140	C, W5	454
–, ethyl ester	130	55	C, W5	454
–, methyl ester	130	53	C, W5	454
Butane	130	40	C, F21, W5	259
		45	C, W17	456
–, 1-iodo-	100	9.45×10^4	Q1, W14	187
		11.3×10^4	Q2, W14	187
		12.6×10^4	Q3, W14	187
2-Butanone	130	550	C, W17	456
		600	C, F21, W5	259
	200	750	C, W5	455
–, 3-methyl-	130	840	C, F21, W5	259
1-Butene	130	330	C, W5	52
		470	C, W5	52
		560	C, F21, W5	259
	189	900	B, W5	443
	200	570	C, W5	455
–, 2-methyl-	130	210	C, F21, W5	259
		530	C, F21, W5	259
–, 3-methyl-	130	1200	C, F21, W5	259
2-Butene	130	250	C, F21, W5	259
		380	C, W5	454
–, 1,4-dichloro-	130	4100	C, W5	454
–, 2-methyl	130	470	C, F21, W5	259
tert-Butyl alcohol	30	0	E, W4	482
	130	2	C, F21, W5	259
Butylamine	130	220	C-W5	454
Butyraldehyde	130	3250	C, W5	457
Butyric acid, methyl ester	130	220	C, W5	454
Butyronitrile	130	520	C, F21, W5	259
Carbon tetrachloride	20	215	E, W	143
	50	772	C, Q1,	391
	70	974	C, Q1	391
		7000	C, W4	215
		32000	C	210
	90	740	Q1, W12	453
		1210	C, Q1	391
		20200	Q2, W12	453
		32500	Q3, W12	453
		34000	W12	453
	95	1250 ± 200	W23, Q(1)	518
		22000 ± 1000	W23, Q(2)	518
		43000 ± 4000	W23, Q(3)	518
		1130 ± 700	W20, Q(1)	518
		2000 ± 1000	W20, Q(2)	518
		37000 ± 3000	W20, Q(3)	518
	130	9800	C, F21, W5	259
	140	1600	C, Q1	170
		1700	C, Q1, F19	170
		1800	C, Q1, W13	170
		2200	C, Q1, F20	170
		22000	C, Q2	170
		23000	C, Q2, F19	170
		30000	C, Q1, W1	170
		36000	C, Q3	170
		38000	C, Q2, F20	170
		39000	C, Q3, F19	170
		60000	C, Q2, W13	170

TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Ethylene (*cont'd*)				
Carbon tetrachloride (*cont'd*)		60000	C, Q3	170
		61000	C, Q3, F20	170
		70000	C, Q4, F20	170
		90000	C, Q4, F20	170
		100000	C, Q2, W1	170
		110000	C, Q3, W1	170
		130000	C, Q3, W13	170
		140000	C, Q4, W1	170
		180000	C	170
Chloroacetic acid, methyl ester	90	590, 550, 1200	C, Q(1), Q(2), Q(3)	557
		1680, 2240, 2340	C, Q(4), Q(5), Q(6)	557
Chloroform	28	2100	E, Q1, W	244
		13000	E, Q2, W	244
		15000	E, Q3, W	244
	70	8000	C, W4	215
		30000	C	210
	80	2470	C, Q1, W12	101
		15500	C, Q2, W12	101
		24900	C, Q3, W12	101
		31200	C, Q4, W12	101
		43900	C, W12	101
	95	2000 ± 120	W23, Q(1)	518
		10000 ± 500	W23, Q(2)	518
		16000 ± 3000	W23, Q(3)	518
		1150 ± 50	W20, Q(1)	518
		5000 ± 300	W20, Q(3)	518
		8000 ± 1000	W20, Q(3)	518
	101	1500	E, Q1, W	224
		4500	E, Q3, W	244
		5400	E, Q2, W	244
	103	2890	C, Q1, W12	101
		15400	C, Q2, W12	101
		23800	C, Q3, W12	101
		29800	C, Q4, W12	101
		41100	C, W12	101
	130	2900	C, F21, W5	259
	140	3210	C, Q1, W12	101
		15200	C, Q2, W12	101
		22200	C, Q3, W12	101
		28000	C, Q4, W12	101
		37600	C, W12	101
Cumene	130	500	C, F21, W5	259
Cyclohexane	130	80	C, F21, W5	259
		90	C, W17	456
		91	C, F21, W5	259
	200	190	C, W5	455
–, methyl-	130	110	C, F21, W5	259
Cyclopentane	130	109	C, W17	456
		127	C, F21, W5	259
	200	228	C, W5	455
Cyclopropane	130	0	C, F21, W5	259
Decane	130	120	C, F21, W5	259
	189	425	B, W5	443
1-Decene	189	1090	B, W5	443
Dibutylamine	130	1070	C, W5	454
Dichloroacetic acid, methyl ester	90	1900, 6900, 9400	C, Q(1), Q(2), Q(3)	558
Dimethylamine	130	1900	C, F21, W5	259
p-Dioxane	130	320	C, F21, W5	259
Ethane	130	6	C, F21, W5	259
–, 1,1-bis(dimethylamino)-	130	1070	C, W5	457
–, 1-bromo-2-chloro-	130	390	C, W5	454
–, chloro-	70	120	C, W4	215
–, 1,2-dibromo-	130	1250	C, W5	454
–, 1,1-dichloro-	70	1500	C, W4	215

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Ethylene (*cont'd*)				
Ethane, 1,2-dichloro-	130	110	C, F21, W5	259
–, iodo-	65	1.51×10^5	Q1	189
		1.59×10^5	Q2	189
		1.65×10^5	Q3	189
	100	1.1×10^5	Q1	452
		1.36×10^5	Q1, W14	188
		1.43×10^5	Q2, W14	188
		1.48×10^5	Q3, W14	188
		1.49×10^5	Q3	452
–, 1,1,1-trichloro-	70	500	C, W4	215
Ethanol	20	5.71	E, W	143
	30	110, 210, 270	E, Q(1), Q(3), Q(5)	523
	60	76, 240, 280	E, Q(1), Q(3), Q(5)	523
	100	89, 270, 340	E, Q(1), Q(3), Q(5)	523
	125	100, 310, 320	E, Q(1), Q(3), Q(5)	523
	130	68	C, W17	456
		69	C, F21, W5	259
		75	C, W5	454
	125–135	190	C, W2	381
	150	92, 260	E, Q(1), Q(3)	523
	180	73, 350	E, Q(1), Q(3)	523
	200	135	C, W5	455
Ethyl acetate	130	45	C, W5	454
	200	121	C, W17	455
Ethylene oxide	130	7	C, F21, W5	259
Formaldehyde	130	560	C, W5	457
Fomamide, *N,N*-dimethyl-	130	260	C, F21, W5	259
Formic acid, methyl ester	130	42	C, W5	454
Furan, tetrahydro-	130	288	C, W5	454
		289	C, F21, W5	259
	200	401	C, W5	455
Heptaldehyde	130	2600	C, W17	457
		3900	C, W5	457
	200	4800	C, W5	457
Heptane	50–70	90	W3	218
	130	80	C, F21, W5	259
Hexane	130	68	C, F21, W5	259
	189	225	B, W5	443
1-Hexene	189	900	B, W5	443
–, 2-ethyl-	130	3300	C, F21, W5	259
Hydrogen	130	159	C, W5	454
		160	C, F21, W5	259
	200	400	C, W5	455
Isobutyronitrile	130	1070	C, F21, W5	259
Isocyanic acid, butyl ester	130	212	C, W5	454
Isopropanol	30	96, 410, 520	E, Q(1), Q(3), Q(5)	523
	60	65, 310, 380	E, Q(1), Q(3), Q(5)	523
	100	65, 300, 350	E, Q(1), Q(3), Q(5)	523
	125	75, 380, 380	E, Q(1), Q(3), Q(5)	523
	130	130	C, W17	456
		140	C, F21, W5	259
		144	C, W5	454
	125–135	570	C, W1	381
	150	98, 470, 460	E, Q(1), Q(3), Q(5)	523
	180	86, 440, 500	E, Q(1), Q(3), Q(5)	523
	200	234	C, W5	455
Isothiocyanic acid, butyl ester	130	0	C, W5	454
Methane	130	0	C, W5	259
–, bromochloro-	100	1600	C, Q1, W11	2
		4500	C, Q2, W11	2
		7500	C, Q3, W11	2
		8000	C, Q4, W11	2
	130	10000	C, W5	454
	140	16.0×10^5	Q1, W11, II	1

TABLE 4. *cont'd*

Solvent/additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Ethylene (*cont'd*)				
Methane, bromochloro- (*cont'd*)		47.0×10^5	Q2, W11, II	1
–, chloro-	70	4	C, W4	215
–, dichloro-	70	700	C, W4	215
	130	360	C, F21, W5	259
–, dimethoxy-	130	73	C, W5	454
–, iodo-	65	41000	Q1	189
		45000	Q2	189
		45000	Q3	189
	100	41000	Q1	189
		45000	Q2	189
		45000	Q3	189
Methanol	30	36, 84, 100	E, Q(1), Q(2), Q(3)	523
	60	46, 100, 140	E, Q(1), Q(2), Q(3)	523
	100	34, 90, 120	E, Q(1), Q(2), Q(3)	523
	125	56, 100, 140	E, Q(1), Q(2), Q(3)	523
	130	21	C, F21, W5	259
	150	53, 120, 160	E, Q(1), Q(2), Q(3)	523
	180	37, 120, 160	E, Q(1), Q(2), Q(3)	523
Methylamine	130	53	C, W5	454
1-Octene	130	360	C, W5	52
		360	C, F21, W5	259
Pentane, 2,2,4-trimethyl-	130	64	C, F21, W5	259
Pentene	189	900	B, W5	443
–, 4,4-dimethyl-	130	175	C, W5	454
–, 4-methyl-	130	310	C, W5	454
Phosphine	130	207000	C, W5	457
–, dibutyl	130	36000	C, W5	454
–, tributyl	130	4500	C, W5	454
–, triphenyl	130	50	C, W5	454
Phosphorous acid, dimethyl ester	130	5100	C, F21, W5	259
Propane	130	27	C, F21, W5	259
		27.6	C, W17	456
		31	C, F21, W5	259
	200	65.2	C, W5	455
–, 2-chloro-	70	250	C, W4	215
Propane, 2-chloro-2-methyl-	70	40	C, W4	215
–, 2,2-dimethyl-	130	8	C, F21, W5	259
–, 2-iodo-	65	5.7×10^5	Q1	189
		5.9×10^5	Q2	189
		6.07×10^5	Q3	189
	100	4.55×10^5	Q1	189
		4.70×10^5	Q2	189
		4.83×10^5	Q3	189
–, 2-methyl-	130	50	C, F21, W5	259
		72	C, W5	454
	200	136	C, W5	455
–, 1,1,1,2,2,3,3,3-octafluoro-	130	4	C, F21, W5	259
1-Propene	130	110	C, W5	52
		122	C, W5	454
		150	C, W5	52
	200	200	C, W5	455
Propionaldehyde	130	2300	C, W17	457
		3300	C, W5	457
	200	2830	C, W5	457
Propionic acid, methyl ester	90	63000	C, Q1	485
		92000	C, Q3	485
		1.08×10^5	C, Q5	485
		630, 420, 780	C, Q(1), Q(2), Q(3)	516
		890, 1030, 1230	C, Q(4), Q(5), Q(6)	516
	120	78000	C, Q1	485
		1.12×10^5	C, Q3	485
		1.39×10^5	C, Q5	485
		780, 430, 1060	C, Q(1), Q(2), Q(3)	516
		1220, 1300, 1410	C, Q(4), Q(5), Q(6)	516

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Ethylene (*cont'd*)				
–, 3-cyano-, methyl ester	130	790	C, W5	454
Silane, tetramethyl	130	0	C, F21, W5	259
Tetradecane	189	580	B, W5	443
1-Tetradecene	189	1760	B, W5	443
Toluene	130	130	C, W5	52
		154	C, W5	454
		180	C, W17	456
	200	220	C, W5	455
Tributylamine	130	820	C, W5	454
Trichloroacetic acid, methyl ester	90	1000, 1700, 2770	C, Q(1), Q(2), Q(3)	559
Tridecane	130	140	C, F21, W5	259
Trimethylamine	130	180	C, F21, W5	259
		330	C, W5	454
Water	20	1.71	E, W	143
p-Xylene	130	300	C, F21, W5	259
		317	C, W5	454
		400	C, W17	456
	200	434	C, W5	455
Ethylene, bromo-				
Carbon tetrachloride	60	50		417
Ethylene, chloro-				
Acetaldehyde	50	110		164
Aniline, *N,N*-dimethyl-	50	2700		161
Benzene	35	1500		219
Butyraldehyde	50	350	W8	500
		420	W7	500
		500	W15	500
		580		500
Carbon tetrabromide	50	4.7×10^4	F26	492
		50.0×10^4		66
	60	3300	Q1	418
		1.85×10^4	Q2	418
		7.45×10^4	Q3	418
		12.15×10^4	Q4	418
Cyclohexane, 1,2-epoxy-4-vinyl-	–	264		428
Ethane, 1,2-dichloro-	25	4.0		425
	50	4.5	C, F26	392
Ether, dodecyl vinyl	50	156		4
Furan, tetrahydro-	25	16		425
	40	30		246
	50	24		164
Heptane, 2,4,6-trichloro-	50	5		211
Oxalic acid, diethyl ester	25	1.4		315
Pentane, 2,4-dichloro-	25	9.0	G	315
	50	5		211
Ethylene, 1,1-dichloro-				
Phosphorus trichloride	60	14	D	214
Ethylene, tetrafluoro-				
Ethanol	100	800	C, Q5, W2	3
		820	C, Q6, W2	3
		860	C, Q4, W2	3
		880	C, Q3, W2	3
Isopropanol	100	1540	C, Q3, W2	3
		1660	C, Q4, W2	3
		1700	C, Q5, W2	3
Methanol	100	350	C, Q3, W2	3
		390	C, Q4, W2	3
Hexanoic acid, vinyl ester				
Benzene	80	4.9		201
1-Hexene				
Carbon tetrachloride	140	4.1×10^4	C, Q1, F19	170
Cyclohexanol	125–135	390	C	381
Ethyl alcohol	30–35	170	D	381

TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Isobutene				
Carbon tetrachloride	100	$(7.1 \pm 0.2) \times 10^4$	E, Q(1)	537
		$(8.1 \pm 0.5) \times 10^5$	E, Q(2)	
Isobutyric acid, vinyl ester				
Benzene	80	4.49		201
Maleic acid, diethyl ester				
Stearamide, *N*-allyl-	90	22.4	J	173
Maleic anhydride/methyl methacrylate				
Acetone	60	1.6	HH	367
Maleic anhydride/styrene				
Aniline, *N,N*-dimethyl-	60	930		489
Carbon tetrachloride	70	1.04	HH	365
Methacrylic acid				
Bromotrichloromethane	70	300		566
–, butyl ester				
Benzene	60	0.158		264
–, 2-(diethylamino)ethyl ester/styrene				
Carbon tetrachloride	80	23.6		335
Toluene	80	13.3		335
–, ethyl ester				
Acetic acid	80	0.095	S	83
Acetone	80	0.102		83
Acetophenone	80	0.281		83
Benzene	80	0.081		83
–, chloro-	80	0.436		83
–, ethyl-	80	1.428		83
2-Butanone	80	0.252		83
Butyl alcohol	80	0.454		83
sec-Butyl alcohol	80	1.604		83
tert-Butyl alcohol	80	0.417		83
Carbon tetrachloride	80	0.901		83
		5.640	C	183
Chloroform	80	0.703		83
		2.360	C	183
Cumene	80	2.067		83
Cyclohexane	80	0.928		83
Ethane, 1,2-dichloro-	80	1.821	C	183
Ethane, 1,1,2,2-tetrachloro-	80	0.311		83
		1.820	C	183
–, 1,1,1-trichloro-	80	0.536		83
Ethyl acetate	80	0.919		83
Ethyl alcohol	80	0.429		83
Heptane	80	0.865		83
2-Heptanone	80	0.702		83
Isobutyl alcohol	80	0.445		83
2,4-Pentanedione	80	0.236		83
Toluene	80	0.436		83
–, hexadecyl ester				
Carbon tetrachloride	70	0.983	–	137
Cumene	70	2.05	–	137
–, isobutyl ester				
Benzene	60	0.165		264
Carbon tetrachloride	80	1.971	C	183
Chloroform	80	1.110	C	183
Ethane, 1,2-dichloro-	80	0.510	C	183
–, 1,1,2,2-tetrachloro-	80	0.510	C	183
Methacrylonitrile				
Carbon tetrabromide	100	900	A, F7	109
	120	1000	A, F7	109
Iron(III) chloride	60	30800	F7	19
Isobutyraldehyde	60	0.001		70
Toluene	60	0.996		21
Methyl methacrylate				
Acetaldehyde	60	6.5		86
Acetic acid	80	0.24	A	31

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TABLE 4. *cont'd*

Solvent/Additive	T (°)	C_S (×10^4)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
Acetic acid, monochloro-	60	0.64	R	529
–, dichloro-	60	0.80	R	529
–, 1,1-dimethyl-2,2,2-trinitro- ethyl ester	45	520		110
–, trichloro-	60	1.10	R	529
Acetone	60	0.195		81
	80	0.225	A	31
		0.275		81
Acetonitrile, (*m*-bromophenyl)-	60	3.89		462
–, (*p*-bromophenyl)-	60	2.78		461
–, (*m*-chlorophenyl)-	60	4.28		462
–, (*p*-chlorophenyl)-	60	3.21		461
–, (*p*-methoxyphenyl)-	60	19.0		461
–, phenyl-	60	5.18		461
–, *m*-tolyl-	60	5.75		462
–, *p*-tolyl-	60	7.83		461
Acetylene, *p*-bromophenyl-	60	41.3	K	151
–, *p*-chlorophenyl-	60	38.9	K	151
–, *p*-nitrophenyl-	60	127.5	K	151
Aluminum, hydrodiisobutyl	60	3600	S	156
–, triethyl	50	1550	R, F2	547
	60	1240		156
Aniline	60	4.2	F2	424
	80	6.3	F2	424
	100	9.0	F2	424
–, *N,N*-dimethyl-	30	2.45		508
	50	18	F16	228
		30.4	H	409
		430		161
	60	11.3	A, F2	424
	70	10.8		270
	80	17.0	A, F2	424
	100	20.0	A, F2	424
–, *N,N*-divinyl-	60	340		82
–, *N*-methyl-	60	7.0	F2	424
	80	10.0	F2	424
	100	13.3	F2	424
p-Anisaldehyde	60	1.11		495
Anisole	25	0	D	16
–, *p*-ethynyl-	60	40.3	K	151
–, *p*-isopropyl-	60	3.46		406
–, *p*-methyl-	60	0.57		496
Anthracene	50	0		15
Azobenzene	50	100	C	282
Benzaldehyde	60	2.5		86
		0.86		495
–, *p*-bromo-	60	1.43		495
–, *m*-chloro-	60	0.96		495
–, *p*-chloro-	60	1.03		495
–, *p*-cyano-	60	2.06		495
Benzene	25	0	D	16
	30	0.01		508
	50	0.036		147,327
	52	0.027		81
	60	0.040		81
		0.83	C	181
	75	0.33	C	123
	80	0.075	A	31
		0.080		81
		0.24	I1	145
	90	0.036		147
–, allyl-	60	400		502
–, bromo-	25	0	D	16
–, *tert*-butyl-	80	0.260	A	31

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
–, chloro-	25	0	D	16
	60	0.074		81
	80	0.200	A	31
		0.207		81
–, *p*-diisopropyl-	60	5.72		406
–, *m*-dinitro-	50	52		15
–, ethyl-	52	0.501		81
	60	0.766		81
	80	1.311		81
		1.350	A	31
		2.1	I1	145
–, ethynyl-	60	21.9	K	151
		22.3	J	150
–, fluoro-	25	0	D	16
Benzene sulfonylchloride	60	5.16	R	543
–, *p*-chloro-	60	8.56	R	543
–, *p*-dimethyl-	60	4.06	R	543
Benzonitrile	25	0	D	16
	60	0.162		150
–, *p*-hydroxy-	50	6.0		479
–, *p*-isopropyl-	60	4.99		406
p-Benzoquinone	44.1	5.5×10^4		194
	50	5.7×10^4		15
	60	4.5×10^4		42
–, 2,3,5,6-tetrachloro-	44.1	2600		194
Benzothiazolethion, 3-allyl-	60	153		502
Benzyl ether	25	10.4	D	368
	60	8.0		368
Bibenzyl	50	0.0	F2	354
Biphenyl, 2,2-methylene-	60	41.8		567
	60	53.5		567
Borane, tributyl-	60	7.45		156
Bromoform	77	23	D, C, R	506
Butane, 1-chloro-	80	1.20	A	31
–, 1,1,1-trinitro-	45	8300		110
1,4-Butanediol	60	0.61	F24	421
	80	1.07	F24	421
2-Butanone	60	0.45	C	290
	70	0.56	C	123
	75	0.83	C	123
	80	0.70	A	31
1-Butene	40	3.1		287
	50	5.1		287
–, 3,4-epoxy-2-methyl-	80	29.6		269
2-Butene, *cis*-	40	3.2		287
	50	4.9		287
–, *trans*-	40	3.0		287
	50	5.2		287
3-Buten-2-ol, 1-chloro-3-methyl-	80	18.8		269
Butyl alcohol	60	0.394		479
	80	0.25	A	31
sec-Butyl alcohol	60	0.259		479
	80	0.85	A	31
tert-Butyl alcohol	60	0.085		81
	80	0.100	A	31
		0.152		81
Butylamine, *N*-nitro-	45	0		110
Butyl ether	60	0.8		86
1-Butyne, 1-phenyl-	60	10.8		150
Butyraldehyde	50	1.47	W8	500
		2.25	W7	500
		3.40		500
Carbon tetrabromide	30	2800 ± 600	D, R, JJ3a	521
		1000 ± 100	D, R, JJ3b	521

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
Carbon tetrabromide (*cont'd*)		1000 ± 500	D, R, JJ3c	521
		500 ± 200	D, R, JJ3d	521
	60	2700	F2	109
	60	1500		568
	60	1900		568
	80	3300	F2	109
	100	4600	F2	109
Carbon tetrachloride	20	0.2	C, D	35
	30	20	D, F2	451
		0.20		514
	50	0.82		514
	60	0.925		81
		2.40	C	181
		5		86
		20.11	R	529
		18.52	R, H	529
		0.42	R	568
		0.5	R, H	568
	70	1.74		514
	80	2.393	A	31
		2.421		81
		3.3	I1	145
	–	24.4	D	427
Chloroform	60	0.454		81
		1.77	C	181
	80	1.129		81
		1.400	A	31
		1.9	I1	145
	–	1.9	D	427
Copper(II) chloride	60	105×10^5	F7	36
Cumene	60	1.9		7
		2.56		406
	80	1.9	A	31
		2.4	I1	145
–, *p*-bromo-	60	3.71		406
–, *p-tert*-butyl-	60	2.74		406
–, *p*-chloro-	60	3.07		406
Cyclohexane	60	12		86
	80	0.10	A	31
–, methyl-	80	0.195	A	31
–, *trans*-1,4-, diacetate	60	8.46	C	569
–, *cis/trans*-1,4-, dicarboxylic acid dimethylester	60	1.16	C	569
Cyclotetrasiloxane, octamethyl-	50	2.5	C	450
	79.5	0.080		474
p-Dioxane	80	0.222	A	31
Diphenylamine	44.1	0		194
Diphenylamine-T	60	0.3	F2	46
Disiloxane, 1,1-dimethoxy-3,3,3-trimethyl-1-phenyl-	79.5	0.032		474
–, hexamethyl-	79.5	0.104		474
Epibromohydrin	60	16.53	R	529
Epichlorohydrin	60	9.3	R	529
Ethane, 1,2-dichloro-	60	0.35		81
	80	0.756		81
–, nitro-	45	2.0		110
–, 1,1,2,2-tetrachloro-	60	0.155		81
	80	0.200	A	31
		0.235		81
–, 1,1,1-trichloro-	80	0.600	A	31
–, 1,1,1-trinitro-	45	1400		110
Ethyl acetate	60	0.100	C	316
		0.13	A	290,316
		0.132	C	216
		0.134		290
		0.155		290

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
Ethyl acetate (*cont'd*)		0.156	C	290
		0.46	I10	146
	70	0.55	C	123
	75	0.83	C	123
	80	0.240	A	31
Ethyl alcohol	60	0.40	A, F2	423
	80	0.625	A, F2	423
	100	0.80	A	49
Ethylene glycol	60	0.28	F24	421
	80	0.60	F24	421
Germane, diethylchloro-	60	22000	A, R	539
–, ethyldichloro-	60	39300	A, R	539
–, triethyl-	60	5800	A, R	539
–, triphenyl-	60	18500	A, R	539
Glycerol	60	0.152		479
Heptane	50	1.8		206
1-Heptanol, 2,2,3,3,4,4,5,5,6,6,7,7-dodecafluoro-	60	2.8	F2	442
Hydrazyl, 2,2-diphenyl-1-picryl	44.1	200×10^5		194
Hydroquinone	45	7.0		30
	131	100	A	398
Indium, triethyl-	60	332		156
Isobutyl alcohol	60	0.10		81
		0.505		479
	80	0.229		81
		0.250	A	31
Isobutyric acid	80	0.900	A	31
–, methyl ester	60	0.26		275
Isopropyl alcohol	60	0.583		81
	80	1.907		81
	100	3.00	A	49
		8	C	337
	130	43	C	337
		45	C	480
Lead, tetraethyl	60	3.14	S	156
Malononitrile, furfurylidene-	44.1	1.2×10^4		194
Mercury, diethyl	60	0.898		156
Methane, bromotrichloro-	30	830	D, Q3	311
		1.2×10^4	D	311
		4.5×10^4	D, Q4	311
–, bromotrinitro-	45	1.0×10^4		110
Methane, dichloro-	60	0.100		81
	80	0.217		81
–, nitro-	60	2.0		86
–, trinitro-	45	5400		110
–, triphenyl-	60	4.0		44
Methanol	60	0.2	A, F2	423
	80	0.33	A, F2	423
	100	0.45	A	49
1-Naphthol	45	<5.0		30
2,6-Octadiene, 2,6-dimethyl-	60	6.7		324
Oleic acid, methyl ester	60	1.68		441
		8.0		7
Oxime, acrolein-	60	25500		555
–, crotonaldehyde-	60	500		555
–, ethylisopropenylketone-	60	3000		555
–, methacrolein-	60	17000		555
–, methylacrolein-	60	5200		555
–, methylisobutenylketone-	60	4700		555
–, methylisopropenylketone-	60	2900		555
–, methylvinylketone-	60	1300		555
Oxolane, *cis*-3,4-diacetoxy-	60	1.39	C	569
Pentane, 2,2,4-trimethyl-	50	1.2		206
1-Pentanol, 2,2,3,3,4,4,5,5-octa-fluoro-	60	2.36	F2	442
2-Pentanone, 4,4-dimethyl-5,5,5-trinitro-	45	400		110

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
–, 4-methyl-	80	0.700	A	31
3-Pentanone	60	0.833		81
	80	1.729		81
		1.775	A	31
		2.7	I1	145
Pentasiloxane, dodecamethyl-	79.5	0.145		474
Phenol	50	2.5		479
–, *o*-bromo-	50	5.0		479
–, *p*-bromo-	50	5.0		479
–, *o*-chloro-	50	3.5		479
–, *o*-ethyl-	50	7.2		479
–, *p*-ethyl-	50	7.5		479
–, *o*-isopropyl-	50	13.3		479
–, *p*-isopropyl-	50	13.3		479
–, *p*-methoxy-	45	<5.0		30
–, 2,3,4,6-tetramethyl-	45	11.0		30
Phenyl ether	25	6.42	D	368
	60	9.13		368
Phosphine, octyl-	60	2.3×10^4		295
–, phenyl-	60	16.1×10^4	S	295
–, tributyl-	60	30.6		156
Phthalic acid, dimethylester	30	0.2		508
Piperidine, 1-nitroso-	45	8.2		110
Propane, 1,2-dichloro-	80	0.675	A	31
–, 1,1-dinitro-	45	68		110
–, 2,2-dinitro-	45	15		110
–, 1-nitro-	45	5		110
1,2-Propanediol	60	0.48	F24	421
	80	0.86	F24	421
1-Propanol, 2,2,3,3-tetrafluoro-	60	1.86	F2	442
Propene, 1,3-diphenyl-	60	15.6		567
1-Propene, 2-methyl-	40	2.5		287
	50	4.4		287
Propionic acid, 2,2,2-trinitroethyl ester	45	3000		110
Propionitrile, 3-phosphino-	60	1.4×10^4		295
–, 3,3′-phosphinylidenedi-	60	1.3×10^4		295
Propyl alcohol	60	0.69	A, F2	423
	80	0.84	A, F2	423
	100	1.25	A	49
Pyridine	70	0.176		514
Pyrocatechol	45	<5		30
–, *p*-*tert*-butyl-	45	9		30
Pyrogallol	45	26		30
Silane, (α-bromotolyl)trimethoxy-	79.5	29.8		474
–, bromomethylphenyltrimethoxy-	79.5	29.8	R	554
–, chlorotrimethyl-	30	144	D, F2	451
	50	2.2		249
–, dichlorodimethyl-	30	175	D, F2	451
	50	2.45		249
–, dichloromethyl-	79.5	15.2		474
–, diethylchloro-	60	1700	A, R	539
–, dimethoxymethylphenyl-	79.5	0.20		474
		0.2	R	554
–, dimethylphenyl-	60	300	A, R	539
–, hexamethoxy-(3,3′-thiodipropyl)bis-	79.5	25.8	R	554
–, methyldichloro-	79.5	15.2	R	554
	60	3100	A, R	539
–, (3-mercaptopropyl)trimethoxy-	79.5	6930	R	554
–, tetraethyl-	60	5.75		156
–, tetramethyl-	30	5.0	D, F2	451
	50	1.3		249
–, trichloro	60	5000	A, R	539
–, trichloromethyl-	30	185	D, F2	451
	50	2.7		249

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S (×10⁴)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
–, triethyl	60	200	A, R	539
–, triisopropoxymethyl-	79.5	0.697		474
		0.697	R	554
–, trimethoxymethyl-	79.5	0.331		474
		0.331	R	554
–, trimethoxyphenyl-	79.5	0.053		474
		0.053	R	554
–, triphenyl-	60	1200	A, R	539
Silicon chloride	30	256	D, F2	451
	50	3.0		249
Siloxane, 1,1-dimethoxy-trimethyl-1-phenyl-di-3,3,3-	79.5	0.032	R	554
–, dodecamethyl penta-	79.5	0.145	R	554
–, 1,1,1,3,5,5,5-heptamethyl-3-phenyltri-	79.5	0.232	R	554
–, 1,1,1,3,5,5,5-heptamethyl-tri-	79.5	0.284	R	554
–, 1,1,1,3,5,5,5-heptamethyl-tri-	79.5	0.189	R	554
–, 1,1,1,3,5,5,5-heptamethyl-3-(3,3,3,3-tri-fluoropropyl)-tri-	79.5	0.205	R	554
–, hexamethyl-di-	79.5	0.104	R	554
–, hexamethyl-phenyl-tri-	79.5	1.84	R	554
–, 1,1,1,5,5,5-bexamethyl-3-(2-phenylpropyl)-tri-	79.5	2.08	R	554
–, 3-(3-mercaptopropyl)-1,1,1,3,5,5,5-heptamethyl-tri-	79.5	1284.5	R	554
–, octamethyl cyclotetra-	79.5	0.08	R	554
–, octamethyl tri-	79.5	0.0316	R	554
Sorbit-2,5-diacetate, 1,4:3, 6-, dianhydro-	60	29	C	569
Stearamide, *N*-allyl-	90	3.01	C, J	173
Stearic acid, methyl ester	60	0.282		441
Stibine, tributyl	60	<1.0		156
Tin, tetrabutyl	60	1.32		156
Toluene	20	0.04	C, D	35
	52	0.084		81
	60	0.170		21,81
		0.190	C	316
		0.202	C	32,316,317
		0.250	C	316
		0.26		275
		0.400	C	316
		0.45		496
	70	0.567	C	123
	80	0.292	C	32
		0.303		81
		0.52	I1	145
		0.525	A	31
		0.91	C	123
–, *p*-bromo-	60	0.58		496
–, *m*-chloro-	60	0.48		496
–, *p*-chloro-	60	0.49		496
–, α-chloro	60	4.17	C	181
–, *p*-ethynyl-	60	64.4	K	151
–, *p*-nitro-	44.1	0		194
–, 2,4,6-trinitro-	44.1	500		194
m-Tolunitrile, α-cyano-	60	4.55		462
p-Tolunitrile	60	0.73		496
–, α-cyano-	60	1.74		461
Tributylamine	70	25.7		270
Triethylamine	20	1.5	C, D	35
	60	8.3	J	24
		1900		25
Tripropylamine	60	14.6		156
Trisiloxane, 1,1,1,3,5,5,5-heptamethyl-	79.5	0.284		474
–, –, 3-(β-methylphenethyl)-	79.5	2.08		474
–, –, 3-phenyl-	79.5	0.232		474
–, –, 3-propyl-	79.5	0.189		474
–, –, 3-(3,3,3-trifluoropropyl)-	79.5	0.205		474

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
–, 1,1,1,5,5,5-hexamethyl-3-phenyl-	79.5	1.84		474
–, octamethyl-	79.5	0.032		474
Urea, thio-	42	1.21		503
Water	60	0		268
		0.002		479
		0.03	A, R	529
	80.5	0	F7, F24	48
m-Xylene	60	0.43		496
p-Xylene	60	0.50		496
2,4-Xylenol	50	6.5		479
Naphthalene, 1-vinyl-				
Naphthalene	60	30–50		216
Nonanoic acid, vinyl ester				
Toluene	50	11.1	R	357
	60	13.9	R	357
	70	15.2	R	357
1-Octene				
Butyl alcohol	117–118	270	C	381
sec-Butyl alcohol	117–118	520	C	381
Ethyl alcohol	115–118	230	C	381
Isopropyl alcohol	30–35	630	D	381
	120–125	520	C	381
Methanol	116–120	110	C	381
Phthalimide, *N*-vinyl-				
Chloroform	55	3.4		313
Ethane, 1,2-dichloro-	55	0.35		313
Methane, dichloro-	55	0.97		313
2-Picoline, 5-vinyl-				
Allyl ether	70	21.4		11
1-Propene				
Carbon tetrachloride	100	$(5-10) \times 10^4$	C	210
Chloroform	100	1.03×10^4	C	210
1-Propene, 3-chloro-				
Carbon tetrachloride	100	4800	C	210
Hydrochloric acid	80	1.8×10^4	Q1	238
		5.4×10^4	Q2	238
1-Propene, 2-methyl-				
Carbon tetrachloride	100	17.0×10^4	C	210
–, 3,3,3-trifluoro-				
Carbon tetrabromide		640000	C, Q(1–3)	570
Propionic acid, vinyl ester				
Toluene	–	1.4		158
Propylene				
Bromoethane	50	1200	Q(1–4)	517
	75	1400	Q(1)	517
		1500	Q(2)	517
		1800	Q(3–4)	517
	100	1700	Q(1)	517
		1900	Q(2)	517
		1800	Q(3–4)	517
	125	2200	Q(1–2)	517
		2100	Q(3–4)	517
	150	2700	Q(1–4)	517
Chloroform	95	17200 ± 1100	W23, Q(1)	518
		33000 ± 15000	W23, Q(2)	518
		17000 ± 800	W24, Q(1)	518
		299000 ± 8000	W24, Q(2)	518
		13800 ± 800	W20, Q(1)	518
		266000 ± 10000	W20, Q(2)	518
Stearic acid, vinyl ester				
Toluene	50	20.7	R	357
	70	21.6	R	357
Styrene				
Acetaldehyde	60	8.5		86

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S (×10^4)	Remarks	Refs.
Styrene (*cont'd*)				
Acetamide, *N,N*-dimethyl-	50	0.743		375
	60	4.6		113
Acetic acid	40	2.22	C	385
–, methyl ester	100	0.33		72
–, bromo-	60	430		112
	68	300		149
–, chloro-	68	200		149
–, –, methyl ester	60	0.3	A	128
	100	0.75	A	128
–, dibromo-, ethyl ester	90	2700	C	64
–, monochloro-	60	28.6	R	529
		0.76	R, H	529
–, dichloro-	60	35.0	R	529
		1.0	R, H	529
–, dichloro-, ethyl ester	60	1.3	A	128
–, iodo-	68	8000		149
–, phenyl-	60	6.0	A	128
–, –, ethyl ester	100	8.8		72
–, tribromo-	–	3.0×10^4		178
	90	2.4×10^4	C	64
–, –, ethyl ester	90	10.5×10^4	C	64
–, trichloro-	–	270		178
	60	66.0	A	128
		100	R	529
		3.75	R, H	529
–, –, ethyl ester	60	65.0	A	128
	90	90.0	C	64
	100	145.0	A	128
Acetic anhydride	60	0.7	A	128
Acetoacetic acid, ethyl ester	100	1.3		72
–, 2-acetyl, ethyl ester	100	3.0		72
Acetone	60	4.1	C	182
		<0.5	A	128
		0.32	A	501
–, oxime	60	2.2	A	128
Acetonitrile	60	0.44	A	128
–, *m*-bromophenyl-	60	66.7		462
Acetonitrile, *p*-bromophenyl-	60	68.5		461
–, *m*-chlorophenyl-	60	65.2		462
–, *p*-chlorophenyl-	60	66.0		461
–, *p*-methoxyphenyl-	60	51.0		461
–, phenyl-	60	45.1		461
–, *m*-tolyl-	60	48.5		462
–, *p*-tolyl-	60	49.2		461
Acetyl bromide	60	8600	S	112
Acetyl chloride, chloro-	60	3300		112
Acetylene, *p*-bromophenyl-	60	188.5	K	151
–, *p*-chlorophenyl-	60	161	K	151
–, *p*-nitrophenyl-	60	3130	K	151
Adipic acid, diallyl ester	60	6.0		446
–, di-(3,3,5,5-tetramethyl-4-nitrosocyclohexyl) ester	60	1.1×10^4	F9, J	314
Allyl alcohol	60	1.5	A	128
Aluminum, hydrodiisobutyl	100	26.9×10^4		156
		28.0×10^4	A	155
–, triethoxy-	100	<0.1	A	155,156
–, triethyl	100	8.05×10^4		156
		17.0×10^4	A	155
–, triisobutyoxy-	100	<1.0	A	155
–, triisobutyl	110	28.5×10^4	A	155
Aniline	50	20	F2	154
	60	2.0	A	128
–, *N,N*-dimethyl-	50	12	F2	154
		53		161
–, *N,N*-divinyl-	60	130		82

TABLE 4. *cont'd*

Solvent/Additive	T (°)	C_S (×10⁴)	Remarks	Refs.
Styrene (*cont'd*)				
Aniline, *N*-methyl-	50	13	F2	154
–, 2,4,6-trinitro-	50	11.8×10^4		370,372
p-Anisaldehyde	60	2.86		495
Anisole, *p*-ethynyl-	60	60.0	K	151
–, *m*-isopropyl-	60	5.23		405
–, *p*-isopropyl-	60	3.23		406
–, *p*-methyl-	60	0.78		496
–, 2,4,6-trinitro-	50	20.3×10^4		370,372
Anthracene	44.1	2.0×10^4	J	159
–, dihydro-	50	610	D	271
2H-Azepin-2-one, hexahydro-	130	0.61	C, I	108
Azobenzene	70	750	C	281
Benzaldehyde	60	4.54		495
		5.5		86
	100	2.6	A	298
–, *p*-bromo-	60	12.2		495
–, *m*-chloro-	60	13.7		495
–, *p*-chloro-	60	8.63		495
	100	5.6	A	298
–, *p*-cyano-	60	76.7		495
Benzene	35	3.9	F2	119
	40	5.8	F2	119
	50	0.01		327
	60	0.018	A	127
		0.023		79
		0.028	C	255
		0.04	A, I5	145
		1.92	H	415
	70	5.50	C	123
	75	6.67	C	123
	80	0.061	I5	185
		0.121	C	255
		0.156		273
	100	0.184	A	127
		0.23	A, I5	145
		0.31	A	235
		0.42	A	235
	132	0.81	A	235
		0.89	A	127
		1.5	A, I5	145
–, allyl-	100	36	A, R	524
–, bromo-	60	1.78	C	182
	155	3	A	237
–, *sec*-butyl-	60	6.22	H	415
–, *tert*-butyl-	60	0.04	A, I5	145
		0.06	A	127
	80	0.193	I5	185
	100	0.55	A	127
–, chloro-	60	0.133	C	255
		1.50	C	182
	80	0.235	C	255
		0.874	I5	185
	100	0.54	A	235
	140	0.6		58
–, –, 2,4,6-trinitro-	50	58.5×10^4		370,372
–, 1,2-dibromoethyl-	60	1950		112
–, *p*-dibutyl	60	7.02	H	415
–, *p*-di-*sec*-butyl-	60	10.70	H	415
–, *p*-di-*tert*-butyl-	60	0.87	H	415
–, *m*-dichloro-	140	0.2		58
		1.4		67
–, *o*-dichloro-	60	3.4	C	182
–, *p*-dichloro-	60	2.6	C	182

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S (×10⁴)	Remarks	Refs.
Styrene (*cont'd*)				
Benzene, diethyl-, (mixture)	100	3.35	A	235
		6.33	A	235
	132	5.13	A	235
–, *p*-diisopropyl-	60	3.30		497
		6.60		406
–, ethyl-	60	0.67	A	127
		0.70		79
		0.710	C	255
		0.83	A, I5	145
		2.7	C	363
	80	1.07	I5	185
		1.113	C	255
	100	1.38	A	235
		1.62	A	127
		2.2	A, I5	145
		2.33	A	235
	132	2.31	A	235
		2.9	A	127
		4.9	A, I5	145
–, ethynyl-	60	96.3	K	151
		98.3	J	150
–, *sec*-hexyl-	60	12.76	H	415
–, *sec*-pentyl-	60	9.43	H	415
–, tri-*sec*-butyl-	60	13.30	H	415
–, 1,3,5-trinitro-	40	9.48×10^5		372
	50	6.43×10^5		370,372,373
	60	3.51×10^5		372
Benzo[B] chrysene	44.1	1.3×10^5	J	159
Benzoic acid				
–, *m*-(phenylazo)-, methyl ester	70	700	C	281
–, 2,4,6-trinitro-, ethyl ester	50	5.72×10^5		370,372
Benzoin	60	40	A	128
Benzonitrile	60	5.3		150
–, *p*-isopropyl	60	18.6		406
Benzo[A]pyrene	44.1	1.4×10^5	J	159
p-Benzoquinone	60	22.7×10^5		42
	80	56.6×10^5	J	27
p-Benzoquinone, 2-anilino-	45	53.2×10^5	J	199
–, 2,5-dimethyl-	80	4.3×10^5	J	27
–, 2-methyl-	80	21.0×10^5	J	27
–, 2,3,5,6-tetrachloro-	80	95.0×10^5	J	27
–, 2,3,5,6-tetramethyl-	80	6700	J	27
–, 2,3,5-trimethyl-	80	2.6×10^5	J	27
Benzyl ether	25	71.6	D	368
	60	62.4		368
Bibenzyl, α,α′-dibromo-	60	3020		112
Bicyclohexyl, 3,3,3′,3′,5,5,5′,5′-octamethyl-4,4′-dinitroso-	60	1.12×10^4	F9, J	314
	80	1.2×10^4	F9, J	314
Biphenyl, 2,2′-methylene-	60	142		567
	60	97.9		567
Borane, tributoxy-	100	<0.1		156
–, tributyl	100	34.8		156
Butane, 1-bromo-	60	0.06	A	128
	100	0.35	A	128
–, 1-chloro-	60	0.04	A	128
	100	0.37	A	128
–, 2-chloro-	60	1.2	A, S	128
	100	0.3	A	128
–, 2,2-dimethyl-	60	0.43		304
–, 1-iodo-	60	1.85	A	128
	100	5.5	A	128
1,4-Butanediol	60	3.2	F24	422
	80	5.6	F24	422
	100	9.3	F24	422

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10⁴)	Remarks	Refs.
Styrene (*cont'd*)				
2-Butanone	60	4.98	C	182
	70	8.60	C	123
	75	12.00	C	123
1-Butene	100	2.6	A	358
–, 3,3-dimethyl-2-phenyl-	110	10	A	433
–, 2,4-diphenyl-	110	70	A	433
–, 3,4-epoxy-2-methyl-	80	17.4		269
–, 2-methyl-	100	3.1	A	358
–, 3-methyl-	100	6.9	A	358
		6.1	A, R	524
2-Butene	100	2.0	A	358
–, 1,4-dichloro-	80	51	C	112
–, 2,3-dimethyl-	100	5.4	A	358
		5.1	A, R	524
–, 2-methyl-	100	2.9	A	358
3-Buten-2-ol, 1-chloro-3-methyl-	80	8.2		269
Butyl alcohol	40	11.2	F24	119
	50	6.5		430
	60	0.06	A	128
		1.6	A, C	323,385
sec-Butyl alcohol	60	0.562		479
tert-Butyl alcohol	50	6.6		430
	60	0.22		422
		6.65	A	385
	80	0.345		422
	100	0.55	A	261
	130	1.0	A	261
Butylamine	60	0.5	A	128
tert-Butyl ether	60	2.6	C, F2	301
	80	1.0	C, F2	301
tert-Butyl isocyanide	100	33.0		4,75
1-Butyne, 1-phenyl-	60	34.3		150
Butyraldehyde	–	2.7	W8	412
	–	14.3		412
	50	2.7	F29, W8	414
		3.7	F29, W16	414
		4.0	F2, W7	413
		4.7	F29, W7	414
		8.0	F2, W15	413
		8.0	F29, W15	414
		11.7	F2	413
		14.3	F29	414
	60	5.7	A	128
	100	11.0	A	128
–, diallyl acetal	60	20.2		446
Butyric acid, 4-hydroxy-, γ-lactone	50	0.409		375
Cadmium, dibutyl	100	1170		156
Carobonic acid, cyclic ethylene ester	50	0.235	E	458
–, diallyl ester	60	6.2		446
–, di-(3,3,5,5-tetramethyl-4-nitrosocyclohexyl) ester	60	1.3×10^4	F27, J	314
	80	1.4×10^4	F9, J	314
Carbon tetrabromide	40	1.8×10^4	F2	109
	60	1.78×10^4	C	64
		2.2×10^4	F2	109
		2.5×10^4	F1	109
		13.6×10^4	A	128
		4.2×10^4		487
		$(5.09 \pm 0.18) \times 10^5$	II2	520
	60	88300		568
	60	40600		568
	70	1.8×10^4		61
	80	2.3×10^4	F2	109
	90	2.51×10^4	C	64
	100	2.35×10^4	A	128

TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Styrene (*cont'd*)				
Carbon tetrachloride	–	80	W8	412
	–	100		412
	50	17		513
		248		513
	60	69	Q36	63
		84	C, W8	401
		87	C	113,183
		90	C, W7	401
		92	A	128,129,210
		98	C	401
		100		366
		109	Q142	63
		110		223
		120		416
		122	A, X	114
		144.1	R	529
		130.9	R, H	529
		148	X	115
	60	92		568
	60	110		568
	76	18	C	236
		117	A	236
	80	133	I5	185
	85	34.1		163
	95	148	Q38	63
		186	Q142	63
	100	185	A	128,129
	132	304	A	129
	140	300		58
Chloroform	60	0.41	A	501
		0.5	A	128,210
		0.566	C	255
		3.40	C	182
	68	4.0		149
	80	0.50	I5	185
		0.916	C	255
Chloroform/acetone	60	3.3		501
m-Cresol	50	11		247,248
o-Cresol	50	33		247,248
	60	43		121
p-Cresol	50	22.1		247,248
	60	39		121
–, α-phenyl-	60	<5		121
Cumene	60	0.8		7
		0.82	A	127
		1.04	A, I5	145
		3.88		406
	80	1.31	I5	185
	100	2.00	A	127
		2.90	A, I5	145
–, *m*-bromo-	60	8.29		405
–, *p*-bromo-	60	7.57		406
–, *p*-tert-butyl-	60	3.46		406
–, *p*-chloro-	60	6.90		406
Cyclohexane	60	0.024	A	127
		0.031		79
		0.04	A, I5	145
		0.063	C	255
		8.5	F23	119
	80	0.066	I5	185
		0.083	C	255
		0.156		273
	100	0.16	A	127
		0.23	A, I5	145

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TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Styrene (*cont'd*)				
Cyclohexane (*cont'd*)		0.31	A	235
		12.3	A, R	524
	132	0.81	A	235
		0.87	A	127
		1.5	A, I5	145
Cyclohexanone	60	7.90	C	182
–, *trans*-1,4-, diacetate	60	16.9	C	569
–, *cis/trans*-1,4-, dicarboxylic acid dimethylester	60	4.2	C	569
Cyclopentanone	60	3.30	C	182
1-Cyclopentene-1-carboxylic acid, 3,3,5,5-tetramethyl-4-nitroso-, diester with pyrocatechol	60	1.3×10^4	F27, J	314
	80	1.0×10^4	F9, J	314
Cyclotetrasiloxane, octamethyl-	50	4.0	C	450
1,2,3,4-Dibenzpyrene	44.4	6.0×10^4	J	159
1,2,7,8-Dibenztetracene	44.4	13.0×10^4	J	159
1,2,9,10-Dibenztetracene	44.4	13.0×10^4	J	159
p-Dioxane	60	0	A, S	128
		2.28	C	4
		2.75	C	182
	100	0.8		220
Diphenylamine-T	60	0.9	F2	46
Disiloxane, hexamethyl-	79.5	0.387		474
Epibromohydrine	60	67.48	R	529
Epichlorohydrine	60	37.87	R	529
Ethane, 1,2-dibromo-	60	0.988	C	255
	80	1.914	C	255
–,1,2-dichloro-	60	0.333	C	255
		4.12	C	182
	70	1.1		67
	80	1.137	C	255
		9.8	C	112
	100	3.84	A	235
–, pentaphenyl-	60	20000	A	127
–, 1,1,2,2-tetrachloro-	100	10.8	A	235
–, 1,1,2,2-tetrachloro-1,2-difluoro-	90	1.13	A	14
–, 1,1,2-trichloro-1,2,2-trifluoro-	90	0.84	A	14
Ethanehexacarboxylic acid, hexaethyl ester	50	<50		89
1,1,2-Ethanetricarboxyic acid	100	0.94		72
Ether, benzyl methyl	68	6.0		149
–, *p*-bromobenzyl methyl	68	6.0		149
–, *p*-chlorobenzyl methyl	68	4.0		149
–, *p*-cyanobenzyl methyl	68	20.0		149
–, dodecyl vinyl	60	3.32	C	4
		4.11	C	4
Ethyl acetate	60	15.5	F10	119
	70	5.5	C	123
	75	6.67	C	123
	100	0.39		72
Ethyl alcohol	60	1.32	F2	423
		1.611		479
	80	2.60	F2	423
Ethylene, 1,1-diphenyl-	110	450	A	432
Ethylene glycol	60	1.36	F24	422
	80	2.70	F24	422
	100	4.70	F24	422
–, bis(*m*-phenylazobenzoate)	70	900	C	281
Ethyl ether	60	5.64	C	4
Fluorene	60	75.0	A	127
	100	124.0	A	127
Formamide, *N,N*-dimethyl-	40	1.09	E	458
	50	0.869		375
	60	4.0		113
	100	1.08		256

TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10⁴)	Remarks	Refs.
Styrene (*cont'd*)				
Furan, tetrahydro-	50	0.50	C	449
α, D-Glucoside, methyl-				
–, –, 6-deoxy-6-mercapto-	100	55000		220
–, –, 2,3-di-*O*-benzyl-	100	62		220
–, –, 2,3,4,6-tetra-*O*-acetyl-	100	2.0		220
–, –,6-*O*-(*p*-toluenesulfonyl)-	100	2.0		220
–, –, 2,3,4-tri-*O*-acetyl-6-deoxy-6-iodo-	100	50		220
–, –, 6-*O*-triphenylmethyl-	100	21		220
β, D-Glucoside, methyl-				
–, –, 6-deoxy-6-dipropylamino-	100	22		220
Germane, ethyldichloro-	60	56900	A, R	539
–, diethylchloro-	60	31600	A, R	539
–, triethyl-	60	2400	A, R	539
–, dimethylchloro-	60	33500	A, R	539
–, triphenyl-	60	23000	A, R	539
Heptane	60	0.42	A	127
	100	0.95	A	127
1-Heptanol, 2,2,3,3,4,4,5,5,6,6,7,7-dodecafluoro-	60	13.33	F2	442
1-Heptene	100	2.7	A	358
2-Heptene	100	3.2	A	358
Hexane	100	0.9	A	358
1-Hexene	100	2.5	A	358
		2.5	A, R	524
2-Hexene	100	3.6	A	358
Hydrochloric acid	100	0		238
Hydroquinone	60	3.6	A	128
Hydroxylamine, *N,N*-dibenzyl-	60	5000	R	533
–, *N*-benzyl-*N*-phenyl-	60	3.8×10^4	R	533
–, *N,N*-diethylene-	60	2.5×10^4	R	533
–, *N*-ethyl-*N*-phenyl-	60	20.5×10^4	R	533
Indium triethyl	100	1.7600×10^4		156
Iron(III) chloride	60	536.0×10^4		19
Isobutyl alcohol	60	0.17	A	385
		0.497		479
Isobutyl alcohol-D	100	2.9	A	261
	130	7.8	A	261
Isobutyraldehyde		8.2	W8	412
		21.0		412
Isobutyric acid	60	2.5	C	385
		4.6	A	385
Isobutyronitrile	100	2.7	A	261
	130	3.5	A	261
Isophthalic acid, diallyl ester	60	3.5		446
Isopropyl alcohol	60	3.05	F2	423
	80	4.00	F2	423
	100	1.7	A	261
		6.0	F2	423
	130	2.7	A	261
Isopropyl alcohol-D	100	1.6	A	261
Isopropyl-1-D alcohol-D	100	0.78	A	261
Lead, tetraethyl	100	1.24		156
Malonic acid, diallyl ester	60	5.2		446
–, diethyl ester	60	0.47	A	128
	100	0.46		72
–, dimethyl ester	100	0.42		72
–, acetyl-, diethyl ester	100	1.2		72
–, bromo-, diethyl ester	60	700	A	128
	100	1200	A	128
–, butyl-, diethyl ester	100	0.82		72
–, dibromo-, diethyl ester	60	1.2×10^4	A	128
–, dichloro-, diethyl ester	60	30.0	A	128
	100	62.0	A	128
–, diethyl-, diethyl ester	100	0.88		72
–, ethyl-, diethyl ester	100	0.72		72

TABLE 4. *cont'd*

Solvent/Addition	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Styrene (*cont'd*)				
Malonic acid, phenyl-, diethyl ester	100	3.5		72
Mercury, diethyl	100	0.335		156
Methane, bis(2-chloroethoxy)-	80	6.0	C	112
–, bromotrichloro-	80	7.6×10^4	D, Q2	312
		7.7×10^4	D, Q2	195
		2.4×10^6	D, Q3	312
		2.78×10^6	D, Q3	195
	60–80	6.5×10^5		439
		$(6.5 \pm 0.4) \times 10^5$		504
	80	9450	I5	185
–, dibromo-	60	110		112
–, dichloro-	60	0.15	A	128
	80	9.5	C	112
	100	11.8	A	128
–, diiodo-	60	710		112
–, diphenyl-	60	2.3	A	127
	100	4.2	A	127
		35	A, R	524
–, nitro-	60	10		86
–, triphenyl-	60	3.5	A	127
	80	6.0		44
	100	8.0	A	127
Methanetricarboxylic acid	100	0.91		72
Methanol	60	0.296		479
		0.74	F2	423
	80	1.10	F2	423
	100	1.22	F2	423
–, (4-biphenylyl)phenyl(*p*-vinyl-phenyl)-	50	3.5		57
–, bis(4-biphenylyl)(*p*-vinyl-phenyl)-	50	3.5		57
Naphthalene	60	11		216
–, decahydro-	60	0.4	A	127
–, 2-isopropenyl-	80	56		98
		70		98
	99	69		98
		86		98
–, 2-methoxy-	60	<5.0		121
–, 1,2,3,9-tetahydro-1-phenyl-	60	10000	C	467
1-Naphthol	60	480	J	50,121
–, 2,4-dichloro-	60	490	J	121
1-Naphthol-D	60	75		50,121
2-Naphthol	60	77		122
Naphtho[2,3-a]pyrene	44.4	24.0×10^5	J	159
2,6-Octadiene, 2,6-dimethyl-	60	2.0	C	324
2-Octene	100	2.8	A	358
Oleic acid, methyl ester	60	3.15	C	441
		3.52		441
		455		239
	70	420	C	141
	90	6.64	A	441
Oxalic acid, diallyl ester	60	4.2		446
–, diethyl ester	60	13.5	F22	119
Oxetane, 3,3-bis(chloromethyl)-	50	8.0	C	449
Oxime, acrolein	60	10800		555
–, crotonaldehyde-	60	1500		555
–, ethylisopropenylketone-	60	4300		555
–, methacrolein-	60	13000		555
–, methylacrolein-	60	400		555
–, methylisobutylketone-	60	2300		555
–,methylisopropenylketone-	60	1100		555
–, methylvinylketone-	60	2700		555
Oxolane, *cis*-3,4-diacetoxy-	60	1.89	C	569
Pentane, 1-chloro-	60	0.49	A	128
–, 2,2,4-trimethyl-	100	<10	A	155
2,4-Pentanedione	100	2.0		72

TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Styrene (*cont'd*)				
1-Pentanol, 2,2,3,3,4,4,5,5-octa-fluoro-	60	11.36	F2	442
3-Pentanone	60	2.6	A	385
Pentasiloxane, dodecamethyl-	79.5	0.285		474
1-Pentene	100	2.3	A	358
–, 4,4-dimethyl-2-phenyl-	110	10	A	433
–, 2,4-diphenyl-	110	170	A	433
–, 4-methyl-2,4-diphenyl-	110	2900	A	433
–, 4-methyl-2-phenyl-	110	10	A	433
–, 2,4,4-triphenyl-	110	2600	A	433
2-Pentene	100	4.2	A	358
–, 2-methyl-	100	6.3	A	358
–, 4-methyl-	100	6.9	A	358
Phenol	50	8.1		247,248
	60	14		122
–, *p*-benzyloxy	60	290	J	50,121
–, *p-tert*-butyl-	60	26		121
–, *o*-chloro-	60	6.0		122
–, *p*-chloro-	60	– 11		121
–, 2,6-di-*tert*-butyl-	60	49		121
–, 2,6-diisopropyl-	60	310	J	121
–, *p*-fluoro-	60	54		121
–, *m*-methoxy-	60	<5		121
–, *o*-methoxy-	60	43		122
–, *p*-methoxy-	60	260	J	121
–, *o*-phenyl-	60	<5		121
–, 2,3,4,6-tetramethyl-	60	580	J	50,121
–, 2,4,6-trinitro-	50	2.11×10^5		371
Phenol-D, *p*-benzyloxy-	60	10		50
–, 2,3,4,6-tetramethyl-	60	20		50
Phenyl ether	25	7.94	D	368
	60	7.86		368
Phosphine, dibutyl	100	2.08×10^4		296
–, diethyl	100	1.35×10^4		296
–, octyl	60	3.6×10^4	A	295
Phosphine, phenyl	60	43.9×10^4	A, S	295
–, tributyl	100	24.4		156
Phosphoric acid, tributyl ester	100	<0.1		156
Phosphorus, white (P4)	25	400	E	99
Phosphorus trichloride	57	250	C, D	214
	75	800		494
o-Phthalic acid				
–, bis(2-methylallyl) ester	60	6.3		446
–, diallyl ester	60	6.3		446
–, di-(3,3,5,5-tetramethyl-4-nitrosocyclohexyl) ester	80	1.2×10^4	F9, J	314
		1.32×10^4	F27, J	314
Piperidine	60	1.0	A	128
Propane, 1-chloro-2,3-epoxy-	50	7.5	C	449
–, 1-chloro-2-methyl	60	1.4	A	128
	100	3.0	A	128
–, 1,1,1,3-tetrabromo-3-phenyl-	90	3.65×10^4	C	64
–, 1,1,1-tribromo-	90	2.41×10^4	C	64
1,2-Propanediol	60	2.08	F24	422
	80	3.90	F24	422
	100	6.80	F24	422
1,3-Propanediol, 2,2-bis(bromomethyl)-, diacetate	60	4.05		325
1,3-Propanedione, 1,3-diphenyl-	60	7.0	A	128
1-Propene, 3-chloro-2-methyl-	60	24.0	A	128
–, 2-methyl-	100	1.7	A	358
–, 1,3-diphenyl-	60	87.3		567
Propionaldehyde, diallyl acetal	60	12.3		446
Propionic acid	60	0.05	A	128
		4.3	C	385
		4.5		323
		4.65	A	385

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TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Styrene (*cont'd*)				
Propionitrile, 3-phosphino-	60	50000	A	295
–, 3,3′-phophinylidenedi-	60	50000	A	295
Propyl alcohol	60	2.00	F2	423
	80	3.14	F2	423
	100	3.60	F2	423
Propylene oxide	50	1.6	C	449
2-Propyn-1-ol	60	7.0	A	128
Pyridine	60	0.6	A	128
Pyrocatechol	60	1340	J	50,121
–, *p-tert*-butyl-	60	3600	J	50,121
Pyrocatechol-D	60	260		50
–, *p-tert*-butyl-	60	370		50
Pyrogallol	60	10400	J	50,121
Pyrogallol-D	60	1600		50
Sebacic acid, diallyl ester	60	4.8		446
Silane, chlorotrimethyl-	50	12.5		249
–, dichlorodimethyl-	50	17.8		249
–, diethylchloro-	60	5700	A, R	539
–, dimethylphenyl-	60	2200	A, R	539
–, hexamethoxy-(3,3′-thiodipropyl) bis-	79.5	118	R	554
–, methyldichloro-	60	9800	A, R	539
–, 3-mercaptopropyl-trimethoxy-	79.5	5.9×10^4	R	554
–, trichloro-	60	1.4×10^4	A, R	539
–, tetraethyl-	100	8.12		156
–, tetramethyl-	50	3.1		249
–, trichloromethyl-	50	19.2		249
–, triethyl-	60	1200	A, R	539
	70	33.4		90
	80	36.8		90
–, trimethoxymethyl-	79.5	0.23		474
		0.230	R	554
–, triphenyl-	60	3700	A, R	539
	70	2.44		90
	80	1.3		90
Silicon chloride	50	20.0		249
Siloxane, hexamethyl-di-	79.5	0.387	R	554
–, dodecamethyl-penta-	79.5	0.285	R	554
–, octamethyltri-	79.5	0.069	R	554
Sorbit-2,5-diacetate, 1,4:3,6-, dianhydro-	60	77	C	569
Stannane, triphenyl-	60	3.3×10^4	A, R	539
Stearamide, *N*-allyl-	90	5.82	A, J	173
		8.30	C, J	173
Stearic acid, methyl ester	60	1.06		441
		526		239
	70	15.6	C	141
	90	0.676	A	441
Stibine, tributyl	100	58.0		156
Stibene, dibromo-	60	3020	A	112
Styrene, α-bromo-	70	10000		172
–, β-bromo-	70	2000		172
–, dibromo-	60	1950		112
–, α-ethyl-	110	10		439
–, α-methyl-	60	0.86		431
	74	95		343
	80	3.2		98
		4.9		98
	99	5.6		98
		8.5		98
	110	1.67		431
Succinic acid, diallyl ester	60	5.4		446
Succinonitrile, tetraphenyl-	50	28000		89
Sulfonyl chloride, benzene-	60	4330	R	543
–, *p*-chloro-benzene-	60	7650	R	543
–, *p*-methyl-benzene-	60	3180	R	543

TABLE 4. *cont'd*

Solvent/Additive	T (°)	C_S (×10^4)	Remarks	Refs.
Styrene (*cont'd*)				
Sulfonyl chloride, *p*-methoxy-benzene-	60	3110	R	543
–, methane-	60	1180	R	543
–, phenylmethane-	60	3190	R	543
–, α-phenyl-β-(methanesulfonyl)-ethane-	60	27600	R	543
Terephthalamide, *N,N'*-dimethyl-*N,N'*-dinitroso-	40	1400		160
	60	2000		160
Terephthalic acid, diallyl ester	60	4.5		446
Tin, tetrabutyl	100	3.71		156
Toluene	60	0.105	C	255
		0.121		21,24,79
		0.125	A	127
		0.134		78
		0.16	A, I5	145
		0.21		318
		0.82		496
		1.10	C	363
		2.05		363
	80	0.15	C	385
		0.298	I5	185
		0.3	C	385
		0.308	C	255
		0.310		76,77
		0.313		78,273
		0.813	C, F17	530
	100	0.53	A	235
		0.55	C	385
		0.645	A	127
		0.72	A	235
		0.8	A, I5	145
	132	1.12	A	235
–, *p*-bromo-	60	1.30		496
–, *m*-chloro-	60	1.25		496
	70	0.62		67
	140	1.8		67
–, *p*-chloro-	60	1.07		496
–, α-chloro-	60	1.56	A	128
–, α,α-dichloro-	60	50.0	A	128
–, *p*-ethynyl-	60	72.0	K	151
–, α-$^2H_1$, toluene	80	0.825	C, F17	530
–, ββ-$^2H_2$, toluene	80	0.820	C, F17	530
–, αββ-$^2H_3$, toluene	80	0.992	C, F17	530
–, ααα-trichloro-	60	57.5	A	128
–, 2,4,6-trinitro-	50	14.6×10^4		370,372
p-Toluidine	50	78	F2	154
–, *N,N*-dimethyl-	50	16	F2	154
–, *N*-methyl-	50	11	F2	154
m-Tolunitrile, α-cyano-	60	91.4		462
p-Tolunitrile	60	2.07		496
–, α-cyano-	60	112		461
s-Triazine, trimethyl-	60	0.468		88
Triethylamine	60	1.4	W9	364
		3.0	W6	364
		7.1		24
		7.5		363,364
Tripropylamine	100	24.2		156
Trisiloxane, octamethyl-	79.5	0.069		474
Urea, 1,3-bis(3,3,5,5-tetramethyl-4-nitrosocyclohexyl)-	60	14500	F9, J	314
	80	15000	F9, J	314
Water	60	0.006		479
		0.31	A, R	529
m-Xylene	60	0.78		496
p-Xylene	60	0.84		496
–, α,α'-dibromo-	60	150		112
2,6-Xylenol	60	110		121

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Styrene (*cont'd*)				
Zinc, diethyl	100	3660		156
–, *p*-chloro-				
Anisole, *p*-isopropyl-	60	3.86		406
Benzaldehyde	100	1.9	A	298
–, *p*-chloro-	100	9.7	A	298
Benzene, *p*-diisopropyl-	60	3.62		497
		7.24		406
Benzonitrile, *p*-isopropyl-	60	8.84		406
Carbon tetrabromide	60	52000	F2	109
Carbon tetrachloride	60	45		366
Cumene	60	3.44		406
–, *p*-bromo-	60	5.71		406
–, *p-tert*-butyl-	60	3.52		406
–, *p*-chloro-	60	4.97		406
–, *p*-iodo-				
Benzene	50	0.2		56
–, *p*-methyl				
Anisole, *p*-isopropyl-	60	3.27		408
Benzene, *p*-diisopropyl-	60	3.67		408
		7.34		406
Benzonitrile, *p*-isopropyl-	60	26.0		408
Cumene	60	4.12		408
–, *p*-bromo-	60	9.23		408
–, *p-tert*-butyl-	60	3.59		408
–, *p*-chloro-	60	7.67		408
–, pentafluoro-				
Benzene, bromo-	60	0		469
–, chloro-	60	0		469
–, ethyl-	60	5.35		469
–, fluoro-	60	0.117		469
2-Butanone, 3-methyl-	60	1.09		469
Cumene	60	6.76		469
Furan, tetrahydro-	60	1.53	A	469
		1.61		469
2-Pentanone, 4-methyl-	60	0.033		469
Toluene	60	1.20		469
Styrene/Styrene, *p*-chloro-				
Carbon tetrachloride	60	15	EF	366
		115	EE	366
Succinimide, *N*-vinyl-				
Acetic acid	55	0.077	C, F25	93
Ethane, 1,2-dichloro-	55	0.127	C, F26	93
Valeric acid, 4-methyl-, vinyl ester				
Benzene	80	6.2		201
Vinyl acetate				
Acetaldehyde	30	400		346
	45	530	J	86
	50	390		460
	60	0.72		257
		200	I8	145
		220		232
		500		460
		570	F2	86
		660	J	86
	70	610		460
	75	700	J	86
Acetamide, *N*-butyl-	60	40		86
Acetic acid	50	0.180		466
	60	0.166	C	465
		0.200		466
		1.0	I9	145
		1.13		289
		10	F2	86
	65	0.170	C	466

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S (×10^4)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Acetic acid, allyl ester	60	85	F2	86
		94	J	86
–, benzyl ester	60	80	F2, J	86
–, butyl ester	50	13.2		208
–, *sec*-butyl ester	50	4.4		208
	60	8.0		86
–, *tert*-butyl ester	50	1.5		208
	60	6.2		232
–, isobutyl ester	50	9.1		208
–, isopropyl ester	50	3.5		208
	60	3.1		145,232
		8.0		86
	67.5	9.0	J	86
	75	10	J	86
–, methyl ester	60	1.56		145,231
		1.6		145,232
		2.5		86
–, propyl ester	50	6.2		208
	60	3.4		145,232
–, 1,3,3,3-tetrachloropropyl ester	70	423.2	C	389
–, bromo-	60	489	C, J	386
	70	4450	C	389
–, chloro-	70	2550	C	389
–, cyano-, methyl ester	60	5000	J	86
–, dichloro-, ethyl ester	60	210		86
–, phenyl-	60	400	J	86
–, trichloro-	70	1445	C	389
–, ethyl ester	60	4400		86
–, trifluoro-, ethyl ester	50	30	C	71
Acetic anhydride	60	8.0		86
Acetoacetic acid, ethyl ester	70	80.4	C	390
Acetone	60	1.5		86
		11.70		289
		12.0		145
	70	25.6	C	330
	75	42	C	184
Acetonitrile	60	10		86
–, phenyl-	60	2100	J	86
Acetophenone	50	91.5		15
	60	100	J	86
	70	62.0	C	390
–, 3′-hydroxy-	45	1405	J	51
–, 3′-hydroxy-D-	45	1290	J	51
Aniline	50	149		15
		210	F2	154
–, *N,N*-dimethyl-	50	260	F2	154
–, *N*-methyl-	50	360	F2	154
–, *p*-nitro-	50	48600		15
m-Anisaldehyde	60	2500	J	86
o-Anisaldehyde	60	420	J	86
p-Anisaldehyde	60	370	J	86
Anisole	60	10	F2, J	86
Anthracene	20	6.68×10^5	J	41
	30	6.03×10^5	J	41
	40	4.55×10^5	J	41
	50	2.057×10^5		15
		3.64×10^5	J	41
	60	2.78×10^5	J	41
–, 9-phenyl-	50	2.73×10^5	J	41
Benzaldehyde	60	230	J	145,355
		460	F2	86
		540	J	86
	70	421	C, J	390
	75	600	J	86

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Benzaldehyde, *m*-chloro-	60	860	J	86
–, *o*-chloro-	60	390	J	86
–, *p*-chloro-	60	340	J	86
–, *m*-cyano-	60	1070	J	86
–, *p*-cyano-	60	610	J	86
–, *p*-isopropyl-	60	540	J	86
Benz[A]anthracene	50	1.17×10^5	J	41
Benzene	60	1.07		263
		1.2	J	86
		1.2		294
		2.4	C	80
		2.96		289
		20		294
	70	5.27	C	390
	75	1.4	J	86
		1.40		263
		3.6	C	184
–, bromo-	50	18.9		15
	60	8.0	W7	265
		9.2	W15	265
		10.0		265
	70	134.2	C	389
	75	25.2	C	184
–, *tert*-butyl-	60	3.61		289
–, chloro-	60	5.6	W7	265
		6.8	W15	265
		8.0		265
		8.35		289
		80	J	86
	70	2.61	C	389
	75	12.7	C	184
Benzene, *o*-dichloro-	75	42	C	184
–, *p*-dichloro-	70	11.8	C	389
–, *m*-dinitro-	45	1.05×10^6	C, J	28
	50	645700		15
–, *o*-dinitro-	45	9.6×10^5	C, J	28
–, *p*-dinitro-	45	26.7×10^5	C, J	28
	50	662800		15
–, ethyl-	60	55.15		289
		100	J	86
–, nitro-	50	110300		15
–, 1,3,5-trinitro-	45	8.9×10^6	C, J	28
	50	434280		15
Benzo[B]chrysene	50	2.83×10^5	J	41
Benzoic acid	60	50	J	86
–, ethyl ester	60	26	J	86
–, *p*-nitro-	50	245700		15
Benzoic anhydride	60	130	J	86
Benzoin	60	800	J	86
Benzonitrile	50	40.6		15
–, *m*-hydroxy-	45	820	J	51
–, *m*-hydroxy-D-	45	805	J	51
Benzo[GHI]perylene	50	1.82×10^4	J	370
Benzophenone	50	286		15
Benzo[A]pyrene	50	3.06×10^5	J	41
Benzo[E]pyrene	50	8400	J	370
p-Benzoquinone, 2,3,5,6-tetramethyl-	45	9.5×10^5	J	27
Benzoyl chloride	50	366		15
	70	300	C	389
Benzyl alcohol	70	556	C	390
Biphenyl	50	263		15
	60	6.4		132
Borane, tributyl	10	9000		191

TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10^4)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Butane, 1-bromo-	60	50		86
	70	1100	C	389
–, 1-chloro-	60	10		86
–, 1-iodo-	60	800		86
2,3-Butanedione	60	670	F2, J	86
2-Butanone	60	73.80		289
	75	165	C	184
–, 3-methyl-	60	118.16		289
1-Butene, 3-chloro-3-methyl-	50	28900	F2	152
2-Butene, 1-chloro-3-methyl-	50	4300	F2	152
1-Buten-3-yne	60	0	J	232
Butyl alcohol	60	20.0	I9	145
		20.39		289
	70	29.1	C	390
sec-Butyl alcohol	60	31.74		289
	70	6.21	C	390
	75	95.0	C	184
tert-Butyl alcohol	60	0.46		289
		0.5	I9	145
		1.3		86
	70	12.1	C, J	390
Butyl ether	60	76		86
3-Butyn-2-ol, 2-methyl-	60	400	J	86
Butyraldehyde	40	440	W8	500
		510	W7	500
		590	W15	500
		670		500
	60	650		232,355
		1000		86
	70	388	C	390
Butyric acid, ethyl ester	50	45	C	71
–, methyl ester	60	18		145,232
		19		86
Carbon tetrabromide	60	7.39×10^6	F2	109,145
	70	28740	C	389
Carbon tetrachloride	0	1500		346
	20	4700	E	309
	45	7600	J	86
	60	800	Q1	10
		1300	Q2	10
		4700	Q3	10
		6700	Q4	10
		7300	F2	86
		8000	Q5	10
		9000	Q6	10
		9600	J	86
		10000		210
		10500	Q7	10
		10700	Q8	10
	70	2023	C	389
	75	10500	J	86
Chloral	60	5000		86
	70	4927	C	389
Chloral hydrate	70	4312	C	389
Chloroform	–	100		345
	30	140		346
	60	125.18		289
		130	I9	145
		150	J	86
		160		210
		170	F2	86
	70	554	C	389
2-Chloro-3-(methyl-^{14}C)-1butene(4-^{14}C)	50	3980	F2	509
3-Chloro-2-pentene-(2,4-^{14}C)	50	628	F2	509

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10⁴)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Chrysene	50	3360	J	370
m-Cresol	45	375	J	51
m-Cresol-D	45	85	J	61
p-Cresol	45	710	J	51
p-Cresol-D	45	130	J	51
Crotonaldehyde	60	1800	J	355
Cumene	60	89.9		289
		100		7,86
	70	139	C	390
	75	356	C	184
Cyclohexane	60	6.59		289
		7.0	I9	145
		100	F2	86
–, methyl-	60	11.75		289
		24		86
1,3-Cyclohexanedione, 5,5-dimethyl-	70	5580	C	390
Cyclohexanol	70	127	C	390
Cyclohexanone	60	180	F2	86
	75	670	C	184
Cyclohexene	60	620	J	86
		1600	F2	86
	75	770	J	86
Dibenz[a,h]anthracene	50	8.7×10^4	J	370
Dibenzo[def,mno]chrysene	40	156.5×10^4	J	41
	50	129.2×10^4	J	41
	60	105.4×10^4	J	41
1,2,3,4-Dibenzpyrene	50	73.6×10^4	J	41
Diethylene glycol	70	85.3	C	390
Diethylphosphonate	60	350	F1	571
	60	910	F2	571
	60	830	F2	571
	60	730	F2	571
p-Dioxane	60	20	F2	86
	70	49.1	C	390
Diphenylamine	50	138		15
	60	240		46
Diphenylamine-D	60	170		46
Diphenylamine-T	60	230		46
Ethane, 1,1-dibromo-	60	1100		86
–, 1,2-dibromo-	70	134	C	389
–, 1,1-dichloro-	60	65		86
–, 1,2-dichloro-	60	5		86
		7	I9	145
		7.18		289
–, 1,2-dichloro-	70	10.2	C	389
–, hexachloro-	70	1210	C	389
–, pentachloro-	70	1348	C	389
–, 1,1,2,2-tetrabromo-	60	6000		86
–, 1,1,2,2-tetrachloro-	60	107.03		289
		160		86
	70	67.72	C	389
–, 1,1,1-trichloro-	60	71.11		289
–, 1,1,2-trichloro-	60	35.98		289
1,1-Ethanediol, diacetate	60	40		86
Ether, benzyl methyl	60	280	F2, J	86
–, bis(2-chloroethyl)	70	245	C	389
–, dodecyl vinyl	60	57.2	C	4
		73.5	C	4
–, ethyl	60	45.3	C	4
Ethyl acetate	20	1.52		328
	40	2.11		328
	50	2.9		208
		12	C	71
	60	1.07		289

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Ethyl acetate (*cont'd*)		1.25	C	80
		2.6		145,232
		2.96		328
		3.3		86
		3.4		420
	70	7.8	C	390
Ethyl alcohol	60	25	F2	86
	70	26.3	C	390
Ethylene, tetrabromo-	70	2800	C	389
–, tetrachloro-	70	465	C	389
–, tribromo-	70	34720	C	389
–, trichloro-	70	3810	C	389
Ethylene glycol	70	83.0	C, J	390
Fluorene	60	4700	J	86
	70	3610	C, J	390
–, 9-phenyl-	70	16240	C	390
Formamide, *N,N,*-dimethyl-	60	50		86
Formic acid, ethyl ester	50	22	C	71
–, methyl ester	60	3		86
2-Furaldehyde	60	15000	J	86
Furfuryl alcohol	70	2520	C, J	390
Germane, diethylchloro-	60	7800	A, R	539
–, dimethylchloro-	60	86600	A, R	539
–, triethyl-	60	4500	A, R	539
–,triphenyl-	60	56000	A, R	539
Glycolic acid, methyl ester	60	300		86
Heptane	50	17.0		208
1-Heptanol, 2,2,3,3,4,4,5,5,6,6,7,7-dodecafluoro-	60	33.3	F2	442
1,5-Hexadien-3-yne	60	0		232
Hexanoic acid, 2-ethyl-, ethyl ester	50	65	C	71
Hydroquinone	50	7000	J	338
–, 2,5-di-*tert*-butyl-	50	38000	J	338
–, 2,6-dimethyl-	50	29000	J	338
–, tetramethyl-	50	74000	J	338
Isobutyl alcohol	60	21.75		289
	70	32.4	C	390
Isobutyric acid	60	5.02		289
Isobutyric acid, ethyl ester	50	160	C	71
–, methyl ester	60	58		145,232
		71		420
		86		86
Isobutyronitrile	60	100		86
Isopropyl alcohol	70	44.6	C	390
Lactic acid, ethyl ester	60	700		86
–, methyl ester	60	640		86
Lauric acid, ethyl ester	50	105	C	71
Malonic acid, dimethyl ester	60	17		86
p-Mentha-1,8-dene	60	1900	J	86
Mesitol	50	5000	J	338
Methane, bromotrichloro-	25	$\gg 10^4$	D, S	39
	60	6000	C	39
		$>4\times10^5$	C	39
	70	6303	C	389
–, dichloro-	60	4		86
–, iodo-	70	1230	C	389
–, nitro-	60	2300	F2, J	86
	75	2600	J	86
–, tribromo-	70	34760	C	389
–, triphenyl-	60	700		45
Methanol	–	9.0		5
		10.0		5
		10.5		5
	10	3.4		190
	60	2.26		145,231

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TABLE 4. *cont'd*

Solvent/Additive	T (°C)	C_S (×10⁴)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Methanol (*cont'd*)		4.3		320
		6.0		86
	70	5.5		320
Naphthacene	50	8.62×10^6	J	370
Naphthalene	50	1150	J	370
		1457		15
	70	1715	C, J	390
–, decahydro-	60	48		86
Naphtho[1,2,3,4-def]chrysene	50	1.35×10^5	J	41
Nonanoic acid, ethyl ester	50	80	C	71
2,6-Octadiene, 2,7-dichloro-	50	3200	F2	152
–, 2,6-dimethyl-	60	430		324
		700		7
Octanoic acid, ethyl ester	50	70	C	71
Oleic acid, methyl ester	60	217		441
		1000	J	86
	90	358		441
Orthoformic acid, trimethyl ester	–	7.6		345
	30	8.0		346
Oxalic acid, diethyl ester	60	4.0		86
–, dimethyl ester	60	1.0		86
		2.0		145,232
Paraldehyde	70	136	C	390
Pentane, 2,2,4-trimethyl-	50	8.0		208
2,4-Pentanedione	60	10		86
1-Pentanol, *n* 2,2,3,3,4,4,5,5-octafluoro-	60	26.1	F2	442
2-Pentanone, 4-methyl-	60	34.52		289
3-Pentanone	60	10.0	I9	145
		114.39		289
Pentyl acetate	70	7.2	C	390
	75	87.0	C	184
Pentyl alcohol	75	56	C	184
Perylene	50	2.88×10^5	J	41
Phenanthrene	50	870	J	370
		5600		15
	70	3380	C, J	390
Phenol	45	215	J	51
	50	120		15
	60	600	J	86
–, *m*-chloro-	45	205	J	51
–, *p*-chloro-	45	400	J	51
–, *p*-nitro-	50	8.86×10^4		15
–, 2,3,4,6-tetramethyl-	45	1.13×10^4	J	51
Phenol-D	45	35	J	51
–, *m*-chloro-	45	70	J	51
–, *p*-chloro-	45	80	J	51
–, 2,3,4,6-tetramethyl-	45	800	J	51
Phosphorus trichloride	60	1.5×10^4	C, D	214
Propane, 2-bromo-2-methyl-	60	150		86
–, 2-chloro-2-methyl	60	26		86
1-Propanol, 2,2,3,3-tetrafluoro-	60	7.11	F2	442
1-Propene, 3-chloro-	60	3100		86
–, 3-chloro-2-methyl-	60	400	J	86
Propionaldehyde	60	950	J	86
		1000	F2	86
	70	457	C	390
Propionic acid, ethyl ester	50	40	C	71
–, methyl ester	60	23		232
		26		420
Pyrene	50	11500	J	370
Pyrocatechol, 4-(1,1,3,3,-tetramethylbutyl)-	50	11000	J	338
Pyrogallol	50	50000	J	338
Salicylic acid	70	296	C	390
Silane, dimethylphenyl-	60	2200	A, R	539

TABLE 4. *cont'd*

Solvent/Additive	*T* (°C)	C_S ($\times 10^4$)	Remarks	Refs.
Vinyl acetate (*cont'd*)				
Silane, methyldichloro-	60	5800	A, R	539
–, trichloro-	60	8800	A, R	539
–, triethyl-	60	1200	A, R	539
–, triphenyl-	60	2700	A, R	539
Stearamide, *N*-allyl-	90	620.1	C, J	173
Stearic acid, ehtyl ester	50	140	C	71
–, methyl ester	60	38.2		441
Succinic acid, diethyl ester	60	41		420
–, dihexyl ester	60	40		420
–, dimethyl ester	60	31		420
m-Tolualdehyde	60	570	J	86
p-Tolualdehyde	60	440	J	86
Toluene		3.3		158
	50	12.0		15
		14.9	R	357
		100	C	71
		123		71
	60	17.8	R	357
		20.75	C	80
		20.89		21,59,289
		21.6		357
		34	J	86
	60	35	F2	86
		49.0	W15	265
		69.0		265
	70	21.1	R	357
		21.8	C	390
		29.2		357
	75	66	C	184
	80	91.6		273
–, bromo-	50	20.6		15
–, *o*-chloro-	70	92.86	C	389
–, *p*-chloro-	70	195	C	389
–, α-chloro-	60	450	J	86
	70	584	C	389
	75	118	C	184
Toluene, *p*-nitro-	50	106300		15
p-Toluidine	50	750	F2	154
–, *N,N*-dimethyl-	50	380	F2	154
–, *N*-methyl-	50	830	F2	154
Toluonitrile	50	38.3		15
Triethylamine	50	360	F2	154
	60	370	J	24,145
Triphenylene	50	160	J	370
Veratraldeyhyde	60	550	J	86
Xylene	50	14.9		15
	70	278	C	390
	75	166	C	184
Vinyl chloride				
Carbon tetrachloride	60	280	Q(3)	511
Chloroform	60	290	Q(3)	511
Bromotrichloromethane	60	400000	Q(3)	511
Vinylidene chloride				
N-Methylpyrolidone	50	20	R	541
	60	20	R	541
2-Vinylpyridine				
Silane, diethylchloro-	60	5400	A, R	539
–, Methyldichloro-	60	8600	A, R	539
–, trichloro-	60	12000	A, R	539
–, triethyl-	60	2000	A, R	539
–, triphenyl-	60	4000	A, R	539
Vinyltrimethylsilane				
Bromoform		1200000	C, Q(1–2)	572

TABLE 5. TRANSFER CONSTANTS TO SULFUR COMPOUNDS

Modifier	T (°C)	C_X	Remarks	Refs.
Acrylamide, *N*-octadecyl-/acrylonitrile (1:1 mol ratio)				
1-Dodecanethiol	60	0.539	C, F24	174
Acrylic acid				
1-Dodecanethiol	45	1.9	C, F31	549
–, methyl ester				
1-Butanethiol	30	1.53	A	397
	60	1.69	A	69,397
Ethanethiol	50	0.78	Q1	330
		0.94 ± 0.07	Q1	478,507
		1.65 ± 0.12	Q2	478,507
		1.57 ± 0.09	Q3	508
		1.57 ± 0.18	Q4	330,509
		1.79	Q2	330
		5.00	Q3	330
2-Propanethiol	60	0.544	Q1	477
		0.668	Q2	477
		0.700	Q3	477
		0.656	Q4	477
Acrylonitrile				
1-Dodecanethiol	50	0.73		378
Hydrogen sulfide	50	0.13		378
Methyl sulfoxide	20	0.1	C, F8	248
	30	0.47		196
	40	0.0000812	E	458
	50	0.11		404
		0.29		197
		0.795		375
Methyl tetrasulfide	80	0.69	J	85
p-Toluenethiol	50	0.97		378
Acrylonitrile/1,3-butadiene (10–90%)				
1-Hexanethiol,				
–, 1,1,3,3,5,5-hexamethyl-	5	1.5	C, H	380
1-Pentanethiol,				
–, 1,1,3,3-tetramethyl-		53.3	C, H	380
Acrylonitrile/1,3-butadiene (20–80%)				
1-Hexanethiol				
–, 1,1,3,3,5,5-hexamethyl-	5	1.2	C, H	380
1-Pentanethiol				
–, 1,1,3,3-tetramethyl-	5	2.1	C, H	380
Acrylonitrile/1,3-butadiene (30–70%)				
1-Hexanethiol				
–, 1,1,3,3,5,5-hexamethyl-	5	1.1	C, H	380
1-Pentanethiol				
–, 1,1,3,3-tetramethyl-	5	1.8	C, H	380
Acrylonitrile/styrene (38.5–61.5 mol%)				
1-Pentanethiol				
–, 1,1,3,3,4-pentamethyl-	50	1.02	C, H	380
Butadiene				
Xanthogendisulfide, dibutyl-	60	6.9	J	532
–, diethyl-	60	8.1	J	532
–, di-2-ethylhexyl-	60	7.5	J	532
–, di-isopropyl-	60	8.3	J	532
1,3-Butadiene				
1-Butanethiol, 1,1,3,3-tetramethyl-	5	5.3	H	242
	50	3.7	H	242
1-Octanethiol	5	21.8	H	242
	50	16.0	H	242
		19.0	H	243
–, 1,1,3,3,5,5,7,7-octamethyl-	50	3.0	H	242
1-Tetradecanethiol	50	19.5	H	242
1,3-Butadiene/styrene				
1-Dodecanethiol	5	0.66	B, H, J	384
Formic acid, thio-, dithiobis-				
–, –, –, *O,O′*-dibutyl ester	5	2.42	B, H, J	383

TABLE 5. *cont'd*

Modifier	*T* (°C)	C_X	Remarks	Refs.
1,3-Butadiene/styrene (*cont'd*)	−5	1.75	H	180
	50	5.34	C, H, J	382
–, –, –, *O,O′*-di-*sec*-butyl ester	5	1.65	B, H, J	
	−5	1.565	H	180
–, –, – *O,O′*-dicyclohexyl ester	5	1.78	B, H, J	383
	50	3.71	C, H, J	383
–, –, –, *O,O′*-diethyl ester	5	8.43	B, H, J	383
	−5	4.23	H	180
	50	16.04	C, H, J	382
–, –, –, *O,O′*-diheptyl ester	5	0.41	B, H, J	383
	50	1.12	C, H, J	382
–, –, –, *O,O′*-dihexyl ester	5	0.74	B, H, J	383
	50	1.78	C, H, J	382
–, –, –, *O,O′*-diisobutyl ester	5	1.87	B, H, J	383
	−5	1.573	H	180
	50	6.43	C, H, J	382
–, –, *O,O′*-diisopentyl ester	5	1.21	B, H, J	383
		7.0	B, H, J	341
	−5	1.85	H	180
	50	4.38	C, H, J	382
–, –, –, *O,O′*-diisopropyl ester	5	2.83	B, H, J	383
		3.4	B, H, J	341
		12.5	B, H	100
		0.40–1.31	B, H, J, GG4	100
		0.80–3.01	B, H, J, GG3	100
		1.40–3.70	B, H, J, GG2	100
		1.80–3.50	B, H, J, GG1	100
		1.80–6.0	B, H, J, GG5	100
	–	9.78		179
	−5	1.185	H	180
	50	9.78	C, H, J	382
–, –, –, *O,O′*-dimethyl ester	5	16.43	B, H, J	383
	−5	15.86	H	180
	50	27.04	C, H, J	382
–, –, –, *O,O′*-dineopentyl ester	5	1.01	B, H, J	383
	50	3.40	C, H, J	382
–, –, –, *O,O′*-dioctyl ester	5	0.23	B, H, J	383
	50	0.64	C, H, J	382
–, –, –, *O,O′*-dipentyl ester	5	1.45	B, H, J	383
	−5	1.70	H	180
	50	3.20	C, H, J	382
–, –, –, *O,O′*-dipropyl ester	5	4.42	B, H, J	383
	−5	1.815	H	180
	50	9.20	C, H, J	382
1-Heptanethiol				
–, 1,1,3,3,5,5,6-heptamethyl-	5	0.64	B, H, J	384
1-Hexanethiol				
–, 1,1,3,3,5,5-hexamethyl-	5	1.22	B, H, J	384
		4.1	H	54,55
		2.7–4.7	H	54
1-Octanethiol				
–, 1,1,3,5,5,7,7-octamethyl-	5	0.34	B, H, J	384
p-Dioxin, 2,3-dihydro/maleic anhydride				
1-Butanethil	60	6300	R	169
Ethylene				
1-Butanethiol	130	5.8	C, W5	457
Ethyl sulfide	130	0.027	C, W5	454
Methyl sulfoxide	130	12	C, F21, W5	259
2-Propanethiol, 2-methyl-	130	15.0	C, W5	457
Sulfur hexafluoride	130	0.0000	C, F21, W5	259
Methyl methacrylate				
Acetic acid, dithiodi-, diethyl ester	60	0.00065		86
–, mercapto-, methyl ester	60	0.63		274
Acetophenone, 3′-mercapto-	45	4.2		30
–, 4′-mercapto-	45	2.6		30

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TABLE 5. *cont'd*

Modifier	*T* (°C)	C_X	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
Anisole, 4,4′-dithiodi-	50	0.0044		285
	60	0.0052		285
p-Anisoyl disulfide	60	14.6		369
Benzenesulfonic acid				
–, compound with pyridine	60	0.00365		490
–, thio-, *S*-phenyl ester	60	0.0196	A	491
Benzenethiol	45	4.7		30
	60	2.7		274
	70	15		566
–, *m*-bromo-	45	3.8		30
–, *p*-bromo-	45	5.6		30
–, *m*-chloro-	45	3.5		30
–, *p*-chloro-	45	4.6		30
Benzoyl disulfide	60	10.0		369
Benzyl disulfide	25	0.134		368
	50	0.016	F2	354
	60	0.00627		368
Benzyl sulfide	25	0.0183	D	368
	50	0.0098		252
		0.0098	F2	354
	60	0.00154		368
Benzyl sulfone	50	0.0040		252
Benzyl sulfoxide	50	0.0039		252
Benzyl tetrasulfide	50	0.084	F2, J	354
Benzyl trisulfide	50	0.021	F2, J	354
1-Butanethiol	60	0.66		274
		0.67	A	69,397
Carbanilide, thio-	50	0.008	F2	251
		0.22	C, F2	251
–, –, 4,4′-bis(dimethylamino)-	50	0.09	C, F2	251
–, –, 4,4′-dichloro-	50	0.35	C, F2	251
–, –, 3,3′-dimethoxy-	50	0.33	C, F2	251
–, –, 3,3′-dimethyl-	50	0.21	C, F2	251
–, –, 4,4′-dimethyl-	50	0.13	C, F2	251
–, –, 3,3′-dinitro-	50	0.55	C, F2	251
Carbon disulfide	60	0.00007	A	288
2,13-Dioxa-7,8-dithia-3,12-disila-tetradecane, 3,3,12,12-tetrameth oxy-	79.5	0.00258		474
Disulfide, bis(*p*-bromobenzoyl)-	60	16.7		369
–, bis (*p*-bromophenyl)-	50	0.0046		285
	60	0.0098		285
–, bis(*p*-chlorobenzoyl)-	60	10.0		369
–, bis(*p*-chlorophenyl)-	50	0.0072		285
	60	0.0117		285
–, bis(*p*-cyanobenzoyl)-	60	290		369
–, bis(dimethylthiocarbamoyl)-	70	0.0115		104
–, bis(*p*-nitrobenzoyl)-	60	694		369
–, bis(*o*-nitrophenyl)-	50	0.0176		285
	60	0.0508		285
–, bis(*p*-nitrophenyl)-	50	0.0127		285
	60	0.0193		285
1-Dodecanethiol	60	0.7		573
	70	0.55		573
	80	0.42		573
	90	0.33		573
Ethanethiol, 2-amino-, hydrochloride	50	0.17	F7	473
	70	0.15	F7	473
Ethanol, 2-mercapto-	50	0.43	F2	473
	60	0.62		274
	70	0.40	F2	473
Ethyl disulfide	60	0.00013		310
Formamidine, *N,N′*-diphenyl-				
–, –, 1,1′-dithiobis-	50	0.22	C, F2	251
Methyl sufoxide	60	0.0000071	A	438

TABLE 5. *cont'd*

Modifier	T (°C)	C_X	Remarks	Refs.
Methyl methacrylate (*cont'd*)				
2-Naphthalenethiol	45	1.3		30
	60	3.1		274
1-Penthanethiol	50	0.8	H	344
Phenyl disulfide	25	0.0174	D	368
	50	0.0038		285
	60	0.0007		310
		0.00176		368
		0.0085		285
		0.0110	A	491
Phenyl disufone	60	0.0003	A	491
Phenyl sulfide	25	0.00554	D	368
	50	0.0064		252
	60	0.00132		368
Phenyl sulfone	50	0.0006		252
Phenyl sulfoxide	50	0.0013		252
1-Propanethiol, 3-[1,3,3,3-tetramethyl-1-(trimethylsiloxy)disiloxanyl]-	79.5	0.128		474
–, 3-(trimethoxy)-	79.5	0.693		474
2-Propanethiol	60	0.38		274
–, 2-methyl-	60	0.18		274
Propionic acid, 3-mercapto-	50	0.39	F2	473
	70	0.38	F2	473
Sulfide, benzoyl dimethylthiocarbamoyl	20	5.5	D	280
	60	0.08	A	280
Sulfur	–	1.3	C	118
	44.1	0.075		194
	50	0.106	F2, J	354
Thiosulfuric acid, *S*-butyl ester				
–, –, sodium salt	60	0.00226		490
–, *S*-isopropyl ester				
–, –, sodium salt	60	0.00167		490
–, *S*-phenyl ester				
–, –, compound with pyridine	60	0.374		490
–, –, potassium salt	60	0.00537		490
–, *S*-propyl ester				
–, –, sodium salt	60	0.00190		490
m-Toluenethiol	45	4.7		30
p-Toluenethiol	45	7.4		30
α-Toluenethiol	50	0.027	F2, J	354
p-Toluoyl disulfide	60	11.0		369
p-Tolyl disulfide	50	0.0031		285
	60	0.0044		285
Styrene				
Acetic acid, dithiodi-	50	<0.005		297
	99	0.2		96
–, –, diethyl ester	60	0.015		86
–, –, dimethyl ester	99	0.1		96
–, –, mercapto-	99	>14.0	J, R	96
–, –, butyl ester	50	26.0	A	146
–, –, ethyl ester	60	58.0	A	126
–, –, methyl ester	60	0.63		323
	99	27.6		96
–, phenyl-				
–, –, *p,p*′-dithiodi-	50	0.24		89
–, thio	99	>14.7	J	96
Aniline, 2,2′ dithiodi-	25	3.8		297
	50	3.0		297
		3.4		297
	75	3.0		297
–, 4,4′-dithiodi-	50	0.24		89
–, *N*-dodecyl-, 4,4′-dithiodi-	50	0.21		89
Anisole, 2,2′-dithiodi-	50	3.0		89
–, 4,4′-dithiodi-	50	0.18		89
–, *p*-methyl-, α,α′-dithiobis-	99	0.021		96

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TABLE 5. *cont'd*

Modifier	T (°C)	C_X	Remarks	Refs.
Styrene (*cont'd*)				
p-Anisoyl disulfide	60	96.0		369
Anthranilic acid, 4,4′-dithiobis-	50	3.0		89
Arylbenzene thiolsulfonate	60	0.95	R, F2	544
–, *p*-chloro-	60	2.22	R, F2	544
–, *p*-methoxy-	60	1.872	R, F2	544
–, *p*-methyl-	60	1.237	R, F2	544
Benzenesulfonic acid				
–, compound with pyridine	60	0.00617		490
–, thio-, *S*-phenyl ester	50	1.60	A	491
	60	1.67	A	491
Benzenethiol	99	0.08		96
–, *o*-ethoxy-	99	25.1		96
–, *p*-ethoxy-	99	0.13		96
Benzene thiosulfonate				
–, aryl-*p*-chloro-	60	2.597	R, F2	544
–, aryl-*p*-methoxy-	60	1.475	R, F2	544
–, aryl-*p*-methyl	60	1.099	R, F2	544
2-Benzimidazolethiol	99	0.21		96
Benzoic acid, 2,2′-dithiodi-	50	0.01		89
–, –, diethyl ester	50	<0.005		89
–, –,dimethyl ester	99	0.2		96
–, 4,4′-dithiodi-	50	0.11		297
		0.17		89
–, –, diethyl ester	50	0.11		89,297
–, *o*-mercapto-	99	>14.7		96
–, –, methyl ester	99	17.0		96
–, thio-	99	6.23	J	96
Benzothiazole, 2,2′-dithiobis-	25	2.3		297
	50	2.1		297
		2.3		297
	75	2.4		297
	99	2.73		96
–, 2,2′-thiobis-	50	<0.005		297
2-Benzothiazolethiol	50	0.03		297
	99	0.26		96
Benzo[B]thiophene, 4,5,6,7-tetrahydro-4(2-thienyl)-	60	0.011		419
Benzoyl disulfide	50	<0.005		89
	60	0.010		545
		0.0107		304
		36.0		369
	99	0.11		96
Benzyl alcohol, *o,o*′-dithiobis-	50	0.58		89
–, *p,p*′-dithiobis-	50	0.09		297
Benzyl diselenide	60	2.0	A	128
Benzyl disulfide	50	0.02		89
		0.03		297
	60	0.00878		368
		0.01	A	128
	99	0.011		96
Benzyl sulfide	25	0.548	D	368
	50	0.069		252
	60	0.00335		368
Benzyl sulfone	50	0.052		252
Benzyl sulfoxide	50	0.051		252
1-Butanethiol	25	5.4	D, Q1	340
		13.2	D	340
	60	21.0	A	395
		22.0	A	69,397
		25		131
	70	15.0	A	395
	80	17.0	A	395
	99	15.4		96

TABLE 5. *cont'd*

Modifier	*T* (°C)	C_X	Remarks	Refs.
Styrene (*cont'd*)				
1-Butanethiol, 1,1,3,3-tetramethyl-	5	5.5	H	242
		6.4	H	222
	50	4.3	H	242
1-Butanethiol-D	60	5.2	A	395
	70	4.0	A	395
	80	7.0	A	395
Butyl disulfide	25	0.00079		448
	55	0.00154		448
	60	0.0024		304
	99	0.0068		96
	150	0.022	A	359
sec-Butyl disulfide	50	<0.005		89
tert-Butyl disulfide	50	<0.005		89
	60	0.00014		304
Butyl sulfide	60	0.0022		304
tert-Butyl sulfide	60	0.025		304
Carbanilic acid, *p,p'*-dithiodi-diethyl ester	50	0.24		89
Carbon disulfide	60	0.00066	A	288
Carbonic acid, dithio-				
–, –, *S,S'*-bis(carboxymethyl)ester	50	0.36		297
–, trithio-				
–, –, *S,S'*-bis(carboxymethyl) ester	50	0.21		297
1-Decanethiol	80	4.3	C3, H	574
	80	4.2	C3, H	574
2,13-Dioxa-7,8-dithia-3,12-disilatetradecane, 3,3,12,12-tetramethoxy-	79.5	0.0118		474
Diphenyldisulfide	60	0.147		546
Disulfide, bis(*p*-bromobenzoyl)	60	745		369
–, bis(α-bromo-*o*-tolyl)	50	1.0		297
–, bis(*p*-chlorobenzoyl)	60	196		369
–, bis(chlorobenzyl)	50	<0.005		297
–, bis(2-chloroethyl)	50	0.01		297
–, bis(α-chloro-*o*-tolyl)	50	1.3		297
–, bis(*p*-cyanobenzoyl)	60	3190		369
–, bis(diethylthiocarbamoyl)	60	0.724		286
–, bis(dimethylthiocarbamoyl)	60	1.11		286
	70	0.0136		104
	80	0.568	J	40
		0.620		481
	95	0.780		481
		0.860	J	40
	115	0.939	J	40
		1.035		481
	130	0.984	J	40
		1.150		481
–, bis(2-ethylhexyl)	50	<0.005		297
–, bis(*N*-ethyl-*N*-phenylthio-carbamoyl)	60	1.75		286
–, bis(1-methylheptyl)	99	0.0104		96
–, bis(morpholinothiocarbonyl)	60	6.1		286
–, bis(1-naphthylmethyl)	99	0.033		96
–, bis(*p*-nitrobenzoyl	60	6650		369
–, bis(*o*-nitrophenyl)	50	–		89
–, bis(1-phenylethyl)	50	<0.005		89
–, bis(β-(2-pyridyl)ethyl)	50	0.03		297
–, bis(2,3,5,6-tetramethylphenyl)	50	0.73		297
–, bis(2,4,6-triisopropylphenyl)	50	0.12		89
1-Dodecanethiol	60	14.8	A	69,126
		19.0		59
	70	19		562
	70	0.69	C3, H	574
	90	1.3	C3, H	574
	100	13.0		156
	110	26.0		156

TABLE 5. *cont'd*

Modifier	*T* (°C)	C_X	Remarks	Refs.
Styrene (*cont'd*)				
tert-Dodecanethiol	70	1.5	C3, H	574
	90	1.5	C3, H	574
	90	1.6	C3, H	574
Ethanethiol	50	17.1		331
Ethanol, 2,2′-dithiodi-	50	<0.005		297
–, –, di(chloroacetate)	50	<0.005		297
Ether, ethyl 3-mercaptopropyl	60	14.1	A	126
		21.0		69
	100	13.7		69
Ethyl disulfide	99	0.0045		96
Formamidine, *N,N*′-diphenyl-, 1,1′-dithiobis-	50	6.72	C, F2	251
Formic acid, thio-, dithiobis, *O,O*′–diisopropyl ester	50	5.3		297
	99	7.5		96
1-Heptanethiol	99	15.1		96
1-Hexanethiol	99	15.3		96
–, 1,1,3,3,5,5-hexamethyl-	25	3.2		297
	50	2.9		297
	75	2.4		297
Hexyl disulfide	99	0.0104		96
Hydrogen sulfide	70	5.0		145
Isobutyl disulfide	60	0.0020		304
Isopropyl disulfide	60	0.00066		304
Lauryl disulfide	60	0.00023	A	128
Lepidine, 2,2-dithiodi-	50	0.04		89
Mesityl disulfide	50	0.69		89
Methyl disulfide	60	0.0094		304
Methyl sulfoxide	40	0.0000693	E	458
	50	0.548		375
	60	0.0000242		429
		0.000048	A	438
Morpholine, 4,4′-dithiodi-	50	<0.005		297
1-Naphthalenemethanethiol	25	12.7		297
	50	18.3		297
	75	15.7		297
	99	24.6		96
1-Naphthalenethiol	99	0.15		96
2-Naphthalenethiol	99	0.18		96
1-Naphthoyl disulfide	50	0.34		89
1-Naphthyl disulfide	99	1.57		96
2-Naphthyl disulfide	25	0.17		297
	50	0.19		297
	75	0.29		297
	99	0.36		96
1-Octadecanethiol	99	14.7		96
Octadecyl disulfide	99	0.024		96
1-Octanethiol	5	19.3	H	339
		23.0	H	242
	50	19.0	H	242
–, 1,1,3,3,5,5,7,7-octamethyl-	50	4.7	H	242
2-Octanethiol	99	3.2		96
1,4,5-Oxadithiepane	150	0.057	A	359
1-Pentanethiol	50	20.0	H	344
Phenetole, 2,2′-dithiodi-	99	0.075		96
–, 4,4′-dithiodi-	99	0.33		96
Phenyl disulfide	50	0.06		297
		0.102	A	491
	60	0.0103		368
		0.111	A	491
		0.147		285
Phenyl disulfone	50	0.022	A	491
	60	0.025	A	491
Phenyl sulfide	25	0.0325	D	368
	50	0.056		252
	60	0.00548		368

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TABLE 5. *cont'd*

Modifier	*T* (°C)	C_X	Remarks	Refs.
Styrene (*cont'd*)				
Phenyl sulfone	50	0.021		252
Phenyl sulfoxide	50	0.024		252
1-Propanethiol, 3-(trimethoxysilyl)-	79.5	5.90		474
2-Propanethiol, 2-methyl-	50	4.0	H	344
	60	3.1	A	261
		3.7	A	69,126
	60	4.6		59
	100	1.8	A	261
		2.3	A	69,126
Propionic acid, 3,3-dithiodi-				
–, –, dipropyl ester	50	<0.005		297
–, 2-mercapto-	–	7.7		178
–, 3-mercapto-	–	9.4		178
	50	6.0		297
Propyl disulfide	60	0.00234		304
Pyridine, 2,2′-dithiodi-	50	0.01		89
Quinoline, 2,2′-dithiodi-	50	0.05		89
Sulfide, ethyl 2,4-diphenylbutyl	50	30.0		331
–, ethyl phenethyl	50	7.15		331
1-Tetradecanethiol	50	19.0	H	242
Thiosulfuric acid, *S*-butyl ester				
–, –, sodium salt	60	0.173		490
–, *S*-isopropyl ester, sodium salt	60	0.407		490
–, *S*-phenyl ester				
–, – potassium salt	60	0.763		490
–, *S*-propyl ester, sodium salt	60	0.150		490
p-Toluenethiol	99	0.07		96
α-Toluenethiol	99	25.5		96
–, *p*-methoxy-	99	26.0		96
p-Toluoyl disulfide	60	46.3		369
o-Tolyl disulfide	25	0.22		297
	50	0.23		297
		0.28		297
	75	0.32		297
p-Tolyl disulfide	50	0.11		297
	99	0.15		96
2,6-Xylyl disulfide	50	0.69		297
Vinyl acetate				
Acetic acid, dithiodi-				
–, –, diethyl ester	60	1.41		86
		1.5		351
Acetic acid, ithio-				
–, –, *S*-(2-hydroxyethyl)ester, acetate	60	0.0132	J	140
Acetyl disulfide	60	0.29	J	86
1-Butanethiol	60	48.0		140,397
Butyl disulfide	60	1.0	J	86, 351
Butyl sulfide	60	0.026	J	351
1,4,5-Oxadithiepane	60	0.25–2.5		351
Sulfur	45	470.0	J	28
α-Toluenethiol	70	0.885	C	390
Thiol acetate	60	0.186	F20	575

C. REMARKS

A. Thermal initiation
B. Hydroperoxide initiation
C. Peroxide initiation
  C1. Ammonium persulfate
  C2. Potassium persulfate
  C3. Sodium persulfate
D. Photoinitiation
E. γ-Ray initiation
F. Solution polymerization in:
  F1. Acetonitrile
  F2. Benzene
  F3. Butyl acetate
  F4. Butyl chloride
  F5. Chlorobenzene

TABLE 5. *cont'd*

Modifier	T (°C)	C_X	Remarks	Refs.
Styrene (*cont'd*)				
Phenyl sulfone	50	0.021		252
Phenyl sulfoxide	50	0.024		252
1-Propanethiol, 3-(trimethoxysilyl)-	79.5	5.90		474
2-Propanethiol, 2-methyl-	50	4.0	H	344
	60	3.1	A	261
		3.7	A	69,126
	60	4.6		59
	100	1.8	A	261
		2.3	A	69,126
Propionic acid, 3,3-dithiodi-				
–, –, dipropyl ester	50	<0.005		297
–, 2-mercapto-	–	7.7		178
–, 3-mercapto-	–	9.4		178
	50	6.0		297
Propyl disulfide	60	0.00234		304
Pyridine, 2,2′-dithiodi-	50	0.01		89
Quinoline, 2,2′-dithiodi-	50	0.05		89
Sulfide, ethyl 2,4-diphenylbutyl	50	30.0		331
–, ethyl phenethyl	50	7.15		331
1-Tetradecanethiol	50	19.0	H	242
Thiosulfuric acid, *S*-butyl ester				
–, –, sodium salt	60	0.173		490
–, *S*-isopropyl ester, sodium salt	60	0.407		490
–, *S*-phenyl ester				
–, – potassium salt	60	0.763		490
–, *S*-propyl ester, sodium salt	60	0.150		490
p-Toluenethiol	99	0.07		96
α-Toluenethiol	99	25.5		96
–, *p*-methoxy-	99	26.0		96
p-Toluoyl disulfide	60	46.3		369
o-Tolyl disulfide	25	0.22		297
	50	0.23		297
		0.28		297
	75	0.32		297
p-Tolyl disulfide	50	0.11		297
	99	0.15		96
2,6-Xylyl disulfide	50	0.69		297
Vinyl acetate				
Acetic acid, dithiodi-				
–, –, diethyl ester	60	1.41		86
		1.5		351
Acetic acid, ithio-				
–, –, *S*-(2-hydroxyethyl)ester, acetate	60	0.0132	J	140
Acetyl disulfide	60	0.29	J	86
1-Butanethiol	60	48.0		140,397
Butyl disulfide	60	1.0	J	86, 351
Butyl sulfide	60	0.026	J	351
1,4,5-Oxadithiepane	60	0.25–2.5		351
Sulfur	45	470.0	J	28
α-Toluenethiol	70	0.885	C	390
Thiol acetate	60	0.186	F20	575

C. REMARKS

A. Thermal initiation
B. Hydroperoxide initiation
C. Peroxide initiation
  C1. Ammonium persulfate
  C2. Potassium persulfate
  C3. Sodium persulfate
D. Photoinitiation
E. γ-Ray initiation
F. Solution polymerization in:
  F1. Acetonitrile
  F2. Benzene
  F3. Butyl acetate
  F4. Butyl chloride
  F5. Chlorobenzene

F6. *o*-Dichlorobenzene
F7. Dimethylformamide
F8. Dimethyl sulfoxide
F9. *p*-Dioxane
F10. Ethyl acetate
F11. Ethyl methyl ketone
F12. Heptane
F13. Water
F14. Magnesium perchlorate
F15. Succinonitrile
F16. Sulfur dioxide
F17. Toluene
F18. Zinc chloride
F19. Octane
F20. Methanol
F21. Propane
F22. Diethyl oxalate
F23. Cyclohexane
F24. Butyl alcohol
F25. Acetic acid
F26. 1,2-Dichloroethane
F27. Ethylbenzene
F28. Cylohexanone
F29. Parabutyr aldehyde
F30. Water–methanol mixture
F31. *tert*-Butyl alcohol
F32. Hexane
F33. 1-Propanol
F34. Carbon tetrachloride

G. Heterogeneous polymerization
H. Emulsion polymerization
I. Recalculated from data of:
I1. Basu, Sen, and Palit (1950)
I2. Baysal and Tobolsky (1952)
I3. Chadha and Misra (1958)
I4. Dixon-Lewis (1949)
I5. Gregg and Mayo (1953)
I6. Ham (1956)
I7. Kwart, Broadbent, and Bartlett (1950)
I8. Matsumoto, et. al. (1959)
I9. Palit and Das (1954)
I10. Palit, Nandi, and Saha (1954)
I11. Saha, Nandi, and Palit (1956)
I12. Stein and Schulz (1960)
I13. Wheeler, Lavin, and Crozier (1952)
J. Apparent transfer constant; retardation occurred
K. Average value
L. Estimated from model compounds
M. For end groups:
M1. Tribromomethyl
M2. Butylamino
M3. Diethylamino
M4. Hydroxymethyl
M5. Aldehyde
M6. Thioglycolate
M7. $-CH(OH)CH_2$-SH
M8. Dodecyl
M9. 2-Hydroxyethyl
M10. $-(CH_2)_{11}SH$
N. For middle groups
O. For side chain
P. For main chain
Q. Telomerization (number of monomer units in transferring chain)
R. Calculated from viscosity average molecular weight
S. Value uncertain
T. In presence of 0.4 mol/l lithium nitrate
U. In presence of ( ) mol/l sodium chloride
V. In presence of ( ) mol/l sodium bromide
W. Under pressure of:
W1. 200 psi (13.8 bar)
W2. 250 psi (17.2 bar)
W3. 1470 psi (101.4 bar)
W4. 5000 psi (344.8 bar)
W5. 20000 psi (1379.0 bar)
W6. 26600 psi (1834.1 bar)
W7. 28400 psi (1958.2 bar)
W8. 56000 psi (3861.2 bar)
W9. 64600 psi (4454.2 bar)
W10. 168000 psi (11583.6 bar)
W11. 600 psi (41.4 bar)
W12. 2500 psi (172.4 bar)
W13. 18 psi (1.2 bar)
W14. 735 psi (50.7 bar)
W15. 14200 psi (979.1 bar)
W16. 42600 psi (2937.3 bar)
W17. 34500 psi (2378.8 bar)
W18. 3000 bar
W19. 2700 bar
W20. 2400 bar
W21. 2000 bar
W22. 1800 bar
W23. 150 bar
W24. 600 bar
X. Corrected for loss of low molecular weight polymer
Y. $CM = 125 \times \exp(-7300/RT)$
Z. $CM = 3.0 \times \exp(-5673/RT)$
AA. $CM = 0.4 \times \exp(-6219/RT)$
BB. $CM = 0.2 \times \exp(-5400/RT)$
CC. $CM = 6.4 \times \exp(-4120/RT)$
DD. $CM = 4.77 \times \exp(-3540/RT)$
EE. Radical is styrene
FF. Radical is *p*-chlorostyrene
GG. 1/C varies with polym. rate and emulsifier of:
GG1. K caprate
GG2. K laurate
GG3. K myristate
GG4. K palmitate
GG5. K rosinate
HH. C is combined constant for copolymerization, $= (C_{S1} \times R_1 \times M_1 + C_{S2} \times R_2 \times M_2)/(R_1 \times M_1 \times M_1 + 2 \times M_1 \times M_2 + R_2 \times M_2 \times M_2)$
II. In presence of $FeBr_2$

III. In presence of FE(CO)$_5$
II2. In presence of methacrylic acid methyl ester
JJ0. Catalyzed by Co(II)-tetramethylhematoporphyrine
JJ1. Catalyzed by Co(II)-hematoporphyrine-tetramethyl ether
JJ2. Catalyzed by Co(II)-tetra-4-*tert*-butylbenzoporphyrine
JJ3. In presence of $ZnCl_2$; $[ZnCl_2]/[MMA] =$
(a) 0
(b) 0.1
(c) 0.23
(d) 0.40
KK. Copolymerization of acrylonitrile and butyl acrylate
LL. Controlled to pH 3–4 with acetic acid

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Photopolymerization Reactions

J. P. Fouassier
Laboratoire de Photochimie Générale, Mulhouse, Cedex, France

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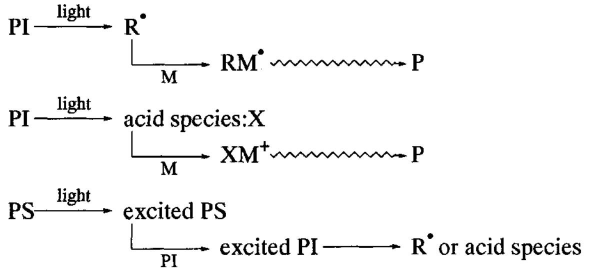
A. INTRODUCTION

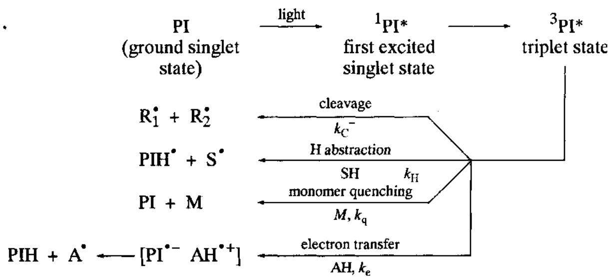
UV curing technologies use light beams to start photochemical and chemical reactions in organic materials (monomers, oligomers, prepolymers, polymers), mostly through a Photo-Induced Polymerization (PIP) reaction. This leads to the formation of a new polymeric material whose applications lie in various industrial sectors, such as coatings, graphic arts, imaging, microelectronics, etc. Specific advantages of these technologies over the usual thermal operations are rapid through-cure, solvent-free formulation, room temperature treatment and low energy requirements.

This PIP process is concerned with the creation of a polymer P through a chain radical or cationic reaction initiated by light in the presence of a photoinitiator (PI) and a coupled PI/photosensitizer (PS):



The reactivities of PI and PS govern, for a large part, the practical efficiency of the PIP reaction. The present chapter reports typical data obtained (through time-resolved laser spectroscopy experiments) on the excited state processes in PI and PS occurring after the absorption of the photon. Rate constants reported in the following tables correspond to the following processes:

1.



2. $R^{\bullet}$ (or $A^{\bullet}$ or $S^{\bullet}$...) + M $\xrightarrow{k_{RM}}$ $RM^{\bullet}$
3. $^3PI^*$ + light stabilizer (LS) $\xrightarrow{k_a}$
4. $^3PS^*$ + PI $\xrightarrow{k_T}$ excitation transfer
5. τ_T°: Triplet state lifetime under the given conditions (equal to the reciprocal value of the sum of the first-order rate constants of the different processes)
   τ_T: Triplet state lifetime in the presence of a given additive
6. $^3PS^*$ + cationic photoinitiator C^+ $\xrightarrow{k_e}$ $PS^{\bullet +}$ $C^{\bullet}$
   (a) Energy transfer can sometimes occur:
   $^3PS^* + C^+ \longrightarrow PS + C^{+*}$
   (b) Energy and electron transfer can also occur in the first excited singlet state $^1PS^*$.

Detailed data are available, especially in several chapters of two edited books (1) and in a recent monograph (2). Few data are known on the photopolymerization itself and largely depend on the practical formulation used as well as the experimental conditions. Typically, one photon absorbed can lead to ~10000 polymerized double bonds (3). Rate constants of propagation k_p and termination k_t for a polyurethane acrylate resin containing an acrylate monomer (weight ratio, 1 : 1) as reactive diluent are $\sim 10^4$ l/mol/s and 3×10^4 l/mol/s respectively (when half of the double bonds have been polymerized) (3).

B. TABLES

TABLE 1. RATE CONSTANTS OF CLEAVAGE, ELECTRON TRANSFER AND MONOMER QUENCHING IN RADICAL PHOTOINITIATORS[a]

Compound	$10^{-8}k_c$ (s^{-1})	$10^{-9}k_e$ (l/mol/s)	$10^{-6}k_q$ (l/mol/s)	Monomers[b]/amines[c]/ solvents[d]	Refs.
I1a		1.3	66	M_1, AH_1, S_1	4
I1b		2.0	150		
I1c		1.2	2.5		
I1d		1.2	2		
I1e		0.2	1		
I1f		0.07	13		
I1g		1.5	180		
I1h		0.6	8		
I1i		0.27	0.05		
I1a			3200	M_2, S_2	21
			360	M_5, S_2	21
			5.4	M_3, S_2	21
			34	M_4, S_2	21
I1a		0.003[e]			22
		0.001[f]			
I1a		7		S_2, AH_3	26
		2		S_2, AH_4	
		1.9		S_2, AH_2	
		2		S_2, AH_5	
		0.56		S_2, AH_6	
I1j	10			S_3	23
I1k		0.5	1500	M_7, AH_2, S_4	25
I1l		0.9	1550		
I1m		0.0064[e]		S_2	26
I1n		0.0025[e]			
I1p		0.0056[e]			
I1q		0.0043[e]			
I1r			56	S_6, M_1	26
I1s			110		
I1r			5500	S_6, M_2	26
I1s			7400		
I1r			5100	S_6, M_5	26
I1s			6500		
I1r			49	S_6, M_3	26
I1s			140		
I1r			9.4	S_6, M_4	26
I1s			50		
I2a	7.14		250	M_1, AH_1, S_1	5
I2b	0.87	0.26	20		
I2c	0.003	<0.001	4.5		
I2d	0.00025	0.08	8		
I2e	0.83	0.20	22		
I2f	0.003	0.08	10		
I2g	0.67	0.17	29		
I2h	1.18	0.15	20		
I2i	0.80	0.05	21		

TABLE 1. *cont'd*

Compound	$10^{-8}k_c$ (s^{-1})	$10^{-9}k_e$ (l/mol/s)	$10^{-6}k_q$ (l/mol/s)	Monomers[b]/amines[c]/ solvents[d]	Refs.
I3a	10		≥ 200	M_1, AH_1, S_1	6
I3b	1		2		
I3c	25				
I3d	0.005	$<10^{-4}$			
I3e	10				
I3f	0.006	$\approx 10^{-4}$			
I3g	0.007	$<10^{-4}$			
I3h	0.13	$<10^{-4}$			
I4a	≥ 100			S_1	7
I4b	≥ 100				
I4c	≥ 100				
I4d	≥ 100				
I4e			8100	M_2, S_2	7
I4f			4800		
I4g			6500		
I4h			1500		
I4i			190		
I4e			480	M_1, S_2	7
I4f			800		
I4g			1000		
I4h			200		
I4i			13		
I4f			60	M_3, S_2	7
I4g			17		
I4h			< 1		
I4i			5.7		
I4f			1300	M_4, S_2	7
I4g			700		
I4h			380		
I4i			180		
I5a	≥ 10				8
I6a	7×10^{-3}		0.7	M_1, S_1	9
I7a		0.7	0.05	M_1, AH_1, S_1	9
I7b		6×10^{-5}	440		
I8a		0.85	0.35	M_1, AH_1, S_1	9
I9a		2.5	11	M_1, AH_1, S_1	9
I10a	≥ 10				10
I11a	0.8			M_1, AH_1, S_1	10
I11b	≥ 1				
I11c	0.12	0.9	700		
I11d	0.01	0.4	1200		
I12a			480	M_1, S_2	11
I12b			800		
I12c			1000		
I12d			200		
I12e			13		
I12a			8100	M_2, S_2	11
I12b			4800		
I12c			6500		
I12d			1500		
I12e			190		
I12b			6	M_3, S_2	11
I12c			17		
I12d			<10		
I12e			5.7		
I12b			1300	M_4, S_2	11
I12c			700		
I12d			380		
I12e			180		
I13a	1.4	1.6		AH_2, S_2	12
I14a			11000	M_1, AH_1, S_1	13
I14b		6.5	2900		
I14c		6.0	15		
I14d		3.5	1200		
I15a	>5			S_2	14
I15b	4				
I15c	>5				

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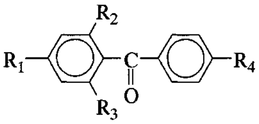
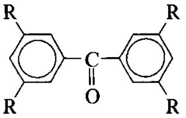
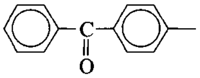
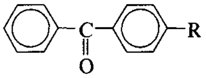
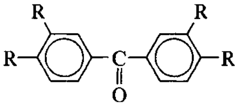
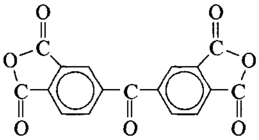
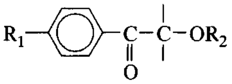
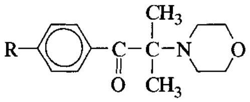
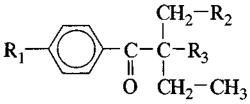
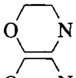
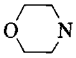
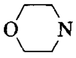
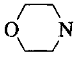
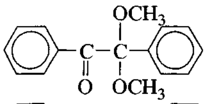
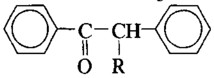
TABLE 1. *cont'd*

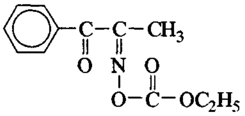
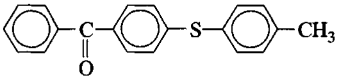
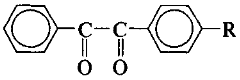
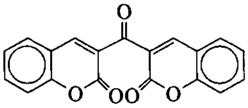
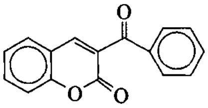
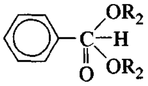
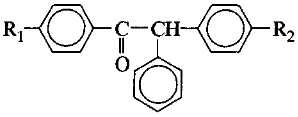
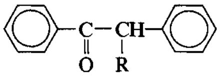
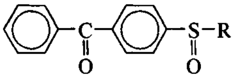
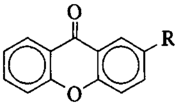
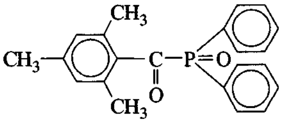
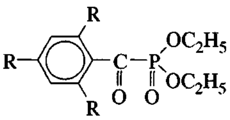
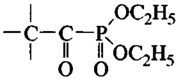
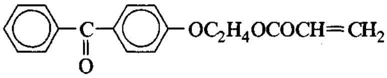
Compound	$10^{-8}k_c$ (s^{-1})	$10^{-9}k_e$ (l/mol/s)	$10^{-6}k_q$ (l/mol/s)	Monomers[b]/amines[c]/ solvents[d]	Refs.
I15d	3.3				
I16a		1.5	180	AH_1, S_1	15
I16b	>3				
I17a	0.05		300	S_1	16
I18a	0.16			S_1	17
I19a	0.3	0.7	100	S_1	18
I20a	29			S_2	18
I21a	60			S_2	18
I22a	~10			S_3	19
I22b	~5		93		
I22c	0.02		2.3		
I22d	0.014		2.0		
I23a		6	15	M_1, AH_3, S_2	20
I23b		5	2		
I23c		4	3		
I23d		4	3		
I23e		0.01		AH_2, S_5	24
I23f		0.017			
I23a		2.5	3000	M_2, S_2, AH_2	20
I23b			6000		
I23c			6000		
I23d			6000		
I23a			0.2	M_3, S_2	20
I23b			0.02		
I23c			0.03		
I23d			0.04		
I23a			4	M_4, S_2	20
I23b			0.4		
I23c			1		
I23d			1		
I23a			40	M_5, S_2	20
I23b			30		
I23c			5		
I23d			6		
I23a			1	M_6, S_2	20
I23b			1		
I23c			0.3		
I23d			0.3		
I23a		8		S_2, AH_4	26
I23b		6			
I23c		6			
I23d		6			
I23a			26	S_1, M_8	13
I23a			23	S_1, M_9	13
I23b		8		S_2, AH_7	26
I23b		0.85		S_2, AH_8	26
I23g		$<10^{-5}$	65	M_7, S_4	25
I23h		$<10^{-5}$	37		
I24			0.016	S_2, M_1	37
I25			0.006	S_2, M_{10}	37
I26			0.007	S_2, M_{10}	37
I27		4.4[f]		S_2	39
I28		0.3			
I29		0.015		S_7, AH_9	41

[a]Compound chemistries given in Annex to Table 1.
[b]*Monomers:* M_1 – methyl methacrylate; M_2 – styrene; M_3 – vinyl acetate; M_4 – acrylonitrile; M_5 – vinyl pyrrolidone; M_6 – butylvinylether; M_7 – acrylamide; M_8 – PETA; M_9 – TMPTA; M_{10} – butylmethacrylate.
[c]*Amines:* AH_1 – methyl diethanolamine; AH_2 – triethylamine; AH_3 – ethyl-4-(dimethylamino)-benzoate; AH_4 – bis-(2-hydroxy ethyl)-methylamine; AH_5 – methyl-4-amino benzoate; AH_6 – 1,4-diazabicyclo [2.2.2] octane (DABCO); AH_7 – dimethylamine; AH_8 – 2-(dimethyl aminoethyl)-benzoate; AH_9 – diethylaniline.
[d]*Solvents:* S_1 – toluene; S_2 – benzene; S_3 – acetonitrile; S_4 – water; S_5 – 2-propanol; S_6 – acetone; S_7 – ethanol.
[e]Rate constant of H abstraction by THF.
[f]Rate constant of H abstraction by isopropanol.

ANNEX TO TABLE 1. PHOTOINITIATOR COMPOUND CHEMISTRIES

	Compound	R	R_1	R_2	R_3	R_4
	I1a		H	H	H	H
	I1b		H	H	H	OCH_3
	I1c		H	H	H	SCH_3
	I1d		H	H	H	S–ϕ
	I1e		H	H	H	$N(CH_3)_2$
	I1f		$N(CH_3)_2$	H	H	$N(CH_3)_2$
	I1g		O–ϕ	H	H	O–ϕ
	I1h		CH_3	CH_3	CH_3	H
	I1i		H	H	H	ϕ
	I1j	COOOR				
	I1k	$-CH_2N(CH_3)_3^+Cl^-$				
	I1l	$-CH_2SO_3^-Na^+$				
	I1m	Cl				
	I1n	OCH_3				
	I1p	F				
	I1q	COOH				
	I1r	$COOCH_3$				
	I1s					
	I2a		H	H		
	I2b		OCH_3	H		
	I2c		$N(CH_3)_2$	H		
	I2d		SCH_3	H		
	I2e		$O(CH_2)_2OH$	H		
	I2f		$S(CH_2)_2OH$	H		
	I2g		$O(CH_2)_2Si(C_2H_5O)_3$	H		
	I2h		$O(CH_2)_2OCOCH{=}CH_2$	H		
	I2i		$O(CH_2)_2OCOCH{=}CH_2$	$COCH{=}CH_2$		
	I3a	H				
	I3b	SCH_3				
	I3c	OCH_3				
	I3d	$N(CH_3)_2$				
	I3e		H	C_6H_5	$N(CH_3)_2$	
	I3f			C_6H_5	$N(CH_3)_2$	
	I3g			$CH{=}CH_2$	$N(CH_3)_2$	
	I3h			$CH{=}CH_2$		
	I4a					
	I4b	OCH_3				
	I4c	OC_4H_9				
	I4d	$OCH(CH_3)_2$				
	I4e	OH				
	I4f	$OCOCH_3$				
	I4g	H				
	I4h	CH_3				
	I4i					

ANNEX TO TABLE 1. *cont'd*

	Compound	R	R_1	R_2	R_3	R_4
	I5a					
	I6a					
	I7a	H				
	I7b	$CH_2SO_3^-Na^+$				
Fluorenone	I8a					
	I9a					
	I9b					
	I10a			C_2H_5		
	I11a		H	H		
	I11b		H	CH_3		
	I11c		CH_3	H		
	I11d		CH_3O	H		
	I12a	OH				
	I12b	$OCOCH_3$				
	I12c	H				
	I12d	CH_3				
	I12e					
	I13a	CH_3				
	I14a	H				
	I14b	i-C_3H_7				
	I14c	OC_2H_5				
	I14d	t-C_4H_9				
	I15a					
	I15b	H				
	I15c	CH_3				
	I15d					
	I16a					

ANNEX TO TABLE 1. *cont'd*

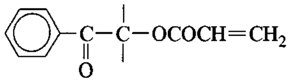
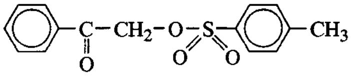
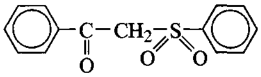
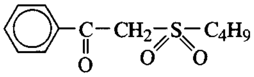
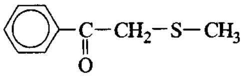
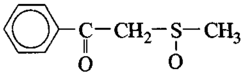
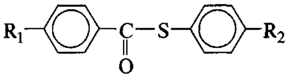
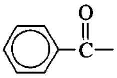
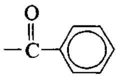
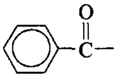
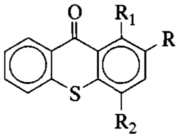
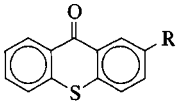
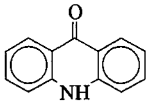
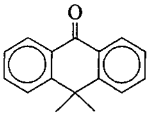
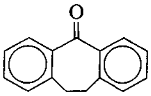
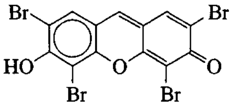
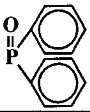
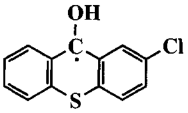
	Compound	R	R_1	R_2	R_3	R_4
	I16b					
	I17a					
	I18a					
	I19a					
	I20a					
	I21a					
	I22a		H	C_8H_{17}		
	I22b		NO_2	H		
	I22c					
	I22d			$C_{12}H_{25}$		
	I23a	H	H	H		
	I23b	Cl	H	H		
	I23c	CH_3	H	H		
	I23d	$CH_3(CH_3)_2$	H	H		
	I23e	H	Br	OC_3H_7		
	I23f	H	Cl	OC_3H_7		
	I23g	$-OCH_2COOH$				
	I23h	$OCH_2CH_2CH_2\overset{+}{N}(CH_3)_3SO_3Me^-$				
	I24					
Acridine	I25					
Phenazine	I26					
	I27					
	I28					
	I29					

TABLE 2. BIMOLECULAR RATE CONSTANTS[a] FOR THE REACTION OF PHOSPHONYL RADICALS WITH VARIOUS MONOMERS IN CYCLOHEXANE AT ROOM TEMPERATURE[b]

	Radical				
Monomer			$(O=)\dot{P}(CH_3)(OCH_3)$	$(O=)\dot{P}(OCH_3)_2$	$(O=)\dot{P}(OC_2H_5)_2$
Methacrylonitrile	5.0	4.6	4.5	9.2	11
Styrene	6.0	4.5	8.0	22	25
Methylmethacrylate	8.0	5.0	5.8	5.8	5.3
Acrylonitrile	2.0	2.0	0.18	0.58	0.26
Methyl acrylate	3.5	2.1	1.3	1.7	1.6
n-Butyl vinyl ether	0.4	0.3	0.23	2.1	1.4
Vinyl acetate	0.16	0.13	0.082	0.29	0.18

[a]k_{RM} in 10^7 l/mol/s.
[b]Ref. 26.

TABLE 3. BIMOLECULAR RATE CONSTANTS[a] FOR THE REACTION OF VARIOUS RADICALS WITH VARIOUS OLEFINIC MONOMERS AT ROOM TEMPERATURE[b]

	Radical							
Monomer	$Ph-\dot{C}(OH)-Ph$	$H_3C-\dot{C}(OH)-CH_3$		$Ph-\dot{C}(=O)$	$Ph_2\dot{P}=O$	$Ph^\bullet$	$Ph\dot{S}O_2$	$Ph\dot{S}O_3$
Styrene		3.5×10^{-2}	7×10^{-4}	1.2×10^{-2}	6			
Methylmethacrylate	9×10^{-4}	5.4×10^{-2}	4×10^{-5}	0.9×10^{-2}	6	18[c]	10^{-3}†	10^{-1}†
Acrylonitrile	4×10^{-4}	1.6×10^{-2}		2×10^{-3}	2			
Methyl acrylate					2			
n-Butyl vinyl ether			$< 10^{-6}$		0.5			
Vinyl acetate	6×10^{-4}			2×10^{-2}	0.2			
N-Vinylpyrrolidone			4×10^{-5}					

[a]k_{RM} in 10^7 l/mol/s.
[b]Ref. 26.
[c]From Ref. 40.
†From Ref. 16.

TABLE 4. BIMOLECULAR RATE CONSTANTS[a] FOR THE REACTION OF $Ph_2\dot{P}=O$ AND $Ph_2\dot{P}=S$ WITH VARIOUS MONOMERS[b,c]

	Radical	
Monomer	$Ph_2\dot{P}=O$	$Ph_2\dot{P}=S$
Methacrylonitrile	1.9	0.9
Styrene	4.6	0.4
Methylmethacrylate	4.1	0.19
Acrylonitrile	1.3	0.52
Methyl acrylate	1.7	0.62
n-Butyl vinyl ether	5.0	0.15
Vinyl acetate	1.4	0.042

[a]k_{RM} in 10^7 l/mol/s
[b]Ref. 27.
[c]Experiments were carried out in CH_2Cl_2 solution at room temperature.

TABLE 5. ELECTRON TRANSFER REACTION OF RADICALS WITH DIPHENYLIODONIUM SALTS

Radicals	$10^{-9}k_e$ (l/mol/s)	Refs.
$Ph_2P\dot{O}$	$\leq 10^{-3}$	42
$Ph_2\dot{C}OH$	0.03	43
$(CH_3)_2\dot{C}OH$	0.06	

TABLE 6. ELECTRON TRANSFER RATE CONSTANTS (k_e) BETWEEN PHOTOSENSITIZERS AND CATIONIC PHOTOINITIATORS AND QUENCHING RATE CONSTANTS (k_q) FOR CYCLOHEXENE OXIDE IN METHANOL (M) AND ACETONITRILE (AN)

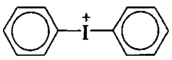
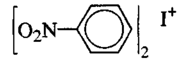
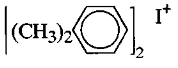
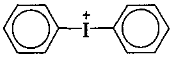
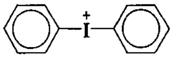
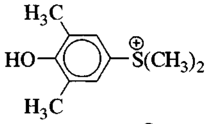
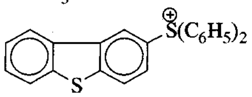
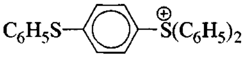
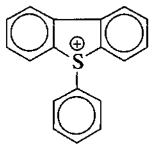
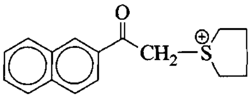
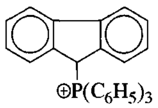
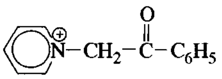
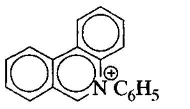
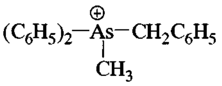
Photosensitizer	Cationic photoinitiator	Anion	Solvent	$10^{-7}k_e$ (l/mol/s)	$10^{-7}k_q$ (l/mol/s)	Refs.
Chlorothioxanthone		AsF_6^-	M	24	0.3	28
		Cl^-		24		
		PF_6^-		26		
		BF_4^-		24		
		AsF_6^-	AN	290		
Chlorothioxanthone		AsF_6^-	M	400		
				36		
Benzophenone		AsF_6^-	M	15	0.33	
		Cl^-		1		
		BF_4^-		47		
Ketocoumarin		BF_4^-	M	6.4	0.04	
Chlorothioxanthone	$(C_6H_5)_3S^+\ PF_6^-$		M	14		29
		PF_6^-		35		
		PF_6^-		28		
		SbF_6^-		4		
		AsF_6^-		8		
		BF_4^-		570		
		BF_4^-		110		
		PF_6^-		14		
		AsF_6^-		100		
		BF_4^-		38		
	$(C_6H_5)_3Se^+AsF_6^-$			15		

TABLE 6. *cont'd*

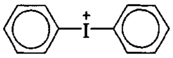
Photosensitizer	Cationic photoinitiator	Anion	Solvent	$10^{-7}k_e$ (l/mol/s)	$10^{-7}k_q$ (l/mol/s)	Refs.
Xanthone		Cl^-	M	140		30
Michler's ketone				0.7		
Thioxanthone				200		
10-Methylacridone				350		
Acridone				740		
Anthracene			M	1		31
Chlorothioxanthone	$(NO_2\varphi)_2I^+$	Cl^-		400		28
Pyrene				130		
Benzophenone				500		
Isopropylthioxanthone				250		

TABLE 7. EXCITATION TRANSFER RATE CONSTANTS (k_T) FOR THIOXANTHONES AND PHOTOINITIATORS[a]

Thioxanthone	Initiator	Solvent	$10^{-6}k_T$ (l/mol/s)
TXI	HMK	Toluene	100
		Methanol	290
	OMK	Toluene	75
		Methanol	380
	TPMK	Toluene	240
		Methanol	630
	NMK	Toluene	4700
		Methanol	7900
ETX	TPMK	Toluene	12
		Methanol	110
ITX	TPMK	Toluene	60
		Methanol	55

[a]Ref. 32.

ANNEX TO TABLE 7. COMPOUND CHEMISTRIES

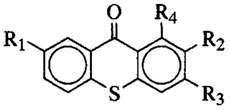
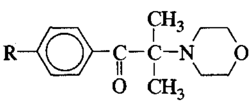
TX's	R	R_1	R_2	R_3	R_4	Abbrev.	Triplet state energy level (kcal/mol)
		H	Cl	H	H	CTX	62
		H	$CH(CH_3)_2$	H	H	ITX	61
		CH_3	H	COOET	H	ETX	58,5
		H	H	H	COOET	TXI	63
Mok's							
	H					HMK	65
	SCH_3					TPMK	61
	OCH_3					OMK	65
	$N(CH_3)_2$					NMK	63

TABLE 8. TRIPLET STATE LIFETIMES (τ_T) OF THE SENSITIZER (TXI) IN DIFFERENT MEDIA[a], AND RATE CONSTANT (k_T) OF THE INTERACTION BETWEEN TXI AND TPMK[b]

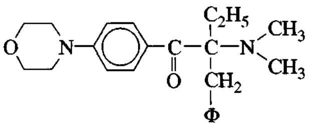
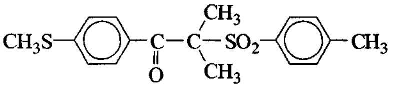
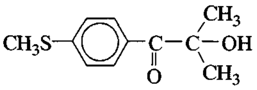
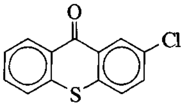
Medium	τ_T (ns)	η (cp at 28°C)	$10^{-6}k_T$ (l/mol/s)
TMPTA[c] (100%)	650	40	80
Acrylate (66/33)	2200	185	31
Toluene–Ep. acrylate (50/50)	1500	9.5	35
Toluene–TMPTA (25/75)	270	5.8	135
Toluene–TMPTA (50/50)	200	1.7	<40
Toluene–TMPTA (75/25)	280	0.9	150
HDDA[d] (100%)	650	5.2	95
HDDA–Ep. acrylate (50/50)	2500	58	22
Toluene–HDDA (50/50)	1000	1.2	140
Toluene–HDDA–Ep. acrylate (25/50/25)	850	5.8	68
Toluene–PETA[e] (50/50)	220	3.1	40
Toluene–PETA–Ep. acrylate (43/43/14)	360	6.9	69
Toluene	50	0.53	240
Methanol	140	0.52	630

[a]Viscosity: η.
[b]Ref. 33; for formula, see Annex to Table 7.
[c]Trimethylolpropane triacrylate.
[d]Hexanedioldiacrylate.
[e]Pentaerythritol triacrylate.

TABLE 9. SOME VALUES OF THE TRIPLET STATE ENERGY LEVELS OF PHOTOINITIATORS AND MONOMERS

Compound	Triplet state energy (ΔE) (kcal/mol)	
I1a	69	Cited in Ref. 13
I4a	73	
I7a	53	
I8a	53	
I9b	59	
M_2	61	
I14a	75	Cited in Ref. 38
I24	57	

TABLE 10. VALUES OF τ_T^0, τ_T, AND $k_a^{b\dagger}$ IN SOLUTION

Photoinitiators	τ_T^0 (ns)	τ_T (ns)	$10^{-6}k_a^b$ (l/mol/s)
	4200	4000	0.85
	3300	2000	14
	470	470	≤5
	4000	1750	24

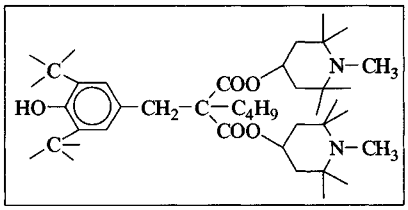
†Determined in bulk epoxyacrylate–HDDA (60:40 w/w); a in solution b in the presence of LS1 (2%).; Ref. 34.

TABLE 11. RATE CONSTANT OF INTERACTION OF KETONES AND LIGHT STABILIZERS IN SOLUTION

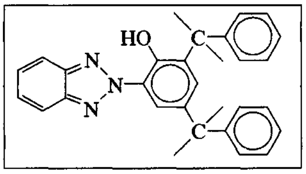
Photoinitiator	Light stabilizer	$10^{-6}k_a$ (l/mol/s)	Refs.
Benzophenone	LS1	6500	34
	LS2	8550	
	LS3	10300	
	LS4	15000	
	LS5	7050	
	SL6	5900	35
Acetone	LS1	500	36
	LS7	700	

ANNEX TO TABLE 11.

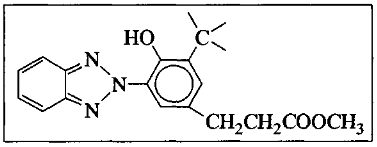
LS1:



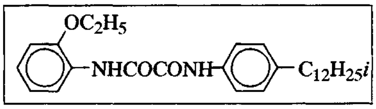
LS2:



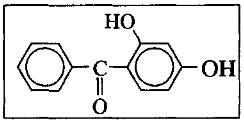
LS3:



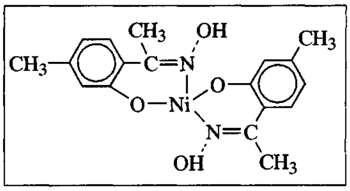
LS4:



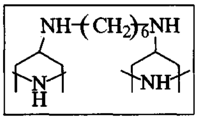
LS5:



LS6:



LS7:



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Free Radical Copolymerization Reactivity Ratios

Robert Z. Greenley*
Monsanto Co., 544 Oak Valley Drive, St. Louis, MO 63131, USA

A. Introduction II-181
B. Tables II-182
Table 1. Copolymer Reactivity Ratios II-182
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A. INTRODUCTION

When a vinyl monomer is copolymerized with a second monomer, the relationship between the composition of the initially formed copolymer and the initial monomer mixture is given by

$$\frac{dm_1}{dm_2} = \frac{M_1(r_1M_1 + M_2)}{M_2(r_2M_2 + M_1)}$$

where m_1 is the number of moles of monomer 1 entering the copolymer, m_2, the number of moles of monomer 2 entering the copolymer, M_1, the number of moles of monomer 1 in the monomeric mixture, M_2, the number of the moles of monomer 2 in the monomer mixture, and r_1 and r_2 are the monomer reactivity ratios.

The monomer reactivity ratios, r_1 and r_2, for any monomer pair are the ratios of the rate constants of the different propagation reactions:

$$\sim M_1^{\bullet} + M_1 \longrightarrow \sim M_1M_1^{\bullet} \quad k_{11}$$
$$\sim M_1^{\bullet} + M_2 \longrightarrow \sim M_1M_2^{\bullet} \quad k_{12}$$
$$\sim M_2^{\bullet} + M_2 \longrightarrow \sim M_2M_2^{\bullet} \quad k_{22}$$
$$\sim M_2^{\bullet} + M_1 \longrightarrow \sim M_2M_1^{\bullet} \quad k_{21}$$

with $r_1 = k_{11}/k_{12}$, $r_2 = k_{22}/k_{21}$. $\sim M^{\bullet}$ represents a polymer chain ending in a radical derived from monomer M.

The original compilations of reactivity ratios and their references were published by L. J. Young in the first two editions of this Handbook. In the third edition, the original listings and those through 1986 were re-evaluated. This fourth edition contains an additional 548 evaluated monomer pairs giving a total of 3,265 such pairs. Only free radical reactivity ratios are listed. When the original references were available, they were read. If the experimental data was published, the reactivity ratios were recalculated according to the methods of Kelen and Tűdös (803,804). The 95% confidence limits for the reactivity ratios were also calculated (805). If the authors used this method for *r*-value evaluation, including adjustment of the monomer feeds for total conversion, then the reported values were utilized. There are a number of reported reactivity ratios that are not reported here. This is due to the absence of these values in the abstracts of papers which were published in journals unavailable to the author.

All of the monomer pairs in Table 1 are cross-referenced. The full spelling of each monomer was included in its Monomer 1 citation. Sometimes truncated but distinguishable names have been used in the Monomer 2 lists.

If only the reactivity ratios and reference are given, then, either no experimental data was given or the journal was not available and the Chemical Abstracts summary was the source of the data. If a Y or N (yes or no) appears in the conversion (Conv.) column then the reactivity ratios were recalculated. If a recalculation was performed but the 95% confidence columns (95%) are still left blank, it indicates that only two feed/polymer data pairs were available. In general, if there is a citation (Y or N) in the Conv. column but no reactivity ratios are shown in the reactivity ratio columns, the copolymerization did not follow the copolymerization equation (ionic or penultimate effects were prevalent). In a few cases, the data were too scattered to allow a reactivity ratio calculation.

Recalculations yield negative reactivity ratios in several cases. We are aware that this is a physically unrealistic artifact. When the 95% confidence limits are applied to these negative numbers, a value of zero usually falls within these limits. It may be noted that a single reference sometimes contains a variety of reactivity ratios for one monomer pair. The reader may assume that these result from a change of polymerization conditions; e.g., different polymerization temperatures or polymerization media of varying polarity.

For those who are interested in using the Kelen–Tűdös calculations, a listing of a simplistic program written in QuickBasic (Microsoft) is also given (Table 2).

*Retired.

B. TABLES

TABLE 1. COPOLYMER REACTIVITY RATIOS

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acenaphthalene	Acrylate, (−)-menthyl					Y	645
Acenaphthalene	Acrylonitrile	2.56		0.02			575
Acenaphthalene	Carbazole, *N*-vinyl-	6.62	1.77	−0.03	0.12	N	331
Acenaphthalene	Fumarate, diisopropyl	2.57		0.06			1039
Acenaphthalene	Maleic anhydride	0.46		0.02			1039
Acenaphthalene	Maleic anhydride	0.46	0.13	−0.04	0.05	N	26
Acenaphthalene	Maleimide, *N*-cyclohexyl-	0.57		0.11			1039
Acenaphthalene	Methacrylate, (−)-menthyl	2.48	0.55	0.316	0.085	Y	645
Acenaphthalene	Methacrylate, methyl	1.05	0.14	0.36	0.04	N	326
Acenaphthalene	Methacrylate, methyl	0.99	0.15	0.38	0.04	N	326
Acenaphthalene	Methacrylate, methyl	2.25		0.44			575
Acenaphthalene	Methacrylonitrile	2.38		0.15			575
Acenaphthalene	Pyrrolidone, *N*-vinyl-					N	326
Acenaphthalene	Pyrrolidone, *N*-vinyl-					N	326
Acenaphthalene	Stilbene	5.65	0.23	−0.01	0.04	N	725
Acenaphthalene	Styrene	0.33		3.81			525
Acetamide, *N*-(4-methacryloyloxyphenyl)-2-(4-methoxy)	Methacrylate, 2-hydroxyethyl	1.49		0.61			1051
Acetamide, *N*-vinyl-	Acrylamide	0.3		1.4			984
Acetamide, *N*-vinyl-	Methacrylate, methyl	0.19		2.65			984
Acetamide, *N*-vinyl-	Methacrylate, methyl	0.71		1.18			984
Acetamide, *N*-vinyl-	Methacrylate, methyl	0.01		2.1			984
Acetamide, *N*-vinyl-	Vinyl acetate	5.5		0.6			984
Acetamide, *N*-vinyl-	Vinyl acetate	21		0			984
Acetanilide, 4-(2-methacryloyloxy)-ethyloxy)	Methacrylate, 2-hydroxyethyl	0.67		1.39			1096
Acetanilide, 4-(2-methacryloyloxy)-hexyloxy)	Methacrylate, 2-hydroxyethyl	0.87		1.19			1096
Acetanilide, 4-(methacryloyloxy)-	Methacrylate, 2-hydroxyethyl	1.94		0.78			1096
Acetate, 2-chloro-, vinyl	Vinyl acetate	1.18		0.8			892
Acetate, allyl	Vinyl acetate	0.43		1.8			1045
Acetate, chloro-, allyl	Vinyl acetate	0.69		0.77			1045
Acetate, dichloro-, allyl	Vinyl acetate	0.54		0.57			1045
Acetate, isopropenyl	Fumarate, diisopropyl	0.011		0.67			1038
Acetate, trichloro-, allyl	Vinyl acetate	0.28		0.41			1045
Acetylene, phenyl-	Acrylate, methyl	0.272	0.072	0.622	0.062	Y	60
Acetylene, phenyl-	Acrylate, methyl	0.093	0.01	0.664	0.045	Y	731
Acetylene, phenyl-	Acrylonitrile	0.325	0.083	0.266	0.044	Y	60
Acetylene, phenyl-	Isoprene	0.1		3.01			648
Acetylene, phenyl-	Maleic anhydride	0.08		0.06			797
Acetylene, phenyl-	Methacrylate, methyl	0.2		1.5			443
Acetylene, phenyl-	Methacrylate, butyl	0.21		1.7			565
Acetylene, phenyl-	Methacrylate, isobutyl	0.27		1.9			565
Acetylene, phenyl-	Methacrylate, methyl	1.69	26.56	−0.06	0.16	Y	357
Acetylene, phenyl-	Methacrylate, methyl	0.07	0.016	1.111	0.095	Y	732
Acetylene, phenyl-	Methacrylonitrile	0.04		0.78			648
Acetylene, phenyl-	Pyridine, 2-vinyl-					Y	192
Acetylene, phenyl-	Styrene	0.33	0.12	0.324	0.02	Y	357
Aconitate, trimethyl	Acrylonitrile	−0.48	0.11	4.24	0.92	Y	147
Aconitate, trimethyl	Butadiene	0	0.22	0.4	0.4	Y	147
Aconitate, trimethyl	Styrene	−0.013	0.009	1.026	0.091	Y	147
Aconitate, trimethyl	Vinyl chloride	0.19		0.04		Y	147
Aconitate, trimethyl	Vinylidene chloride	0.15	0.94	64.6	23.74	N	149
Acrolein	Acrylamide	1.95	0.58	0.8	0.23	N	207
Acrolein	Acrylamide	1.59	0.1	0.18	0.02	N	208
Acrolein	Acrylate, butyl	1.86	0.19	0.638	0.032	Y	291
Acrolein	Acrylate, butyl	2.29	0.58	1.12	0.41	N	292
Acrolein	Acrylate, ethyl	1.2		0.6			291
Acrolein	Acrylate, ethyl	1.98	0.44	1.09	0.25	N	292
Acrolein	Acrylate, methyl	−0.07	0.03	7.86	3.58	N	207
Acrolein	Acrylate, methyl	1.41	0.4	0.83	0.12	Y	291

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrolein	Acrylate, methyl	2.54	0.93	1.08	0.38	N	292
Acrolein	Acrylic acid	2.48	1.24	0.08	0.28	Y	57
Acrolein	Acrylic acid	0.5		1.15			57
Acrolein	Acrylonitrile	1.16	0.13	0.88	0.06	N	207
Acrolein	Acrylonitrile	1.07	0.08	0.71	0.03	N	207
Acrolein	Acrylonitrile	1.52	0.07	0.48	0.01	N	208
Acrolein	Acrylonitrile	1.28		0.6			504
Acrolein	Methacrylate, methyl	0.76	0.12	1.136	0.05	Y	291
Acrolein	Methacrylate, methyl	0.59	0.3	1.33	0.4	N	292
Acrolein	Methacrylonitrile	0.68	0.12	1.17	0.05	N	208
Acrolein	Methacrylonitrile	0.72		1.2			446
Acrolein	Pyridine, 2-vinyl-	2.64	0.14	−0.12	0.03	N	208
Acrolein	Styrene	0.216	0.036	0.257	0.017	Y	291
Acrolein	Styrene	0.02	0.01	0.22	0.02	N	292
Acrolein	Styrene	0.32	0.002	0.205	0.006	Y	307
Acrolein	Styrenesulfonate, *p*-, sodium	0.395	0.092	0.327	0.033	Y	57
Acrolein	Styrenesulfonate, *p*-, sodium	0.26	0.16	0.047	0.071	Y	57
Acrolein	Styrenesulfonate, *p*-, sodium	0.113	0.018	0.01	0.009	Y	57
Acrolein	Vinyl acetate	3.04	0.43	−0.02	0.12	N	207
Acrolein	Vinyl chloride	5.22	0.13	0.03	0.11	N	271
Acrolein diethylacetal	Acrylonitrile	0.02		11.19			767
Acrolein diethylacetal	Maleic anhydride	0.18		0.07			767
Acrolein, methyl-	Acrylate, butyl	2.5		0.02			589
Acrolein, methyl-	Acrylonitrile	1.7		0.15			455
Acrolein, methyl-	Acrylonitrile	3.8		0.15			587
Acrolein, methyl-	Acrylonitrile	3.8		0.15			589
Acrolein, methyl-	Acrylonitrile	1.72	0.42	0.03	0.19	Y	91
Acrolein, methyl-	Methacrylate, methyl	0.4		0.1			589
Acrolein, methyl-	Methacrylonitrile	1.78	0.07	0.41	0.01	N	208
Acrolein, methyl-	Methacrylonitrile	1.25		0.45			587
Acrolein, methyl-	Methacrylonitrile	1.25		0.45			589
Acrolein, methyl-	Styrene	0.833	0.092	0.173	0.017	N	223
Acrolein, methyl-	Styrene	0.3		0.41			589
Acrolein, methyl-	Vinyl acetate	0.98		0.15			589
Acrolein, 2-chloro-	Styrene	0.15	0.07	0.02	0.05		806
Acryl-2′-ethyl-4,5,7-trinitro-9-flurenone-2-carboxylate	Acrylate, *N*-(2-hydroxyethyl)-carbazolyl	0.585	0.028	0.912	0.079	Y	715
Acryl-2′-ethyl-4,5,7-trinitro-9-flurenone-2-carboxylate	Methacrylate, *N*-(2-hydroxyethyl)-carbazolyl	0.102	0.022	0.773	0.096	Y	703
Acrylamide	Acetamide, *N*-vinyl-	1.4		0.3			984
Acrylamide	Acrolein	0.8	0.23	1.95	0.58	N	207
Acrylamide	Acrolein	0.18	0.02	1.59	0.1	N	208
Acrylamide	Acrylic acid	1.08	0.17	0.288	0.029	Y	221
Acrylamide	Acrylic acid	0.445	0.075	1.644	0.069	Y	278
Acrylamide	Acrylic acid	1.346	0.044	0.341	0.012	Y	278
Acrylamide	Acrylic acid	0.598	0.047	1.38	0.14	N	37
Acrylamide	Acrylic acid	0.58		3.8			869
Acrylamide	Acrylic acid	1.06		0.29			869
Acrylamide	Acrylic acid, *cis*-3-bromo-	7.64	1.67	−0.2	0.11	Y	298
Acrylamide	Acrylic acid, *cis*-3-ethyl-	6.32	0.68	−0.16	0.1	Y	298
Acrylamide	Acrylic acid, *trans*-3-bromo-	4.13	0.76	−0.33	0.16	Y	298
Acrylamide	Acrylic acid, *trans*-3-ethyl-	8.19	1.09	−0.21	0.11	Y	298
Acrylamide	Acrylonitrile	0.81	0.11	0.863	0.033	Y	228
Acrylamide	Acrylonitrile	1.08	0.51	0.97	0.1	Y	228
Acrylamide	Acrylonitrile	0.5	0.26	1.8	0.75	N	330
Acrylamide	Acrylonitrile	1.36		0.88			421
Acrylamide	Acrylonitrile	1.3		0.8			461
Acrylamide	Cinnamic acid, *cis*-	3.84	0.68		0.28	Y	298
Acrylamide	Cinnamic acid, *trans*-	3.4	0.24	−0.24	0.15	Y	298
Acrylamide	Crotonic acid	3.76	0.89	−0.18	0.14	Y	298
Acrylamide	Crotonic acid	4.23	1.37	−0.19	0.19	Y	298
Acrylamide	Crotonic acid	4.72		0.11			569
Acrylamide	Crotonic acid	5.32		0.12			569
Acrylamide	Crotonic acid, *cis*-					Y	341
Acrylamide	Crotonic acid, *trans*-	7.2	0.33	−0.085	0.024	Y	341

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylamide	Dioxolane, 1,3,4-methylene-2-trichloro-	8.6		0.037			616
Acrylamide	Maleic anhydride	0.56		0			655
Acrylamide	Methacrylate, 2-hydroxyethyl	0.05		1.89			689
Acrylamide	Methacrylate, 2-hydroxyethyl	0.14		0.98			928
Acrylamide	Methacrylate, 3-methoxy-2-hydroxypropyl	0.04		3.98			689
Acrylamide	Methacrylate, dimethylaminoethyl sulfate	0.52	0.05	1.9	0.2		1052
Acrylamide	Methacrylate, methyl	2.29	0.44	2.34	0.17	N	314
Acrylamide	Methacrylate, methyl	0.53	0.09	3	0.09	N	314
Acrylamide	Methacrylate, methyl	0.82		2.53			314
Acrylamide	Methacrylate, methyl	0.9	1.07	3	0.45	N	691
Acrylamide	Methacrylic acid	0.57		1.63			1028
Acrylamide	Methacrylic acid	0.58		4.4			852
Acrylamide	Methacrylic acid	0.56		0.15			852
Acrylamide	Methylenebutyrolactone	0.3		2.85			746
Acrylamide	Styrene	0.58	0.12	1.17	0.06	N	295
Acrylamide	Styrene	1.32	0.13	1.21	0.04	N	314
Acrylamide	Styrene	0.33	0.14	1.49	0.16	N	314
Acrylamide	Styrene	0.59		1.13			314
Acrylamide	Styrene	8.97	0.43	0.65	0.03	N	343
Acrylamide	Styrene	0.2		1.05			555
Acrylamide	Succinimide, *N*-vinyl-	1.86		0.17			600
Acrylamide	Vinyl chloride					Y	156
Acrylamide	Vinyl methyl ketone	3.99	0.7	0.47	0.44	Y	609
Acrylamide	Vinyl methyl ketone	1.02	0.13	0.75	0.23	Y	609
Acrylamide	Vinylene carbonate	13.8		0.05			387
Acrylamide	Vinylmethylphenylsulfonium tetrafluoro	3.4		0.1			793
Acrylamide	Vinylsulfonic acid	3.5	0.15	0.3	0.1		1066
Acrylamide, 2-chloro-*N*,*N*-dimethyl-	Methacrylate, methyl	− 0.159	0.502	2.71	0.398	Y	917
Acrylamide, 2-chloro-*N*,*N*-dimethyl-	Styrene	− 0.036	0.152	1.29	0.065	Y	917
Acrylamide, *N*,*N*-dibutyl-	Styrene	0.294	0.058	1.6	0.058		806
Acrylamide, *N*,*N*-diethyl-	Acrylic acid	0.35	0.12	0.36	0.04	N	205
Acrylamide, *N*,*N*-diethyl-	Butanoate, 3-acrylamido-3-methyl-, sodium	0.987	0.153	0.22	0.138	Y	857
Acrylamide, *N*,*N*-diethyl-	Methacrylate, methyl	0.41	0.15	1.65	0.16	N	170
Acrylamide, *N*,*N*-diethyl-	Styrene	0.39		1.23			739
Acrylamide, *N*,*N*-diethyl-	Styrene	0.34		1.36			739
Acrylamide, *N*,*N*-diethyl-	Styrene	0.18		1.54			739
Acrylamide, *N*,*N*-dimethyl-	Methacrylate, methyl	0.57	0.08	2.15	0.08	N	315
Acrylamide, *N*,*N*-dimethyl-	Methacrylate, methyl	0.59	0.09	2.8	0.1	N	315
Acrylamide, *N*,*N*-dimethyl-	Methacrylate, methyl	0.21	0.21	2.64	0.15	N	691
Acrylamide, *N*,*N*-dimethyl-	Styrene	0.12	0.3	1.15	0.35	N	170
Acrylamide, *N*,*N*-dimethyl-	Styrene	0.49	0.15	1.37	0.1	N	315
Acrylamide, *N*,*N*-dimethyl-	Styrene	0.47	0.2	1.32	0.12	N	315
Acrylamide, *N*,*N*-dimethyl-	Sulfonate, 2-acrylamido-2-methylpropane	1.108	0.59	0.162	0.949	Y	857
Acrylamide, *N*,*N*-dimethyl-	Vinyl methyl ketone	0.82	0.36	0.1	0.43	Y	609
Acrylamide, *N*-(2-(4-hydroxyphenyl)ethyl)-	Methacrylamide, *N*-(2-hydroxypropyl)-	0.95	0.09	1.01	0.09		965
Acrylamide, *N*-(2-(propionamide)-	Styrene	0.86	0.3	1.84	0.21	N	295
Acrylamide, *N*-methyl-	Methacrylate, methyl	0.05	0.72	1.14	0.09	N	691
Acrylamide, *N*-methylol	Acrylate, butyl	0.61		0.87			441
Acrylamide, *N*-methylol	Acrylate, ethyl	1.4		1.4			442
Acrylamide, *N*-methylol	Acrylate, methyl	1.9		1.3			441
Acrylamide, *N*-methylol	Acrylonitrile	1.2		0.7			442
Acrylamide, *N*-methylol	Acrylonitrile	2.33		0.98			577
Acrylamide, *N*-methylol	Acrylonitrile	2.56		0.22			596
Acrylamide, *N*-methylol	Methacrylate, methyl	0.7		1.62			593
Acrylamide, *N*-methylol	Methacrylate, methyl	0.7		1.62			596
Acrylamide, *N*-methylol	Styrene	0.48		0.03			596
Acrylamide, *N*-methylol	Vinyl chloride					Y	157
Acrylamide, *N*-methylol-	Styrene	0.4	0.03	1.55	0.05		891
Acrylamide, *N*-octadecyl-	Acrylonitrile	1.4	0.17	1.034	0.02	Y	119
Acrylamide, *N*-octadecyl-	Methacrylate, methyl	0.42	0.11	4.119	0.07	Y	290

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylamide, *N*-octadecyl-	Styrene	0.54	0.14	2.08	0.12	Y	290
Acrylamide, *N*-octadecyl-	Vinyl acetate	8.25	1.46	0.004	0.011	Y	119
Acrylamide, *N*-octadecyl-	Vinylidene chloride	1.4	0.11	0.432	0.008	Y	119
Acrylamide, *N*-octyl-	Styrene	0.258	0.119	2.715	0.244		806
Acrylamide, *N*-propyl-	Acrylate, butyl	0.4		0.8			730
Acrylamide, *N*-propyl-	Acrylate, methyl	0.26		1.2			730
Acrylamide, *N*-*tert*-butyl-	Acrylonitrile	1.14		0.2			709
Acrylamide, *N*-*tert*-butyl-	Methacrylate, methyl	2.83		0.25			709
Acrylamide, α-fluoro-	Methacrylate, methyl	0.148	0.081	2.13	0.136	Y	823
Acrylamido, 1-,-1-deoxy-D-glucitol	Methacrylate, methyl	0.05	0.09	3.75	0.24	N	258
Acrylamido, 1-,-1-deoxy-D-glucitol	Styrene	0.03	0.02	2.42	0.08	N	258
Acrylamido, 1-,-1-deoxy-D-glucitol	Vinyl acetate	0.98	0.87	0.03	0.17	N	258
Acrylamido, 2-,2-methylpropanesulfonate, sodium	Vinyl acetate	11.6		0.05			700
Acrylamido, 2-,-2-methylpropanesulfonic acid	Methacrylate, 2-hydroxyethyl	0.9		0.86			618
Acrylamido, 2-,-2-methylpropanesulfonic acid	Methacrylate, 2-hydroxypropyl	1.03		0.89			618
Acrylamido-2-methylpropane sulfonate sodium salt	*N*-Vinylpyrrolidone	0.66		0.13			939
Acrylamidomethylamino, *p*-, azobenzene	Styrene	8.5		0.083			858
Acrylamidomethylamino, *p*-, azobenzene	Vinyl acetate	12.98		0.126			858
Acrylate, (−)-menthyl	Acenaphthalene					Y	645
Acrylate, (−)-menthyl	Pyridine, 4-vinyl-	0.291	0.017	2.32	0.45	Y	667
Acrylate, 1,1,5-trihydroperfluoroamyl	Methacrylonitrile	0.14		1.03			809
Acrylate, 2,3-dibromopropyl	Styrene	0.16		0.42			643
Acrylate, 2,4,5-trichlorophenyl	Pyrrolidone, *N*-vinyl-	0.163	0.02	0.012	0.008	Y	840
Acrylate, 2,4,5-trichlorophenyl	Styrene	0.23	0.021	0.277	0.048	Y	622
Acrylate, 2,4,6-tribromophenyl	Styrene	0.1		0.2			643
Acrylate, 2,4-dinitrophenyl	Acrylate, *N*-(2-hydroxyethyl)-carbazolyl	0.158	0.015	0.109	0.026	Y	716
Acrylate, 2,4-dinitrophenyl	Methacrylate, *N*-(2-hydroxyethyl)-carbazolyl	0.186	0.009	0.243	0.034		716
Acrylate, 2(*O*-ethyl methylphosphonoxy)-, methyl	Methacrylate, methyl	0.44	0.25	0.73	0.04		882
Acrylate, 2-chloroethyl	Acrylate, ethyl	1.03		0.9			726
Acrylate, 2-chloroethyl	Acrylate, methyl	1.07		0.9			726
Acrylate, 2-chloroethyl	Acrylonitrile	0.87		1.03			790
Acrylate, 2-chloroethyl	Itaconate, bis(tri-*n*-butyltin)	0.683		0.391			940
Acrylate, 2-chloroethyl	Itaconic anhydride	−0.016	0.022	2.46	0.38	Y	365
Acrylate, 2-chloroethyl	Itaconic anhydride	0.251	0.021	2.61	0.32	Y	365
Acrylate, 2-chloroethyl	Maleic anhydride	7.15	0.31	0.027	0.004	Y	117
Acrylate, 2-chloroethyl	Methacrylate, methyl	0.37		2.15			790
Acrylate, 2-chloroethyl	Pyrrolidone, *N*-vinyl-	0.52		0.03			790
Acrylate, 2-chloroethyl	Styrene	0.1	0.17	0.55	0.47	Y	140
Acrylate, 2-chloroethyl	Styrene	0.139	0.083	0.494	0.097	Y	178
Acrylate, 2-chloroethyl	Styrene	0.12		0.54			790
Acrylate, 2-chloroethyl	Vinyl butyl ether	2.01		0			790
Acrylate, 2-chloroethyl	Vinyl isobutyl ether	2.24		0			790
Acrylate, 2-chloroethylglucitol	Styrene	0.14	0.09	0.49	0.2		806
Acrylate, 2-cyano-, methyl	Styrene, α-methyl-	0.001		0.05			452
Acrylate, 2-cyano-, methyl	Vinyl acetate	0.5		0.005			452
Acrylate, 2-cyanoethyl	Styrene	0.128	0.074	0.399	0.032	Y	178
Acrylate, 2-ethylhexyl	Acrylate, glycidyl	1.12	0.07	1.18	0.06	N	126
Acrylate, 2-ethylhexyl	Methacrylate, glycidyl	0.09	0.13	2.41	0.46	Y	674
Acrylate, 2-ethylhexyl	Styrene	0.31	0.6	0.96	0.3	N	126
Acrylate, 2-ethylhexyl	Styrene	0.26		0.94			463
Acrylate, 2-ethylhexyl	Vinyl acetate	7.5		0.04			570
Acrylate, 2-ethylhexyl	Vinyl chloride	4.15		0.16			510
Acrylate, 2-hydroxyethyl	Acrylate, butyl	0.9	0.23	0.3	0.06	N	868
Acrylate, 2-hydroxyethyl	Acrylate, ethyl	0.97	0.24	0.5	0.03	N	868
Acrylate, 2-hydroxyethyl	Acrylate, methyl	0.9	0.13	0.94	0.04	N	868
Acrylate, 2-nitrobutyl	Acrylonitrile	1.76	0.69	0.67	0.25	N	234
Acrylate, 2-nitrobutyl	Methacrylate, methyl	0.27	0.04	1.19	0.12	N	234
Acrylate, 2-nitrobutyl	Styrene	0.12	0.01	0.35	0.03	N	234
Acrylate, 3,4-epoxyhexahydrobenzyl	Acrylonitrile	0.388	0.074	0.25	0.13	Y	680

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, 3,4-epoxyhexahydrobenzyl	Styrene	1.97	0.35	0.27	0.3	N	680
Acrylate, 4-acetylphenyl	Methacrylate, glycidyl	0.292	0.141	0.644	0.13	Y	1012
Acrylate, β-acetoxymethyl-, methyl	Methacrylate, methyl	0.24		0.91			1091
Acrylate, β-acetoxymethyl-, methyl	Styrene	0.19		0.34			1091
Acrylate, β-chloro-2-hydroxypropyl	Acrylonitrile	0.7		0.24			654
Acrylate, β-ethoxy-, ethyl	Acrylonitrile	– 0.26	0.56	2.42	1.8	N	194
Acrylate, β-ethoxy-, ethyl	Styrene	– 0.21	0.44	46.98	27.03	Y	194
Acrylate, *N*-(2-hydroxyethyl)-3,6-dichlorocarbazolyl	Methacrylate, 2,4-dinitrophenyl	0.115	0.029	1.207	0.032	Y	736
Acrylate, *N*-(2-hydroxyethyl)carbazolyl	Acryl-2′-ethyl-4,5,7-trinitro-9-fluorene	0.912	0.079	0.585	0.028	Y	715
Acrylate, *N*-(2-hydroxyethyl)carbazolyl	Acrylate, 2,4-dinitrophenyl	0.109	0.026	0.158	0.015	Y	716
Acrylate, *N*-(2-hydroxyethyl)carbazolyl	Acryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	0.62	0.044	0.361	0.016	Y	702
Acrylate, *N*-(2-hydroxyethyl)carbazolyl	Methacryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	1.04	0.14	0.08	0.026	Y	702
Acrylate, *N*-(2-hydroxyethyl)carbazolyl	Methacryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	0.334	0.022	1.364	0.018	Y	719
Acrylate, α-(4-chlorobenzyl)-, ethyl	Styrene	1.03	0.13	0.04	0.09		806
Acrylate, α-(4-cyanobenzyl)-, ethyl	Styrene	0.65	0.09	0.06	0.05		806
Acrylate, α-(4-methoxybenzyl)-, ethyl	Styrene	0.71	0.24	0.33	0.3		806
Acrylate, α-(*O*-ethyl methylphosphonoxy)-methyl	Methacrylate, methyl	0.44		0.73			851
Acrylate, α-(hydroxymethyl)-, methyl	Styrene	0.34		0.36			932
Acrylate, α-[2,2-bis(carbomethoxy)ethyl]-, methyl	Methacrylate, methyl	0.04		3.7			1092
Acrylate, α-[2,2-bis(carbomethoxy)ethyl]-, methyl	Styrene	0.09		0.58			1092
Acrylate, α-acetoxy-, ethyl	Acrylate, α-chloro-, ethyl	0.3		1.71			638
Acrylate, α-acetoxy-, ethyl	Acrylate, ethyl	0.968	0.033	0.943	0.075	Y	244
Acrylate, α-acetoxy-, ethyl	Methacrylate, methyl	0.608	0.02	1.65	0.12	Y	244
Acrylate, α-acetoxy-, ethyl	Styrene	0.173	0.01	0.557	0.031	Y	244
Acrylate, α-acetoxy-, ethyl	Vinyl acetate	5.621	0.094	0.08	0.021	Y	244
Acrylate, α-benzyl-, methyl	Styrene	0.175	0.053	0.57	0.028	Y	49
Acrylate, α-benzyl-, ethyl	Styrene	0.9	0.2	0.14	0.17		806
Acrylate, α-benzyl-, methyl	Methacrylate methyl	0.173	0.022	2.36	0.23	Y	610
Acrylate, α-benzyl-, methyl	Methacrylate methyl	0.09	0.01	3.9	0.19	N	610
Acrylate, α-bromo-, ethyl	Styrene	0.44	0.08	0.02	0.04		806
Acrylate, α-butyl-, methyl	Styrene	0.205	0.053	0.812	0.043	Y	49
Acrylate, α-chloro-, methyl	Methacrylate, methyl	1.13	0.19	0.31	0.24	Y	6
Acrylate, α-chloro-, ethyl	Acrylate, α-methoxy-, methyl	0.58		0.11			638
Acrylate, α-chloro-, ethyl	Acrylate, α-acetoxy-, ethyl	1.71		0.3			638
Acrylate, α-chloro-, ethyl	Acrylate, α-fluoro-, ethyl	2.9		0.21			638
Acrylate, α-chloro-, ethyl	Acrylate, methyl	3.22		0.09			638
Acrylate, α-chloro-, ethyl	Acrylonitrile, α-methoxy-	0.9		0.3			638
Acrylate, α-chloro-, ethyl	Methacrylonitrile	2		0.45			638
Acrylate, α-chloro-, ethyl	Styrene	0.32	0.11	0.08	0.07		806
Acrylate, α-chloro-, ethyl	Vinyl acetate	30		0.03			638
Acrylate, α-chloro-, methyl	Acrylonitrile	1.76	0.18	0.122	0.081	Y	6
Acrylate, α-chloro-, methyl	Methacrylate, methyl	1.92	0.08	0.11	0.09	N	31
Acrylate, α-chloro-, methyl	Styrene	0.3		0.25			74
Acrylate, α-chloro-, methyl	Vinylidene cyanide	0.313	0.021	0.066	0.07	Y	82
Acrylate, α-chloro-, sodium	Styrenesulfonate, *p*-, sodium	0.27	0.06	1.44	0.31	Y	834
Acrylate, α-cyano-, methyl	Acrylonitrile	0.68	0.09	0.01	0.02	N	141
Acrylate, α-cyano-, methyl	Acrylate, methyl	0.34	0.07	0.02	0.04	N	141
Acrylate, α-cyano-, methyl	Methacrylate, methyl	0.03	0.01	0.21	0.02	N	141
Acrylate, α-cyano-, methyl	Methacrylate, methyl	0.135	0.016	0.068	0.014	Y	182
Acrylate, α-cyano-, methyl	Methacrylonitrile	0.15	0.01	0.18	0.01	N	143
Acrylate, α-cyano-, methyl	Styrene	0.61	0.05	0.05	0.01	N	141
Acrylate, α-cyclohexyl-, methyl	Styrene	– 0.001	0.034	1.615	0.048	Y	49
Acrylate, α-ethyl-, methyl	Styrene	0.197	0.014	0.758	0.014	Y	49
Acrylate, α-ethyloxymethyl-, methyl	Styrene	0.24		0.37			1047
Acrylate, α-fluoro-, ethyl	Acrylate, α-chloro-, ethyl	0.21		2.9			638
Acrylate, α-fluoro-, methyl	Styrene	0.16	0.11	0.66	0.17		806
Acrylate, α-hexafluoropropyloxymethyl-, methyl	Styrene	0.07		0.23			1047

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, α-hydroxymethyl-, ethyl	Azlactone, 2-vinyl-4,4-dimethyl-	0.668	0.12	0.389	0.229	Y	1011
Acrylate, α-hydroxymethyl-, ethyl	Methacrylate, methyl	1.34	0.062	1.26	0.17	N	1027
Acrylate, α-hydroxymethyl-, ethyl	Styrene	0.546	0.127	0.468	0.03	Y	982
Acrylate, α-isobutyl-, methyl	Styrene	0.202	0.042	0.974	0.022	Y	49
Acrylate, α-isopropyl-, methyl	Styrene	0.036	0.034	1.872	0.052	Y	49
Acrylate, α-isopropyloxymethyl-, methyl	Styrene	0.26		0.41			1047
Acrylate, α-methoxy, methyl	Acrylate, α-chloro-, ethyl	0.11		0.58			638
Acrylate, α-methoxy-, methyl	Styrene	0.513	0.058	1.131	0.078		806
Acrylate, α-*p*-chlorobenzyl-, methyl	Methacrylate, methyl	0.255	0.034	1.87	0.222	Y	905
Acrylate, α-*p*-methoxybenzyl-, methyl	Methacrylate, methyl	0.13	0.008	1.71	0.109	Y	905
Acrylate, α-phenoxymethyl-, methyl	Methacrylate, methyl	0.755	0.061	1.13	0.038	Y	1048
Acrylate, α- phenoxymethyl-, methyl	Styrene	0.256	0.102	0.176	0.05	Y	1048
Acrylate, α-phenyl-, methyl	Acrylate, methyl	1		0.06			141
Acrylate, α-phenyl-, methyl	Acrylonitrile	6.7		0.08			141
Acrylate, α-phenyl-, methyl	Methacrylate, methyl	0		0.21			141
Acrylate, α-phenyl-, methyl	Methacrylate, methyl	0		0.3			49
Acrylate, α-phenyl-, methyl	Methacrylonitrile	0.25		0.19			143
Acrylate, α-phenyl-, methyl	Styrene	1		0.06			141
Acrylate, α-phenyl-, methyl	Styrene	0.4		0.03			399
Acrylate, α-phenyl-, methyl	Styrene	0.45		0.06			488
Acrylate, α-phenyl-, methyl	Styrene	1.275	0.008	1.176	0.015	Y	49
Acrylate, α-phenyl-, butyl	Styrene	0.107	0.055	0.04	0.022	Y	488
Acrylate, α-phenyl-, chloroethyl	Styrene	0.201	0.09	0.025	0.015	Y	488
Acrylate, α-phenyl-, propyl	Styrene	0.126	0.063	0.03	0.015	Y	488
Acrylate, α-propyl-, methyl	Styrene	0.208	0.07	0.821	0.029	Y	49
Acrylate, α-propyloxymethyl-, methyl	Styrene	0.29		0.47			1047
Acrylate, α-*sec*-butyl-, methyl	Styrene	0.004	0.024	2.29	0.068	Y	49
Acrylate, α-tetrafluoropropyloxymethyl-, methyl	Methacrylate, methyl	0.61		1.43			1047
Acrylate, α-tetrafluoropropyloxymethyl-, methyl	Styrene	0.17		0.37			1047
Acrylate, α-trifluoroethyloxymethyl-, methyl	Styrene	0.2		0.26			1047
Acrylate, α-trifluoromethyl-, methyl	Methacrylate, methyl	−0.17	0.18	1.8	0.23	Y	681
Acrylate, α-trifluoromethyl-, methyl	Methacrylate, methyl	0	0.1	3.2	0.5	N	825
Acrylate, α-trifluoromethyl-, methyl	Methacrylate, methyl	0.1	0.1	2.3	0.2	N	825
Acrylate, α-trifluoromethyl-, methyl	Styrene, *p*-chloro-	0	0.03	0.24	0.02	N	825
Acrylate, α-trimethylsiloxy-, methyl	Styrene	1.42		0.46			1101
Acrylate, benzyl	Acrylonitrile	0.72	0.16	0.28	0.19	N	23
Acrylate, benzyl	Acrylonitrile	0.63		1.49			385
Acrylate, benzyl	Allyl chloride	9.9		0.06			438
Acrylate, benzyl	Methacrylate, methyl	0.19	0.2	2.23	0.14	Y	277
Acrylate, benzyl	Styrene	0.2	0.12	0.494	0.05	Y	178
Acrylate, benzyl	Styrene	0.248	0.041	0.534	0.028	Y	277
Acrylate, butyl	2-Oxazoline, 2-isopropenyl-	0.24	0.01	1.4	0.08		894
Acrylate, butyl	Acrolein	0.638	0.032	1.86	0.19	Y	291
Acrylate, butyl	Acrolein	1.12	0.41	2.29	0.58	N	292
Acrylate, butyl	Acrolein, methyl-	0.02		2.5			589
Acrylate, butyl	Acrylamide, *N*-propyl-	0.8		0.4			730
Acrylate, butyl	Acrylamide, *N*-methylol-	0.87		0.61			441
Acrylate, butyl	Acrylate, 2-hydroxyethyl	0.3	0.06	0.9	0.23	N	868
Acrylate, butyl	Acrylic acid	1.08	0.18	0.59	0.27	N	187
Acrylate, butyl	Acrylic acid	0.91	0.13	1.31	0.3	N	252
Acrylate, butyl	Acrylic acid, α-bromo-	0.19		0.09			733
Acrylate, butyl	Acrylonitrile	1.06	0.15	1.679	0.058	Y	118
Acrylate, butyl	Acrylonitrile	0.894	0.019	0.781	0.083	Y	162
Acrylate, butyl	Acrylonitrile	0.82	0.13	1.08	0.08	N	233
Acrylate, butyl	Acrylonitrile	0.9		1			513
Acrylate, butyl	Acrylonitrile	1.2		1			513
Acrylate, butyl	Allyl acetate	10.2	42.2	0.039	0.066	N	1053
Acrylate, butyl	Allyl chloride	5.83		0.1			438
Acrylate, butyl	Benzofuran, 2-vinyl-	0.041	0.043	7.8	1.36	N	1020
Acrylate, butyl	Butadiene	0.074	0.03	1.04	0.11	Y	257
Acrylate, butyl	Ethylene	13.94	0.38	0.01	0.003	N	42
Acrylate, butyl	Furan, 2-vinyl-5-methyl	0.118	0.019	0.392	0.051	Y	1105

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, butyl	Itaconate, bis(tri-*n*-butyltin)	0.91		0.422			940
Acrylate, butyl	Itaconate, dimethyl	0.4		0.94			398
Acrylate, butyl	Maleimide, *N*-(2,4-dimethylphenyl)-	0.62		0.2			788
Acrylate, butyl	Methacrylate, 2-(*N*,*N*-dimethylcarbamoyloxy)ethyl	0.47		1.89			600
Acrylate, butyl	Methacrylate, 2-chloro-2,3,3,3-fluoropropyl	0.079	0.304	0.221	0.636	N	927
Acrylate, butyl	Methacrylate, 2-hydroxyethyl	0.09	0.11	4.75	4.2	Y	358
Acrylate, butyl	Methacrylate, 2-hydroxypropyl	0.171	0.041	5.35	0.32	Y	333
Acrylate, butyl	Methacrylate, 2-hydroxypropyl	0.24	0.16	3.3	6.82	Y	662
Acrylate, butyl	Methacrylate, butyl	0.3		2.2			187
Acrylate, butyl	Methacrylate, glycidyl	0.083	0.052	2.16	0.57	Y	674
Acrylate, butyl	Methacrylate, methyl	0.13	0.15	0.92	0.2	N	30
Acrylate, butyl	Methacrylate, methyl	0.11	0.018	2.86	0.32	Y	639
Acrylate, butyl	Methacrylate, methyl	0.43	0.07	1.88	0.4	N	87
Acrylate, butyl	Methacrylic acid	0.31	0.1	1.25	0.31	N	187
Acrylate, butyl	Oxazoline, 2,2-isopropenyl-	0.24		1.4			862
Acrylate, butyl	Pyridine, 2-vinyl-	0.1		2.51			236
Acrylate, butyl	Pyridine, 2-vinyl-	0.11	0.01	2.59	0.14	N	78
Acrylate, butyl	Pyridine, 4-vinyl-	0.23	0.04	4.3	0.34	N	78
Acrylate, butyl	Styrene	0.25	0.05	0.79	0.08		1032
Acrylate, butyl	Styrene	0.34	0.06	0.79	0.11		1032
Acrylate, butyl	Styrene	0.38	0.05	0.75	0.1		1032
Acrylate, butyl	Styrene	−0.106	0.099	1.23	0.21	N	19
Acrylate, butyl	Styrene	0.29	0.05	0.44	0.03	N	20
Acrylate, butyl	Styrene	0.18	0.03	0.84	0.2	N	38
Acrylate, butyl	Styrene	0.19		0.66			38
Acrylate, butyl	Styrene	0.21		0.82			463
Acrylate, butyl	Styrene	0.15		0.8			549
Acrylate, butyl	Styrene	0.164		0.698			612
Acrylate, butyl	Styrene	0.164		0.698			632
Acrylate, butyl	Styrene, *o*-chloro-	0.2		2.25			558
Acrylate, butyl	Styrene, *p*-1-(2-hydroxybutyl)-	0.17		0.4			548
Acrylate, butyl	Styrene, *p*-octylamine sulfonate	0.3		2.3			817
Acrylate, butyl	Succinimide, *N*-vinyl-	1.54		0.15			789
Acrylate, butyl	Thiophene, 3-vinyl	0.386		0.499			1000
Acrylate, butyl	Vinyl acetate	3.48	3.39	0.018	0.072	Y	301
Acrylate, butyl	Vinyl bromide	4.07	0.44	0.18	0.16	N	268
Acrylate, butyl	Vinyl bromide	3.7		0.19			268
Acrylate, butyl	Vinyl chloride	4.4		0.07			518
Acrylate, butyl	Vinyl fluoride	19		0.01			604
Acrylate, butyl	Vinyl fluoride	19		0.01			606
Acrylate, butyl	Vinyl methyl ketone	0.8	0.06	1.81	0.24	N	53
Acrylate, butyl	Vinyl, *p*-, benzylethylcarbinol	0.17		0.4			591
Acrylate, butyl	Vinylanthracene, 9-	3.717	0.046	0.126	0.054	Y	123
Acrylate, butyl	Vinylidene chloride	0.873	0.022	0.934	0.006	Y	118
Acrylate, butyl	Vinylidene chloride	0.46		0.84			464
Acrylate, butyl	Vinylidene chloride	0.58		0.87			464
Acrylate, *cis*-B-cyano-, methyl	Acrylonitrile					N	1034
Acrylate, *cis*-B-cyano-, methyl	Styrene					N	1034
Acrylate, cresyl	Acrylonitrile	0.773	0.067	0.72	0.15	Y	363
Acrylate, cyclododecyl	Styrene	0.34	0.15	0.47	0.14		806
Acrylate, cyclododecyl	Styrene	0.31	0.08	0.54	0.08		806
Acrylate, cyclododecyl	Styrene	0.301	0.072	0.461	0.07		806
Acrylate, cyclohexyl	*N*-Vinylpyrrolidone	1.297	0.088	0.122	0.014		1061
Acrylate, cyclohexyl	Styrene	0.272	0.048	0.913	0.107		1061
Acrylate, cyclohexyl	Styrene	0.254	0.141	0.885	0.102		806
Acrylate, cyclohexyl	Styrene	0.16	0.13	0.53	0.11		806
Acrylate, cyclohexyl	Styrene	0.17	0.09	0.7	0.12		806
Acrylate, cyclohexyl	Styrene	0.18	0.07	0.58	0.1		806
Acrylate, di-, copper	Methacrylate, di-, dicyclopentadienyl-titanium	1.09		0.89			876
Acrylate, di-, copper	Styrene	0.12	0.08	5.94	0.05	N	829
Acrylate, di-, copper	Styrene	0.56	0.09	1.74	0.03	N	829

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, di-, nickel	Methacrylate, di-, dicyclo-pentadienyltitanium	0.95		0.65			876
Acrylate, di-, nickel	Styrene	0.53	0.06	1.83	0.02	N	829
Acrylate, di-, zinc	Acrylonitrile	0.24		0.41			646
Acrylate, di-, zinc	Styrene	0.9	0.07	1.1	0.02	N	829
Acrylate, dibutylchlorotin	Acrylate, methyl	0.09		0.81			659
Acrylate, diethylaluminum	Styrene	0.046	0.035	− 0.002	0.016	Y	652
Acrylate, diethylaluminum	Styrene					Y	652
Acrylate, dodecyl	Acrylonitrile	0.88	0.16	2.37	0.07	N	233
Acrylate, ethyl	2-Oxazoline, 2-isopropenyl-	0.19	0.02	1.39	0.06		894
Acrylate, ethyl	Acrolein	0.6		1.2			291
Acrylate, ethyl	Acrolein	1.09	0.25	1.98	0.44	N	292
Acrylate, ethyl	Acrylamide, *N*-methylol-	1.4		1.4			442
Acrylate, ethyl	Acrylate, 2-chloroethyl	0.9		1.03			726
Acrylate, ethyl	Acrylate, 2-hydroxyethyl	0.5	0.03	0.97	0.24	N	868
Acrylate, ethyl	Acrylate, α-acetoxy-, ethyl	0.943	0.075	0.968	0.033	Y	244
Acrylate, ethyl	Acrylate, hydroxyethyl	0.5	0.05	0.88	0.09		890
Acrylate, ethyl	Acrylic acid	1.02		0.91			711
Acrylate, ethyl	Acrylonitrile	1.2	0.07	0.92	0.08		1023
Acrylate, ethyl	Acrylonitrile	0.81	0.27	1.16	0.78	N	198
Acrylate, ethyl	Acrylonitrile	4		0.66			389
Acrylate, ethyl	Acrylonitrile	0.95		0.44			542
Acrylate, ethyl	Allyl chloride	7.73		0.08			438
Acrylate, ethyl	Benzofuran, 2-vinyl-	0.015	0.01	5.76	0.334	N	1020
Acrylate, ethyl	Carbazole, *N*-vinyl-	1.1		0.27			757
Acrylate, ethyl	Ethylene, 1,1-diphenyl-	0.8		0.5			65
Acrylate, ethyl	Imidazolid-2-one, 1,3-divinyl-	0.41	0.13	− 0.08	0.03	N	800
Acrylate, ethyl	Imidazolid-2-one, 1-ethyl-3-vinyl-	0.47	0.06	0.01	0.01	N	800
Acrylate, ethyl	Isopropenylisocyanate	0.79		0.15			434
Acrylate, ethyl	Maleimide, 2,3-dimethyl-*N*-(2-methacryloyloxy)ethyl	0.28	1.15	1.55	3.06	Y	619
Acrylate, ethyl	Methacrylate, 2-(sulfonic acid)ethyl	0.3		3.2			564
Acrylate, ethyl	Methacrylate, 2-bromoethyl	0.37		2.7			657
Acrylate, ethyl	Methacrylate, 2-hydroxyethyl	0.189	0.008	11.21	0.43	Y	358
Acrylate, ethyl	Methacrylate, 2-hydroxypropyl	0.273	0.054	13.32	1.05	Y	333
Acrylate, ethyl	Methacrylate, 2-hydroxypropyl	0.207	0.045	9.08	3.95	Y	662
Acrylate, ethyl	Methacrylate, butyl	0.22	0.17	2.43	0.39	Y	690
Acrylate, ethyl	Methacrylate, methyl	0.47		1.83			30
Acrylate, ethyl	Methacrylate, methyl	0.28		2			469
Acrylate, ethyl	Methacrylate, methyl	0.22	0.05	2.04	0.28	N	87
Acrylate, ethyl	Methacrylic acid					N	1065
Acrylate, ethyl	Norbornadiene	2.39	0.44	− 0.01	0.03	N	267
Acrylate, ethyl	Oxazoline, 2-, 2-isopropenyl-	0.19		1.39			862
Acrylate, ethyl	Propanesulfonate, 3-[diethyl-2-(2-methacroyloxyethoxy)]ethyl	3.97	1.03	0.19	0.02	Y	962
Acrylate, ethyl	Pyridine, 2-vinyl-	0.21	0.06	0.28	0.1	N	250
Acrylate, ethyl	Pyridine, 2-vinyl-	0.21		2.25			832
Acrylate, ethyl	Pyridine, 4-vinyl-	0.29		2.58			832
Acrylate, ethyl	Pyrimid-2-one, 1,3-divinylhexahydro-	0.59	0.13	− 0.05	0.03	N	800
Acrylate, ethyl	Styrene	0.139	0.085	0.699	0.072	Y	178
Acrylate, ethyl	Styrene	0.16		1.01			463
Acrylate, ethyl	Styrene	0.19		0.79			530
Acrylate, ethyl	Styrene	0.2		0.8			530
Acrylate, ethyl	Styrene	0.48		0.8			542
Acrylate, ethyl	Styrene	0.152		0.787			673
Acrylate, ethyl	Styrene	0.152		0.787			677
Acrylate, ethyl	Styrene 3-tri-*n*-butylstannyl-	10.4		0.01			985
Acrylate, ethyl	Tropone, 2-methacryloyloxy-	0.387	0.027	3.13	0.528	Y	1104
Acrylate, ethyl	Vinyl 2-chloroethyl ether	5		0.15			439
Acrylate, ethyl	Vinyl 2-chloroethyl ether	4.65		0			726
Acrylate, ethyl	Vinyl isobutyl sulfide	0.36	0.02	0.05	0.04	N	285
Acrylate, ethyl	Vinyl isobutyl sulfide	0.32	0.02	0.05	0.05	N	336
Acrylate, ethyl	Vinylanthracene, 9-	3.498	0.041	0.295	0.056	Y	123
Acrylate, ethyl	Vinylidene chloride	0.72	0.39	0.58	0.15	Y	65
Acrylate, ferrocenylmethyl	Acrylate, methyl	0.14		4.46			293

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, ferrocenylmethyl	Maleic anhydride	−0.3	2.96	0.09	0.14	Y	325
Acrylate, ferrocenylmethyl	Methacrylate, methyl	0.024	0.064	2.8	0.19	Y	293
Acrylate, ferrocenylmethyl	Methacrylate, methyl	0.08		2.9			293
Acrylate, ferrocenylmethyl	Styrene	−0.016	0.06	1.87	0.17	Y	293
Acrylate, ferrocenylmethyl	Styrene	0.02		2.3			293
Acrylate, ferrocenylmethyl	Styrene	0.02		2.5			576
Acrylate, furfuryl	Methacrylate, 2-hydroxyethyl	0.88	0.19	1.35	0.08		1063
Acrylate, glycidyl	Acrylate, 2-ethylhexyl	1.18	0.06	1.12	0.07	N	126
Acrylate, glycidyl	Acrylonitrile	1		1.01			114
Acrylate, glycidyl	Styrene	0.17		0.6			114
Acrylate, glycidyl	Styrene	0.24		0.73	0.34	N	126
Acrylate, glycidyl	Vinyl acetate	7.6		0.003			553
Acrylate, heptafluorobutyl	Butadiene	0.073	0.031	0.359	0.039	Y	206
Acrylate, heptafluorobutyl	Methacrylate, methyl	0.177		0.084		Y	206
Acrylate, heptafluorobutyl	Styrene	0.049	0.013	0.31	0.01	Y	206
Acrylate, heptyl	Maleimide, *N*-(2,4-dimethylphenyl)-	0.14		0.2			788
Acrylate, heptyl	Methacrylate, methyl	0.46	0.02	2.51	0.13		980
Acrylate, hydroxyethyl	Acrylate, ethyl	0.88	0.09	0.5	0.05		890
Acrylate, hydroxyethyl	Acrylate, methyl	1	0.1	1	0.1		890
Acrylate, hydroxyethyl	Acrylate, methyl	0.94	0.1	0.23	0.03		890
Acrylate, isobutyl	Methacrylate, methyl	0.135	0.02	4.1	0.5	Y	639
Acrylate, isobutyl	Methacrylate, glycidyl	0.282	0.026	1.24	0.12	Y	674
Acrylate, isobutyl	Methacrylate, methyl	0.29	0.04	1.04	0.08	N	30
Acrylate, isopropyl	Styrene	0.195	0.027	0.755	0.024	Y	178
Acrylate, *m*-chlorophenyl	Acrylonitrile	0.85	0.036	1.3	0.073	Y	363
Acrylate, *m*-nitrophenyl	Methacrylate methyl	1.04	0.135	0.928	0.248	Y	1074
Acrylate, methyl	2-Oxazoline, 2-isopropenyl-	0.16	0.04	1.9	0.08		894
Acrylate, methyl	2-Oxazolinium BF4, 3-methyl-2-isopropenyl-	0.096	0.057	0.251	0.483	Y	908
Acrylate, methyl	2-Oxazolinium, 2-isopropenyl-	0.191	0.031	2.08	0.327	Y	908
Acrylate, methyl	Acetylene, phenyl-	0.622	0.062	0.272	0.072	Y	60
Acrylate, methyl	Acetylene, phenyl-	0.664	0.045	0.093	0.01	Y	731
Acrylate, methyl	Acrolein	7.86	3.58	−0.07	0.03	N	207
Acrylate, methyl	Acrolein	0.83	0.12	1.41	0.4	Y	291
Acrylate, methyl	Acrolein	1.08	0.38	2.54	0.93	N	292
Acrylate, methyl	Acrylamide, *N*-methylol-	1.3		1.9			441
Acrylate, methyl	Acrylamide, *N*-propyl-	1.2		0.26			730
Acrylate, methyl	Acrylate, 2-chloroethyl	0.9		1.07			726
Acrylate, methyl	Acrylate, 2-hydroxyethyl	0.94	0.04	0.9	0.13	N	868
Acrylate, methyl	Acrylate, α-chloro-, ethyl	0.09		3.22			638
Acrylate, methyl	Acrylate, α-cyano-, methyl	0.02	0.04	0.34	0.07	N	141
Acrylate, methyl	Acrylate, α-phenyl-, methyl	0.06		1			141
Acrylate, methyl	Acrylate, dibutylchlorotin	0.81		0.09			659
Acrylate, methyl	Acrylate, ferrocenylmethyl	4.46		0.14			293
Acrylate, methyl	Acrylate, hydroxyethyl	1	0.1	1	0.1		890
Acrylate, methyl	Acrylate, hydroxyethyl	0.23	0.03	0.94	0.1		890
Acrylate, methyl	Acrylate, tributyltin	0.82		0.03			659
Acrylate, methyl	Acrylic acid, α-bromo-	0.24		0.1			733
Acrylate, methyl	Acrylonitrile	0.51	0.02	0.56	0.03		1024
Acrylate, methyl	Acrylonitrile	0.844	0.037	1.54	0.044	Y	151
Acrylate, methyl	Acrylonitrile	0.85	0.2	1.31	0.08	N	233
Acrylate, methyl	Acryloyl chloride	0.34		2.3			508
Acrylate, methyl	Allyl acetate	5		0			470
Acrylate, methyl	Allyl acrylate	0.52		0.33			578
Acrylate, methyl	Allyl chloride					Y	204
Acrylate, methyl	Allyl chloride	8.45		0.05			437
Acrylate, methyl	Allyl chloride	5.45		0.07			437
Acrylate, methyl	Allyl chloride	6.46		0.4			437
Acrylate, methyl	Allyl chloride	9.1		−0.02			437
Acrylate, methyl	Allylbenzene	11.35	0.66	−0.036	0.016	Y	351
Acrylate, methyl	Benzophenone, *p*-vinyl-	0.09	0.02	3.6	1.06	Y	866
Acrylate, methyl	Benzophenone, *p*-vinyl-	1.1	0.02	3.54	0.077	Y	911
Acrylate, methyl	Butadiene	0.07	0.87	1.09	4.53	Y	257
Acrylate, methyl	Butadiene, 2-chloro-	0.06		10.4		Y	61
Acrylate, methyl	Carbamate, *N*,*N*-diethyl-, vinyl	4.78	0.22	−0.027	0.049	Y	92

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, methyl	Carbazole, *N*-vinyl-	0.53	0.13	0.049	0.029	Y	13
Acrylate, methyl	Carbazole, *N*-vinyl-	0.43		0.11			551
Acrylate, methyl	Carbazole, *N*-vinyl-	0.51	0.073	0.028	0.045	Y	98
Acrylate, methyl	Cinnamate, dibutylchlorotin	1.65		− 0.2			659
Acrylate, methyl	Diallyl phthalate	6.208	0.069	0.028	0.005	Y	297
Acrylate, methyl	Diallyl phthalate	6.18	0.16	0.038	0.008	Y	297
Acrylate, methyl	Diallylcyanamide	6.7		0.05			603
Acrylate, methyl	Diallylcyanamide	6.7		0.05			604
Acrylate, methyl	Ethylene					N	41
Acrylate, methyl	Ethylene	19.4		0.02			768
Acrylate, methyl	Ethylene 1,1-diphenyl-	0.09	0.01	− 0.24	0.15	N	334
Acrylate, methyl	Ethylene, 1,1-diphenyl-	0.12	0.01	0.21	0.05	N	334
Acrylate, methyl	Ethylene tetrachloro-	830		0			402
Acrylate, methyl	Ethylene, trichloro-	33		0			470
Acrylate, methyl	Fumarate, diisopropyl	1.9		0.091			1038
Acrylate, methyl	Hexatriene, tetrachloro-	0.262	0.087	3.19	1.36	Y	5
Acrylate, methyl	Hexene-1	− 0.13	0.6	− 0.67	0.03	Y	60
Acrylate, methyl	Imidazole, 1-vinyl-2-methyl-	1.28		0.05			465
Acrylate, methyl	Indene	0.63		0.1			606
Acrylate, methyl	Indene	0.62		0.12			606
Acrylate, methyl	Isoprene	0.12		0.75			424
Acrylate, methyl	Isoprene, 3-acetoxy-	0.27		5.71			770
Acrylate, methyl	Isopropenyl, 3-1-cyclohexenyl, acetate	0.37		0.57			770
Acrylate, methyl	Isopropenylisocyanate	0.6		0.11			434
Acrylate, methyl	Isopropenylisocyanate	0.799	0.049	0.079	0.047	Y	99
Acrylate, methyl	Maleic anhydride	2.788	0.051	0.012	0.013	Y	260
Acrylate, methyl	Maleic anhydride	2.5		0			470
Acrylate, methyl	Maleimide, *N*-(4-bromophenyl)-	0.429	0.099	0.39	0.17	Y	628
Acrylate, methyl	Maleimide, *N*-(4-chlorophenyl)-	0.684	0.052	0.155	0.052	Y	628
Acrylate, methyl	Maleimide, *N*-(4-tolyl)-	0.64	0.16	0.14	0.16	Y	644
Acrylate, methyl	Maleimide, *N*-phenyl-	0.554	0.048	0.103	0.052	Y	644
Acrylate, methyl	Methacrylate, 2,3-epithiopropyl	0.34		2.81			787
Acrylate, methyl	Methacrylate, 2-(*N,N*-dimethyl carbamoyloxy)ethyl	0.22		1.32			600
Acrylate, methyl	Methacrylate, 2-chloroethyl	0.29		2.19			726
Acrylate, methyl	Methacrylate, 2-hydroxyethyl	− 0.005	0.036	8.67	8.28	Y	358
Acrylate, methyl	Methacrylate, 2-hydroxypropyl	0.013	0.007	7.335	0.083	Y	333
Acrylate, methyl	Methacrylate, ferrocenylmethyl	1.4	0.35	0.042	0.085	Y	293
Acrylate, methyl	Methacrylate, methyl	0.4	0.12	2.15	0.04	N	324
Acrylate, methyl	Methacrylate, *t*-butyl dimethylsilyl	0.288	0.057	1.07	0.21	Y	1069
Acrylate, methyl	Methacrylic anhydride	0.16		4.75			275
Acrylate, methyl	Oxazoline, 2-,2-isopropenyl-	0.16		1.9			862
Acrylate, methyl	Oxazoline, 2-,2-isopropenyl-	0.328	0.032	2.07	0.191	Y	877
Acrylate, methyl	Oxazoline, 2-,2-isopropenyl-4,4-dimethyl	0.46		1.3			596
Acrylate, methyl	Oxazoline, 2-,4-acryloxy-methyl-2,4-dimethyl	0.29		0.11			596
Acrylate, methyl	Oxazoline, 2-,4-methacryl-oxy-2,4-dimethyl	0.4		0.56			596
Acrylate, methyl	Oxazolinium, 2-, tetrafluoro-borate, 3-methyl	0.552	0.043	0.344	0.105	Y	877
Acrylate, methyl	Phthalimide, *N*-(4-vinylphenyl)-	1.14		1.56			636
Acrylate, methyl	Phthalimide, *N*-(methacryloyloxy)-	0.193	0.028	1.23	0.168	Y	979
Acrylate, methyl	Propenyl, 2-chloro-, acetate	0.7		0			445
	Pyridine, 2-methyl-5-vinyl-	0.18	0.05	1	0.3	N	232
Acrylate, methyl	Pyridine, 2-vinyl-	0.37	0.4	2.13	0.54	Y	2
Acrylate, methyl	Pyridine, 2-vinyl-	0.17	0.03	1.72	0.26	N	231
Acrylate, methyl	Pyridine, 2-vinyl-	0.2	0.03	2.12	0.1	N	749
Acrylate, methyl	Pyridine, 2-vinyl-5-ethyl-	0.18	0.004	1.32	0.03	N	231
Acrylate, methyl	Pyridine, 4-vinyl-	0.2	0.03	1.78	0.32	N	231
Acrylate, methyl	Pyridine, 4-vinyl-	0.15		2.14			424
Acrylate, methyl	Pyrrolidone, 1-benzyl-3-methylene-5-methyl	0.125	0.025	1.58	0.24	Y	633
Acrylate, methyl	Styrene	0.24		0.82			139
Acrylate, methyl	Styrene	0.8	0.21	0.192	0.057	Y	14

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, methyl	Styrene	0.168	0.067	0.722	0.056	Y	151
Acrylate, methyl	Styrene	0.18		0.75			393
Acrylate, methyl	Styrene	0.18		0.75			397
Acrylate, methyl	Styrene	0.14		0.68			463
Acrylate, methyl	Styrene	0.07		0.9			495
Acrylate, methyl	Styrene	0.3		0.65			496
Acrylate, methyl	Styrene	0.16		0.4			496
Acrylate, methyl	Styrene	0.148	0.026	0.871	0.022	Y	865
Acrylate, methyl	Styrene, 2,5-dichloro-	0.142	0.054	3.93	1.38	Y	136
Acrylate, methyl	Styrene, 2,5-dichloro-	0.288	0.069	4.47	0.15	Y	2
Acrylate, methyl	Styrene, α-methoxy-	0.17	0.02	0.003	0.01	N	142
Acrylate, methyl	Styrene, *m*-methyl-	0.14		1.65			558
Acrylate, methyl	Styrene, *p*-1-(2-hydroxybutyl)-	0.18		0.48			548
Acrylate, methyl	Styrene, *p*-*N*,*N*-dimethylamino-	0.06	0.01	0.38	0.16	Y	866
Acrylate, methyl	Styrene, *p*-dimethylamino-	0.192	0.01	0.372	0.055	Y	911
Acrylate, methyl	Styrene, *p*-methoxy-	0.07		2			558
Acrylate, methyl	Styrene, *p*-methyl-	0.17		1.54			558
Acrylate, methyl	Succinimide, *N*-vinyl-	0.357	0.063	0.9	0.17	Y	80
Acrylate, methyl	Vinyl 2-chloroethyl ether	3.27		0			726
Acrylate, methyl	Vinyl acetate	7.28	0.37	0.04	0.01		1067
Acrylate, methyl	Vinyl acetate	6.38		0.03		Y	158
Acrylate, methyl	Vinyl acetate	2.58	0.3	0.405	0.043	Y	25
Acrylate, methyl	Vinyl acetate	6.7		0.03			489
Acrylate, methyl	Vinyl acetate	6.3		0.03			568
Acrylate, methyl	Vinyl butyl ether	3.65	0.07	0.01	0.01	N	345
Acrylate, methyl	Vinyl butyl ether	3.6		0			574
Acrylate, methyl	Vinyl butylsulfonate	4.14	0.58	0	0.4	Y	185
Acrylate, methyl	Vinyl chloride	4.4	0.22	0.093	0.002	Y	151
Acrylate, methyl	Vinyl chloride	7.66	0.5	0.002	0.01	Y	46
Acrylate, methyl	Vinyl chloride	5		0			470
Acrylate, methyl	Vinyl chloride	4		0.06			518
Acrylate, methyl	Vinyl cymantrene	0.46	0.14	0.211	0.067	Y	354
Acrylate, methyl	Vinyl ethyl ether	3.3		0			470
Acrylate, methyl	Vinyl fluoride	43		0.01			604
Acrylate, methyl	Vinyl fluoride	43		0.01			606
Acrylate, methyl	Vinyl hendecanoate	3.615	0.012	0.033	0.008	Y	145
Acrylate, methyl	Vinyl isobutyl ether	3.63	0.04	0	0.002	N	347
Acrylate, methyl	Vinyl isobutyl sulfide	0.3	0.01	0.05	0.02	N	285
Acrylate, methyl	Vinyl isobutyl sulfide	0.29	0.01	0.06	0.02	N	336
Acrylate, methyl	Vinyl methyl sulfide	0.209	0.034	0.084	0.086	Y	195
Acrylate, methyl	Vinyl phenyl sulfide	0.57	0.1	− 0.02	0.22	Y	193
Acrylate, methyl	Vinyl stearate	5.8		0.03			537
Acrylate, methyl	Vinyl thiolacetate	0.8		0.23			566
Acrylate, methyl	Vinyl, 2-bromo-, ethyl ether	16.83	2.34	− 0.79	0.32	Y	194
Acrylate, methyl	Vinyl, *p*-, benzylethylcarbinol	0.18		0.48			591
Acrylate, methyl	Vinylanthracene, 9-	2.998	0.067	0.08	0.092	Y	123
Acrylate, methyl	Vinylhydroquinone dibenzoate	0.46		0.75			440
Acrylate, methyl	Vinylidene chloride	0.95	0.21	0.9	0.11	Y	107
Acrylate, methyl	Vinylidene chloride	0.8		0.7			107
Acrylate, methyl	Vinylidene chloride	1		1			377
Acrylate, methyl	Vinylisocyanate	1.38		0.14			435
Acrylate, mono-, ethylene glycol	Acrylonitrile	1.2		0.8			682
Acrylate, *o*-chlorophenyl	Acrylonitrile	1.171	0.023	1.123	0.037	Y	363
Acrylate, *o*-chlorophenyl	Methacrylate, methyl	0.4		1.25			621
Acrylate, octadecyl	Acrylonitrile	1.04	0.38	1.91	0.1	Y	118
Acrylate, octadecyl	Acrylonitrile	1.35	0.4	4.39	0.64	N	233
Acrylate, octadecyl	Acrylonitrile	0.32	0.35	1.76	0.2	Y	290
Acrylate, octadecyl	Methacrylate, methyl	0.464	0.07	2.477	0.024	Y	290
Acrylate, octadecyl	Styrene	0.37	0.12	0.777	0.018	Y	290
Acrylate, octadecyl	Styrene	0.18		0.44			290
Acrylate, octadecyl	Styrene	0.31		0.79			290
Acrylate, octadecyl	Styrene	0.18		0.44			290
Acrylate, octadecyl	Vinylidene chloride	1	0.14	0.9	0.037	Y	118
Acrylate, octyl	Acrylonitrile	0.84	0.74	1.98	0.3	Y	118
Acrylate, octyl	Styrene	0.01	0.53	0.39	0.11		806

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylate, octyl	Vinyl chloride	4.8		0.12			518
Acrylate, octyl	Vinylidene chloride	0.679	0.057	0.851	0.018	Y	118
Acrylate, *p*-(cinnamoylamino)phenyl	Styrene	0.35		1.08			685
Acrylate, *p*-bromophenyl	Acrylonitrile	1.026	0.062	0.8	0.13	Y	363
Acrylate, *p*-bromophenyl	Methacrylate, methyl	0.191	0.014	0.926	0.056	Y	1074
Acrylate, *p*-chlorophenyl	Acrylonitrile	0.951	0.063	0.32	0.056	Y	63
Acrylate, *p*-chlorophenyl	Methacrylate, methyl	0.235	0.023	1.01	0.132	Y	1074
Acrylate, *p*-chlorophenyl	Methacrylate, methyl	0.3		1.09			621
Acrylate, *p*-methylphenyl	Methacrylate, methyl	0.223	0.036	1.45	0.275	Y	1074
Acrylate, pentabromophenyl	Styrene	0.1		0.16			643
Acrylate, pentachlorophenyl	Acrylic acid	1.12		0.82			900
Acrylate, pentachlorophenyl	Styrene	0.9		2.11			900
Acrylate, phenyl	Acrylonitrile	0.327	0.045	0.43	0.13	Y	363
Acrylate, phenyl	Fumarate, diisopropyl	3.4		0.07			1038
Acrylate, phenyl	Methacrylate, methyl	0.45		1.56			621
Acrylate, phenyl	Methacrylate, methyl	0.416	0.041	1.54	0.14	Y	672
Acrylate, sodium	Vinyl acetate					Y	37
Acrylate, *tert*-butyl	Methacrylate, glycidyl	0.463	0.079	2.096	0.443	Y	814
Acrylate, tetrahydrofurfuryl	Styrene	0.489	0.196	0.475	0.186		806
Acrylate, thio- butyl	Styrene	0.421	0.17	0.439	0.14		806
Acrylate, thio-, ethyl	Styrene	0.291	0.075	0.18	0.038		806
Acrylate, thio-, *tert*-butyl	Styrene	0.368	0.055	0.157	0.034		806
Acrylate, tributyltin	Acrylate, methyl	0.03		0.82			659
Acrylate, trifluoro-, methyl	Styrene	0		1.4			595
Acrylate, trifluoro-, methyl	Styrene	0		1.4			598
Acrylate, trifluoro-, methyl	Vinyl acetate	0		0.24			595
Acrylate, trifluoro-, methyl	Vinyl acetate	0		0.24			598
Acrylate, trifluoro-, methyl	Vinyl chloride	0		1.5			595
Acrylate, trifluoro-, methyl	Vinyl chloride	0		1.5			598
Acrylic acid	Acrolein	0.08	0.28	2.48	1.24	Y	57
Acrylic acid	Acrolein	1.15		0.5			57
Acrylic acid	Acrylamide	0.288	0.029	1.08	0.17	Y	221
Acrylic acid	Acrylamide	1.644	0.069	0.445	0.075	Y	278
Acrylic acid	Acrylamide	0.341	0.012	1.346	0.044	Y	278
Acrylic acid	Acrylamide	1.38	0.14	0.598	0.047	Y	37
Acrylic acid	Acrylamide	3.8		0.58			869
Acrylic acid	Acrylamide	0.29		1.06			869
Acrylic acid	Acrylamide, *N*,*N*-dimethyl-	0.36	0.04	0.35	0.12	N	205
Acrylic acid	Acrylate, pentachlorophenyl	0.82		1.12			900
Acrylic acid	Acrylate, butyl	0.59	0.27	1.08	0.18	N	187
Acrylic acid	Acrylate, butyl	1.31	0.3	0.91	0.13	N	252
Acrylic acid	Acrylate, ethyl	0.91		1.02			711
Acrylic acid	Acrylic acid, 2-benzamido-	0.48		2.08			1019
Acrylic acid	Acrylic acid, *N*-acetyl-α-amino-	1.41		0.49			661
Acrylic acid	Carbamate, *N*,*N*-diethyl-, vinyl	5.58	0.32	−0.097	0.068	Y	92
Acrylic acid	Carbamate, *N*-vinyl-, ethyl	4.69		0.26		Y	81
Acrylic acid	Imidazole, 1-vinyl-	0.0025		0.32			955
Acrylic acid	Methacrylate, isopropyl	1.03		0.68			847
Acrylic acid	Methacrylate, methyl	1.73	0.096	0.418	0.02	N	964
Acrylic acid	Methacrylate, butyl	0.24	0.21	3.53	0.42	N	187
Acrylic acid	*N*-Vinylimidazole	1.932	0.077	0.187	0.025	Y	879
Acrylic acid	Phosphonic acid, α-phenylvinyl-	0.7	0.13	0.04	0.83	Y	132
Acrylic acid	Propenyl, 2-chloro-, acetate	1		0			445
Acrylic acid	Propylene					Y	183
Acrylic acid	Pyrrolidone, *N*-vinyl-	0.88	0.69	0.1	0.21	N	250
Acrylic acid	Styrene	0.05		0.25			312
Acrylic acid	Styrene	0.08		1.1			312
Acrylic acid	Styrene	0.25		0.15			397
Acrylic acid	Styrene	0.35		0.22			414
Acrylic acid	Styrene	0.136	0.029	0.253	0.069	Y	47
Acrylic acid	Styrene	0.15		0.25			490
Acrylic acid	Styrene	0.45		0.25			542
Acrylic acid	Styrene	0.25		0.15			561
Acrylic acid	Vinyl acetate	8.66	6.63	0.021	0.059	Y	37
Acrylic acid	Vinyl chloride	6.69	0.88	0.107	0.011	Y	135

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylic acid	Vinyl chloride	9.28	0.51	0.03	0.09	N	229
Acrylic acid	Vinyl chloride	7.04	0.33	0.024	0.069	Y	288
Acrylic acid	Vinyl chloride	6.8		0.11			379
Acrylic acid	Vinylhydroquinone	0.29	0.11	0.026	0.092	Y	337
Acrylic acid	Vinylhydroquinone dibenzoate	0.44		0.95			444
Acrylic acid	Vinylidene chloride	1.246	0.042	0.437	0.065	Y	288
Acrylic acid	Vinylidene cyanide	0.212	0.016	0.291	0.042	Y	82
Acrylic acid, 2-benzamido-	Acrylic acid	2.08		0.48			1019
Acrylic acid, 2-benzamido-	Styrene	0.78		0.13			1019
Acrylic acid, 2-ethyl	Methacrylic acid	0.194	0.027	1.12	0.132	Y	1004
Acrylic acid, 2-ethyl	Methacrylic acid	0.069	0.04	2.29	0.417	Y	1004
Acrylic acid, 2-ethyl	Methacrylic acid	0.23		1.14		Y	961
Acrylic acid, *N*-acetyl-α-amino	Acrylic acid	0.49		1.41			661
Acrylic acid, *N*-acetyl-α-amino-	Styrene	0.44		0.91			661
Acrylic acid, α-bromo	Methacrylate, methyl	0.11		0.37			733
Acrylic acid, α-bromo	Acrylate, butyl	0.09		0.19			733
Acrylic acid, α-bromo	Acrylate, methyl	0.1		0.24			733
Acrylic acid, α-bromo	Methacrylate, butyl	0.13		0.85			733
Acrylic acid, α-bromo	Pyrrolidone, *N*-vinyl	0.07		0.25			694
Acrylic acid, *cis*-3-bromo-	Acrylamide	−0.2	0.11	7.64	1.67	Y	298
Acrylic acid, *cis*-3-ethyl	Acrylamide	−0.16	0.1	6.32	0.68	Y	298
Acrylic acid, *trans*-3-bromo-	Acrylamide	−0.33	0.16	4.13	0.76	Y	298
Acrylic acid, *trans*-3-ethyl-	Acrylamide	−0.21	0.11	8.19	1.09	Y	298
Acrylic anhydride	Allyl chloride	11.66	0.56	0.02	0.02	N	219
Acrylic anhydride	Methacrylonitrile	1	0.13	0.42	0.04	N	219
Acrylic anhydride	Styrene	0.1	0.004	0.16	0.01	N	219
Acrylonitrile	1,3-pentadiene, *cis*-	0.026	0.173	0.017	0.012	Y	912
Acrylonitrile	1,3-pentadiene, *cis*-	0.06	0.242	0.071	0.029	Y	912
Acrylonitrile	1,3-pentadiene, *trans*-	0.069	0.104	0.018	0.01	Y	912
Acrylonitrile	1,3-pentadiene, *trans*-	0.068	0.096	0.064	0.02	Y	912
Acrylonitrile	2-Oxazoline, 2-isopropenyl-	0.13	0.04	0.52	0.06		894
Acrylonitrile	Acenaphthalene	0.02		2.56			575
Acrylonitrile	Acetylene, phenyl-	0.266	0.044	0.325	0.083	Y	60
Acrylonitrile	Aconitate, trimethyl	4.24	0.92	−0.48	0.11	Y	147
Acrylonitrile	Acrolein	0.88	0.06	1.16	0.13	N	207
Acrylonitrile	Acrolein	0.71	0.03	1.07	0.08	N	207
Acrylonitrile	Acrolein	0.48	0.01	1.52	0.07	N	208
Acrylonitrile	Acrolein	0.6		1.28			504
Acrylonitrile	Acrolein diethylacetal	11.19		0.02			767
Acrylonitrile	Acrolein, methyl-	0.15		1.7			455
Acrylonitrile	Acrolein, methyl-	0.15		3.8			587
Acrylonitrile	Acrolein, methyl-	0.03	0.19	1.72	0.42	Y	91
Acrylonitrile	Acrylamide	0.863	0.033	0.81	0.11	Y	228
Acrylonitrile	Acrylamide	0.97	0.1	1.08	0.51	Y	228
Acrylonitrile	Acrylamide	1.8	0.75	0.5	0.26	N	330
Acrylonitrile	Acrylamide	0.88		1.36			421
Acrylonitrile	Acrylamide	0.8		1.3			461
Acrylonitrile	Acrylamide, *N*-methylol-	0.7		1.2			442
Acrylonitrile	Acrylamide, *N*-methylol-	0.98		2.33			577
Acrylonitrile	Acrylamide, *N*-methylol-	0.22		2.56			596
Acrylonitrile	Acrylamide, *N*-octadecyl-	1.034	0.02	1.4	0.17	Y	119
Acrylonitrile	Acrylamide, *N*-*tert*-butyl-	0.2		1.14			709
Acrylonitrile	Acrylate, 2-chloroethyl	1.03		0.87			790
Acrylonitrile	Acrylate, 2-nitrobutyl	0.67	0.25	1.76	0.69	N	234
Acrylonitrile	Acrylate, 3,4-epoxyhexahydrobenzyl	0.25	0.13	0.388	0.074	Y	680
Acrylonitrile	Acrylate, β-chloro-2-hydroxypropyl	0.24		0.7			654
Acrylonitrile	Acrylate, β-ethoxy-, ethyl	2.42	1.8	−0.26	0.56	N	194
Acrylonitrile	Acrylate, α-chloro-, methyl	0.122	0.081	1.76	0.18	Y	6
Acrylonitrile	Acrylate, α-cyano-, methyl	0.01	0.02	0.68	0.09	N	141
Acrylonitrile	Acrylate, α-phenyl-, methyl	0.08		6.7			141
Acrylonitrile	Acrylate, benzyl	0.28	0.19	0.72	0.16	N	23
Acrylonitrile	Acrylate, benzyl	1.49		0.63			385
Acrylonitrile	Acrylate, butyl	1.679	0.058	1.06	0.15	Y	118
Acrylonitrile	Acrylate, butyl	0.781	0.083	0.894	0.019	Y	162
Acrylonitrile	Acrylate, butyl	1.08	0.08	0.82	0.13	N	233

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylonitrile	Acrylate, butyl	1		0.9			513
Acrylonitrile	Acrylate, butyl	1		1.2			513
Acrylonitrile	Acrylate, *cis*-β-cyano-, methyl					N	1034
Acrylonitrile	Acrylate, cresyl	0.72	0.15	0.773	0.067	Y	363
Acrylonitrile	Acrylate, di-, zinc	0.41		0.24			646
Acrylonitrile	Acrylate, dodecyl	2.37	0.07	0.88	0.16	N	233
Acrylonitrile	Acrylate, ethyl	0.92	0.08	1.2	0.07		1023
Acrylonitrile	Acrylate, ethyl	1.16	0.78	0.81	0.27	N	198
Acrylonitrile	Acrylate, ethyl	0.66		4			389
Acrylonitrile	Acrylate, ethyl	0.44		0.95			542
Acrylonitrile	Acrylate, glycidyl	1.01		1			114
Acrylonitrile	Acrylate, *m*-chlorophenyl	1.3	0.073	0.85	0.036	Y	363
Acrylonitrile	Acrylate, methyl	0.56	0.03	0.51	0.02		1024
Acrylonitrile	Acrylate, methyl	1.54	0.044	0.844	0.037	Y	151
Acrylonitrile	Acrylate, methyl	1.31	0.08	0.85	0.2	N	233
Acrylonitrile	Acrylate, mono-, ethylene glycol	0.8		1.2			682
Acrylonitrile	Acrylate, *o*-chlorophenyl	1.123	0.037	1.171	0.023	Y	363
Acrylonitrile	Acrylate, octadecyl	1.91	0.1	1.04	0.38	Y	118
Acrylonitrile	Acrylate, octadecyl	4.39	0.64	1.35	0.4	N	233
Acrylonitrile	Acrylate, octadecyl	1.76	0.2	0.32	0.35	Y	290
Acrylonitrile	Acrylate, octyl	1.98	0.3	0.84	0.74	Y	118
Acrylonitrile	Acrylate, *p*-bromophenyl	0.8	0.13	1.026	0.062	Y	363
Acrylonitrile	Acrylate, *p*-chlorophenyl	0.32	0.056	0.951	0.063	Y	363
Acrylonitrile	Acrylate, phenyl	0.43	0.13	0.327	0.045	Y	363
Acrylonitrile	Acryloyl chloride	1.2		1			580
Acrylonitrile	Acryloylpyrrolidone	1.56		0.43			666
Acrylonitrile	Allyl acetate	6.57	2.11	−0.09	0.12	Y	108
Acrylonitrile	Allyl alcohol					N	108
Acrylonitrile	Allyl alcohol	2.6		0.05			108
Acrylonitrile	Allyl alcohol	3.9	1.06	0.1	0.16	N	176
Acrylonitrile	Allyl alcohol	1.79	0.11	0.12	0.37	Y	300
Acrylonitrile	Allyl chloride	2.145	0.049	−0.152	0.008	Y	108
Acrylonitrile	Allyl chloride	3.45	0.65	0.08	0.03	Y	47
Acrylonitrile	Allylbenzene	3.82	1.7	−0.05	0.15	Y	24
Acrylonitrile	Allylbenzene	5.35	0.3	−0.026	0.022	Y	351
Acrylonitrile	Allylcyclohexane	3.81	11.42	−0.18	1.01	Y	24
Acrylonitrile	Allylstearamide, *N*-	3.79	0.28	0.03	0.27	Y	119
Acrylonitrile	Benzothiazole, vinylmercapto-	0.191	0.014	0.178	0.081	Y	763
Acrylonitrile	Butadiene	0.046	0.006	0.358	0.046	Y	21
Acrylonitrile	Butadiene	0.1	0.059	0.452	0.023	Y	255
Acrylonitrile	Butadiene	0.05		0.35			418
Acrylonitrile	Butadiene	0.06		0.1			501
Acrylonitrile	Butadiene	0.03	0.02	0.2	0.01	N	66
Acrylonitrile	Butadiene, 1,4-dicarboxylate, diethyl	0.29	0.12	2.79	0.9	N	327
Acrylonitrile	Butadiene, 1-(diethylamino)-	0.481	0.049	0.426	0.208	Y	864
Acrylonitrile	Butadiene, 1-(diethylamino)-	0.208	0.049	0.425	0.48	Y	889
Acrylonitrile	Butadiene, 1-acetoxy-	−0.012	0.043	0.82	0.68	Y	91
Acrylonitrile	Butadiene, 1-ethoxy	0.02	0.008	0.065	0.009	Y	864
Acrylonitrile	Butadiene, 1-ethoxy	0.01	0.008	0.065	0.02	Y	889
Acrylonitrile	Butadiene, 2-chloro-	0.04		5.35			402
Acrylonitrile	Butadiene, 2-chloro-	0.05		4.8			504
Acrylonitrile	Butadiene, 2-chloro-	0.056	0.023	5.38	0.45	Y	61
Acrylonitrile	Butadiene, 2-fluoro-	0.077	0.021	0.6	0.18	Y	174
Acrylonitrile	Butadiene, 2-trimethylsilyloxy-	0.036		0.065			993
Acrylonitrile	Butadiene-1-carboxylate, ethyl	0.3		3.2			791
Acrylonitrile	Butadiene-1-carboxylic acid	0.2		4			791
Acrylonitrile	Butadiene-1-carboxylic acid	0.03		11			799
Acrylonitrile	Butene-1	13.46	3.61	0.24	0.81	Y	211
Acrylonitrile	Butene-1, 4-(*p*-chlorophenyl)-	4.68	0.63	0.066	0.044	Y	24
Acrylonitrile	Butene-1, 4-(*p*-methoxy-phenyl)-	2.56	1.11	−0.085	0.088	Y	24
Acrylonitrile	Butene-1, 4-cyclohexyl-	5.03	0.76	0.014	0.055	Y	24
Acrylonitrile	Butene-1, 4-phenyl-	4.51	0.86	0.024	0.069	Y	24
Acrylonitrile	Butene-2, *cis*	22.32		0.11		Y	211
Acrylonitrile	Butene-2, *trans*	62.99	10.67	0.84	0.6	Y	211
Acrylonitrile	Carbazole, *N*-vinyl-	0.39	0.04	0.09	0.04	N	269

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylonitrile	Cinnamate, α-cyano-, ethyl	12.6	2.3	−0.18	0.15	Y	310
Acrylonitrile	Cinnamonitrile	8.46	0.37	0.36	0.1	Y	310
Acrylonitrile	Cinnamonitrile, α-cyano-					Y	310
Acrylonitrile	Citraconimide, *N*-methyl-	0.53		0.6			460
Acrylonitrile	Crotonaldehyde	8		0			429
Acrylonitrile	Crotonaldehyde	25		0.01			504
Acrylonitrile	Crotonate, α-chloro-, ethyl	9.53		0			785
Acrylonitrile	Crotonate, α-cyano-, ethyl	11.4		0.06			785
Acrylonitrile	Crotonate, α-methoxy-, methyl	1		0			785
Acrylonitrile	Crotonate, α-methyl-, methyl	2.97		0			785
Acrylonitrile	Crotonate, α-acetyl-, methyl	8.68		0			785
Acrylonitrile	Crotonate, α-carboethoxy-, ethyl	18.7		0			785
Acrylonitrile	Crotonate, ethyl	25.2		0			785
Acrylonitrile	Crotonic acid	21		0			402
Acrylonitrile	Cyclopentene, 4-, -1,3-dione	3.02	0.71	0.04	0.058	Y	95
Acrylonitrile	Cyclopropene, 3,3-dimethoxy-	1.424	0.038	0.245	0.037	Y	838
Acrylonitrile	Diallyl phthalate	4.23	0.15	0.04	0.012	Y	153
Acrylonitrile	Diallyl phthalate	2.78	0.52	0.037	0.031	Y	153
Acrylonitrile	Ethylene	7		0			415
Acrylonitrile	Ethylene,1,1-diphenyl-	0.05	0.01	−0.02	0.01	N	143
Acrylonitrile	Ethylene, tetrachloro-	456		0			571
Acrylonitrile	Ethylene, tetrachloro-	470		0			59
Acrylonitrile	Ethylene, trichloro-	67		0			470
Acrylonitrile	Ethylene, trichloro-	62.1		0			572
Acrylonitrile	Fumarate, diisopropyl	16		0.2			1038
Acrylonitrile	Fumarate, diethyl	8		0			470
Acrylonitrile	Fumarate, diethyl	10		0.1			640
Acrylonitrile	Hexatriene, tetrachloro-	0.234	0.05	4.01	1.25	Y	4
Acrylonitrile	Hexene-1	2.07		−1.08		Y	60
Acrylonitrile	Indene	0.281	0.05	0.09	0.25	Y	360
Acrylonitrile	Indene	0.29	0.12	0.07	0.24	Y	360
Acrylonitrile	Isobutylene	1.295	0.008	0	0.002	Y	21
Acrylonitrile	Isobutylene	0.98	0.25	0.02	0.38	Y	211
Acrylonitrile	Isobutylene	1.02		0			484
Acrylonitrile	Isoprene	0.03		0.45			417
Acrylonitrile	Isopropenyl methyl ketone	0.3		1.2			490
Acrylonitrile	Isopropenyl methyl ketone	0.36		0.7			542
Acrylonitrile	Isopropenylisocyanate	0.24		0.1			434
Acrylonitrile	Itaconic acid	0.59	0.34	0.86	0.74	Y	164
Acrylonitrile	Itaconic anhydride	0.034	0.014	4.83	0.33	Y	365
Acrylonitrile	Maleate, diethyl	12		0			470
Acrylonitrile	Maleate, diethyl	20		0			640
Acrylonitrile	Maleic anhydride	6		0			470
Acrylonitrile	Maleimide, *N*-(2-bromophenyl)-	2.029	0.214	0.338	0.045	Y	863
Acrylonitrile	Maleimide, *N*-(2-chlorophenyl)-	0.956	0.095	1.078	0.048	Y	863
Acrylonitrile	Maleimide, *N*-(4-chlorophenyl)-	0.972	0.112	0.743	0.048	Y	863
Acrylonitrile	Maleimide, *N*-2-bromophenyl-	2.02	0.205	0.348	0.044	Y	915
Acrylonitrile	Maleimide, *N*-2-chlorophenyl-	0.955	0.095	1.08	0.048	Y	915
Acrylonitrile	Maleimide, *N*-4-chlorophenyl-	0.972	0.112	0.743	0.048	Y	915
Acrylonitrile	Maleimide, *N*-octadecyl-	2.482	0.119	0.389	0.023	Y	863
Acrylonitrile	Maleimide, *N*-octadecyl-	2.46	0.115	0.39	0.023	Y	915
Acrylonitrile	Methacrylamide, *N*-(*p*-chlorophenyl)-	0.399	0.019	0.627	0.051	Y	352
Acrylonitrile	Methacrylamide, *N*-(*p*-methoxyphenyl)-	0.337	0.019	0.559	0.048	Y	352
Acrylonitrile	Methacrylamide, *N*-(*p*-methylphenyl)-	0.336	0.026	0.549	0.06	Y	352
Acrylonitrile	Methacrylamide, *N*-(*p*-nitrophenyl)-	0.37	0.14	2.34	1.07	Y	352
Acrylonitrile	Methacrylamide, *N*-phenyl-	0.381	0.085	0.71	0.19	Y	352
Acrylonitrile	Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	0.02		14			664
Acrylonitrile	Methacrylate, 2-(*N*,*N*-dimethylcarbamoyloxy)ethyl	0.38		1.89			600
Acrylonitrile	Methacrylate, 2-bromoethyl	0.31		2.38			657
Acrylonitrile	Methacrylate, 2-chloroethyl	0.14		1.3			382
Acrylonitrile	Methacrylate, 2-hydroxyethyl	0.2		1			689
Acrylonitrile	Methacrylate, 2-naphthyl	0.15	0.2	1.17	0.2	Y	611
Acrylonitrile	Methacrylate, 2-naphthyl	0.094	0.099	1.02	0.19	Y	611

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylonitrile	Methacrylate, 2-naphthyl	0.06	0.1	0.76	0.18	Y	611
Acrylonitrile	Methacrylate, 2-naphthyl	– 0.01	0.16	0.64	0.24	N	611
Acrylonitrile	Methacrylate, 3,5-dimethyladamantyl	0.19	0.01	1.3	0.23	N	335
Acrylonitrile	Methacrylate, benzyl	0.2	0.1	0.96	0.1	N	23
Acrylonitrile	Methacrylate, butyl	0.291	0.039	0.98	0.2	Y	165
Acrylonitrile	Methacrylate, ferrocenylmethyl	0.15	0.04	0.82	0.42	Y	325
Acrylonitrile	Methacrylate, glycidyl	0.95	0.06	0.85	0.05	N	114
Acrylonitrile	Methacrylate, glycidyl	0.14		1.32			433
Acrylonitrile	Methacrylate, isobutyl	0.217	0.037	1.05	0.22	Y	165
Acrylonitrile	Methacrylate, methyl	0.138	0.037	1.322	0.05	Y	216
Acrylonitrile	Methacrylate, methyl	– 0.016	0.048	1.11	0.12	Y	681
Acrylonitrile	Methacrylate, mono-, ethylene glycol	0.19		1.5			682
Acrylonitrile	Methacrylate, phenyl	0.36		0.46			363
Acrylonitrile	Methacrylate, potassium	0.226	0.04	0.203	0.086	Y	808
Acrylonitrile	Methacrylate, potassium 18-crown-6-ether	0.07	0.006	0.175	0.018	Y	808
Acrylonitrile	Methacrylic acid	0.04	0.13	0.2	0.26	Y	16
Acrylonitrile	Methacrylic acid	0.092	0.06	2.38	0.29	Y	216
Acrylonitrile	Methacrylonitrile	0.43	0.04	1.67	0.12	N	198
Acrylonitrile	Methacryloyl chloride	0.35		2.8			580
Acrylonitrile	Methacryloyl acetone	0.01	0.004	3.74	0.22	Y	339
Acrylonitrile	Methylenebutyrolactone	0.09		1.1			745
Acrylonitrile	*N,N*-Divinylaniline	0.246	0.014	– 0.006	0.07	Y	45
Acrylonitrile	*N*-Vinylimidazole	3.393	0.008	0.832	0.044	Y	879
Acrylonitrile	Naphthalene, 1-vinyl-	0.107	0.028	0.451	0.088		967
Acrylonitrile	Norbornadiene	0.48	0.27	0.05	0.23	N	267
Acrylonitrile	Norbornadiene	0.66	0.01	0.44	0.05	N	69
Acrylonitrile	Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro	0.985	0.675	1.484	1.078	Y	838
Acrylonitrile	Oxazoline, 2-,2-isopropenyl-	0.13		0.52			862
Acrylonitrile	Oxazoline, 2-,2-isopropenyl-, 4-dimethyl	0.24		1.83			596
Acrylonitrile	Oxazoline, 2-,4-methacryloxy-2,4-dimethyl	0.11		0.89			596
Acrylonitrile	Pentadiene, *trans*-1,3-	0.06	0.064	0.095	0.021	Y	867
Acrylonitrile	Pentadiene, *cis*-1,3-	0.026	0.018	0.172	0.012	Y	867
Acrylonitrile	Pentadiene, *cis*-1,3-	0.056		0.198			952
Acrylonitrile	Pentadiene, *cis*-1,3-	0.033	0.017	0.188	0.011	N	997
Acrylonitrile	Pentadiene, *trans*-1,3-	0.07	0.017	0.104	0.01	Y	867
Acrylonitrile	Pentadiene, *trans*-1,3-	0.085		0.132			952
Acrylonitrile	Pentadiene, *trans*-1,3-	0.079	0.018	0.114	0.009	N	997
Acrylonitrile	Pentadiene, *cis*-1,3-	0.06	0.071	0.241	0.029	Y	867
Acrylonitrile	Pentadienoate, *trans*-4-ethoxy-2,4-, ethyl	0.01		5.4			723
Acrylonitrile	Pentene-1, 5-cyclohexyl-	4.22	0.45	– 0.043	0.044	N	24
Acrylonitrile	Pentene-1, 5-phenyl-	3.84	0.48	– 0.026	0.046	Y	24
Acrylonitrile	Phosphate, diethyl isopropenyl	15.2		0.03			650
Acrylonitrile	Phosphine oxide, diphenylvinyl-	3.8		0.16			843
Acrylonitrile	Phosphonic acid, α-phenylvinyl-	0.34	0.12	– 0.45	0.41	Y	132
Acrylonitrile	Phosphonic acid, α-phenylvinyl-	2.36		0			590
Acrylonitrile	Phthalide, 3-(4-vinylphenoxy)-	0.084	0.053	0.43	0.19	Y	721
Acrylonitrile	Phthalimide, *N*-vinyl-	0.43	0.01	0.24	0.02		1046
Acrylonitrile	Phthalimide, *N*-(methacryloyloxy)-	0.204	0.016	1.45	0.072	Y	979
Acrylonitrile	Pinene	0.07	0.01	13.5	0.1		936
Acrylonitrile	Propene, 2-chloro-	1.164	0.053	– 0.023	0.062	Y	181
Acrylonitrile	Propene, 3,3,3-trichloro-	12.2		0.1			402
Acrylonitrile	Propene, 1-chloro-, *cis*-	23.37	2.99	– 0.12	0.19	Y	181
Acrylonitrile	Propene, 1-chloro-, *trans*-	19.61	1.72	0.01	0.17	Y	181
Acrylonitrile	Pyridazinone, 3-(2-vinyl)-6-methyl-	0.32	0.02	0.19	0.04	N	340
Acrylonitrile	Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-	0.74	0.02	0.02	0.02	N	340
Acrylonitrile	Pyridine, 2-methyl-5-vinyl-	0.16	0.01	0.31	0.02	N	232
Acrylonitrile	Pyridine, 2-vinyl-	0.05		21.9			456
Acrylonitrile	Pyridine, 2-vinyl-	0.1	0.03	0.44	0.08	N	50
Acrylonitrile	Pyridine, 2-vinyl-5-ethyl-	0.02		0.43			115
Acrylonitrile	Pyridine, 2-vinyl-5-ethyl-	0.06	0.07	0.43	0.18	N	50
Acrylonitrile	Pyridine, 4-vinyl-	0.11		0.41			115
Acrylonitrile	Pyridine, 4-vinyl-	0.09	0.04	0.34	0.13	N	50

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylonitrile	Pyrrolidone, *N*-vinyl-					Y	213
Acrylonitrile	Silane, γ-methacryloxypropyltrimethoxy-	0.094	0.034	3.79	0.594	Y	977
Acrylonitrile	Styrene	0		0.33			140
Acrylonitrile	Styrene	0.02	0.06	0.29	0.04	N	198
Acrylonitrile	Styrene	0.05		0.4			269
Acrylonitrile	Styrene	0.03		0.36			396
Acrylonitrile	Styrene	0.06		0.39			403
Acrylonitrile	Styrene	0.05		0.37			417
Acrylonitrile	Styrene	0.07		0.37			543
Acrylonitrile	Styrene	0.04		0.4			60
Acrylonitrile	Styrene	0.17		0.3			727
Acrylonitrile	Styrene	0.17		0.33			727
Acrylonitrile	Styrene	0.15		0.33			727
Acrylonitrile	Styrene	0.17		0.36			727
Acrylonitrile	Styrene	0.07		0.46			727
Acrylonitrile	Styrene	0.06		0.41			727
Acrylonitrile	Styrene	0.03		0.43			727
Acrylonitrile	Styrene	0.06		0.55			727
Acrylonitrile	Styrene	0.01		0.35			812
Acrylonitrile	Styrene, 2,4,6-trimethyl-	0.874	0.051	0.065	0.048	Y	58
Acrylonitrile	Styrene, 2,5-dichloro-	0.22	0.01	0.08	0.03	N	84
Acrylonitrile	Styrene, 2,5-dichloro-	0.25		0.07			84
Acrylonitrile	Styrene, 2,5-dichloro-	0.26		0.09			84
Acrylonitrile	Styrene, 3-tri-*n*-butylstannyl-	4.88		0.001			985
Acrylonitrile	Styrene, 4-methyl-	0.079	0.005	0.227	0.021	Y	929
Acrylonitrile	Styrene, α-(trimethylsilyloxy)-	0.05		0			970
Acrylonitrile	Styrene, α-methoxy-	0.06	0.01	−0.002	0.01	N	142
Acrylonitrile	Styrene, α-methyl-	0.07	0.04	0.08	0.03	N	171
Acrylonitrile	Styrene, α-methyl-	0.04		0.17			265
Acrylonitrile	Styrene, α-methyl-	0.04		0.24			265
Acrylonitrile	Styrene, α-methyl-	0.04	0.005	0.14	0.03	N	65
Acrylonitrile	Styrene, α-methyl-	0.063	0.041	0.09	0.024	Y	75
Acrylonitrile	Styrene, α-methyl-	0.34	0.15	0.103	0.036	Y	75
Acrylonitrile	Styrene, α-methyl-	0.03		0.14			835
Acrylonitrile	Styrene, α-methyl-	−0.02	0.27	0.08	0.07	N	94
Acrylonitrile	Styrene, *m*-methyl-	0.07		0.43			378
Acrylonitrile	Styrene, *p*-1-(2-hydroxy-butyl)-	0.04		0.31			548
Acrylonitrile	Styrene, *p*-1-(2-hydroxy-propyl)-	0.1		0.53			380
Acrylonitrile	Styrene, *p*-2-(2-hydroxy-propyl)-	0.05		0.41			547
Acrylonitrile	Styrene, *p*-acetoxy-	0.07	0.01	0.4	0.03	N	47
Acrylonitrile	Styrene, *p*-chloro-	−0.09	0.06	0.92	0.06	N	825
Acrylonitrile	Styrene, *p*-chloromethyl-	0.067		0.56			1035
Acrylonitrile	Styrene *p*-methyl-	0.05		0.33			378
Acrylonitrile	Succinimide, *N*-vinyl-	0.116	0.024	0.516	0.081		80
Acrylonitrile	Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	0.42		1.1			583
Acrylonitrile	Tetrazole, 5-phenyl-2-(4′-vinyl)phenyl-	0.32		1.4			583
Acrylonitrile	Tetrazole, 1-vinyl-	0.54	0.032	0.314	0.066	Y	925
Acrylonitrile	Toluenesulfonamide, *N,N*-methyl-vinyl-	0.42	0.12	0.04	1.04	Y	80
Acrylonitrile	Triallyl citrate	1.76	0.082	−0.08	0.1	Y	367
Acrylonitrile	Tricyclo[4.2.2.0{2,5}]dec-7-ene-	2.75		0.25			963
Acrylonitrile	3,4,9,10-tetracarboxylic acid						
Acrylonitrile	Vinyl 12-ketostearate	3.3	0.5	−0.18	0.36	Y	146
Acrylonitrile	Vinyl 2-chloroethyl ether	1.09		0			597
Acrylonitrile	Vinyl 2-ethylhexanoate	9.24	1.96	−0.047	0.05	Y	47
Acrylonitrile	Vinyl 3,3-bis(ethoxycarbonyl)propyl ether	1.02		0.06			1015
Acrylonitrile	Vinyl acetate	4.05	0.82	0.04	0.067	Y	158
Acrylonitrile	Vinyl acetate					N	235
Acrylonitrile	Vinyl acetate	5.51	0.91	0.06	0.22	Y	6
Acrylonitrile	Vinyl acetate	5.29	1.13	−0.06	0.08	Y	75
Acrylonitrile	Vinyl acetate	9.2	6.39	−0.03	0.09	Y	75
Acrylonitrile	Vinyl benzoate	5.03	1.08	0.019	0.051	Y	47
Acrylonitrile	Vinyl bromide	2.79	0.2	0.06	0.04	N	268
Acrylonitrile	Vinyl bromide	2.25		0.06			268
Acrylonitrile	Vinyl butyl ether					N	345

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylonitrile	Vinyl butyl ether	0.98	0.13	−0.03	0.01	N	347
Acrylonitrile	Vinyl butyl sulfide	0.086	0.01	0.041	0.028	Y	303
Acrylonitrile	Vinyl chloride	3.26	0.34	−0.01	0.037	Y	140
Acrylonitrile	Vinyl chloride	2.55	0.12	0.07	0.03	N	202
Acrylonitrile	Vinyl chloride	2.62	0.25	0.02	0.08	N	22
Acrylonitrile	Vinyl chloride	3.62	0.21	0.044	0.002	Y	238
Acrylonitrile	Vinyl chloride	3.65	0.22	0.052	0.01	Y	46
Acrylonitrile	Vinyl chloride	4		0.04			529
Acrylonitrile	Vinyl chloroacetate	4.18	0.33	−0.007	0.016	Y	362
Acrylonitrile	Vinyl chloroacetate	0.34		0.09			542
Acrylonitrile	Vinyl chloroethyl ether	1.04	0.05	−0.02	0.02	N	116
Acrylonitrile	Vinyl chloromethyl ketone	0.064	0.019	0.88	0.12	Y	356
Acrylonitrile	Vinyl cymantrene	0.446	0.048	−0.065	0.093	Y	354
Acrylonitrile	Vinyl dichloroacetate	7.45	0.32	0.044	0.015	N	362
Acrylonitrile	Vinyl dichloroacetate	0.25		0.18			542
Acrylonitrile	Vinyl dodecyl ether	0.82		0			373
Acrylonitrile	Vinyl ether	0.94		0.02			386
Acrylonitrile	Vinyl ethyl ether	0.69	0.12	0.06	0.12	N	194
Acrylonitrile	Vinyl ethyl oxalate	1.34	0.45	0.06	0.03	N	285
Acrylonitrile	Vinyl ethyl sulfide	0.09	0.01	0.06	0.03	N	285
Acrylonitrile	Vinyl ethyl sulfide	0.06	0.01	0.05	0.03	N	336
Acrylonitrile	Vinyl ethyl sulfoxide	1.63	0.16	−0.08	0.14	Y	286
Acrylonitrile	Vinyl fluoride	44		0.005			528
Acrylonitrile	Vinyl fluoride	24		1			590
Acrylonitrile	Vinyl formate	2.54	1.79	−0.004	0.12	Y	47
Acrylonitrile	Vinyl hendecanoate	1.88	0.44	0.09	0.91	Y	145
Acrylonitrile	Vinyl isobutyl ether	−0.24	0.26	0.7	0.09	N	322
Acrylonitrile	Vinyl isobutyl ether	−0.05	0.07	0.99	0.06	N	322
Acrylonitrile	Vinyl isobutyl ether	0.98	0.15	−0.04	0.01	N	347
Acrylonitrile	Vinyl isobutyl ether	1.26	0.19	−0.04	0.02	N	347
Acrylonitrile	Vinyl isobutyl sulfide	0.08	0.005	0.03	0.01	N	285
Acrylonitrile	Vinyl isobutyl sulfide	0.062	0.004	0.022	0.038	Y	303
Acrylonitrile	Vinyl isobutyl sulfide	0.08	0.004	0.03	0.01	N	336
Acrylonitrile	Vinyl isothiocyanate	0.36		1.4			542
Acrylonitrile	Vinyl laurate	4		0.04			381
Acrylonitrile	Vinyl methyl ketone	0.59	0.13	1.75	0.11	Y	140
Acrylonitrile	Vinyl methyl ketone	0.63		1.39			504
Acrylonitrile	Vinyl octadecyl ether	0.85		0			373
Acrylonitrile	Vinyl octyl ether	0.81		0			373
Acrylonitrile	Vinyl phenyl ether	2.5		0.23			556
Acrylonitrile	Vinyl phenyl sulfide	0.11	0.01	0.03	0.02	N	285
Acrylonitrile	Vinyl phenyl sulfide	0.11	0.01	0.03	0.01	N	336
Acrylonitrile	Vinyl stearate	4.639	0.015	0.078	0.007	Y	145
Acrylonitrile	Vinyl *tert*-butyl sulfide	0.09	0.024	0	0.013	Y	303
Acrylonitrile	Vinyl trichloroacetate	7.34	0.9	0.047	0.039	Y	362
Acrylonitrile	Vinyl, α-chloro-, triethoxysilane					Y	
Acrylonitrile	Vinyl, *p*-, benzylethylcarbinol	0.04		0.31			591
Acrylonitrile	Vinyl, *p*-, benzylmethylcarbinol	0.11	0.17	0.54	0.2	N	48
Acrylonitrile	Vinyl-tris(trimethoxysiloxy)-silane	3.9		0.07			209
Acrylonitrile	Vinyl-tris(trimethoxysiloxy)-silane	3.85		0.08			573
Acrylonitrile	Vinylbenzoate, *p*-, sodium	0.174	0.04	0.23	0.34	Y	175
Acrylonitrile	Vinylbenzoic acid, *p*-	0.06	0.009	1.63	0.42	Y	175
Acrylonitrile	Vinylene carbonate	14.9		0.08			579
Acrylonitrile	Vinylethynyl-4-piperidinol, 1,2,5-trimethyl	0.08		0.38			783
Acrylonitrile	Vinylferrocene	0.186	0.025	0.165	0.092	Y	294
Acrylonitrile	Vinylferrocene	0.16		0.15			294
Acrylonitrile	Vinylhydroquinone	0.56	0.36	0.04	0.03	N	338
Acrylonitrile	Vinylidene chloride	0.92	0.11	0.32	0.14	Y	138
Acrylonitrile	Vinylidene chloride	1.04	0.2	0.28	0.034	Y	238
Acrylonitrile	Vinylidene chloride	0.44		0.4			404
Acrylonitrile	Vinylidene chloride	0.58		0.42			404
Acrylonitrile	Vinylidene chloride	0.65		0.49			404
Acrylonitrile	Vinylidene chloride	0.57		0.69			404
Acrylonitrile	Vinylidene chloride	0.5		0.76			404

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Acrylonitrile	Vinylidene chloride	0.48		0.95			404
Acrylonitrile	Vinylidene chloride	0.65		0.95			404
Acrylonitrile	Vinylidene chloride	0.65		1.3			404
Acrylonitrile	Vinylidene chloride	0.66		1.74			404
Acrylonitrile	Vinylidene chloride	0.63		1.43			404
Acrylonitrile	Vinylidene chloride	0.63		1.8			404
Acrylonitrile	Vinylidene chloride	0.58		0.39			468
Acrylonitrile	Vinylisocyanate	0.19		0.16			435
Acrylonitrile	Vinylmethyldiacetoxysilane	2.246	0.054	−0.11	0.23	Y	754
Acrylonitrile	Vinylmethylphenylsulfonium tetrafluoroborate	2.2		0.1			793
Acrylonitrile	Vinyltriethoxysilane	6.59	0.6	0.41	0.38	Y	209
Acrylonitrile	Vinyltriethoxysilane	26.83	29.59	2.69	2.5	Y	237
Acrylonitrile	Vinyltrimethoxysilane	9.09		0.45		Y	237
Acrylonitrile	Vinyltrimethylsilane	4.08	0.76	0.1	0.27	Y	209
Acrylonitrile, 2-chloro-	Styrene	0.087	0.04	0.014	0.004	Y	884
Acrylonitrile, 2-fluoro-	Styrene					Y	884
Acrylonitrile, α-chloro-	Styrene	0.03	0.02	0.13	0.04		806
Acrylonitrile, α-fluoro-	Styrene	0.03		0.44			850
Acrylonitrile, α-hydroxymethyl-	Styrene	0.528	0.086	0.205	0.029	Y	981
Acrylonitrile, α-methoxy	Acrylate, α-chloro-, ethyl	0.3		0.9			638
Acrylonitrile, α-methoxy	Styrene	0.312	0.054	0.534	0.069		806
Acrylonitrile, α-perfluoropropyl-	Methacrylate, methyl	0	0.05	1.9	0.3		926
Acryloxymethylpentamethyldisiloxane	Methacrylate, 2-hydroxyethyl	0.52		0.86			822
Acryloyl chloride	Acrylate, methyl	2.3		0.34			508
Acryloyl chloride	Acrylonitrile	1		1.2			580
Acryloyl chloride	Methacrylate, 2-hydroxypropyl	0.29		1.79			649
Acryloyl chloride	Methacrylate, methyl	1.51		0.48			508
Acryloyl chloride	Methacrylate, methyl	0.05		0.42			776
Acryloyl chloride	Pyrrolidone, *N*-vinyl	0.15		0.04			599
Acryloyl chloride	Styrene	0.02	0.02	0.1	0.05	N	220
Acryloyl chloride	Vinyl chloride	3.03	0.22	0.02	0.029	Y	288
Acryloyl chloride	Vinylidene chloride	1.12		0.5			288
Acryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	Acrylate, *N*-(2-hydroxyethyl)-carbazolyl	0.361	0.016	0.62	0.044	Y	702
Acryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	Methacrylate, *N*-ethyl-3-hydroxymethylcarbazolyl	0.103	0.015	1.425	0.09	Y	701
Acryloyloxy, 2-, benzoic acid	Methacrylate, *N*-methyl-*N*-phenyl-2-amino	1.82	0.2	0.22	0.03	N	651
Acryloyloxy, 2-, benzoic acid	Styrene	0.64	0.02	0.06	0.02	N	651
Acryloylpyrrolidone	Acrylonitrile	0.43		1.56			666
Adipate, divinyl	Styrene	0.011	0.011	20.36	0.26	Y	815
Allyl acetate	Acrylate, butyl	0.039	0.066	10.2	42.2	N	1053
Allyl acetate	Acrylate, methyl	0		5			470
Allyl acetate	Acrylonitrile	−0.09	0.12	6.57	2.11	Y	108
Allyl acetate	Isobutylene, 3-chloro-	0.15		4.5			412
Allyl acetate	Maleic anhydride	−0.001	0.007	0.028	0.019	Y	27
Allyl acetate	Methacrylate, ethyl	−0.57	0.82	81.27	1.93	N	210
Allyl acetate	Methacrylate, methyl	−2.42	37.66	99.24	24.6	N	210
Allyl acetate	Methacrylate, methyl	0		23			470
Allyl acetate	Styrene	0.01	0.05	62.8	82.7	N	1053
Allyl acetate	Styrene	0		90			470
Allyl acetate	Vinyl acetate	0.45		0.6			140
Allyl acetate	Vinyl acetate	0.7		1			502
Allyl acetate	Vinyl acetate	0.7		1			998
Allyl acetate	Vinyl chloride	1.2					470
Allyl acetate	Vinyl chloride	0		1.16			475
Allyl acetate	Vinylidene chloride	0		6.6			470
Allyl acrylate	Acrylate, methyl	0.33		0.52			578
Allyl acrylate	Allyl chloride	10.4		0.08			578
Allyl acrylate	Vinyl acetate	17.35		0.11			578
Allyl alcohol	Acrylonitrile					N	108
Allyl alcohol	Acrylonitrile	0.05		2.6			108
Allyl alcohol	Acrylonitrile	0.1	0.16	3.9	1.06	N	176
Allyl alcohol	Acrylonitrile	0.12	0.37	1.79	0.11	Y	300

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Allyl alcohol	Methacrylate, ethyl	–0.02	1.92	107.4	5.3	N	210
Allyl alcohol	Methacrylate, methyl	–1.62	2.9	78.79	6.5	N	210
Allyl butyrate	Vinyl acetate	0.64		0.97			998
Allyl chloride	Acrylate, benzyl	0.06		9.9			438
Allyl chloride	Acrylate, butyl	0.1		5.83			438
Allyl chloride	Acrylate, ethyl	0.08		7.73			438
Allyl chloride	Acrylate, methyl					Y	204
Allyl chloride	Acrylate, methyl	0.05		8.45			437
Allyl chloride	Acrylate, methyl	0.07		5.45			437
Allyl chloride	Acrylate, methyl	0.4		6.46			437
Allyl chloride	Acrylate, methyl	–0.02		9.1			437
Allyl chloride	Acrylic anhydride	0.02	0.02	11.66	0.56	N	219
Allyl chloride	Acrylonitrile	–0.152	0.008	2.145	0.049	Y	108
Allyl chloride	Acrylonitrile	0.08	0.03	3.45	0.65	Y	47
Allyl chloride	Allyl acrylate	0.08		10.4			578
Allyl chloride	Methacrylate, benzyl	0.02		58.7			438
Allyl chloride	Methacrylate, methyl					Y	204
Allyl chloride	Styrene	0.05	0.16	35.55	15.82	Y	10
Allyl chloride	Styrene						204
Allyl chloride	Styrene	0.03		36.8			438
Allyl chloride	Vinyl acetate	–2.4	3.21	1.355	0.089	Y	204
Allyl chloride	Vinyl acetate	0.61	0.15	0.66	0.15	Y	3
Allyl chloride	Vinyl acetate	0.75		0.34			438
Allyl chloride	Vinyl benzoate	0.88		0.46			438
Allyl chloride	Vinyl butyrate	1.15		0.31			438
Allyl chloride	Vinyl formate	0.78		0.57			438
Allyl chloride	Vinyl propionate	0.68		0.62			438
Allyl chloride	Vinylidene chloride	0.24	0.24	3.49	1.4	Y	3
Allyl chloroacetate	Methacrylic anhydride	–0.01	0.13	29.76	13	Y	106
Allyl chloroacetate	Styrene	0.06		34.3			782
Allyl glycidyl hexahydrophthalate	Styrene	0.06		34.3			782
Allyl glycidyl phthalate	Styrene	0.14		34.8			782
Allyl isobutyrate	Vinyl acetate	0.51		1.04			998
Allyl propionate	Vinyl acetate	0.42		1.29			998
Allyl trichloroacetate	Styrene	0.81	0.02	2.32	0.15		913
Allyl trimethylacetate	Vinyl acetate	0.34		1.15			998
Allyl valerate	Vinyl acetate	0.58		1.07			998
Allylbenzene	Acrylate, methyl	–0.036	0.016	11.35	0.66	Y	351
Allylbenzene	Acrylonitrile	–0.05	0.15	3.82	1.7	Y	24
Allylbenzene	Acrylonitrile	–0.026	0.022	5.35	0.3	Y	351
Allylbenzene	Maleic anhydride					Y	351
Allylbenzene	Methacrylonitrile	–0.061	0.03	16.24	1.36	Y	351
Allylbenzene	Triallyl citrate	0.339	0.039	2.01	0.5	Y	367
Allylcyclohexane	Acrylonitrile	–0.18	1.01	3.81	11.42	Y	24
Allylstearamide, *N*-	Acrylonitrile	0.03	0.27	3.79	0.28	Y	119
Allylstearamide, *N*-	Vinyl acetate	0.68	0.26	0.923	0.092	Y	119
Allylstearamide, *N*-	Vinylidene chloride	–0.24	0.19	5.22	0.15	Y	119
Allyltriethoxysilane	Vinyl chloride	–0.94	0.48	1.68	0.38	Y	237
Allylurea	Methacrylic anhydride	–0.06	0.17	29.01	18.48	Y	106
Azlactone, 2-vinyl-4,4-dimethyl-	Acrylate, α-hydroxymethyl-, ethyl	0.389	0.229	0.668	0.12	Y	1011
Azlactone, 2-vinyl-4,4-dimethyl-	Styrene	0.237	0.129	0.175	0.054	Y	1011
Azobenzene, 4-(acrylamidomethylamino)-	Styrene	8.5		0.083			880
Azobenzene, 4-(acrylamidomethylamino)-	Vinyl acetate	12.98		0.126			880
Benzenesulfamide, *p*-methacrylamide-	Vinyl butyl ether	3.4	0.1	0			1005
Benzimidazole, vinylmercapto-	Styrene	0.56	0.41	6.51	0.51	Y	764
Benzoate, *p*-(acryloylethoxy)-, *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	0.36		0.91			881
Benzoate, *p*-(acryloylethoxy)-, phenyl	Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	0.61		0.32			881
Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	0.91		0.36			881
Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy)-, phenyl	0.32		0.61			881
Benzoate, *p*-(acryloyloxy)-, *p*-methoxy phenyl	Benzoate, *p*-(acryloyloxy)-, phenyl *p*-butoxyphenyl	0.49		1.5			881

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Benzoate, *p*-(acryloyloxy)-, phenyl *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy)-, *p*-methoxyphenyl	1.5		0.49			881
Benzoate, *p*-(acryloyloxy)-, phenyl *p*-butoxy phenyl	Benzoate, *p*-(methacryloyloxy)-, (*p*-octyloxy)phenyl	0.23		1.26			881
Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy-ethoxy)-, *p*-butoxy phenyl	0.91		0.36			856
Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy-ethoxy)-, phenyl	0.32		0.61			856
Benzoate, *p*-(acryloyloxy)-, phenyl	Benzoate, *p*-(acryloyloxy-ethoxy)-, *p*-methoxy phenyl	1.5		0.49			856
Benzoate, *p*-(acryloyloxy)-, phenyl	Benzoate, *p*-(methacryloyloxy-ethoxy)-, *p*-methoxy phenyl	0.23		1.26			856
Benzoate, *p*-(acryloyloxy-ethoxy)-, *p*-butoxy phenyl	Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	0.36		0.91			856
Benzoate, *p*-(acryloyloxy-ethoxy)-, *p*-methoxy phenyl	Benzoate, *p*-(acryloyloxy)-, phenyl	0.49		1.5			856
Benzoate, *p*-(acryloyloxy-ethoxy)-,phenyl	Benzoate, *p*-(acryloyloxy)-, *p*-butoxy phenyl	0.61		0.32			856
Benzoate, *p*-(methacryloyloxy)-, *p*-octyloxy phenyl	Benzoate, *p*-(acryloyloxy)-, phenyl butoxy phenyl	1.26		0.23			881
Benzoate, *p*-(methacryloyloxyethoxy)-, *p*-octyloxy phenyl	Benzoate, *p*-(acryloyloxy)-, phenyl	1.26		0.23			856
Benzocyclobutane, α-methylene-	Maleic anhydride	0.002		0.025			1083
Benzocyclobutane, α-methylene-	Methacrylate, methyl	0.46		0.32			1083
Benzocyclobutene, 4-vinyl-	Methacrylate, methyl	1.47		0.6			1085
Benzofuran, 2-vinyl-	Acrylate, butyl	7.8	1.36	0.041	0.043	N	1020
Benzofuran, 2-vinyl-	Acrylate, ethyl	5.76	0.334	0.015	0.01	N	1020
Benzofuran, 2-vinyl-	Methacrylate, methyl	3.89	0.617	0.006	0.02	N	1020
Benzophenone, 2-hydroxy-4-(methacryloxy)-	Methacrylate, methyl	1.65	0.114	0.315	0.036	Y	934
Benzophenone, *p*-vinyl-	Acrylate, methyl	3.6	1.06	0.09	0.02	Y	866
Benzophenone, *p*-vinyl-	Acrylate, methyl	3.54	0.077	1.1	0.02	Y	911
Benzophenone, *p*-vinyl-	Styrene, *p*-*N*,*N*-dimethyl-aminomethyl-	2.54	0.136	0.26	0.017	Y	86
Benzophenone, *p*-vinyl-	Styrene, *p*-*N*,*N*-dimethylamino-	0.84	0.18	0.07	0.05	Y	866
Benzophenone, *p*-vinyl-	Styrene, *p*-dimethylamino-	0.842	0.072	0.176	0.046	Y	911
Benzophenone, *p*-vinyl-	Styrene, *p*-dimethylaminomethyl-	2.54	0.259	0.135	0.017	Y	911
Benzothiazole, vinylmercapto-	Acrylonitrile	0.178	0.081	0.191	0.014	Y	763
Benzothiazole, vinylmercapto-	Fumaronitrile					Y	763
Benzothiazole, vinylmercapto-	Maleic anhydride					Y	763
Benzothiazole, vinylmercapto-	Methacrylate, methyl	0.43	0.14	1.25	0.083	Y	763
Benzothiazole, vinylmercapto-	Styrene	0.349	0.087	2.171	0.07	Y	764
Benzothiazole, vinylmercapto-	Styrene	0.5	0.095	3.02	0.14	Y	764
Benzothiazole, vinylmercapto-	Vinyl acetate	2.53	0.47	0.013	0.037	Y	763
Benzothiazole, vinylmercapto-	Vinyl phenyl sulfide	0.95	0.61	0.24	0.12	Y	763
Benzothiazolone, *N*-[(methacroyloxy)-methyl]	Styrene	3.1	0.01	0.35	0.02		960
Benzoxazole, vinylmercapto-	Styrene	0.24	0.12	2.87	0.19	Y	764
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Methacrylate, methyl	0		30.5			994
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Methacrylate, methyl	0		108			994
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Styrene	0		18.2			994
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Styrene	0		89.2			994
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Vinyl acetate	0.35		1.26			994
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Vinyl acetate	0.15		1.46			994
Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	Vinyl acetate	0.014		1.99			994
Borazine, β-vinyl	Styrene	0.001	0.016	4.53	0.62		1018
Butadiene	Aconitate, trimethyl	0.4	0.4	0	0.22	Y	147
Butadiene	Acrylate, butyl	1.04	0.11	0.074	0.03	Y	257
Butadiene	Acrylate, heptafluorobutyl	0.359	0.039	0.073	0.031	Y	206

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Butadiene	Acrylate, methyl	1.09	4.53	0.07	0.87	Y	257
Butadiene	Acrylonitrile	0.358	0.046	0.046	0.006	Y	21
Butadiene	Acrylonitrile	0.452	0.23	0.1	0.059	Y	255
Butadiene	Acrylonitrile	0.35		0.05			418
Butadiene	Acrylonitrile	0.1		0.06			501
Butadiene	Acrylonitrile	0.2	0.01	0.03	0.02	N	66
Butadiene	Butadiene, 2,3-dimethyl-	1.26		0.78			173
Butadiene	Butadiene, 2,3-dimethyl-	0.3	0.92	0.86	0.24	Y	83
Butadiene	Butadiene, 2-chloro-	0.06		3.41			418
Butadiene	Butadiene, 2-phthalidomethyl	1.014	0.049	1.35	0.45	Y	735
Butadiene	Cyclobutane, 1,2-dimethylene-	0.1		5.76			854
Butadiene	Cyclobutane, 1,2-dimethylene-	0.1	0.05	5.76	0.36		885
Butadiene	Ethylene, trichloro-	9.64	0.21	−0.03	0.07	N	89
Butadiene	Ferrocene, ethyl-α-cylopentadienylide	0.02		1.51			699
Butadiene	Fumarate, diethyl	2.13		0.25			466
Butadiene	Isoprene	0.94		1.06			173
Butadiene	Isoprene	0.14	0.37	0.608	0.062	Y	83
Butadiene	Maleamic acid, *N*-3-dimethylamino-6-methyl phenyl	0.37	0.04	−0.08	0.03	N	679
Butadiene	Maleate, diethyl	8.08		0.11			466
Butadiene	Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	1.06		0.35			600
Butadiene	Methacrylate, methyl	0.75		0.25			140
Butadiene	Methacrylate, methyl	0.504	0.024	0.027	0.004	Y	257
Butadiene	Methacrylate, methyl	0.7		0.32			467
Butadiene	Methacrylonitrile	0.39	0.15	0.053	0.016	Y	257
Butadiene	Methyleneglutaronitrile, 2-					N	196
Butadiene	Pentadiene, *cis*-1,3-	0.63		0.26			743
Butadiene	Pentadiene, *trans*-1,3-	1.22		0.09			743
Butadiene	Pyridine, 2-methyl-5-vinyl-	0.61		0.47			462
Butadiene	Pyridine, 2-methyl-5-vinyl-	1.32		0.72			520
Butadiene	Pyridine, 2-methyl-5-vinyl-	1.29	0.02	0.41	0.02	N	56
Butadiene	Styrene	1.44	0.56	0.84	0.4	Y	140
Butadiene	Styrene	1.55	0.14	0.37	0.25	N	159
Butadiene	Styrene	1.37		0.38			173
Butadiene	Styrene					Y	21
Butadiene	Styrene	1.35		0.58			418
Butadiene	Styrene	1.59		0.44			428
Butadiene	Styrene	1.8		0.6			473
Butadiene	Styrene	1.4		0.44			486
Butadiene	Styrene	1.4		0.38			486
Butadiene	Styrene	0.5		0.68			491
Butadiene	Styrene	1.38	0.11	0.82	0.13	N	56
Butadiene	Styrene	1.83	0.41	0.83	0.21	Y	83
Butadiene	Styrene	1.38		0.64			83
Butadiene	Styrene, 2,5-dichloro-	0.449	0.043	0.45	0.17	Y	255
Butadiene	Styrene, 2,5-dichloro-	0.662	0.017	0.187	0.049	Y	8
Butadiene	Styrene, *p*-chloromethyl	0.87		0.42			1075
Butadiene	Styrene, α-methyl-	1.5	0.13	0.139	0.087	Y	70
Butadiene	Styrene, *p*-chloro-	1.22	2.16	1.6	5.7	Y	255
Butadiene	Vinyl chloride	8.8		0.04			517
Butadiene	Vinyl chloride	5.27	3.35	−0.11	0.31	Y	717
Butadiene	Vinylhendecanoate	22.56	24.54	−0.22	1.26	Y	145
Butadiene	Vinyl pelargonate	26.3		0.02			145
Butadiene	Vinyl stearate	42.5	4.73	0.02	0.27	Y	145
Butadiene	Vinylferrocene	4.34	0.18	0.16	0.15	Y	802
Butadiene	Vinylidene chloride	1.97	0.25	−0.044	0.038	Y	257
Butadiene monoxide	Maleic anhydride	0.05	0.18	0.64	0.06		1064
Butadiene, 1,4-dicarboxylate-,diethyl	Acrylonitrile	2.79	0.9	0.29	0.12	N	327
Butadiene, 1,4-dicarboxylate-, diethyl	Pyridine, 2-vinyl-	0.69	0.23	0.41	0.07	N	327
Butadiene, 1,4-dicarboxylate-,diethyl	Styrene	0.55	0.1	0.09	0.014	Y	327
Butadiene, 1-(2-hydroxyethylthio)-	Styrene, *p*-chloro-	3.27		0.24			810
Butadiene, 1-(diethylamino)-	Acrylonitrile	0.426	0.208	0.481	0.049	Y	864
Butadiene, 1-(diethylamino)-	Acrylonitrile	0.425	0.48	0.208	0.049	Y	889
Butadiene, 1-acetoxy-	Acrylonitrile	0.82	0.68	−0.012	0.043	Y	91

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Butadiene, 1-chloro-	Styrene	1.44	3.1	0.27	0.27	Y	695
Butadiene, 1-ethoxy-	Acrylonitrile	0.065	0.009	0.02	0.008	Y	864
Butadiene, 1-ethoxy-	Acrylonitrile	0.065	0.02	0.01	0.008	Y	889
Butadiene, 1-phthalimido-	Styrene	1.56	0.63	0.299	0.049	Y	163
Butadiene, 1-succinimido-	Styrene	1.68	0.16	0.286	0.018	Y	163
Butadiene, 2,3-bis(diethylphosphono)-	Maleimide	0.14		0.43			759
Butadiene, 2,3-bis(diethylphosphono)-	Maleimide, *N*-(2-hydroxyethyl)-	0.12		0.49			759
Butadiene, 2,3-bis(diethylphosphono)-	Maleimide, *N*-(4-chlorophenyl)-	0.03		0.41			759
Butadiene, 2,3-bis(diethylphosphono)-	Maleimide, *N*-(4-methoxy-phenyl)-	0.04		0.47			759
Butadiene, 2,3-bis(diethylphosphono)-	Maleimide, *N*-chloromethyl-	0.05		0.3			759
Butadiene, 2,3-bis(diethylphosphono)-	Maleimide, *N*-phenyl-	0.05		0.42			759
Butadiene, 2,3-dichloro-	Butadiene, 2-chloro-	1.98	0.25	0.31	0.12	Y	122
Butadiene, 2,3-dichloro-	Ethylene, 1,1-diphenyl-	3.58		−0.08		Y	61
Butadiene, 2,3-dichloro-	Methacrylate, methyl	11.04		0.08		Y	61
Butadiene, 2,3-dichloro-	Phosphonic acid, α-phenylvinyl-	7.75		0.07			588
Butadiene, 2,3-dichloro-	Phosphonic acid, α-phenylvinyl-	7.75		0.07			597
Butadiene, 2,3-dichloro-	Styrene	8.65		0.25			587
Butadiene, 2,3-dichloro-	Styrene	10.6		0.05		Y	61
Butadiene, 2,3-dimethyl-	Butadiene	0.78		1.26			173
Butadiene, 2,3-dimethyl-	Butadiene	0.86	0.24	0.3	0.92	Y	83
Butadiene, 2,3-dimethyl-	Isoprene	0.84		1.18			173
Butadiene, 2,3-dimethyl-	Styrene	1.048	0.066	0.534	0.035	Y	173
Butadiene, 2,3-chloro-		5.19		0.06			457
Butadiene, 2,3-chloro-	Acrylate, methyl	10.4		0.06		Y	61
Butadiene, 2,3-chloro-	Acrylonitrile	5.35		0.04			402
Butadiene, 2,3-chloro-	Acrylonitrile	4.8		0.05			504
Butadiene, 2,3-chloro-	Acrylonitrile	5.38	0.45	0.056	0.023	Y	61
Butadiene, 2,3-chloro-	Butadiene	3.41		0.06			418
Butadiene, 2,3-chloro-	Butadiene, 1-(2-hydroxyethyl-thio)-	1		0.2			810
Butadiene, 2,3-chloro-	Butadiene, 2,3-dichloro-	0.31	0.12	1.98	0.25	Y	122
Butadiene, 2,3-chloro-	Butadiene, 2-fluoro-	3.7		0.22			493
Butadiene, 2,3-chloro-	Butadiene, hexafluoro-	5.47		0.1			127
Butadiene, 2,3-chloro-	Butadiene, hexafluoro-	5.52		0.1			453
Butadiene, 2,3-chloro-	Ethylene, 1,1-diphenyl-	3.4		0.03		Y	61
Butadiene, 2,3-chloro-	Fumarate, diethyl	6.51		0.02		Y	61
Butadiene, 2,3-chloro-	Hexatriene, tetrachloro-	3.6		0.2			459
Butadiene, 2,3-chloro-	Isoprene	2.82		0.06			418
Butadiene, 2,3-chloro-	Isopropenyl methyl ketone	4.035	0.087	0.14	0.01	Y	259
Butadiene, 2,3-dichloro-	Methacrylate, methyl	11.04	0.08			Y	61
Butadiene, 2-chloro-	Maleic anhydride	0.026	0.03	0.329	0.107	N	1068
Butadiene, 2-chloro-	Methacrylate, isobutyl	1.8	0.06	0.9	0.088	N	1057
Butadiene, 2-chloro-	Methacrylate, methyl	6.33		0.08		Y	61
Butadiene, 2-chloro-	Methacrylic acid	2.52	0.2	−0.035	0.058	Y	259
Butadiene, 2-chloro-	Phosphonate, vinyl-,dimethyl	7.5		0.1			594
Butadiene, 2-chloro-	Phosphonic acid, α-phenylvinyl-	7.5		0.1			546
Butadiene, 2-chloro-	Phosphonic acid, α-phenylvinyl-	7.5		0.1			597
Butadiene, 2-chloro-	Quinoline, 2-vinyl-	2.1		0.38			456
Butadiene, 2-chloro-	Styrene	7.84		0.05		Y	61
Butadiene, 2-chloro-	Styrene	5.98	0.5	0.025	0.047	Y	8
Butadiene, 2-chloro-	Vinyl acetate	33.52	8.98	−0.02	0.09	N	247
Butadiene, 2-chloro-	Vinyl butyrate					N	247
Butadiene, 2-chloro-	Vinyl formate	15		−0.04			127
Butadiene, 2-chloro-	Vinyl formate	11.91	3.89	−0.05	0.01	N	247
Butadiene, 2-chloro-	Vinyl propionate					N	247
Butadiene, 2-chloro-	Vinylidene cyanide					Y	82
Butadiene, 2-fluoro-	Acrylonitrile	0.6	0.18	0.077	0.021	Y	174
Butadiene, 2-fluoro-	Butadiene, 2-chloro-	0.22		3.7			493
Butadiene, 2-fluoro-	Butadiene, hexafluoro-	2.93		0.24			453
Butadiene, 2-fluoro-	Isoprene	2.63	0.96	0.25	0.12	Y	174
Butadiene, 2-fluoro-	Methacrylate, methyl	1.23	1.77	0.76	0.77	Y	174
Butadiene, 2-fluoro-	Styrene	2.1	0.12	0.214	0.03	Y	174
Butadiene, 2-fluoro-	Styrene	1.24	0.61	0.22	0.15	Y	174
Butadiene, 2-fluoro-	Styrene, α-methyl-	2.22	0.7	0.72	0.24	Y	174
Butadiene, 2-phthalidomethyl-	Butadiene	1.35	0.45	1.014	0.049	Y	735
Butadiene, 2-trimethylsilyloxy-	Acrylonitrile	0.065		0.036			993
Butadiene, 2-trimethylsilyloxy-	Styrene	1.2		0.64			993

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Butadiene, hexafluoro-	Butadiene, 2-chloro-	0.1		5.47			127
Butadiene, hexafluoro-	Butadiene, 2-chloro-	0.1		5.52			453
Butadiene, hexafluoro-	Butadiene, 2-fluoro-	0.24		2.93			453
Butadiene, hexafluoro-	Isoprene	0.78		1.19			453
Butadiene,1-(2-hydroxyethylthio)-	Butadiene, 2-chloro-	0.2		1			810
Butadiene-1carboxylate, ethyl	Styrene	0.56		0.12			791
Butadiene-1carboxylate, *S*-(-)α-phenethyl-ammonium	Styrene	6.81	1.68	0.45	0.13	Y	748
Butadiene-1-carboxylate, ethyl	Acrylonitrile	3.2		0.3			791
Butadiene-1-carboxylate, ethyl	Pyridine, 2-vinyl-	0.8		0.4			791
Butadiene-1-carboxylic acid	Acrylonitrile	4		0.2			791
Butadiene-1-carboxylic acid	Acrylonitrile	11		0.03			799
Butadiene-1-carboxylic acid	Styrene	0.52		0.15			791
Butadiene-1-carboxylic acid	Styrene	5.55		0.08			799
Butanoate, 3-acrylamido-3-methyl-, sodium	Acrylamide, *N,N*-dimethyl-	0.22	0.138	0.987	0.153	Y	857
Butene, *cis*-2-	Maleimide, *N*-cyclohexyl-	3		0			995
Butene-1	Acrylonitrile	0.24	0.81	13.46	3.61	Y	211
Butene-1	Ethylene	3.25					388
Butene-1	Ethylene	0.16		3.6			407
Butene-1	Vinyl acetate	0.11	0.42	1.55	0.24	Y	211
Butene-1	Vinyl chloride	0.12	0.12	3.34	0.58	Y	30
Butene-1, 2-ethyl-	Vinyl chloride	– 1.05	0.89	1.56	0.26	N	329
Butene-1, 2-methyl-	Vinyl chloride	– 1.18	1.2	1.01	0.31	N	329
Butene-1, 3,3-dimethyl-	Vinyl chloride	– 0.44	0.28	5.64	0.2	N	329
Butene-1, 3,3-dimethyl-	Vinyl chloride	– 0.07	2.5	6.18	13.57	Y	6
Butene-1, 4-(*p*-chlorophenyl)-	Acrylonitrile	– 0.066	0.044	4.68	0.63	Y	24
Butene-1, 4-(*p*-methoxyphenyl)-	Acrylonitrile	– 0.085	0.088	2.56	1.11	Y	24
Butene-1, 4-cyclohexyl-	Acrylonitrile	0.014	0.055	5.03	0.76	Y	24
Butene-1,4-phenyl-	Acrylonitrile	0.024	0.069	4.51	0.86	Y	24
Butene-2	Ethylene			7.5			477
Butene-2	Vinyl chloride	– 1.79	5.22	3.3	2.18	N	329
Butene-2, 2-methyl-	Vinyl chloride	0.3	5.31	8.52	10.54	N	329
Butene-2, *cis*-	Acrylonitrile	0.11		22.32		Y	211
Butene-2, *cis*-	Vinyl acetate	0.03	0.25	8.27	1.05	Y	211
Butene-2, *cis*-	Vinyl chloride	0		8.8			230
Butene-2, *trans*-	Acrylonitrile	0.84	0.6	62.99	10.67	Y	211
Butene-2, *trans*-	Vinyl acetate	– 0.03	0.44	7.2	1.69	Y	211
Butenoate, 3-phenyl-3-, methyl	Styrene	– 0.532	0.512	1.97	0.364	Y	1008
Butyrolactone, α-methylene-	Styrene	0.85	0.06	0.14	0.01	N	663
Caprolactam, *N*-vinyl-	Crotonaldehyde	0.31		0			875
Caprolactam, *N*-vinyl-	Crotonaldehyde	0.31	0.005	0			907
Caprolactam, *N*-vinyl-	*N*-Vinyl pyrrolidone	1.7	0.2	2.8	0.2		883
Caprolactam, *N*-vinyl-	Pyridine, 2-methyl-5-vinyl-	0.04		11.58			589
Caprolactam, *N*-vinyl-	Pyridine, 2-methyl-5-vinyl-	0.04		11.58			592
Caprolactam, *N*-vinyl-	Pyridine, 2-vinyl-	0.12		4.35			589
Caprolactam, *N*-vinyl-	Pyridine, 2-vinyl-	0.12		4.35			592
Caprolactam, *N*-vinyl-	Pyridine, 4-vinyl-	0.1		4.43			589
Caprolactam, *N*-vinyl-	Pyridine, 4-vinyl-	0.1		4.43			592
Caprolactam, *N*-vinyl-	Pyrrolidone, *N*-vinyl-	1.7		2.8			859
Caprolactam, *N*-vinyl-	Styrene	1.02	0.01	0.2	0.01		916
Caprolactam, *N*-vinyl-	Vinyl acetate	0.31		0.63			557
Caprolactam, *N*-vinyl-	Vinyl acetate	2.5		0.35			859
Caprolactam, *N*-vinyl-	Vinyl acetate	2.5		0.35			883
Caprolactam, *N*-vinyl-	Vinyl butyl ether	3.1	5.3	0.03	0.73	Y	215
Caprolactam, *N*-vinyl-	Vinyl isopropyl ether	0.22	1.95	0.01	0.96	Y	215
Caprolactam, *N*-vinyl-	Vinyl phenyl ether	1.3	2.43	0.26	0.37	Y	214
Carbamate, *N,N*-diethyl-, vinyl	Acrylate, methyl	– 0.027	0.049	4.78	0.22	Y	92
Carbamate, *N,N*-diethyl-, vinyl	Acrylic acid	– 0.097	0.068	5.58	0.32	Y	92
Carbamate, *N,N*-diethyl-, vinyl	Maleic anhydride	0.024	0.066	0.025	0.034	Y	92
Carbamate, *N,N*-diethyl-, vinyl	Styrene	– 0.08	0.18	29.56	3.59	Y	197
Carbamate, *N,N*-diethyl-, vinyl	Vinyl acetate	0.13	0.19	1.7	0.04	Y	197
Carbamate, *N*-phenyl-, vinyl	Methacrylate, butyl	0.329		0.418			833
Carbamate, *N*-phenyl-, vinyl	Methacrylate, di-, triethylene-glycol	0.034		0.504			833
Carbamate, *N*-vinyl-, ethyl	Acrylic acid	0.26		4.69		Y	81

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Carbamate, *N*-vinyl-, ethyl	Pyrrolidone, *N*-vinyl-	0.371	0.05	1.77	0.12	Y	81
Carbamate, *N*-vinyl-, ethyl	Vinyl acetate	2.09		0.39			629
Carbamate, *N*-vinyl-, ethyl	Vinyl acetate	0.4	0.26	0.418	0.063	Y	81
Carbamate, *N*-vinyl-, *tert*-butyl	Vinyl acetate	0.46	0.03	1.12	0.07	N	827
Carbamate, *N*-vinyl-, *tert*-butyl	Methacrylate, methyl	0.17	0.1	1.87	0.2		991
Carbamate, *N*-vinyl-, *tert*-butyl	*N*-Vinylpyrrolidone	2.4	0.5	0.4	0.06		991
Carbazole, 2-butenyl-	Carbazole, 9-vinyl-	0.02	0.003	2.6	0.5		904
Carbazole, 9-propenyl-	Carbazole, 9-vinyl-	0.02	0.003	2.8	0.5		904
Carbazole, 9-vinyl-	Carbazole, 2-butenyl-	2.6	0.5	0.02	0.003		904
Carbazole, 9-vinyl-	Carbazole, 9-propenyl-	2.8	0.5	0.02	0.003		904
Carbazole, *N*-butenyl-	Carbazole, *N*-vinyl-	0.02		2.6			871
Carbazole, *N*-methyl-3-vinyl	Styrene	1.404	0.146	0.735	0.067		806
Carbazole, *N*-propenyl-	Carbazole, *N*-vinyl-	0.02		2.8			871
Carbazole, *N*-vinyl-	Acenaphthalene	– 0.03	0.12	6.62	1.77	N	331
Carbazole, *N*-vinyl-	Acrylate, ethyl	0.27		1.1			757
Carbazole, *N*-vinyl-	Acrylate, methyl	0.049	0.029	0.53	0.13	Y	13
Carbazole, *N*-vinyl-	Acrylate, methyl	0.11		0.43			551
Carbazole, *N*-vinyl-	Acrylate, methyl	0.028	0.045	0.51	0.073	Y	98
Carbazole, *N*-vinyl-	Acrylonitrile	0.09	0.04	0.39	0.04	N	269
Carbazole, *N*-vinyl-	Carbazole, *N*-butenyl-	2.6		0.02			871
Carbazole, *N*-vinyl-	Carbazole, *N*-propenyl-	2.8		0.02			871
Carbazole, *N*-vinyl-	Fumarate, diisopropyl	0		0			1038
Carbazole, *N*-vinyl-	Maleate, diethyl	0.21	0.05	0	0.01	N	361
Carbazole, *N*-vinyl-	Maleate, dimethyl	0.51	0.11	0	0.01	N	361
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.14	0.03	1.55	0.16	N	11
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.033	0.015	2.12	0.14	Y	13
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.06		1.8			738
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.75		0.57			738
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.08	0.05	1.84	0.26	N	758
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.33	0.18	0.44	0.22	N	758
Carbazole, *N*-vinyl-	Methacrylate, methyl	0.031	0.022	2.123	0.048	Y	98
Carbazole, *N*-vinyl-	Propene, 2,3-dichloro-	1		0			376
Carbazole, *N*-vinyl-	Styrene	– 0.02	0.06	6	1.34	N	11
Carbazole, *N*-vinyl-	Styrene	0.026	0.034	5.93	1.05	Y	13
Carbazole, *N*-vinyl-	Styrene	0.032	0.057	5.72	0.4	Y	98
Carbazole, *N*-vinyl-	Styrene, *p*-chloro-	0.02		7			551
Carbazole, *N*-vinyl-	Succinimide, *N*-vinyl-	0.04	0.09	0.11	0.83	Y	284
Carbazole, *N*-vinyl-	Vinyl acetate	2.67	0.13	0.126	0.023	Y	246
Carbazole, *N*-vinyl-	Vinyl acetate	3.02		0.15			246
Carbazole, *N*-vinyl-	Vinyl acetate	3.9		0.13			551
Carbazole, *N*-vinyl-	Vinyl butyrate	1.33	0.34	0.07	0.12	Y	246
Carbazole, *N*-vinyl-	Vinyl chloride	4.77		0.17			427
Carbazole, *N*-vinyl-	Vinyl formate	4.142	0.011	0.192	0.001	Y	246
Carbazole, *N*-vinyl-	Vinyl propionate	1.69	0.21	0.081	0.073	Y	246
Carbazole, *N*-vinyl-	Vinyl thiolacetate	0.44	0.28	0.45	0.15	N	97
Carbazole, *N*-vinyl-	Vinylidene chloride	3.6	0.12	– 0.023	0.068	Y	13
Carbazole, *N*-vinyl-	Vinylidene chloride	3.65	0.3	– 0.008	0.018	Y	98
Carbon monoxide	Ethylene	0.32	0.65	0.068	0.012	Y	51
Carbon monoxide	Ethylene	0.004	0.012	0.025	0.006	Y	51
Carbon monoxide	Ethylene	– 0.15	0.07	0.04	0.01	N	52
Carbon monoxide	Ethylene	0		0.5			52
Carbon monoxide	Vinyl acetate	0.33		0.24			474
Carbon monoxide	Vinyl chloride	0.121	0.011	13.52	0.25	Y	184
Cinnamat, methyl	Styrene	0.04	0.13	1.799	0.073	Y	488
Cinnamate, 2-chloroethyl	Styrene	0.01	0.11	1.394	0.068	Y	488
Cinnamate, α-cyano-, 2-ethylhexyl	Styrene	0.06	0.01	0.58	0.004	N	282
Cinnamate, α-cyano-, benzyl	Styrene	– 0.16	0.17	0.4	0.03	N	282
Cinnamate, α-cyano-, butyl	Styrene	– 0.09	0.08	0.47	0.03	N	282
Cinnamate, α-cyano-, cyclohexyl	Styrene	– 0.24	0.22	0.37	0.04	N	282
Cinnamate, α-cyano-, ethyl	Acrylonitrile	– 0.18	0.15	12.6	2.3	Y	310
Cinnamate, α-cyano-, ethyl	Styrene					Y	134
Cinnamate, α-cyano-, hexyl	Styrene	– 0.17	0.26	0.39	0.04	N	282
Cinnamate, α-cyano-, methyl	Pyrrolidone, *N*-vinyl-	– 0.001	0.001	0.044	0.008	Y	816
Cinnamate, α-cyano-, methyl	Styrene	– 0.21	0.35	0.4	0.06	N	282
Cinnamate, benzyl	Styrene	0.14	0.13	1.33	0.12	Y	488

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Cinnamate, butyl	Styrene	0.04	0.15	1.757	0.082	Y	488
Cinnamate, dibutylchlorotin	Acrylate, methyl	− 0.2		1.65			659
Cinnamate, ethyl	Styrene	− 0.076	0.054	1.52	0.31	Y	200
Cinnamate, ethyl	Styrene	0.082	0.045	1.566	0.035	Y	488
Cinnamate, methyl	Styrene	0.02		1.27			653
Cinnamate, *p*-chloro-, methyl	Styrene	0.04		2.24			653
Cinnamate, *p*-methyl-, methyl	Styrene	0		2.84			653
Cinnamate, phenyl	Styrene	0.029	0.055	1.66	0.12	Y	488
Cinnamate, *tert*-butyl	Styrene	0.1	0.12	1.692	0.087	Y	488
Cinnamic acid, *cis*-	Acrylamide	− 0.48	0.28	3.84	0.68	Y	298
Cinnamic acid, *trans*-	Acrylamide	− 0.24	0.15	3.4	0.24	Y	298
Cinnamide, *N,N*-diethyl-	Styrene	0.01		4.17			737
Cinnamide, *p*-chloro-, *N,N*-diethyl-	Styrene	0.01		2.99			737
Cinnamide, *p*-methyl-, *N,N*-diethyl-	Styrene	0.01		4.95			737
Cinnamonitrile	Acrylonitrile	0.36	0.1	8.46	0.37	Y	310
Cinnamonitrile	Styrene	− 0.008	0.021	2.549	0.092	Y	134
Cinnamonitrile, α-cyano-	Acrylonitrile					Y	310
Cinnamonitrile, α-cyano-	Styrene					Y	134
Citraconate, di-*sec*-butyl	Styrene	0.13		2			841
Citraconate, dibenzyl	Styrene	0.047		1.55			841
Citraconate, dibutyl	Styrene	0.054		2.74			841
Citraconate, dicyclohexyl	Styrene	0.03		1.88			841
Citraconate, diethyl	Styrene	0.029		2.48			841
Citraconate, diisobuty	Styrene	0.03		1.8			841
Citraconate, diisopropyl	Styrene	0.076		1.62			841
Citraconate, dimethyl	Styrene	0.049		1.58			841
Citraconate, dipropyl	Styrene	0.027		2.19			841
Citraconic acid	Styrene	0		1.36			1021
Citraconic anhydride	Styrene	0.021	0.058	0.16	0.15	Y	47
Citraconimide, β-iso-, *N*-(4-acetylphenyl)-	Styrene	0		0.42			608
Citraconimide, β-iso-, *N*-(4-acetylphenyl)-	Styrene	0		0.28			608
Citraconimide, β-iso-, *N*-(4-ethoxycarbonylphenyl)-	Styrene	0		0.3			608
Citraconimide, β-iso-, *N*-(4-methoxy-phenyl)-	Styrene	0		0.27			608
Citraconimide, β-iso-, *N*-(*p*-tolyl)-	Styrene	0		0.4			608
Citraconimide, β-iso-, *N*-phenyl-	Styrene	0		0.39			608
Citraconimde, *N*-(1-menthylcarboxy-latomethyl)-	Methacrylate, methyl	0.109	0.115	3.47	0.335	Y	950
Citraconimide, *N*-(4-acetoxyphenyl)-	Methacrylate, methyl	0.18	0.13	1.88	0.16	Y	728
Citraconimide, *N*-(4-acetoxyphenyl)-	Styrene	0.015	0.086	0.151	0.054	Y	728
Citraconimide, *N*-(4-chlorophenyl)-	Methacrylate, methyl	− 0.01	0.18	2.93	0.4	Y	728
Citraconimide, *N*-(4-chlorophenyl)-	Styrene	0.075	0.093	0.181	0.057	Y	728
Citraconimide, *N*-(4-ethoxycarbonyl-phenyl)-	Methacrylate, methyl	− 0.027	0.084	2.72	0.18	Y	728
Citraconimide, *N*-(4-ethoxycarbonyl-phenyl)-	Styrene	0.004	0.033	0.148	0.018	Y	728
Citraconimide, *N*-(4-methoxyphenyl)-	Methacrylate, methyl	− 0.1	0.19	3.16	0.73	Y	728
Citraconimide, *N*-(4-methoxyphenyl)-	Styrene	0.04	0.11	0.63	0.19	Y	728
Citraconimide, *N*-allyl	Styrene	0.004		0.142			959
Citraconimide, *N*-benzyl-	Methacrylate, methyl	0.02	0.14	2.77	0.28	Y	714
Citraconimide, *N*-benzyl	Styrene	− 0.066	0.082	0.19	0.087	Y	714
Citraconimide, *N*-butyl-	Methacrylate, methyl	− 0.12	0.36	2.17	0.56	Y	714
Citraconimide, *N*-butyl-	Styrene	0.03	0.045	0.169	0.028	Y	714
Citraconimide, *N*-ethyl-	Methacrylate, methyl	− 0.04	0.33	3.25	0.79	Y	714
Citraconimide, *N*-ethyl-	Styrene	− 0.002	0.05	0.231	0.044	Y	714
Citraconimide, *N*-hexyl-	Methacrylate, methyl	− 0.08	0.28	2.38	0.45	Y	714
Citraconimide, *N*-hexyl-	Styrene	− 0.03	0.11	0.316	0.086	Y	714
Citraconimide, *N*-isobutyl-	Methacrylate, methyl	− 0.18	0.42	1.78	0.85	Y	714
Citraconimide, *N*-isobutyl-	Styrene	0.07	0.14	0.326	0.094	Y	714
Citraconimide, *N*-isopropyl-	Methacrylate, methyl	0.09	0.27	2.7	0.51	Y	714
Citraconimide, *N*-isopropyl-	Styrene	− 0.014	0.063	0.244	0.055	Y	714
Citraconimide, *N*-methyl-	Acrylonitrile	0.6		0.53			460
Citraconimide, *N*-methyl-	Methacrylate, methyl	0.15		3.24			460
Citraconimide, *N*-methyl-	Styrene	0.24		0.15			460

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Citraconimide, *N*-methyl-	Styrene	0.24		0.14			506
Citraconimide, *N*-phenyl-	Methacrylate, methyl	0.001	0.033	3.081	0.074	Y	728
Citraconimide, *N*-phenyl-	Styrene	– 0.001	0.023	0.175	0.016	Y	728
Citraconimide, *N*-propyl-	Methacrylate, methyl	– 0.03	0.43	3.23	0.98	Y	714
Citraconimide, *N*-propyl-	Styrene	– 0.014	0.087	0.196	0.062	Y	714
Citraconimide, *N*-*tert*-butyl-	Methacrylate, methyl	0.038	0.072	2.88	0.19	Y	714
Citraconimide, *N*-*tert*-butyl-	Styrene	0.045	0.05	0.465	0.039	Y	714
Citraconimide, *N*-tolyl-	Methacrylate, methyl	0.003	0.088	2.75	0.19	Y	728
Citraconimide, *N*-tolyl-	Styrene	– 0.02	0.18	0.31	0.13	Y	728
Citraconimide, α-iso-, *N*-(4-acetylphenyl)-	Styrene	0		0.81			608
Citraconimide, α-iso-, *N*-(4-chlorophenyl)-	Styrene	0		1.03			608
Citraconimide, α-iso-, *N*-(4-ethoxy-carbonylphenyl)-	Styrene	0		0.96			608
Citraconimide, α-iso-, *N*-(4-methoxy-phenyl)-	Styrene	0		0.39			608
Citraconimide, α-iso-, *N*-(p-tolyl)-	Styrene	0		1.69			608
Citraconimide, α-iso-, *N*-phenyl-	Styrene	0		1.76			608
Copper diacrylate	Titanium, dicylopentadienyl-, dimethacrylate	1.09		0.89			895
Crotonaldehyde	Acrylonitrile	0		8			429
Crotonaldehyde	Acrylonitrile	0.01		25			504
Crotonaldehyde	Caprolactam, *N*-vinyl-	0		0.31			875
Crotonaldehyde	Caprolactam, *N*-vinyl-	0		0.31	0.005		907
Crotonaldehyde	Pyrrolidone, *N*-vinyl-	– 0.15	0.01	0.42	0.02	N	248
Crotonaldehyde	Styrene	0.03		14.7			428
Crotonaldehyde	Styrene	0.07		14.7			428
Crotonaldehyde	Styrene	0.12		14.7			428
Crotonaldehyde	Vinyl chloride	– 0.56	0.25	1.55	0.26	N	271
Crotonaldehyde	Vinylidene chloride	0					405
Crotonate, hydrocortisone 21-	*N*-Vinyl pyrrolidone	0.05	0.05	0.75	0.02		1022
Crotonate, α-acetyl-, methyl	Acrylonitrile	0		8.68			785
Crotonate, α-acetyl-, methyl	Styrene	0		2.7			785
Crotonate, α-bromo-, ethyl	Styrene	0		4.42			785
Crotonate, α-carboethoxy-, ethyl	Acrylonitrile	0		18.7			785
Crotonate, α-carboethoxy-, ethyl	Styrene	0		8.24			785
Crotonate, α-chloro-, ethyl	Acrylonitrile	0		9.53			785
Crotonate, α-chloro-, ethyl	Styrene	0		5.13			785
Crotonate, α-cyano-, ethyl	Acrylonitrile	0.06		11.4			785
Crotonate, α-cyano-, ethyl	Styrene	0.02		0.26			785
Crotonate, α-methoxy-, methyl	Acrylonitrile	0		1			785
Crotonate, α-methoxy-, methyl	Styrene	0.04		18.4			785
Crotonate, α-methyl-, methyl	Acrylonitrile	0		2.97			785
Crotonate, α-methyl-, methyl	Styrene	0.02		30.7			785
Crotonate, ethyl	Acrylonitrile	0		25.2			785
Crotonate, ethyl	Styrene	0		27			785
Crotonate, methyl	Styrene	– 0.27	0.22	9.68	1.86	Y	112
Crotonic acid	Acrylamide	– 0.18	0.14	3.76	0.89	Y	298
Crotonic acid	Acrylamide	– 0.19	0.19	4.23	1.37	Y	298
Crotonic acid	Acrylamide	0.11		4.72			569
Crotonic acid	Acrylamide	0.12		5.32			569
Crotonic acid	Acrylonitrile	0		21			402
Crotonic acid	Pyrrolidone, *N*-vinyl-	0	0.03	0.84	0.07	N	245
Crotonic acid	Styrene	0		20			402
Crotonic acid	Vinyl acetate	0.04	0.14	0.317	0.081	Y	47
Crotonic acid	Vinyl acetate	0.01		0.3			526
Crotonic acid	Vinyl acetate	0.001	0.1	0.31	0.07	N	94
Crotonic acid	Vinylidene chloride	– 0.2	1.03	18.1	43.7	Y	47
Crotonic acid, *cis*-	Acrylamide					Y	341
Crotonic acid, *trans*-	Acrylamide	– 0.085	0.024	7.2	0.33	Y	341
Crotononitrile	Styrene	– 0.012	0.06	23.29	1.7	Y	112
Crotononitrile	Styrene	0		23.8			785
Crotononitrile, α-phenyl-	Styrene	0		0.43			785
Cyclobutane, 1,2-dimethylene-	Butadiene	5.76		0.1			854
Cyclobutane, 1,2-dimethylene-	Butadiene	5.76	0.36	0.1	0.05		885
Cyclobutane, 1,2-dimethylene-	Styrene	3.6		0.26			854

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Cyclobutane, 1,2-dimethylene-	Styrene	3.6	0.16	0.28	0.05		885
Cyclopentene, 4-,-1,3-dione	Acrylonitrile	0.04	0.058	3.02	0.71	Y	95
Cyclopentene, 4-,-1,3-dione	Methacrylate, methyl	0.094	0.017	8.11	0.38	Y	95
Cyclopentene, 4-,-1,3-dione	Styrene					Y	263
Cyclopentene, 4-,-1,3-dione	Styrene, *p*-chloro-	0.014	0.006	0.294	0.081	Y	264
Cyclopentene, 4-,-1,3-dione	Vinylidene chloride	0.113	0.027	1.88	0.35	Y	264
Cyclopropane, 1,1-bis(ethoxycarbonyl)-2-vinyl-	Methacrylate, methyl	0.223	0.194	4.21	0.905	Y	1076
Cyclopropane, 1,1-bis(ethoxycarbonyl)-2-vinyl-	Methacrylate, methyl	0.111	0.194	18.3	2.5	Y	1076
Cyclopropene, 3,3-dimethoxy-	Acrylonitrile	0.245	0.037	1.424	0.038	Y	838
Diallyl β-cyanoethylisocyanurate	Vinyl acetate	4.6		0.06			778
Diallyl melamine	Methacrylate, methyl					Y	201
Diallyl melamine	Styrene	−0.32	0.2	36.96	4.02	Y	201
Diallyl melamine	Vinyl acetate	0.318	0.073	0.68	0.026	Y	201
Diallyl phthalate	Acrylate, methyl	0.028	0.005	6.208	0.069	Y	297
Diallyl phthalate	Acrylate methyl	0.038	0.008	6.18	0.16	Y	297
Diallyl phthalate	Acrylonitrile	0.04	0.012	4.23	0.15	Y	153
Diallyl phthalate	Acrylonitrile	0.037	0.031	2.78	0.52	Y	153
Diallyl phthalate	Fumarate, dibutyl	0.02		1.01			665
Diallyl phthalate	Fumarate, diethyl	0.01		1.25			665
Diallyl phthalate	Fumarate, dioctyl	0.02		0.96			665
Diallyl phthalate	Methacrylate, methyl	−0.001	0.011	26.56	1.98	Y	153
Diallyl phthalate	Methacrylate, methyl	0.029	0.026	22.73	1.48	Y	153
Diallyl phthalate	Methacrylate, methyl	0.076	0.006	21.52	0.39	Y	153
Diallyl phthalate	Styrene	0.041	0.038	36.41	1.23	Y	152
Diallyl phthalate	Styrene	0.026	0.071	25.59	2.19	Y	152
Diallyl phthalate	Styrene	0.038	0.04	23.67	1.2	Y	152
Diallyl phthalate	Styrene	0.08		18.8			152
Diallyl phthalate	Styrene	0.09		27.5			152
Diallyl phthalate	Styrene	0.1		16.9			152
Diallyl phthalate	Styrene	0.1		23.8			152
Diallyl phthalate	Styrene	0.13		15.1			152
Diallyl phthalate	Vinyl acetate	2.19	0.34	0.336	0.049	Y	297
Diallyl phthalate	Vinyl acetate	1.66	0.16	0.414	0.029	Y	297
Diallyl phthalate	Vinyl acetate	2		0.72			509
Diallyl phthalate	Vinyl chloride	0.7	0.046	0.833	0.012	Y	296
Diallyl phthalate	Vinylidene chloride	0.2		5			376
Diallyl, 1,3-,5-(2-hydroxy-3-phenoxypropyl)isocyanate	Vinyl acetate	5.5		0.15			671
Diallyl, 1,3-,5-(2-hydroxy-3-phenoxypropyl)isocyanate	Vinyl acetate	3.65		0.16			676
Diallylcyanamide	Acrylate, methyl	0.05		6.7			603
Diallylcyanamide	Acrylate, methyl	0.05		6.7			604
Diallylcyanamide	Methacrylate, methyl	0.04		25			603
Diallylcyanamide	Methacrylate, methyl	0.04		25			604
Diallylcyanamide	Vinyl acetate	1.62		0.01			581
Diallylcyanamide	Vinyl chloride	0.68		0.44			602
Diallylcyanamide	Vinyl chloride	0.68		0.44			603
Diallyldimethylammonium chloride	Vinyl acetate	1.95		0.35			1029
Dicyclopentadiene	Maleic anhydride	0.037	0.112	0.071	0.045	Y	914
Dihydroxydiphenylsulfone diallyl ether	Styrene	0.92	0.16	0.975	0.015		1016
Dimethyleneheptanedioate, 2,6-,dimethyl	Methacrylate, methyl	0.53	0.02	2.36	0.25	N	795
Dioxolane,1,3-,4,4-dimethyl-5-methylene-2-trichloro-	Pyrrolidone, *N*-vinyl-	0.01		3.87			647
Dioxolane,1,3-,4-methylene-2-trichloromethyl-	Acrylamide	0.037		8.6			616
Dioxolane,1,3-,4-methylene-2-trichloromethyl-	Pyrrolidone, *N*-vinyl-	0.04		2.98			647
Diphenyl sulfone,3,3′-bisitaconimido-*m*,*m*′-	Methacrylic acid	0.015	0.058	0.564	0.032	Y	1042
Dithiane, 2-methylene-1,3-	Methacrylate, methyl	4.12		0.08			1031
Dithiane, 2-methylene-1,3-	Styrene	3.35		0.03			1031
Divinylbenzene, *m*-	Styrene	0.58	0.04	0.58	0.15	N	262
Divinylbenzene, *p*-	Maleic anhydride	0.01	0.01	0.09	0.01		943

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Divinylbenzene, *p*-	Styrene	1.18	0.17	0.26	0.25	N	262
Ethene, 2-phenyl-1,1-dicyano-	*N*-Vinylpyrrolidone					Y	947
Ethylene	Acrylate, butyl	0.01	0.003	13.94	0.38	N	42
Ethylene	Acrylate, methyl					N	41
Ethylene	Acrylate, methyl	0.02		19.4			768
Ethylene	Acrylonitrile	0		7			415
Ethylene	Butene-1	3.25					388
Ethylene	Butene-1	3.6		0.16			407
Ethylene	Butene-2	7.5					477
Ethylene	Carbon monoxide	0.068	0.012	0.32	0.65	Y	51
Ethylene	Carbon monoxide	0.025	0.006	0.004	0.012	Y	51
Ethylene	Carbon monoxide	0.04	0.01	−0.15	0.07	N	52
Ethylene	Carbon monoxide	0.5		0			52
Ethylene	Ethylene, tetrafluoro-	0.52	0.18	0.067	0.12		1093
Ethylene	Ethylene, tetrafluoro-	0.575	0.09	0.065	0.027		1094
Ethylene	Ethylene, tetrafluoro-	0.61		0.02			563
Ethylene	Ethylene, tetrafluoro-	0.38		0.1			563
Ethylene	Fumarate, diethyl	0.11	1.14	1.91	3.4	N	41
Ethylene	Maleate, diethyl	0.25		10			41
Ethylene	Maleic anhydride	0.04		0			620
Ethylene	Methacrylate, di-, zinc	0.19		40			935
Ethylene	Methacrylate, methyl					N	41
Ethylene	Phosphonate, vinyl-, diphenyl	0.088	0.01	1.66	2.22	Y	801
Ethylene	Phosphonate, vinyl-, bis(2-chloroethyl)	0.077	0.003	7.73	2.19	Y	801
Ethylene	Phosphonate, vinyl- diisobutyl					Y	801
Ethylene	Propylene	3.43					388
Ethylene	Propylene	3.2		0.62			477
Ethylene	Styrene	0.05		14.88			615
Ethylene	Vinyl acetate	0.16	0.03	0.72	1.2	N	309
Ethylene	Vinyl acetate					N	41
Ethylene	Vinyl acetate	0.28		1.14			413
Ethylene	Vinyl acetate	0.88	0.52	1.03	0.77	N	42
Ethylene	Vinyl acetate	0.74		1.52			559
Ethylene	Vinyl acetate	0.67	0.03	3.74	0.64	N	68
Ethylene	Vinyl acetate	0.13	0.01	1.23	0.21	N	68
Ethylene	Vinyl acetate	0.79		1.4			766
Ethylene	Vinyl butyrate	0.7		1.5			605
Ethylene	Vinyl chloride	0.19	0.17	1.99	0.42	N	180
Ethylene	Vinyl chloride	0.24	0.13	1.74	0.58	N	270
Ethylene	Vinyl chloride	0.34	0.13	4.38	0.44	N	42
Ethylene	Vinyl chloride	0.2		2			472
Ethylene	Vinyl chloride	0.21		3.21			536
Ethylene	Vinyl chloride	0.21	0.01	1.85	0.1	N	63
Ethylene	Vinyl chloride	0.14	0.12	0.96	0.22	N	63
Ethylene	Vinyl chloride	0.23	0.01	1.63	0.22	N	64
Ethylene	Vinyl chloride	0.16	0.01	1.55	0.18	N	68
Ethylene	Vinyl diethylphosphinate	0.15	0.16	−11.99	80.64	Y	311
Ethylene	Vinyl diphenylphosphinate	0.05	0.01	−62.84	34.66	Y	311
Ethylene	Vinyl ethyl ether	2.7		0			584
Ethylene	Vinyl fluoride	2.52	0.32	0.01	0.15	N	42
Ethylene	Vinyl fluoride	1.7		0.3			590
Ethylene	Vinyl propionate	0.67		1.5			605
Ethylene	Vinylidene chloride	0.018	0.005	15.71	1.96	Y	299
Ethylene, 1,1-dichloro-2,2-difluoro	Vinyl acetate	−0.13	0.36	0.33	0.58	Y	6
Ethylene, 1,1-diphenyl-	Acrylate, ethyl	0.5		0.8			65
Ethylene, 1,1-diphenyl-	Acrylate, methyl	−0.24	0.15	0.09	0.01	N	334
Ethylene, 1,1-diphenyl-	Acrylate, methyl	0.21	0.05	0.12	0.01	N	334
Ethylene, 1,1-diphenyl-	Acrylonitrile	−0.02	0.01	0.05	0.01	N	143
Ethylene, 1,1-diphenyl-	Butadiene, 2,3-dichloro-	−0.08		3.58		Y	61
Ethylene, 1,1-diphenyl-	Butadiene, 2-chloro-	0.03		3.4		Y	61
Ethylene, 1,1-diphenyl-	Methacrylate, methyl	0.09		2.1			65
Ethylene, 1,1-diphenyl-	Methacrylate, methyl	0		8.7			901
Ethylene, 1,1-diphenyl-	Methacrylonitrile	−0.45	0.11	0.48	0.1	N	143
Ethylene, 1,1-diphenyl-	Styrene	0.01	0.02	0.33	0.02	N	189
Ethylene, 1,1-diphenyl-	Styrene	−0.02	0.01	0.34	0.01	N	281

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Ethylene, 1,1-diphenyl-	Styrene	1.15		0.87			901
Ethylene, chlorotrifluoro-	Ethylene, tetrafluoro-	1		1			392
Ethylene, chlorotrifluoro-	Isobutylene	0.01	0.02	0.06	0.03	N	318
Ethylene, chlorotrifluoro-	Methacrylate, methyl	−0.074	0.062	51.36	3.31	Y	236
Ethylene, chlorotrifluoro-	Propionate, vinyl	0.08	0.01	0.63	0.04		1097
Ethylene, chlorotrifluoro-	Propylene	0.02	0.08	0.08	0.07	N	318
Ethylene, chlorotrifluoro-	Pyrrolidone, *N*-vinyl-	0.3		0.38			830
Ethylene, chlorotrifluoro-	Styrene	−0.1	0.21	4.38	0.99	Y	236
Ethylene, chlorotrifluoro-	Styrene	0.01		5.2			567
Ethylene, chlorotrifluoro-	Vinyl acetate	0.04	0.02	0.68	0.11		1097
Ethylene, chlorotrifluoro-	Vinyl acetate	−0.02		0.47		Y	236
Ethylene, chlorotrifluoro-	Vinyl chloride	0.01		2.53			454
Ethylene, chlorotrifluoro-	Vinyl fluoride	1.2		0.8			406
Ethylene, chlorotrifluoro-	Vinylidene chloride	0.02		17.14			454
Ethylene, dichloro-, *cis*	Styrene	−3.1		3.1		Y	137
Ethylene, dichloro-, *cis*	Styrene	−2.2		63.1		Y	137
Ethylene, dichloro-, *cis*	Styrene	−0.28	0.12	21.4	4.9	Y	40
Ethylene, dichloro-, *cis*	Styrene	−0.02	0.062	161.3	30.3	Y	9
Ethylene, dichloro-, *cis*	Styrene	0.067	0.053	24.75	2.64	Y	9
Ethylene, dichloro-, *cis*	Vinyl acetate	0.055	0.024	1.02	0.27	Y	137
Ethylene, dichloro-, *cis*	Vinyl acetate	0.01		6.4		Y	137
Ethylene, dichloro-, *cis*	Vinyl acetate	0.058	0.03	0.898	0.06	Y	9
Ethylene, dichloro-, *cis*	Vinyl acetate	0.1	0.14	4.13	1.94	Y	9
Ethylene, dichloro-, *cis*	Vinylidene cyanide					Y	82
Ethylene, dichloro-, *cis*	Vinylidene cyanide					Y	82
Ethylene, *p*-vinyl-1,1-diphenyl-	Styrene	1.31		0.46			742
Ethylene, tetrachloro-	Acrylate, methyl	0		830			402
Ethylene, tetrachloro-	Acrylonitrile	0		456			571
Ethylene, tetrachloro-	Acrylonitrile	0		470			59
Ethylene, tetrachloro-	Methacrylate, methyl					Y	204
Ethylene, tetrachloro-	Styrene					Y	204
Ethylene, tetrachloro-	Styrene	200					204
Ethylene, tetrachloro-	Styrene					Y	40
Ethylene, tetrachloro-	Styrene	0		187			40
Ethylene, tetrachloro-	Styrene	0		185			59
Ethylene, tetrachloro-	Vinyl acetate	−0.07	0.15	4.45	1.87	Y	3
Ethylene, tetrachloro-	Vinyl acetate					Y	59
Ethylene, tetrachloro-	Ethylene	0.067	0.12	0.52	0.18		1093
Ethylene, tetrafluoro-	Ethylene	0.065	0.027	0.575	0.09		1094
Ethylene, tetrafluoro-	Ethylene	0.02		0.61			563
Ethylene, tetrafluoro-	Ethylene	0.1		0.38			563
Ethylene, tetrafluoro-	Ethylene, chlorotrifluoro-	1		1			392
Ethylene, trichloro-	Acrylate, methyl	0		33			470
Ethylene, trichloro-	Acrylonitrile	0		67			470
Ethylene, trichloro-	Acrylonitrile	0		62.1			572
Ethylene, trichloro-	Butadiene	−0.03	0.07	9.64	0.21	N	89
Ethylene, trichloro-	Methacrylate, methyl	0		100			470
Ethylene, trichloro-	Styrene	0		17.1			40
Ethylene, trichloro-	Styrene	0		16.5			40
Ethylene, trichloro-	Styrene	0		12.1			40
Ethylene, trichloro-	Styrene	0		12.7			40
Ethylene, trichloro-	Styrene	−0.006	0.37	16	11	Y	59
Ethylene, trichloro-	Vinyl acetate	−0.06	0.34	0.607	0.076	Y	158
Ethylene, trichloro-	Vinyl acetate	−0.006	0.019	0.7	0.1	Y	9
Ethylene, trichloro-	Vinyl isobutyl ether	0.014	0.003	0.05	0.009	Y	332
Ferrocene, ethyl-α-cyclopentadienylidene	Butadiene	1.51		0.02			699
Ferrocene, ethyl-α-cyclopentadienylidene	Isoprene	1.91		0.01			699
Formaldehyde-*S*-vinyl-*O*-ethylthioacetal	Styrene	0.32	0.24	7.75	0.68	Y	273
Fumarate, allyl methyl	Styrene	0.03	0.02	0.25	0.01	N	713
Fumarate, bis(2-butyl)	Styrene	0	0.01	0.51	0.04	N	249
Fumarate, bis(3-[tris(trimethylsiloxy)-silyl)propyl]	Fumarate, di-*tert*-butyl	0.21		0.67			1040
Fumarate, bis(3-[tris(trimethylsiloxy)-silyl)propyl]	Fumarate, diisopropyl	0.07		0.87			1040
Fumarate, bis(3-chloro-2-butyl)	Styrene	−0.06	0.03	0.26	0.04	N	249

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Fumarate, di-(2-chloroethyl)	Styrene	0		0.18			1038
Fumarate, di-(2-cyanoethyl)	Styrene	0.09		0.07			1038
Fumarate, di-(2-(methoxyethyl)	Styrene	0.03		0.35			1038
Fumarate, di-(2-phenylethyl)	Styrene	0		0.27			1038
Fumarate, di-*sec*-butyl	Styrene	0.04		0.55			1038
Fumarate, di-*tert*-amyl	Styrene	0.08		0.69			1038
Fumarate, di-*tert*-butyl	Fumarate, bis(3-[tris(trimethylsiloxy) silyl)propyl	0.67		0.21			1040
Fumarate, di-*tert*-butyl	Fumarate, dimethyl	1.57	0.365	0.156	0.227	Y	1049
Fumarate, di-*tert*-butyl	Maleate, dimethyl	18.2	6.7	0.011	0.037	Y	1049
Fumarate, di-*tert*-butyl	Styrene	0.04		0.57			1038
Fumarate, dibenzyl	Styrene	0		0.32			1038
Fumarate, dibutyl	Diallyl phthalate	1.01		0.02			665
Fumarate, dibutyl	Imidazole, 1-vinyl-	0.182	0.054	0.03	0.01	Y	614
Fumarate, dibutyl	Styrene	0.04		0.35			1038
Fumarate, dibutyl	Styrene, *tert*-butoxy	0.01		0.18			1077
Fumarate, dicyclohexyl	Styrene	0.06		0.49			1038
Fumarate, dicyclopentyl	Styrene	0.06		0.3			1038
Fumarate, diethyl	Acrylonitrile	0		8			470
Fumarate, diethyl	Acrylonitrile	0.1		10			640
Fumarate, diethyl	Butadiene	0.25		2.13			466
Fumarate, diethyl	Butadiene, 2-chloro-	0.02		6.51		Y	61
Fumarate, diethyl	Diallyl phthalate	1.25		0.01			665
Fumarate, diethyl	Ethylene	1.91	3.4	0.11	1.14	N	41
Fumarate, diethyl	Methacrylate, methyl	0.04	0.004	40.3	0.6	N	28
Fumarate, diethyl	Methacrylate, methyl	0.05		2.1			394
Fumarate, diethyl	*N*-Vinylimidazole	0.191	0.022	0.113	0.019	Y	879
Fumarate, diethyl	Styrene	0.02		0.29			1038
Fumarate, diethyl	Styrene	0.081	0.005	6.3	0.26	Y	139
Fumarate, diethyl	Styrene	0.11	0.022	0.394	0.06	Y	139
Fumarate, diethyl	Styrene	0.07		0.3			139
Fumarate, diethyl	Styrene	0	0.01	0.31	0.02	N	249
Fumarate, diethyl	Styrene	0.1		0.36			562
Fumarate, diethyl	Styrene	0.02		0.29			640
Fumarate, diethyl	Vinyl acetate	0.443	0.007	0.011	0.004	Y	137
Fumarate, diethyl	Vinyl acetate	0.33		0.09			718
Fumarate, diethyl	Vinyl chloride	0.48	0.1	0.13	0.1	Y	137
Fumarate, diethyl	Vinyl ethyl ether	1.63	0.16	−0.124	0.059	Y	194
Fumarate, diethyl	Vinyl isobutyl ether	0.52		0			640
Fumarate, diethyl	Vinylidene chloride	0.012	0.038	12.19	1.58	Y	59
Fumarate, diisobutyl	Styrene	0.05		0.37			1038
Fumarate, diisopropyl	Acenaphthalene	0.06		2.57			1039
Fumarate, diisopropyl	Acetate, isopropenyl	0.67		0.011			1038
Fumarate, diisopropyl	Acrylate, methyl	0.091		1.9			1038
Fumarate, diisopropyl	Acrylate, phenyl	0.07		3.4			1038
Fumarate, diisopropyl	Acrylonitrile	0.2		16			1038
Fumarate, diisopropyl	Carbazole, *N*-vinyl-	0		0			1038
Fumarate, diisopropyl	Fumarate, bis(3-[tris(trimethylsiloxy) silyl)propyl	0.87		0.07			1040
Fumarate, diisopropyl	Isobutylene	0.42		0			1038
Fumarate, diisopropyl	Methacrylate, methyl	0.17		23			1038
Fumarate, diisopropyl	Methacrylonitrile	0		85			1038
Fumarate, diisopropyl	Styrene	0.055		0.4			1038
Fumarate, diisopropyl	Vinyl acetate	0.9		0.012			1038
Fumarate, diisopropyl	Vinyl chloride	0.49		0.29			1038
Fumarate, diisopropyl	Vinylidene chloride	0.095		48			1038
Fumarate, dimethyl	Fumarate, di-*tert*-butyl	0.156	0.227	1.57	0.365	Y	1049
Fumarate, dimethyl	*N*-Vinylimidazole	0.252	0.015	0.133	0.021	Y	879
Fumarate, dimethyl	Styrene	0.03		0.39			1038
Fumarate, dioctyl	Diallyl phthalate	0.96		0.02			665
Fumarate, dioctyl	Pyrrolidone, *N*-vinyl-	0.04	0.04	0.02	0.01	N	121
Fumarate, dipropyl	Imidazole, 1-vinyl-	0.163	0.69	0.009	0.012	Y	614
Fumarate, dipropyl	Styrene	0.02		0.32			1038
Fumarate, isopropyl butyl	Styrene	0.01		0.42			1056
Fumarate, isopropyl butyl	Styrene	0.01		0.3			1056

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Fumarate, isopropyl isobutyl	Styrene	0.01		0.46			1056
Fumarate, isopropyl methyl	Styrene	0.16		0.3			1056
Fumarate, isopropyl *sec*-butyl	Styrene	0.02		0.54			1056
Fumarate, methyl butyl	Styrene	0.02		0.36			1056
Fumarate, methyl ethyl	Styrene	0.02		0.32			1056
Fumarate, methyl isobutyl	Styrene	0.03		0.32			1056
Fumarate, methyl isopropyl	Styrene	0.16		0.3			1056
Fumarate, methyl propyl	Styrene	0.05		0.28			1056
Fumarate, methyl *sec*-butyl	Styrene	0.02		0.45			1056
Fumarate, methyl *tert*-amyl	Styrene	0.06		0.53			1056
Fumarate, methyl *tert*-butyl	Styrene	0.03		0.45			1056
Fumarate, mono-2-butyl	Styrene	− 0.04	0.03	0.33	0.03	N	249
Fumarate, *tert*-butyl 2-ethylhexyl	Styrene	0.01		0.54			1056
Fumarate, *tert*-butyl 4-methyl-2-pentyl	Styrene	0.01		0.57			1056
Fumarate, *tert*-butyl ethyl	Styrene	0.04		0.25			1056
Fumarate, *tert*-Butyl isoamyl	Styrene	0.06		0.45			1056
Fumarate, *tert*-butyl methyl	Styrene	0.03		0.45			1056
Fumarate, *tert*-butyl *sec*-butyl	Styrene	0.07		0.55			1056
Fumaric acid	*N*-vinylimidazole	0.313	0.012	0.121	0.01	Y	879
Fumaronitrile	Benzothiazole, vinylmercapto-					Y	763
Fumaronitrile	Methacrylate, methyl	− 0.064	0.096	6.74	0.79	Y	191
Fumaronitrile	Styrene	− 0.016	0.021	0.202	0.058	Y	137
Fumaronitrile	Styrene	0.006	0.031	0.294	0.044	Y	199
Fumaronitrile	Styrene	0		0.3			478
Fumaronitrile	Styrene					Y	77
Fumaronitrile	Styrene, α-methyl-	− 0.01	0.078	0.094	0.02	Y	77
Fumaryl chloride	Styrene					Y	91
Fumaryl chloride	Vinyl acetate					Y	91
Furan, 2,3-dihydro-	Styrene	0		20			806
Furan, 2-vinyl-5-methyl	Acrylate, butyl	0.392	0.051	0.118	0.019	Y	1105
Furan, 2-vinyl-5-methyl	Methacrylate, isobutyl	0.716	0.169	0.105	0.044	Y	1105
Furan, 2-vinyl-5-methyl	Methacrylate, methyl	0.867	0.292	0.183	0.146	Y	1105
Hex-3-yne-5-ene, 2-methyl-*tert*-butyl peroxide	Maleic anhydride	0.36		0.01			637
Hexatriene, tetrachloro-	Acrylate, methyl	3.19	1.36	0.262	0.087	Y	5
Hexatriene, tetrachloro-	Acrylonitrile	4.01	1.25	0.234	0.05	Y	4
Hexatriene, tetrachloro-	Butadiene, 2-chloro-	0.2		3.6			459
Hexatriene, tetrachloro-	Isoprene	1.58		0.58			459
Hexatriene, tetrachloro-	Methacrylate, methyl	1.76	0.28	0.504	0.057	Y	5
Hexatriene, tetrachloro-	Styrene	0.85	0.22	0.123	0.042	Y	4
Hexatriene, tetrachloro-	Vinyl acetate					Y	4
Hexene, 1-, 3,4-dioic anhydride	Styrene	− 0.052	1	8.57	8.4	Y	933
Hexene, 2-, 3,4-dioic anhydride	Styrene	− 0.08	1.17	3.63	5.6	Y	933
Hexene, 3-, 3,4-dioic anhydride	Styrene	− 0.54	5.83	17.17	436	Y	933
Hexene, 5-, 2,4-dione	Styrene	1.22		0.031			931
Hexene, 5-, 2,4-dione	Styrene	1.38		0.049			931
Hexene, 5-, 2,4-dione	Styrene	1.52		0.066			931
Hexene, 5-, 2,4-dione	Styrene	1.73		0.07			931
Hexene, 5-, 2,4-dione	Styrene	1.91		0.171			931
Hexene, 5-, 2,4-dione	Styrene	1.91		0.179			931
Hexene, 5-, 2,4-dione	Styrene	2.07		0.173			931
Hexene, 5-, 2,4-dione	Styrene	2.46		0.121			931
Hexene, 5-, 2,4-dione	Styrene	2.69		0.24			931
Hexene, 5-, 2,4-dione	Styrene	2.93		0.014			931
Hexene, 5-, 2,4-dione	Styrene	3.19		0.044			931
Hexene, 5-, 2,4-dione	Styrene	4.11		0.028			931
Hexene-1	Acrylate, methyl	− 0.67	0.03	− 0.13	0.6	Y	60
Hexene-1	Acrylonitrile	− 1.08		2.07		Y	60
Hexene-1	Vinyl chloride	− 1.72	9.23	1.54	0.98	N	329
Hexene-1, 2,5-dicarboxylate, dimethyl	Styrene	0.196	0.043	0.678	0.031	Y	828
Imidazole, 1-vinyl	Triazole, 1-*N*-vinyl-1,2,4-					N	972
Imidazole, 1-vinyl-	Acrylic acid	0.32		0.002			955
Imidazole, 1-vinyl-	Fumarate, dibutyl	0.03	0.01	0.182	0.054	Y	614
Imidazole, 1-vinyl-	Fumarate, dipropyl	0.009	0.012	0.163	0.069	Y	614

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Imidazole, 1-vinyl-	Maleate, dibutyl	0.486	0.057	0.093	0.08	Y	614
Imidazole, 1-vinyl-	Maleate, dipropyl	0.314	0.028	0.053	0.035	Y	614
Imidazole, 1-vinyl-	Maleate, monomethyl	0.4		0.6			724
Imidazole, 1-vinyl-	Maleic acid	0.3		0.6			635
Imidazole, 1-vinyl-	Methacrylate, methyl	0.014	0.03	4.36	1.86	Y	364
Imidazole, 1-vinyl-	Pyrrolidone, *N*-vinyl-	0.96	0.19	0.16	0.074	Y	364
Imidazole, 1-vinyl-	Styrene	0.071	0.029	9.94	0.24	Y	364
Imidazole, 1-vinyl-	Vinyl acetate	1.9	6.99	−0.11	1.17	Y	364
Imidazole, 1-vinyl-2-methyl-	Acrylate, methyl	0.05		1.28			465
Imidazole, 1-vinyl-2-methyl-	Methacrylate, methyl	0.047	0.088	4	0.54	Y	364
Imidazole, 1-vinyl-2-methyl-	Methacrylate, methyl	0.003		3.48			479
Imidazole, 1-vinyl-2-methyl-	Styrene	0.09	0.064	8.87	0.62	Y	364
Imidazole, 1-vinyl-2-methyl-	Styrene	0.07		8.97			479
Imidazole, 1-vinyl-2-methyl-	Vinyl chloride	2.15	0.26	0.188	0.077	Y	154
Imidazole, *N*-vinyl-	Silane, methacryloxypropyldimethoxy methyl-	0.079		1.39			1095
Imidazole, *N*-vinyl-	Silane, methacryloxypropyltrimethoxy-	0.158	0.04	2.27	1.12	Y	1088
Imidazole, *N*-vinyl-	Styrene, *p*-trimethyoxysilyl-	0.002		6.9			1095
Imidazolid-2-one, 1,3-divinyl-	Acrylate, ethyl	−0.08	0.03	0.41	0.13	N	800
Imidazolid-2-one, 1-ethyl-3-vinyl-	Acrylate, ethyl	0.01	0.01	0.47	0.06	N	800
Indene	Acrylate, methyl	0.1		0.63			606
Indene	Acrylate, methyl	0.12		0.62			606
Indene	Acrylonitrile	0.09	0.25	0.281	0.05	Y	360
Indene	Acrylonitrile	0.07	0.24	0.29	0.12	Y	360
Indene	Styrene, *p*-chloro-	−0.069	0.066	2.86	0.83	Y	6
Indene	Vinyl acetate	8.64	2.8	0.39	0.2	Y	360
Indene	Vinyl 1-menthyl ether	12.64	12.59	0.67	2.82	Y	750
Indene	Vinyl methyl ketone	0.2		2.63			606
Indene	Vinyl methyl ketone	0.25		2.9			606
Indene	Vinylidene chloride	0.293	0.095	0.49	0.15	Y	6
Indene	Vinylidene chloride	0.34	0.85	−0.02	1.15	Y	6
Isobutene	Maleimide, *N*-cyclohexyl-	0.41		0			995
Isobutylene	Acrylonitrile	0	0.002	1.295	0.008	Y	21
Isobutylene	Acrylonitrile	0.02	0.38	0.98	0.25	Y	211
Isobutylene	Acrylonitrile	0		1.02			484
Isobutylene	Ethylene, chlorotrifluoro-	0.06	0.03	0.01	0.02	N	318
Isobutylene	Fumarate, diisopropyl	0		0.42			1038
Isobutylene	Maleic anhydride	0.012		0.065			988
Isobutylene	Vinyl acetate	0.17	0.19	1.66	0.18	Y	211
Isobutylene	Vinyl chloride	0.06	0.8	2.04	1.82	Y	140
Isobutylene	Vinyl chloride	0.268	0.043	2.12	0.2	Y	155
Isobutylene	Vinyl chloride	−0.54	5.8	1.2	2.05	N	329
Isobutylene	Vinyl chloride	0.08		1.54			560
Isobutylene, 3-chloro-	Allyl acetate	4.5		0.15			412
Isobutylene, 3-chloro-	Vinyl acetate	0		0.13			475
Isobutylene, 3-chloro-	Vinyl chloride	0		0.31			475
Isobutylene, 3-chloro-	Vinylidene chloride	0		1.1			470
Isooctene	Maleimide, *N*-cyclohexyl-	0.72		0			995
Isoprene	Acetylene, phenyl-	3.01		0.1			648
Isoprene	Acrylate, methyl	0.75		0.12			424
Isoprene	Acrylonitrile	0.45		0.03			417
Isoprene	Butadiene	1.06		0.94			173
Isoprene	Butadiene	0.608	0.062	0.14	0.37	Y	83
Isoprene	Butadiene, 2,3-dimethyl-	1.18		0.84			173
Isoprene	Butadiene, 2-chloro-	0.06		2.82			418
Isoprene	Butadiene, 2-fluoro-	0.25	0.12	2.63	0.96	Y	174
Isoprene	Butadiene, hexafluoro-	1.19		0.78			453
Isoprene	Ferrocene, ethyl-α-cyclo-pentadienylide	0.01		1.91			699
Isoprene	Hexatriene, tetrachloro-	0.58		1.58			459
Isoprene	Methacrylate, methyl	0.65	0.23	0.26	0.21	Y	302
Isoprene	Methacrylate, methyl	0.64		0.25			698
Isoprene	Methacrylate, methyl	0.64		0.25			704
Isoprene	Pyridine, 2-vinyl-	0.59		0.47			456
Isoprene	Pyridine, 2-vinyl-	0.58		0.46			458
Isoprene	Pyridine, 4-vinyl-	0.32		2.49			424

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Isoprene	Quinoline, 2-vinyl-	1.88		0.53			456
Isoprene	Styrene	1.922	0.016	0.513	0.02	Y	366
Isoprene	Styrene	1.957	0.011	0.476	0.018	Y	366
Isoprene	Styrene	1.98		0.44			544
Isoprene	Styrene	2.02		0.42			544
Isoprene	Styrene	1.3		0.48			83
Isoprene, 3-acetoxy-	Acrylate, methyl	5.71		0.27			770
Isoprene, 3-acetoxy-	Methacrylate, methyl	2.81		0.16			770
Isoprene, 3-acetoxy-	Styrene	4.47		0.34			770
Isopropenyl acetate	Maleic anhydride	0.034	0.022	0.002	0.011	Y	260
Isopropenyl acetate	Methacrylate, methyl	−0.09	0.12	17.36	1.95	Y	100
Isopropenyl acetate	Vinyl acetate	1.082	0.074	1.171	0.038	Y	100
Isopropenyl acetate	Vinyl chloride	0.23	0.16	2.26	0.13	Y	100
Isopropenyl methyl ketone	Acrylonitrile	1.2		0.3			490
Isopropenyl methyl ketone	Acrylonitirle	0.7		0.36			542
Isopropenyl methyl ketone	Butadiene, 2-chloro-	0.14	0.01	4.035	0.087	Y	259
Isopropenyl methyl ketone	Styrene	0.29		0.44			542
Isopropenyl methyl ketone	Styrene	0.66		0.32			542
Isopropenyl methyl ketone	Vinylidene chloride	4.06	0.66	0.134	0.099	Y	47
Isopropenyl, 3-(1-cyclohexenyl), acetate	Acrylate, methyl	0.57		0.37			770
Isopropenyl, 3-(1-cyclohexenyl), acetate	Methacrylate, methyl	0.4		0.81			770
Isopropenyl, 3-(1-cyclohexenyl), acetate	Styrene	0.56		1.59			770
Isopropenyl-, *p*-, phenol glycidyl ether	Maleic anhydride	0.003		0.002			937
Isopropenylacetophenone, *p*-	Styrene	0.84	0.59	0.3	0.18	Y	266
Isopropenylisocyanate	Acrylate, ethyl	0.15		0.79			434
Isopropenylisocyanate	Acrylate, methyl	0.11		0.6			434
Isopropenylisocyanate	Acrylate, methyl	0.079	0.047	0.799	0.049	Y	99
Isopropenylisocyanate	Acrylonitrile	0.1		0.24			434
Isopropenylisocyanate	Methacrylate, methyl	0.14		3.1			434
Isopropenylisocyanate	Styrene	0.07		8.12			434
Isopropenylisocyanate	Styrene	0.122	0.047	6.84	0.18	Y	99
Isopropenylisocyanate	Vinyl chloride	3		0.39			777
Isopropenylisocyanate	Vinylidene chloride	0.31		0.85			434
Isopropenyltoluene	Methacrylate, methyl	0.04		0.68			688
Isopropenyltoluene	Methacrylate, methyl	0.04		0.68			722
Isopropylidene, 2,3:4,5-di-*O*-, -1-vinylbenzyl-β-D-fructose	Styrene	3.26	1.12	0.14	0.055	Y	772
Itaconamate, *N*-(4-carboethoxyphenyl)-, butyl	Styrene	0.61		0.2			678
Itaconamate, *N*-(4-carboethoxyphenyl)-, ethyl	Methacrylate, methyl	0.48		1.21			678
Itaconamate, *N*-(4-carboethoxyphenyl)-, ethyl	Styrene	0.2		0.23			678
Itaconamate, *N*-(4-carboethoxyphenyl)-, methyl	Styrene	0.58		0.15			678
Itaconamate, *N*-(4-carboethoxyphenyl)-, propyl	Methacrylate, methyl	0.53		1			678
Itaconamate, *N*-(4-carboethoxyphenyl)-, propyl	Styrene	0.4		0.26			678
Itaconamate, *N*-(4-chlorophenyl)-, ethyl	Methacrylate, methyl	0.36		1.24			678
Itaconamate, *N*-(4-chlorophenyl)-, ethyl	Styrene	0.16		0.35			678
Itaconamate, *N*-(4-chlorophenyl)-, methyl	Styrene	0.18		0.38			678
Itaconamate, *N*-(4-chlorophenyl)-, propyl	Methacrylate, methyl	0.31		1.26			678
Itaconamate, *N*-(4-chlorophenyl)-, propyl	Styrene	0.31		0.39			678
Itaconamate, *N*-(4-methoxyphenyl)-, butyl	Styrene	0.69		0.12			678
Itaconamate, *N*-(4-methoxyphenyl)-, ethyl	Methacrylate, methyl	0.43		1.31			678
Itaconamate, *N*-(4-methoxyphenyl)-, ethyl	Styrene	0.34		0.33			678
Itaconamate, *N*-(4-methoxyphenyl)-, methyl	Styrene	0.41		0.26			678
Itaconamate, *N*-(4-methoxyphenyl)-, propyl	Methacrylate, methyl	0.4		1.03			678
Itaconamate, *N*-(4-methoxyphenyl)-, propyl	Styrene	0.4		0.38			678
Itaconamate, *N*-(4-methylphenyl)-, propyl	Methacrylate, methyl	0.28		1.11			678
Itaconamate, *N*-(4-methylphenyl)-, propyl	Styrene	0.19		0.54			678

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Itaconamate, *N*-(4-methylphenyl)-, butyl	Styrene	0.31		0.19			678
Itaconamate, *N*-(4-methylphenyl)-, ethyl	Methacrylate, methyl	0.63		1.43			678
Itaconamate, *N*-(4-methylphenyl)-, ethyl	Styrene	0.26		0.38			678
Itaconamate, *N*-(4-methylphenyl)-, methyl	Styrene	0.16		0.3			678
Itaconamate, *N*-phenyl-, butyl	Styrene	0.49		0.12			678
Itaconamate, *N*-phenyl-, ethyl	Methacrylate, methyl	0.47		1.32			678
Itaconamate, *N*-phenyl-, ethyl	Styrene	0.21		0.45			678
Itaconamate, *N*-phenyl-, methyl	Styrene	0.52		0.31			1059
Itaconamate, *N*-phenyl-, methyl	Styrene	0.18		0.39			678
Itaconamate, *N*-phenyl-, propyl	Methacrylate, methyl	0.15		1.13			678
Itaconamate, *N*-phenyl-, propyl	Styrene	0.18		0.5			678
Itaconate, bis(2-ethylhexyl)	Maleimide, *N*-cyclohexyl-	0.38		0.34			1060
Itaconate, bis(tri-*n*-butyltin)	Acrylate, 2-chloroethyl	0.391		0.683			940
Itaconate, bis(tri-*n*-butyltin)	Acrylate, butyl	0.422		0.91			940
Itaconate, bis(tri-*n*-butyltin)	Methacrylate,allyl	0.038		1.08			940
Itaconate, bis(tri-*n*-butyltin)	*N*-Vinylpyrrolidone	0.065	0.04	0.21	0.013	Y	941
Itaconate, di-2[-2(2-methoxyethoxy)-ethoxy]ethyl	Styrene	0.2	0.015	0.53	0.022		1098
Itaconate, di-*p*-butyl	Maleimide, *N*-cyclohexyl	0.34	0.04	0.21	0.04		1014
Itaconate, diamyl	Styrene	0.5	0.09	0.36	0.05	N	39
Itaconate, dibutyl	Itaconate, dimethyl	1.1		1.1			398
Itaconate, dibutyl	Methacrylate, methyl	0.717	0.11	1.33	0.09		1073
Itaconate, dibutyl	Methacrylate, methyl	0.4		0.8			398
Itaconate, dibutyl	Styrene	0.34	0.05	0.42	0.06	N	39
Itaconate, diethyl	Pyridine, 2-methyl-5-vinyl-	0.17		0.51			545
Itaconate, diethyl	Styrene	0.34	0.12	0.23	0.11	N	39
Itaconate, diethyl	Vinyl chloride	5.65		0.06			480
Itaconate, dimenthyl	Maleimide, *N*-cyclohexyl-	0.318	0.213	0.601	0.193	Y	975
Itaconate, dimenthyl	Methacrylate, methyl	−0.156	0.02	3.34	0.557	Y	975
Itaconate, dimenthyl	Styrene	0.483	0.364	0.502	0.188	Y	975
Itaconate, dimenthyl	Vinyl acetate					Y	975
Itaconate, dimethyl	Acrylate, butyl	0.94		0.4			398
Itaconate, dimethyl	Itaconate, dibutyl	1.1		1.1			398
Itaconate, dimethyl	Methacrylate, methyl	0.3		1.2			398
Itaconate, dimethyl	Methacrylonitrile	0.28		1.26			398
Itaconate, dimethyl	Pyridine, 2-methyl-5-vinyl-	0.22		0.88			545
Itaconate, dimethyl	Styrene					N	39
Itaconate, dimethyl	Styrene	0.14		0.48			398
Itaconate, dimethyl	Styrene	0.06		0.5			586
Itaconate, dimethyl	Styrene, *p*-chloro-	0.15		0.69			398
Itaconate, dimethyl	Vinyl chloride	5		0.05			479
Itaconate, dioctyl	Styrene	0.14	0.12	0.33	0.16	N	39
Itaconate, dipropy	Styrene	0.28	0.06	0.16	0.07	N	39
Itaconate, ethyl hexafluoroisopropyl	Styrene	0.039	0.035	0.435	0.025	N	1103
Itaconate, glycidyl methyl	Styrene	0.041	0.079	0.376	0.036		806
Itaconate, mono-methyl	Methacrylate, 2-naphthyl	0.31	0.42	0.52	0.16	Y	613
Itaconate, mono-methyl	Methacrylate, 2-naphthyl	0.36	0.21	0.59	0.14	Y	613
Itaconate, mono-methyl	Methacrylate, 2-naphthyl	0.135	0.028	0.223	0.02	Y	613
Itaconate, mono-methyl	Methacrylate, 2-naphthyl	0.04	0.11	0.189	0.055	Y	613
Itaconate, mono-methyl	Styrene	0.111	0.052	0.029	0.039	Y	656
Itaconate, mono-methyl	Styrene	0.33	0.15	0.34	0.077	Y	656
Itaconate, mono-methyl	Styrene	0.33	0.11	0.52	0.085	Y	656
Itaconate, mono-methyl	Styrene	0.218	0.086	0.404	0.06	Y	656
Itaconate, monomethyl	Methacrylate, methyl	0.139	0.103	1.1	0.071	Y	1010
Itaconic acid	Acrylonitrile	0.86	0.74	0.59	0.34	Y	164
Itaconic acid	Methacrylate, methyl	0		1.23			260
Itaconic acid	Methacrylate, methyl	0		1.14			408
Itaconic acid	Styrene	0		0.34			420
Itaconic acid	Styrene	0.12	0.67	0.26	0.08	Y	76
Itaconic acid mono(*p*-sulfamidoanilide)	Methacrylate, propargyl	0.58	0.05	1.65	0.02		957
Itaconic anhydride	Acrylate, 2-chloroethyl	2.46	0.38	−0.016	0.022	Y	365
Itaconic anhydride	Acrylate, 2-chloroethyl	2.61	0.32	0.251	0.021	Y	365
Itaconic anhydride	Acrylonitrile	4.83	0.33	0.034	0.014	Y	365
Itaconic anhydride	Methacrylate, methyl	1.17	0.33	0.155	0.024	Y	1010
Itaconic anhydride	Styrene	0.405	0.09	0.004	0.01	Y	365

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Itaconic anhydride	Styrene	0.456	0.09	0.086	0.015	Y	62
Itaconic anhydride	Styrene	0.785	0.05	0.003	0.005	Y	62
Itaconic anhydride	Vinyl acetate	1.57	0.3	− 0.019	0.045	Y	365
Itaconic anhydride	Vinyl acetate	2.87	0.32	− 0.04	0.024	Y	365
Itaconimide, *N*-(2-chloroethyl)-	Methacrylate, methyl	0.54	0.39	0	0.11	Y	642
Itaconimide, *N*-(2-chloroethyl)-	Styrene	0.162	0.092	0.069	0.045	Y	642
Itaconimide, *N*-(4-acetoxyphenyl)-	Styrene	0.21	0.21	0.35	0.12	Y	729
Itaconimide, *N*-(4-chlorophenyl)-	Styrene	0.2	0.18	0.159	0.084	Y	729
Itaconimide, *N*-(4-ethoxycarbonylphenyl)-	Styrene	0.112	0.054	0.232	0.032	Y	729
Itaconimide, *N*-(*p*-chlorophenyl)-	Styrene	0.14		0.15			740
Itaconimide, *N*-(*p*-tolyl)-	Styrene	0.24		0.16			740
Itaconimide, *N*-benzyl-	Methacrylate, methyl	1.06	0.75	0.46	0.18	Y	642
Itaconimide, *N*-benzyl-	Styrene	0.2	0.11	0.056	0.048	Y	642
Itaconimide, *N*-butyl-	Styrene	− 0.019	0.04	0.22	0.03	Y	642
Itaconimide, *N*-ethyl-	Methacrylate, methyl	0.42	0.13	0.486	0.066	Y	642
Itaconimide, *N*-ethyl-	Styrene	0.172	0.06	0.232	0.029	Y	642
Itaconimide, *N*-isobutyl-	Styrene	− 0.03	0.11	0.44	0.11	Y	642
Itaconimide, *N*-isopropyl-	Styrene	0.045	0.064	0.308	0.043	Y	642
Itaconimide, *N*-methyl-	Methacrylate, methyl	1.12	0.73	0.38	0.22	Y	642
Itaconimide, *N*-methyl-	Styrene	0.12	0.12	0.153	0.069	Y	642
Itaconimide, *N*-naphthyl-	Styrene	0.35		0.08			740
Itaconimide, *N*-phenyl-	Styrene	0.109	0.082	0.116	0.043	Y	729
Itaconimide, *N*-phenyl-	Styrene	0.08		0.05			740
Itaconimide, *N*-phenyl-	Styrene	0.998	0.123	0.05	0.248	N	978
Itaconimide, *N*-propyl-	Styrene	0.04	0.18	0.28	0.12	Y	642
Itaconimide, *N*-tolyl-	Styrene	0.219	0.079	0.134	0.031	Y	729
Malemic acid, *N*-3-dimethylamino-6-methylphenyl-	Butadiene	− 0.08	0.03	0.37	0.04	N	679
Malemic acid, *N*-3-dimethylamino-6-methylphenyl-	Styrene	− 0.19	0.03	0.55	0.03	N	679
Maleate, chloro-, diethyl	Styrene	− 0.043	0.021	2.07	0.14	Y	14
Maleate, dibutyl	Imidazole, 1-vinyl-	0.093	0.08	0.486	0.057	Y	614
Maleate, allyl methyl	Styrene	0.02	0.01	8.29	0.14	N	713
Maleate, butyl stannylallyl	Styrene	0.06	0.03	0.1	0.02	N	811
Maleate, di-*tert*-butyl	Vinyl acetate	0.199	0.02	0.005	0.024	Y	1049
Maleate, dibutyl tin	Methacrylate, methyl	− 0.095	0.199	72.7	5.93	Y	987
Maleate, dibutyl tin	Styrene	0.194	0.121	2.08	0.118	Y	987
Maleate, diethyl	Acrylonitrile	0		12			470
Maleate, diethyl	Acrylonitrile	0		20			640
Maleate, diethyl	Butadiene	0.11		8.08			466
Maleate, diethyl	Carbazole, *N*-vinyl-	0	0.01	0.21	0.05	N	361
Maleate, diethyl	Ethylene	10		0.25			41
Maleate, diethyl	Methacrylate, methyl	− 0.1	0.05	341	46	N	28
Maleate, diethyl	Methacrylate, methyl	0		20			470
Maleate, diethyl	Methacrylate, methyl	− 0.02	0.015	285.8	35.9	Y	873
Maleate, diethyl	*N*-Vinylimidazole	0.106	0.147	0.057	0.028	Y	879
Maleate, diethyl	Styrene					Y	14
Maleate, diethyl	Styrene	− 0.013	0.022	6.59	0.46	Y	139
Maleate, diethyl	Styrene	0.07		8			640
Maleate, diethyl	Styrene	0.01	0.01	6.07	0.07	N	874
Maleate, diethyl	Styrene	0.001		6.592			888
Maleate, diethyl	Vinyl acetate	0.04	0.012	0.171	0.025	Y	137
Maleate, diethyl	Vinyl chloride	− 0.003	0.044	0.768	0.078	Y	137
Maleate, diethyl	Vinyl chloride	0		0.8			449
Maleate, diethyl	Vinyl chloride	0.046	0.07	0.9	0.11	Y	6
Maleate, diethyl	Vinyl isobutyl ether	0.17		0			640
Maleate, diethyl	Vinylidene chloride	12.5					3
Maleate, dimethyl	Carbzole, *N*-vinyl-	0	0.01	0.51	0.11	N	361
Maleate, dimethyl	Fumarate, di-*tert*-butyl	0.011	0.037	18.2	6.7	Y	1049
Maleate, dimethyl	*N*-Vinylimidazole	0.046	0.438	0.046	0.046	Y	879
Maleate, dimethyl	Styrene	0.15	0.12	10.65	2.81	Y	137
Maleate, dimethyl	Styrene	0.105	0.058	0.083	0.015	Y	317
Maleate, dimethyl	Succinimide, *N*-vinyl-	− 0.012	0.021	1.25	0.16	Y	284
Maleate, dimethyl	Vinyl acetate	0.257	0.086	− 0.006	0.084	Y	1049
Maleate, dioctyl	Vinyl chloride	0.608	0.099	0.05	0.14	Y	3

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Maleate, dipropyl	Imidazole, 1-vinyl-	0.053	0.035	0.314	0.028	Y	614
Maleate, monoallyl	Maleic anhydride	0.027	0.014	0.051	0.054	N	906
Maleate, monoallyl	Styrene	0.07	0.02	0.14	0.01	N	811
Maleate, monomethyl	Imidazole, 1-vinyl-	0.6		0.4			724
Maleate, tributylstannyl allyl	Maleic anhydride	0.095	0.104	0.032	0.017	N	906
Maleic Anhydride	Isopropenyl-, *p*–, phenol glycidyl ether	0.002		0.003			937
Maleic acid	Imidazole, 1-vinyl-	0.6		0.3			635
Maleic acid	*N*-Vinylimidazole	0.094	0.027	0.018	0.007	Y	879
Maleic anhydride	Acenaphthalene	0.02		0.46			1039
Maleic anhydride	Acenaphthalene	– 0.04	0.05	0.46	0.13	N	326
Maleic anhydride	Acetylene, phenyl-	0.06		0.08			797
Maleic anhydride	Acrolein diethylacetal	0.07		0.18			767
Maleic anhydride	Acrylamide	0		0.56		Y	655
Maleic anhydride	Acrylate, 2-chloroethyl	0.027	0.004	7.15	0.31	Y	117
Maleic anhydride	Acrylate, ferrocenylmethyl				2.96	Y	325
Maleic anhydride	Acrylate, methyl	0.012	0.013	2.788	0.051	Y	260
Maleic anhydride	Acrylate, methyl	0		2.5			470
Maleic anhydride	Acrylonitrile	0		6			470
Maleic anhydride	Allyl acetate	0.028	0.019	– 0.001	0.007	Y	27
Maleic anhydride	Allylbenzene					Y	351
Maleic anhydride	Benzocyclobutane, α-methylene-	0.025		0.002			1083
Maleic anhydride	Benzothiazole, vinylmercapto-					Y	763
Maleic anhydride	Butadiene monoxide	0.64	0.06	0.05	0.18		1064
Maleic anhydride	Butadiene, 2-chloro-	0.329	0.107	0.026	0.03	N	1068
Maleic anhydride	Carbamate, *N,N*-diethyl-, vinyl	0.025	0.034	0.024	0.066	Y	92
Maleic anhydride	Dicyclopentadiene	0.071	0.045	0.037	0.112	Y	914
Maleic anhydride	Divinylbenzene, *p*-	0.09	0.01	0.01	0.01		943
Maleic anhydride	Ethylene	0		0.04			620
Maleic anhydride	Hex-3-yne-5-ene, 2-methyl-*tert*-butyl-peroxide	0.01		0.36			637
Maleic anhydride	Isobutylene	0.065		0.012			988
Maleic anhydride	Isopropenyl acetate	0.002	0.011	0.034	0.022	Y	260
Maleic anhydride	Maleate, monoallyl	0.051	0.054	0.027	0.014	N	906
Maleic anhydride	Maleate, tributylstannyl allyl	0.032	0.017	0.095	0.104	N	906
Maleic anhydride	Maleimide, *N*-phenyl-	– 0.095	0.106	1.08	0.13	Y	990
Maleic anhydride	Maleimide, *N*-phenyl-	0.02	0.65	1.92	11.83	Y	341
Maleic anhydride	Methacrylate, ferrocenylmethyl	0.24	0.28	0.33	0.65	Y	325
Maleic anhydride	Methacrylate, methyl	– 0.163	0.027	4.18	0.31	Y	169
Maleic anhydride	Methacrylate, methyl	– 0.019	0.026	6.36	0.64	Y	260
Maleic anhydride	Methacrylate, methyl	0.08	1.77	0.46	0.69	N	320
Maleic anhydride	Methacrylate, methyl	0.02	0.004	5.2	0.47	N	33
Maleic anhydride	Methacrylate, methyl	0.01		3.1			524
Maleic anhydride	Methacrylate, methyl	0.01		3.85			524
Maleic anhydride	Methacrylate, methyl	0.01		3.4			524
Maleic anhydride	Methacrylate, methyl	0.02		3.85			524
Maleic anhydride	Methacrylate, di-, di-*n*-butylstannyl	0.024	0.008	0.012	0.016	Y	954
Maleic anhydride	Methacrylate, benzyl					Y	720
Maleic anhydride	Methacrylate, benzyl	0.372	0.093	– 0.075	0.088	Y	720
Maleic anhydride	Phthalimide, *N*-vinyl-	0.008	0.012	0.344	0.061	Y	284
Maleic anhydride	Propene, 1-chloro-, *cis*-	0.347	0.082	– 0.022	0.08	Y	181
Maleic anhydride	Propene, 1-chloro-, *trans*-	0.28	0.012	0.05	0.015	Y	181
Maleic anhydride	Styrene	0.001	0.008	0.097	0.002	N	105
Maleic anhydride	Styrene	0	0.13	0.04	0.12	Y	12
Maleic anhydride	Styrene	0.003	0.03	0.02	0.003	N	17
Maleic anhydride	Styrene	0.02	0.01	0	0.01	N	241
Maleic anhydride	Styrene	0		0.02			384
Maleic anhydride	Styrene	0		0.02			397
Maleic anhydride	Styrene	0.02		0.04			483
Maleic anhydride	Styrene	0.01		0.04			506
Maleic anhydride	Styrene	0.001		0.04			522
Maleic anhydride	Styrene	0.005		0.05			522
Maleic anhydride	Styrene	0.01		0.02			522
Maleic anhydride	Styrene	0.02		0.04			522
Maleic anhydride	Styrene	0.05		0.04			522
Maleic anhydride	Styrene					N	923
Maleic anhydride	Styrene, α-methyl-	0.08		0.04			492

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Maleic anhydride	Succinimide, *N*-vinyl-	0.021	0.027	0.148	0.073	Y	284
Maleic anhydride	Vinyl 2-chlorocyclohexyl ketone	0.83		1.7			836
Maleic anhydride	Vinyl 4-chlorocyclohexyl ketone	0.08		0.12			836
Maleic anhydride	Vinyl acetate	−0.058	0.074	0.019	0.008	Y	260
Maleic anhydride	Vinyl chloride	−0.22	0.38	0.098	0.042	Y	260
Maleic anhydride	Vinyl chloride	0.4		0.04			521
Maleic anhydride	Vinyl chloride	0.67		0.1			521
Maleic anhydride	Vinylidene cyanide					Y	82
Maleic anhydride, α-chloro-	Styrene	0		0.07			845
Maleimide	Butadiene, 2,3-bis(diethyl-phosphono)-	0.43		0.14			759
Maleimide	Methacrylate, methyl	0.166	0.047	2.576	0.061	Y	251
Maleimide	Methacrylate, methyl	0.17		2.5			992
Maleimide	Piperidinol, 4-, *N*-methyl-4-(vinylethynyl)-	0.49	0.01	2.05	0.03		948
Maleimide	Styrene	0.088	0.036	0.057	0.012	Y	251
Maleimide	Vinylidene chloride	0.464	0.083	0.666	0.056	Y	251
Maleimide, *N*-hydroxymethyl	Methacrylate, methyl	0.263	0.026	1.745	0.03	Y	323
Maleimide, 2,3-dimethyl-*N*-(2-methacryloxyethyl)-	Acrylate, ethyl	1.55	3.06	0.28	1.15	Y	619
Maleimide, 2,3-dimethyl-*N*-(2-methacryloxyethyl)-	Methacrylate, methyl	1.1	3.58	0.51	1.66	Y	619
Maleimide, 2,3-dimethyl-*N*-(2-methacryloxyethyl)-	Methacrylic acid	1.33	0.1	0.746	0.059	Y	619
Maleimide, *N*-(2,4-dimethylphenyl)-	Acrylate, butyl	0.2		0.62			788
Maleimide, *N*-(2,4-dimethylphenyl)-	Acrylate, heptyl	0.2		0.14			788
Maleimide, *N*-(2,6-diethylphenyl)-	Methacrylate, methyl	0.05		4.78			992
Maleimide, *N*-(2,6-diethylphenyl)-	Styrene	0.02		0.19			992
Maleimide, *N*-(2,6-diisopropylphenyl)-	Methacrylate, methyl	0.02		10.9			992
Maleimide, *N*(2,6-dimethylphenyl)-	Methacrylate, methyl	0.07		3.62			992
Maleimide, *N*-(2,6-dimethylphenyl)-	Styrene	0.08		0.14			992
Maleimide, *N*-(2-bromophenyl)-	Acrylonitrile	0.338	0.045	2.029	0.214	Y	863
Maleimide, *N*-(2-chlorophenyl)-	Acrylonitrile	1.078	0.048	0.956	0.095	Y	863
Maleimide, *N*-(2-chlorophenyl)-	Methacrylate, methyl	0.1		2.1			992
Maleimide, *N*-(2-chlorophenyl)-	Styrene	0.013	0.002	0.011	0.004	Y	853
Maleimide, *N*-(2-chlorophenyl)-	Styrene	0.028	0.003	0.038	0.006	Y	853
Maleimide, *N*-(2-chlorophenyl)-	Styrene	0.01	0.005	0.013	0.012	Y	910
Maleimide, *N*-(2-chlorophenyl)-	Styrene	0.006	0.003	0.038	0.28	Y	910
Maleimide, *N*-(2-hydroxyethyl)-	Butadiene, 2,3-bis(diethyl-phosphono)-	0.49		0.12			759
Maleimide, *N*-(2-hydroxyethyl)-	Methacrylate, methyl	0.201	0.083	1.396	0.089	Y	323
Maleimide, *N*-(2-hydroxyethyl)-	Pyrrolidone, *N*-vinyl-	0.038	0.01	0.002	0.002	Y	323
Maleimide, *N*-(2-hydroxyethyl)-	Styrene	0.011	0.027	0.046	0.017	Y	323
Maleimide, *N*-(2-hydroxyethyl)-	Vinyl acetate	0.61	0.12	−0.014	0.037	Y	323
Maleimide, *N*-(2-hydroxyethyl)-	Vinyl acetate	0.88	0.17	0.01	0.041	Y	323
Maleimide, *N*-(2-methylphenyl)-	Methacrylate, methyl	0.09		2.22			992
Maleimide, *N*-(3,5-dimethylphenyl)-	Methacrylate, methyl	0.28		1.63			992
Maleimide, *N*-(3-dimethylaminophenyl)-	Styrene	0.19		0.03			747
Maleimide, *N*-(3-methylphenyl)-	Methacrylate, methyl	0.22		1.18			992
Maleimide, *N*-(3-trifluoromethylphenyl)-	Methacrylate, methyl	0.1		1.57			992
Maleimide, *N*-(4-bromophenyl)-	Acrylate, methyl	0.39	0.17	0.429	0.099		628
Maleimide, *N*-(4-bromophenyl)-	Styrene	0.018	0.007	0.02	0.006	Y	1030
Maleimide, *N*-(4-carboxyethylphenyl)-	Vinyl chloride	3.29	0.18	0.04	0.03	N	306
Maleimide, *N*-(4-carboxyethylphenyl)-α-chloro-	Methacrylate, methyl	−0.004	0.168	0.472	0.114	Y	973
Maleimide, *N*-(4-carboxyethylphenyl)-α-chloro-	Styrene	0.022	0.041	0.059	0.021	Y	973
Maleimide, *N*-(4-chlorophenyl)-	Acrylate, methyl	0.155	0.052	0.684	0.052	Y	628
Maleimide, *N*-(4-chlorophenyl)-	Acrylonitrile	0.743	0.048	0.972	0.112	Y	863
Maleimide, *N*-(4-chlorophenyl)-	Butadiene, 2,3-bis(diethyl-phosphono)-	0.41		0.03			759
Maleimide, *N*-(4-chlorophenyl)-	Vinyl chloride	3.65	0.39	0.026	0.044	Y	306
Maleimide, *N*-(4-chlorophenyl)-α-chloro-	Methacrylate, methyl	0.02	0.03	0.562	0.025	Y	973
Maleimide, *N*-(4-chlorophenyl)-α-chloro-	Styrene	0.019	0.038	0.149	0.048	Y	973
Maleimide, *N*-(4-hydroxyphenyl)-	Methacrylate, methyl	0.345	0.001	1.392	0.001	Y	323
Maleimide, *N*-(4-hydroxyphenyl)-	Styrene	0.13	0.1	−0.059	0.041	Y	323
Maleimide, *N*-(4-hydroxyphenyl)-	Vinyl acetate	1.75	0.17	−0.011	0.027	Y	323
Maleimide, *N*-(4-hydroxyphenyl)-	Butadiene, 2,3-bis(diethyl-phosphono)-	0.47		0.04			75

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Maleimide, *N*-(4-methoxyphenyl)-α-chloro-	Methacrylate, methyl	0.064	0.189	0.556	0.145	Y	973
Maleimide, *N*-(4-methoxyphenyl)-α-chloro-	Styrene	0.049	0.061	0.112	0.031	Y	973
Maleimide, *N*-(4-methylphenyl)-	Methacrylate, methyl	0.34		0.83			992
Maleimide, *N*-(4-methylphenyl)-	Vinyl chloride	4.49	0.34	0.022	0.048	Y	306
Maleimide, *N*-(4-methylphenyl)-α-chloro-	Methacrylate, methyl	0.029	0.158	0.564	0.117	Y	973
Maleimide, *N*-(4-methylphneyl)-α-chloro-	Styrene	0.019	0.078	0.107	0.048	Y	973
Maleimide, *N*-(4-tolyl)-	Acrylate, methyl	0.14	0.16	0.64	0.16	Y	644
Maleimide, *N*-(β-chloroethyl)-α-chloro-	Methacrylate, methyl	0.05	0.04	0.94	0.06		974
Maleimide, *N*-(β-chloroethyl)-α-chloro-	Methacrylate, methyl	0.11	0.05	0.59	0.06		974
Maleimide, *N*-(β-chloroethyl)-α-chloro-	Styrene	0	0.06	0.29	0.05		974
Maleimide, *N*-(L-menthoxycarbonylmethyl)-	Maleimide, *N*-benzyl	0.848	0.221	0.474	0.087	Y	1089
Maleimide, *N*-(L-menthoxycarbonyl-methyl)-	Maleimide, *N*-phenyl-	0.79	0.261	0.798	0.141	Y	1089
Maleimide, *N*-2-bromophenyl-	Acrylonitrile	0.348	0.044	2.02	0.205	Y	915
Maleimide, *N*-2-chlorophenyl-	Acrylonitrile	1.08	0.048	0.955	0.095	Y	915
Maleimide, *N*-4-chlorophenyl-	Acrylonitrile	0.743	0.048	0.972	0.112	Y	915
Maleimide, *N*-[*N*′-α-methylbenzyl) aminocarbonylpentyl]-	Methacrylate, methyl	0.582	0.359	1.37	0.291	Y	1099
Maleimide, *N*-[*N*′-α-methylbenzyl) aminocarbonylpentyl]-	Styrene	0.258	0.25	0.198	0.143	Y	1099
Maleimide, *N*-[*N*′-α-methylbenzyl) aminocarbonylpentyl]-	Styrene					Y	1099
Maleimide, *N*-α-methylbenzyl-	Maleimide, *N*-cyclohexyl-	1.07	0.177	0.392	0.214	Y	1055
Maleimide, *N*-α-methylbenzyl-	Maleimide, *N*-phenyl-	0.683	0.177	0.788	0.5	Y	1055
Maleimide, *N*-allyl-	Styrene	0.035		0.056			1003
Maleimide, *N*-benzyl-	Maleimide, *N*-(L-menthoxycarbonyl-methyl)-	0.474	0.087	0.848	0.221	Y	1089
Maleimide, *N*-benzyl-	Methacrylate, methyl	0.03	0.23	1.28	0.23	Y	348
Maleimide, *N*-benzyl-	Styrene	0.013	0.031	0.058	0.021	Y	348
Maleimide, *N*-benzyl-α-chloro-	Styrene	0	0.06	0.42	0.06		974
Maleimide, *N*-butyl-	Methacrylate, methyl	− 0.1	0.16	1.41	0.19	Y	115
Maleimide, *N*-butyl-	Styrene					Y	115
Maleimide, *N*-butyl-	Styrene	60		0.02			50
Maleimide, *N*-butyl-	Vinyl chloride	− 12.7	106.2	0.24	1.13	Y	305
Maleimide, *N*-chloromethyl-	Butadiene, 2,3-bis(diethyl-phosphono)-	0.3		0.05			759
Maleimide, *N*-cyclohexyl-	Methacrylate, methyl	0.24		1.35			992
Maleimide, *N*-cyclohexyl-	Acenaphthalene	0.11		0.57			1039
Maleimide, *N*-cyclohexyl-	Butene, *cis*-2-	0		3			995
Maleimide, *N*-cyclohexyl-	Isobutene	0		0.41			995
Maleimide, *N*-cyclohexyl-	Itaconate, bis(2-ethylhexyl)	0.34		0.38			1060
Maleimide, *N*-cyclohexyl-	Itaconate, di-*n*-butyl	0.21	0.04	0.34	0.04		1014
Maleimide, *N*-cyclohexyl-	Itaconate, dimenthyl	0.601	0.193	0.318	0.213	Y	975
Maleimide, *N*-cyclohexyl-	Maleimide, *N*-α-methylbenzyl-	0.392	0.214	1.07	0.177	Y	1055
Maleimide, *N*-cyclohexyl-	Methacrylate, methyl	0.19		1.31			1100
Maleimide, *N*-cyclohexyl-	Methacrylate, methyl	0.106	0.048	2.26	0.066	Y	348
Maleimide, *N*-cyclohexyl-	Styrene	0.1		0.102			1100
Maleimide, *N*-cyclohexyl-	Styrene	0.162	0.054	− 0.01	0.017	Y	348
Maleimide, *N*-cyclohexyl-	Isooctene	0		0.72			995
Maleimide, *N*-ethyl-α-chloro-	Methacrylate, methyl	0.13	0.03	0.53	0.04		974
Maleimide, *N*-ethyl-α-chloro-	Styrene	0	0.04	0.9	0.05		974
Maleimide, *N*-hexyl-	Methacrylate, methyl	0.1	0.15	1.9	0.2	Y	348
Maleimide, *N*-hexyl-	Styrene	0.09	0.16	− 0.041	0.069	Y	348
Maleimide, *N*-hydroxymethyl-	Styrene	0.06	0.11	− 0.035	0.053	Y	323
Maleimide, *N*-hydroxymethyl-	Vinyl acetate	1.45	0.21	0.017	0.037	Y	323
Maleimide, *N*-methyl-α-chloro-	Methacrylate, methyl	0.11	0.03	0.63	0.34		974
Maleimide, *N*-methyl-α-chloro-	Styrene	0	0.03	0.63	0.04		974
Maleimide, *N*-octadecyl-	Acrylonitrile	0.389	0.023	2.482	0.119	Y	863
Maleimide, *N*-octadecyl-	Acrylonitrile	0.39	0.023	2.46	0.115	Y	915
Maleimide, *N*-phenyl-	Acrylate, methyl	0.103	0.052	0.554	0.048	Y	644
Maleimide, *N*-phenyl-	Butadiene, 2,3-bis(diethyl-phosphono)-	0.42		0.05			759
Maleimide, *N*-phenyl-	Maleic anhydride	1.92	11.83	0.02	0.65	Y	341
Maleimide, *N*-phenyl-	Maleic anhydride	1.08	0.13	− 0.095	0.106	Y	990
Maleimide, *N*-phenyl-	Maleimide, *N*-(L-menthoxycarbonyl-methyl)-	0.798	0.141	0.79	0.261	Y	1089
Maleimide, *N*-phenyl-	Maleimide, *N*-α-methylbenzyl-	0.788	0.5	0.683	0.177	Y	1055

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Maleimide, *N*-phenyl-	Methacrylate, methyl	0.3		0.98			323
Maleimide, *N*-phenyl-	Methacrylate, methyl	0.164	0.065	1.014	0.06	Y	328
Maleimide, *N*-phenyl-	Methacrylate, methyl	0.3		0.91			992
Maleimide, *N*-phenyl-	Styrene					N	1026
Maleimide, *N*-phenyl-	Styrene	0.044	0.017	0.016	0.004	Y	328
Maleimide, *N*-phenyl-	Styrene	0.01		0.07			992
Maleimide, *N*-phenyl-	Vinyl acetate	1.284	0.046	− 0.003	0.006	Y	328
Maleimide, *N*-phenyl-	Vinyl chloride	4.01	0.18	0.023	0.026	Y	306
Maleimide, *N*-phenyl-α-chloro-	Methacrylate, methyl	0.077	0.098	0.657	0.083	Y	973
Maleimide, *N*-phenyl-α-chloro-	Styrene	− 0.002	0.073	0.087	0.04	Y	973
Maleimide, *N*-propyl-	Vinyl chloride	2.38	0.16	0.06	0.05	N	305
Maleimido-*N*,*N*-dimethylaniline, 4-(2-chlorophenyl)azo	Styrene	0.04		0.05			747
Mesaconate, dibenzyl	Styrene	0.08		0.73			658
Mesaconate, di-*sec*-butyldithiol	Styrene	0.02		0.45			624
Mesaconate, diamyl	Styrene	0.02		1.27			658
Mesaconate, dibenzyldithiol	Styrene	0.06		0.28			624
Mesaconate, dibutyl	Styrene	0.05		1.28			658
Mesaconate, dibutyldithiol	Styrene	0.05		0.41			624
Mesaconate, dicyclohexyl	Styrene	0.1		1.25			658
Mesaconate, diethyl	Styrene	0.06		1.24			658
Mesaconate, diethyldithiol	Styrene	0.03		0.4			624
Mesaconate, dihexyl	Styrene	0.1		1.51			658
Mesaconate, diisoamyl	Styrene	0.07		1.34			658
Mesaconate, diisobutyl	Styrene	0.1		1.29			658
Mesaconate, diisobutyldithiol	Styrene	0.03		0.41			624
Mesaconate, diisopropyl	Styrene	0.04		1.31			658
Mesaconate, diisopropyldithiol	Styrene	0.05		0.44			624
Mesaconate, dimethyl	Styrene	0.04		0.98			658
Mesaconate, dimethyldithiol	Styrene	0.07		0.35			624
Mesaconate, dioctyl	Styrene	0.01		1.23			658
Mesaconate, diphenyl	Styrene	0.07		0.45			658
Mesaconate, diphenyldithiol	Styrene	0.15		0.16			624
Mesaconate, dipropyl	Styrene	0.05		1.22			658
Mesaconate, dipropyldithiol	Styrene	0.06		0.39			624
Mesaconic acid	Styrene	0		1.6			1021
Methacryl-2′-ethyl-4,5,7-trinitro-9-fluorenone-2-carboxylate	Methacrylate, *N*-(2-hydroxy-ethyl)carbazolyl	0.382	0.014	0.63	0.041	Y	703
Methacrylamide	Methacrylate, methyl	1.27	0.24	1.57	0.11	N	316
Methacrylamide	Methacrylate, methyl	0.425	0.085	1.39	0.074	Y	54
Methacrylamide	Methacrylate, methyl	0.49		1.65			55
Methacrylamide	Methacrylic acid	0.33	0.25	2.73	0.28	Y	190
Methacrylamide	Methacrylic acid	1.28		1.55			527
Methacrylamide	Methacrylic acid	0.2	0.014	2.006	0.09	Y	55
Methacrylamide	Styrene	0.48	0.2	1.4	0.13	N	316
Methacrylamide	Styrene	1.24	0.38	1.42	0.17	N	316
Methacrylamide	Vinyl methyl ketone	3	0.18	0.25	0.12	Y	609
Methacrylamide	Vinyl methyl ketone	1.72	0.26	0.28	0.24	Y	609
Methacrylamide, 1-deoxy-D-glucitol	Vinyl acetate	0.56		0.16			258
Methacrylamide, *N*-(2-hydroxypropyl)-	Acrylamide, *N*-(2-(4-hydroxyphenyl)-ethyl)-	1.01	0.09	0.95	0.09		965
Methacrylamide, *N*-(4′-nitro-4-stilbenyl)-	Methacrylate, 2-hydroxyethyl	0.593	0.047	1.474	0.05	Y	342
Methacrylamide, *N*-(4-stilbenyl)-	Methacrylate, 2-hydroxyethyl	0.7	0.23	1.842	0.062	Y	342
Methacrylamide, *N*-(*p*-chlorophenyl)-	Acrylonitrile	0.627	0.051	0.399	0.019	Y	352
Methacrylamide, *N*-(*p*-methoxyphenyl)-	Acrylonitrile	0.559	0.048	0.337	0.019	Y	352
Methacrylamide, *N*-(*p*-methylphenyl)-	Acrylonitrile	0.549	0.06	0.336	0.026	Y	352
Methacrylamide, *N*-(*p*-nitrophenyl)-	Acrylonitrile	2.34	1.07	0.37	0.14	Y	352
Methacrylamide, *N*-[4-(4-methoxy-phenylacetyloxy)phenyl]-	Methacrylate, 2-hydroxyethyl	0.29		1.47			1051
Methacrylamide, *N*-methoxymethyl-	Methacrylate, methyl	0.265	0.009	1.678	0.048	Y	227
Methacrylamide, *N*-*p*-bromophenyl-	Methacrylate, methyl	0.38	0.2	3.48	0.2		968
Methacrylamide, *N*-*p*-tolyl-	Methacrylate, methyl	0.78	0.2	1.43	0.2		968
Methacrylamide, *N*-phenyl	Methacrylate, methyl	0.28	0.2	1.95	0.2		968
Methacrylamide, *N*-phenyl-	Acrylonitrile	0.71	0.19	0.381	0.085	Y	352
Methacrylamide, *N*-phenyl-	Methacrylate, methyl	0.56	0.12	1.42	0.096	Y	352

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylamide, *N*-phenyl-	Styrene	0.88	0.17	1.24	0.06	N	352
Methacrylamide, 1-deoxy-D-glucitol	Methacrylate, methyl	0.04		4.2			258
Methacrylamide, 1-deoxy-D-glucitol	Styrene	0.005		2.09			258
Methacrylamide, *N*-*p*-nitrophenyl-	Methacrylate, methyl	0.29	0.2	5.05	0.2		968
Methacrylate, 2-ethylhexyl	Methacrylate, 2-hydroxypropyl	0.083	0.006	4.56	0.18	Y	708
Methacrylate, ferrocenylmethyl	Maleic anhydride	0.33	0.65	0.24	0.28	Y	325
Methacrylate, ferrocenylmethyl	Pyrrolidone, *N*-vinyl-	2.57	2.77	0.073	0.096	Y	325
Methacrylate, octyl	Methacrylonitrile	0.61	0.05	0.75	0.04	N	44
Methacrylate, potassium 18-crown-6-ether	Acrylonitrile	0.175	0.018	0.07	0.006	Y	808
Methacrylate, tert-butyl	Methacrylate, 2-chloroethyl	0.98	0.22	1.18	0.11	Y	179
Methacrylate, (−)-menthyl	Acenaphthalene	0.316	0.085	2.48	0.55	Y	645
Methacrylate, (2,2-dimethyl-1,3-dioxolane-4-yl)methyl	Methacrylate, methyl	1.1		0.9			807
Methacrylate, 1,1-diphenylethyl	Methacrylate, methyl	0.77		0.72			761
Methacrylate, 1-naphthyl	Methacrylate, methyl	1.8	0.73	0.77	0.14	Y	752
Methacrylate, 1-naphthyl	Methacrylate, methyl	1.68	0.38	0.809	0.078	Y	752
Methacrylate, 1-naphthyl	Methacrylate, methyl	2.62	0.47	0.851	0.084	Y	752
Methacrylate, 1-naphthyl	Methacrylate, methyl	1.52		0.61			761
Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	Acrylonitrile	14		0.02			664
Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	Styrene	0.3		0.63			664
Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	Vinyl acetate	13.7		0.2			664
Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	Vinyl methyl ketone	0.53		0.41			664
Methacrylate, 2,2-dimethylaminoethyl	Methacrylate, methyl	1.01	0.54	0.42	0.02	N	691
Methacrylate, 2,3-epithiopropyl	Acrylate, methyl	2.81		0.34			787
Methacrylate, 2,3-epithiopropyl	Methacrylate glycidyl	0.78		0.81			787
Methacrylate, 2,3-epithiopropyl	Methacrylate, methyl	0.97		0.83			787
Methacrylate, 2,3-epithiopropyl	Styrene	0.28		0.41			787
Methacrylate, 2,4,6-trinitrophenyl	Methacrylate, 2-naphthyl					Y	744
Methacrylate, 2,4-dinitrophenyl ethyl	Acrylate, *N*-(2-hydroxyethyl)-oxy) 3,6-dichloro	1.207	0.032	0.115	0.029	Y	736
Methacrylate, 2,4-dinitrophenyl	Methyacrylate, *N*-(2-hydroxyethyl)-3,6-dichloro	1.112	0.026	0.126	0.026	Y	
Methacrylate, 2,6-(diphenyl)phenyl	Methacrylate, methyl	0.071	0.004	1.42	0.06		1079
Methacrylate, 2-(2-carboxybenzoyl-oxy)ethyl	Methacrylate, butyl	0.85		0.75			1009
Methacrylate, 2-(2-carboxybenzoyl-oxy)ethyl	Methacrylate, butyl	0.85		0.75			1041
Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	Acrylate, butyl	1.89		0.47			600
Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	Acrylate, methyl	1.32		0.22			600
Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	Acrylonitrile	1.89		0.38			600
Methacrylate, 2-(*N*,*N*-dimethyl carbamoyloxy)ethyl	Butadiene	0.35		1.06			600
Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	Methacrylate, methyl	0.42		0.59			600
Methacrylate, 2-acetoxyethyl	Methacrylate, 2-hydroxyethyl	0.99	0.02	1.02	0.01	N	346
Methacrylate, 2-acetoxyethyl	Methacrylate, methyl	1.12	0.06	0.94	0.02	N	346
Methacrylate, 2-acetoxyethyl	Styrene	0.58	0.04	0.44	0.02	N	346
Methacrylate, 2-acetylsalicylicoyloxy-3-hydroxypropyl	*N*-Vinylpyrrolidone	0.85		0.34			1080
Methacrylate, 2-bromoethyl	Acrylate, ethyl	2.7		0.37			657
Methacrylate, 2-bromoethyl	Acrylonitrile	2.38		0.31			657
Methacrylate, 2-bromoethyl	Methacrylate, methyl	1.18		0.79			657
Methacrylate, 2-bromoethyl	Pyrrolidone, *N*-vinyl-	2.44		0.02			657
Methacrylate, 2-bromoethyl	Styrene	0.41		0.32			657
Methacrylate, 2-bromoethyl	Vinyl butyl ether	13.7		0			657
Methacrylate, 2-chloro-2,3,3,3-fluoro-propyl	Acrylate, butyl	0.221	0.636	0.079	0.304	N	927

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, 2-chloro-2,3,3,3-fluoro-propyl	Methacrylate, methyl	0.583	1.17	0.984	0.395	N	927
Methacrylate, 2-chloro-2,3,3,3-fluoro-propyl	Styrene	0.243	0.15	0.121	0.068	N	927
Methacrylate, 2-chloroethyl	Acrylate, methyl	2.19		0.29			726
Methacrylate, 2-chloroethyl	Acrylonitrile	1.3		0.14			382
Methacrylate, 2-chloroethyl	Methacrylate, benzyl	0.989	0.098	1.068	0.042	Y	179
Methacrylate, 2-chloroethyl	Methacrylate, butyl	0.82	0.041	1.086	0.02	Y	179
Methacrylate, 2-chloroethyl	Methacrylate, isobutyl	0.85	0.14	1.014	0.064	Y	179
Methacrylate, 2-chloroethyl	Methacrylate, methyl	0.97	0.18	1.156	0.082	Y	179
Methacrylate, 2-chloroethyl	Methacrylate, methyl	0.48		0.55			382
Methacrylate, 2-chloroethyl	Methacrylate, phenyl	1.02	0.21	0.785	0.083	Y	179
Methacrylate, 2-chloroethyl	Methacrylate, *tert*-butyl	1.18	0.11	0.98	0.22	Y	179
Methacrylate, 2-chloroethyl	Styrene	0.341	0.075	0.35	0.046	Y	179
Methacrylate, 2-chloroethyl	Styrene	0.34	0.08	0.345	0.048	Y	179
Methacrylate, 2-chloroethyl	Styrene	0.23		0.42			382
Methacrylate, 2-chloroethyl	Methacrylate, tributyltin	0.53	0.16	0.2	0.444	N	945
Methacrylate, 2-ethylhexyl	Methacrylate, 2-hydroxypropyl	0.083	0.006	4.56	0.18	Y	692
Methacrylate, 2-hydroxyethyl	Acetamide, *N*-(4-methacryloyloxy-phenyl)-2-(4-methoxy)	0.61		1.49			1051
Methacrylate, 2-hydroxyethyl	Acetanilide, 4-(2-(methacryloyloxy) ethyloxy)	1.39		0.67			1096
Methacrylate, 2-hydroxyethyl	Acetanilide, 4-(2-(methacryloyloxy) hexyloxy)	1.19		0.87			1096
Methacrylate, 2-hydroxyethyl	Acetanilide, 4-(methacryloyloxy)-	0.78		1.94			1096
Methacrylate, 2-hydroxyethyl	Acrylamide	1.89		0.05			689
Methacrylate, 2-hydroxyethyl	Acrylamide	0.98		0.14			928
Methacrylate, 2-hydroxyethyl	Acrylamido, 2-,2-methylpropanesulfonic	0.86		0.9			618
Methacrylate, 2-hydroxyethyl	Acrylate, butyl	4.75	4.2	0.09	0.11	Y	358
Methacrylate, 2-hydroxyethyl	Acrylate, ethyl	11.21	0.43	0.189	0.008	Y	358
Methacrylate, 2-hydroxyethyl	Acrylate, furfuryl	1.35	0.08	0.88	0.19		1063
Methacrylate, 2-hydroxyethyl	Acrylate, methyl	8.67	8.28	−0.005	0.036	Y	358
Methacrylate, 2-hydroxyethyl	Acrylonitrile	1		0.2			689
Methacrylate, 2-hydroxyethyl	Acryloxymethylpentamethyl disiloxane	0.86		0.52			822
Methacrylate, 2-hydroxyethyl	Methacrylate, 2-hydroxypropyl	0.55		1.82			686
Methacrylate, 2-hydroxyethyl	Methacrylamide, *N*-(4′-nitro-4-stilbenyl)-	1.474	0.05	0.593	0.047	Y	342
Methacrylate, 2-hydroxyethyl	Methacrylamide, *N*-(4-stilbenyl)-	1.842	0.062	0.7	0.23	Y	342
Methacrylate, 2-hydroxyethyl	Methacrylamide, *N*-[4-(4-methoxy-phenylacetyloxy)phenyl]-	1.47		0.29			1051
Methacrylate, 2-hydroxyethyl	Methacrylate, 2-acetoxyethyl	1.02	0.01	0.99	0.02	N	346
Methacrylate, 2-hydroxyethyl	Methacrylate, dodecyl	11.2		0.7			837
Methacrylate, 2-hydroxyethyl	Methacrylate, dodecyl	1.6		0.5			837
Methacrylate, 2-hydroxyethyl	Methacrylate, dodecyl	0.8		0.8			837
Methacrylate, 2-hydroxyethyl	Methacrylate, methyl	0.63	0.076	0.824	0.01	Y	350
Methacrylate, 2-hydroxyethyl	Methacrylate, methyl	0.81	1.02	0.192	0.09	Y	358
Methacrylate, 2-hydroxyethyl	Methacrylate, methyl	1.5		0.75			710
Methacrylate, 2-hydroxyethyl	Methacryloxymethylpentamethyl disiloxane	0.97		0.33			822
Methacrylate, 2-hydroxyethyl	Pyridine, 2-vinyl-	0.56	0.04	0.64	0.16	N	342
Methacrylate, 2-hydroxyethyl	Pyridine, 3-vinyl-	0.69	0.01	0.73	0.04	N	342
Methacrylate, 2-hydroxyethyl	Pyridine, 4-vinyl-	0.62	0.04	0.9	0.09	N	342
Methacrylate, 2-hydroxyethyl	Pyrrolidone, *N*-vinyl-	4.841	0.133	−0.019	0.046	Y	840
Methacrylate, 2-hydroxyethyl	Styrene	0.54	0.03	0.44	0.02	N	346
Methacrylate, 2-hydroxyethyl	Styrene	0.856	0.018	0.332	0.006	Y	350
Methacrylate, 2-hydroxyethyl	Styrene	0.65		0.57			463
Methacrylate, 2-hydroxyethyl	Styrene	1.65		0.5			878
Methacrylate, 2-hydroxyethyl	Styrene	0.53		0.59			878
Methacrylate, 2-hydroxyethyl	Styrene	0.59		0.53			903
Methacrylate, 2-hydroxyethyl	Styrene	1.65		0.5			903
Methacrylate, 2-hydroxypropyl	Acrylamido, 2-, 2-methylpropane-sulfonic	0.89		1.03			618
Methacrylate, 2-hydroxypropyl	Acrylate, butyl	5.35	0.32	0.171	0.041	Y	333
Methacrylate, 2-hydroxypropyl	Acrylate, butyl	3.3	6.82	0.24	0.16	Y	662
Methacrylate, 2-hydroxypropyl	Acrylate, ethyl	13.32	1.05	0.273	0.054	Y	333
Methacrylate, 2-hydroxypropyl	Acrylate, ethyl	9.08	3.95	0.207	0.045	Y	662

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, 2-hydroxypropyl	Acrylate, methyl	7.335	0.083	0.013	0.007	Y	333
Methacrylate, 2-hydroxypropyl	Acryloyl chloride	1.79		0.29			649
Methacrylate, 2-hydroxypropyl	Methacrylate, 2-ethylhexyl	4.56	0.18	0.083	0.006	Y	692
Methacrylate, 2-hydroxypropyl	Methacrylate, 2-ethylhexyl	4.56	0.18	0.083	0.006	Y	708
Methacrylate, 2-hydroxypropyl	Methacrylate, 2-hydroxyethyl	1.82		0.55			686
Methacrylate, 2-hydroxypropyl	Methacrylate, butyl	2.35	0.13	0.158	0.007	Y	692
Methacrylate, 2-hydroxypropyl	Methacrylate, butyl	2.35	0.13	0.158	0.007	Y	708
Methacrylate, 2-hydroxypropyl	Methacrylate, ethyl	1.878	0.056	0.245	0.007	Y	692
Methacrylate, 2-hydroxypropyl	Methacrylate, ethyl	1.844	0.039	0.267	0.005	Y	708
Methacrylate, 2-hydroxypropyl	Methacrylate, methyl	1.055	0.04	0.402	0.017	Y	333
Methacrylate, 2-hydroxypropyl	Methacrylate, tributyltin	1.81	0.275	0.728	0.517	N	945
Methacrylate, 2-hydroxypropyl	Methacrylic acid	0.31		0.99			886
Methacrylate, 2-naphthyl	Acrylonitrile	1.17	0.2	0.15	0.2	Y	611
Methacrylate, 2-naphthyl	Acrylonitrile	1.02	0.19	0.094	0.099	Y	611
Methacrylate, 2-naphthyl	Acrylonitrile	0.76	0.18	0.06	0.1	Y	611
Methacrylate, 2-naphthyl	Acrylonitrile	0.64	0.24	−0.01	0.16	N	611
Methacrylate, 2-naphthyl	Itaconate, mono-methyl	0.52	0.16	0.31	0.42	Y	613
Methacrylate, 2-naphthyl	Itaconate, mono-methyl	0.59	0.14	0.36	0.21	Y	613
Methacrylate, 2-naphthyl	Itaconate, mono-methyl	0.223	0.02	0.135	0.028	Y	613
Methacrylate, 2-naphthyl	Itaconate, mono-methyl	0.189	0.055	0.04	0.11	Y	613
Methacrylate, 2-naphthyl	Methacrylate, 2,4,6-trinitrophenyl					Y	744
Methacrylate, 2-naphthyl	Methacrylate, methyl	0.85	0.34	0.75	0.16	Y	540
Methacrylate, 2-naphthyl	Methacrylate, methyl	2.57	0.48	0.602	0.059	Y	760
Methacrylate, 2-naphthyl	Methacrylate, methyl	2.53	0.27	0.581	0.023	Y	760
Methacrylate, 2-naphthyl	Methacrylate, methyl	1.91	0.6	0.532	0.055	Y	760
Methacrylate, 2-naphthyl	Methacrylate, methyl	4.41	0.76	0.614	0.051	Y	760
Methacrylate, 2-naphthyl	Methacrylate, methyl	3.83	0.57	0.623	0.048	Y	760
Methacrylate, 2-naphthyl	Styrene	0.534	0.099	0.56	0.025	Y	540
Methacrylate, 2-naphthyl-, methyl	Styrene	0.113	0.126	0.786	0.16	Y	924
Methacrylate, 2-naphthyl-, methyl	Styrene	0.321	0.098	0.486	0.117	Y	924
Methacrylate, 2-naphthyl-, methyl	Styrene	0.576	0.477	0.61	0.195	Y	924
Methacrylate, 2-naphthyl-, methyl	Styrene	0.216	0.422	0.384	0.225	Y	924
Methacrylate, 2-sulfonic acid)ethyl	Acrylate, ethyl	3.2		0.3			564
Methacrylate, 2-sulfonic acid)ethyl	Methacrylate, ethyl	2		1			564
Methacrylate, 2-sulfonic acid)ethyl	Styrene	0.6		0.37			564
Methacrylate, 2-sulfonic acid)ethyl	Vinylidene chloride	3.6		0.22			564
Methacrylate, 2-methoxyethyl	Styrene	0.48		0.46			918
Methacrylate, 3,5-dimethyladamantyl	Acrylonitrile	1.3	0.23	0.19	0.01	N	335
Methacrylate, 3,5-dimethyladamantyl	Methacrylate, methyl	0.45	0.16	0.68	0.04	N	335
Methacrylate, 3,5-dimethyladamantyl	Styrene	0.63	0.21	0.89	0.14	N	335
Methacrylate, 3,5-dimethyladamantyl	Vinyl chloride	1.85	8.87	0.21	0.04	N	335
Methacrylate, 3-methoxy-2-hydroxypropyl	Acrylamide	3.98		0.04			689
Methacrylate, 5-oxo-pyrrolidinylmethyl	Methacrylate, methyl	0.694	0.087	0.421	0.033	Y	633
Methacrylate, 5-oxo-pyrrolidinylmethyl	Styrene	0.411	0.033	0.342	0.013	Y	633
Methacrylate, β-(2-benzothiazolylthio) ethyl	Vinyl chloride	0.26		0.64			741
Methacrylate, *N*-(2-hydroxyethyl)-3,6-dichlorocarbazolyl	Methacrylate, 2,4-dinitrophenyl	0.126	0.026	1.112	0.026	Y	736
Methacrylate, *N*-(2-hydroxyethyl)-carbazolyl	Acryl-2′-ethyl-4,5,7-trinitroflourenone	0.773	0.096	0.102	0.022	Y	703
Methacrylate, *N*-(2-hydroxyethyl)-carbazolyl	Acrylate, 2,4-dinitrophenyl	0.243	0.034	0.186	0.009	Y	716
Methacrylate, *N*-(2-hydroxyethyl)-carbazolyl	Methacryl-2′-ethyl-4,5,7-trinitro-9-fluorenone	0.63	0.041	0.382	0.014	Y	703
Methacrylate, *N*-α-benzothiazolonylmethyl	Methacrylate, methyl	0.6	0.02	0.5	0.01		887
Methacrylate, *N*-ethyl-3-hydroxymethylcarbazolyl	Acryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	1.425	0.09	0.103	0.015	Y	701
Methacrylate, *N*-ethyl-3-hydroxymethylcarbazolyl	Methacryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	0.729	0.051	0.554	0.019	Y	701
Methacrylate, *N*-methyl-*N*-phenyl-2-aminoethyl	Acryloyloxy, 2-, benzoic acid	0.22	0.03	1.82	0.2	N	651
Methacrylate, *N*-methyl-*N*-phenyl-2-aminoethyl	Methacrylic acid	0.2	0.01	2.16	0.18	N	651
Methacrylate, *N*-methyl-*N*-phenyl-2-aminoethyl	Methacryloyloxy, 2-,benzoate, methyl	0.55	0.04	1.11	0.18	N	651

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, *N*-methyl-*N*-phenyl-2-aminoethyl	Methacryloyloxy, 2-,benzoic acid	0.2	0.01	2.6	0.08	N	651
Methacrylate, *N*-methyl-*N*-phenyl-2-aminoethyl	Styrene	0.58	0.02	0.44	0.04	N	651
Methacrylate, α,α-dimethylbenzyl	Methacrylate, methyl	0.92		0.81			761
Methacrylate, α-naphthoyloxy-, ethyl	Styrene	0.242	0.018	0.216	0.043		1102
Methacrylate, acetonyl	Styrene	0.505	0.115	0.285	0.041	Y	958
Methacrylate, allyl	Itaconate, bis(tri-*n*-butyltin)	1.08		0.038			940
Methacrylate, amyl	Styrene	0.46	0.2	0.52	0.11	Y	179
Methacrylate, benzyl	Acrylonitrile	0.96	0.1	0.2	0.1	N	23
Methacrylate, benzyl	Allyl chloride	58.7		0.02			438
Methacrylate, benzyl	Maleic anhydride					Y	720
Methacrylate, benzyl	Maleic anhydride	−0.075	0.088	0.372	0.093	Y	720
Methacrylate, benzyl	Methacrylate, 2-chloroethyl	1.068	0.042	0.989	0.098	Y	179
Methacrylate, benzyl	Methacrylate, methyl	1.112	0.093	0.808	0.03	Y	111
Methacrylate, benzyl	Methacrylate, methyl	1.05		0.93			32
Methacrylate, benzyl	Methacrylate, methyl	1.38		0.78			540
Methacrylate, benzyl	Methacrylate, phenyl	0.67	0.06	1.42	0.09	N	32
Methacrylate, benzyl	Styrene	0.658	0.084	0.463	0.041	Y	111
Methacrylate, benzyl	Styrene	0.467	0.048	0.435	0.026	Y	179
Methacrylate, benzyl	Styrene	0.51		0.45			487
Methacrylate, benzyl	Styrene	0.42		0.48			540
Methacrylate, benzyl	Styrene	0.3		0.8			602
Methacrylate, benzyl	Styrene	0.5	0.38	0.45	0.32		806
Methacrylate, benzyl	Vinylidene chloride	3.3		0.34			432
Methacrylate, benzylmethylaminoethyl	Methacrylate, methyl	0.296	0.123	0.523	0.134	Y	1081
Methacrylate, butyl	Acetylene, phenyl-	1.7		0.21			565
Methacrylate, butyl	Acrylate, butyl	2.2		0.3			187
Methacrylate, butyl	Acrylate, ethyl	2.43	0.39	0.22	0.17	Y	690
Methacrylate, butyl	Acrylic acid	3.53	0.42	0.24	0.21	N	187
Methacrylate, butyl	Acrylic acid, α-bromo-	0.85		0.13			733
Methacrylate, butyl	Acrylonitrile	0.98	0.2	0.291	0.039	Y	165
Methacrylate, butyl	Carbamate, *N*-phenyl-, allyl	0.418		0.329			833
Methacrylate, butyl	Methacrylate, 2-(2-carboxy-benzoyloxy)ethyl	0.75		0.85			1009
Methacrylate, butyl	Methacrylate, 2-(2-carboxy-benzoyloxy)ethyl	0.75		0.85			1041
Methacrylate, butyl	Methacrylate, 2-chloroethyl	1.086	0.02	0.82	0.041	Y	179
Methacrylate, butyl	Methacrylate, 2-hydroxypropyl	0.158	0.007	2.35	0.13	Y	692
Methacrylate, butyl	Methacrylate, 2-hydroxypropyl	0.158	0.007	2.35	0.13	Y	708
Methacrylate, butyl	Methacrylate, ethyleneglycol-*N*-phenylcarbamate	0.395		0.299			833
Methacrylate, butyl	Methacrylate, glycidyl	0.85	0.03	0.94	0.06	N	224
Methacrylate, butyl	Methacrylate, methyl	2.11	0.08	0.52	0.07	N	30
Methacrylate, butyl	Methacrylate, methyl	1.2		1.27			844
Methacrylate, butyl	Methacrylic acid	1.26	0.12	0.8	0.16	N	187
Methacrylate, butyl	Methacrylic acid	1.15	0.12	0.73	0.2	N	224
Methacrylate, butyl	Methacrylonitrile	0.75	0.07	0.56	0.15	N	44
Methacrylate, butyl	Styrene	0.31	0.2	0.56	0.12	Y	179
Methacrylate, butyl	Styrene	2.52	1.1	−0.05	1.09	N	43
Methacrylate, butyl	Styrene	0.47		0.52			463
Methacrylate, butyl	Styrene	0.64		0.63			530
Methacrylate, butyl	Styrene	0.64		0.54			530
Methacrylate, butyl	Styrene	0.59		0.74			835
Methacrylate, butyl	Styrene, *o*-chloro-	0.32		1.24			558
Methacrylate, butyl	Styrene, *p*-chloro-		0.1		0.1	N	872
Methacrylate, butyl	Styrene *p*-chloro-	0.564	0.131	1.025	0.124		966
Methacrylate, butyl	Styrene chloromethyl-	0.38		1.46			1035
Methacrylate, butyl	Styrene *p*-octylamine sulfonate	0.7		1.5			817
Methacrylate, butyl	Thioindigoid	11.5		0.5			1007
Methacrylate, butyl	Vinyl acetate	30.18	14.47	−0.003	0.15	Y	165
Methacrylate, butyl	Vinyl chloride	13.5		0.05			519
Methacrylate, butyl	Vinylidene chloride	2.07	0.18	0.35	0.03	Y	3
Methacrylate, chloromethyl	Methacrylate, methyl	1.02	0.16	0.477	0.029	Y	712
Methacrylate, chloromethyl	Styrene	0.298	0.03	0.208	0.006	Y	712

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, cyanomethyl	Methacrylate, methyl	0.73	0.11	0.399	0.019	Y	625
Methacrylate, cyanomethyl	Styrene	0.28	0.041	0.144	0.011	Y	625
Methacrylate, cyclohexyl	Methacrylate, tributyltin	0.891	0.136	0.395	0.428	N	945
Methacrylate, cyclohexyl	Styrene	0.57	0.28	0.586	0.088	Y	179
Methacrylate, decyl	Oxazolidone, *N*-vinyl-	12.19	1.35	−0.052	0.049	Y	36
Methacrylate, di-, di-*n*-butylstannyl	Maleic anhydride	0.012	0.016	0.024	0.008	Y	954
Methacrylate, di-, di-*n*-butylstannyl	Vinyl acetate	0.013	0.036	0.013	0.018	Y	949
Methacrylate, di-, zinc	Ethylene	40		0.19			935
Methacrylate, di-, dicyclopentadienyl-titanate	Acrylate, di-, copper	0.89		1.09			876
Methacrylate, di-, dicyclopentadienyl-titanate	Acrylate, di-, nickel	0.65		0.95			876
Methacrylate, di-, ethylene glycol	Styrene	0.67	0.08	0.39	0.15	N	262
Methacrylate, di-, triethyleneglycol	Carbamate, *N*-phenyl-, allyl	0.504		0.034			833
Methacrylate, di-, triethyleneglycol	Methacrylate, ethylene-glycol *N*-phenylcarbamate	0.59		0.24			833
Methacrylate, diethylaminoethyl	Methacrylate, methyl	1.44	0.085	0.843	0.128	Y	1081
Methacrylate, diethylaminoethyl	Methacrylic acid	2.34	1.59	0.63	1.47	Y	16
Methacrylate, dimethylaminoethyl	Methacrylate, methyl	1.2	0.154	0.699	0.051	Y	1081
Methacrylate, dimethylaminoethyl sulfate	Acrylamide	1.9	0.2	0.52	0.05		1052
Methacrylate, diphenylmethyl	Methacrylate, 2-hydroxyethyl	0.5		1.6			837
Methacrylate, diphenylmethyl	Methacrylate, 2-hydroxyethyl	0.8		0.8			837
Methacrylate, diphenylmethyl	Methacrylate, dodecyl	0.7		11.2			837
Methacrylate, diphenylmethyl	Methacrylate, methyl	1.07		0.81			761
Methacrylate, diphenylmethyl	Styrene	0.3	0.1	0.528	0.05	Y	179
Methacrylate, ethyl	Allyl acetate	81.27	1.93	−0.57	0.82	N	210
Methacrylate, ethyl	Allyl alcohol	107.4	5.3	−0.02	1.92	N	210
Methacrylate, ethyl	Methacrylate, 2-(sulfonic acid)ethyl	1		2			564
Methacrylate, ethyl	Methacrylate, 2-hydroxypropyl	0.245	0.007	1.878	0.056	Y	692
Methacrylate, ethyl	Methacrylate, 2-hydroxypropyl	0.267	0.005	1.844	0.039	Y	708
Methacrylate, ethyl	Methacrylate, methyl					N	32
Methacrylate, ethyl	Methacrylate, methyl	1.08		1.08			844
Methacrylate, ethyl	Methacrylate, methyl	1	0.09	1.16	0.19	N	87
Methacrylate, ethyl	Methacrylate, tributyltin	0.601	0.123	0.299	0.607	N	945
Methacrylate, ethyl	Methacrylic acid	0.71		0.57			820
Methacrylate, ethyl	Methacrylonitrile	0.83	0.05	0.46	0.04	N	44
Methacrylate, ethyl	Styrene	0.36	0.12	0.55	0.062	Y	179
Methacrylate, ethyl	Styrene	0.26		0.67			530
Methacrylate, ethyl	Styrene	0.29		0.65			530
Methacrylate, ethyl	Styrene	0.33		0.55			570
Methacrylate, ethyl	Styrene, *o*-chloro-	0.45		1.34			558
Methacrylate, ethyl	Styrene, *p*-chloromethyl-	0.36		1.29			1035
Methacrylate, ethyl	Vinyl acetate	131.8	29.8	−0.77	5.29	N	210
Methacrylate, ethyl	Vinylidene chloride	2.18	0.1	0.353	0.02	Y	3
Methacrylate, ethyleneglycol-*N*-phenylcarbamate	Methacrylate, butyl	0.299		0.395			833
Methacrylate, ethyleneglycol-*N*-phenylcarbamate	Methacrylate, di-, triethyleneglycol	0.24		0.59			833
Methacrylate, ferrocenylmethyl	Acrylate, methyl	0.042	0.085	1.4	0.35	Y	293
Methacrylate, ferrocenylmethyl	Acrylonitrile	0.82	0.42	0.15	0.04	Y	325
Methacrylate, ferrocenylmethyl	Styrene	−0.01	0.14		3.63	Y	293
Methacrylate, ferrocenylmethyl	Styrene	0.01		3.6			576
Methacrylate, ferrocenylmethyl	Vinyl acetate	1.52		0.2			293
Methacrylate, furfuryl	*N*-Vinylpyrrolidone	5.16	1.13	0.0036	0.02	Y	1050
Methacrylate, glycidyl	Acrylate, 2-ethylhexyl	2.41	0.46	0.09	0.13	Y	674
Methacrylate, glycidyl	Acrylate, 4-acetylphenyl	0.644	0.13	0.292	0.141	Y	1012
Methacrylate, glycidyl	Acrylate, butyl	2.16	0.57	0.083	0.052	Y	674
Methacrylate, glycidyl	Acrylate, isobutyl	1.24	0.12	0.282	0.026	Y	674
Methacrylate, glycidyl	Acrylate, *tert*-butyl	2.096	0.443	0.463	0.079	Y	814
Methacrylate, glycidyl	Acrylonitrile	0.85	0.05	0.95	0.06	N	114
Methacrylate, glycidyl	Acrylonitrile	1.32		0.14			433
Methacrylate, glycidyl	Methacrylate, 2,3-epithiopropyl	0.81		0.78			787
Methacrylate, glycidyl	Methacrylate, butyl	0.94	0.06	0.85	0.03	N	224
Methacrylate, glycidyl	Methacrylate, methyl	0.52	0.06	0.71	0.08	Y	113
Methacrylate, glycidyl	Methacrylate, methyl	0.934	0.085	0.726	0.042	Y	226

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, glycidyl	Methacrylate, methyl	1.05		0.8			463
Methacrylate, glycidyl	Methacrylate, methyl	0.501	0.027	0.688	0.076	Y	639
Methacrylate, glycidyl	Methacrylic acid	1.2	0.1	0.98	0.16	N	224
Methacrylate, glycidyl	*N*-Vinylpyrrolidone	4.29	0.498	0.003	0.018		1017
Methacrylate, glycidyl	Styrene	0.16	0.03	0.54	0.07	N	114
Methacrylate, glycidyl	Styrene	0.539	0.04	0.278	0.086	Y	217
Methacrylate, glycidyl	Styrene	0.46	0.08	0.47	0.02	N	225
Methacrylate, glycidyl	Styrene	0.54		0.44			225
Methacrylate, glycidyl	Styrene	0.55		0.45			463
Methacrylate, glycidyl	Styrene	0.74	0.1	0.31	0.04	N	849
Methacrylate, glycidyl	Styrene	0.73	0.284	0.11	0.045	N	893
Methacrylate, glycidyl	Styrene	0.514	0.098	0.435	0.033	Y	999
Methacrylate, glycidyl	Vinyl phenyl ketone	0.719		0.697			946
Methacrylate, glycidyl	Vinyl, mono-, ethylene glycol ether	4.41		0			780
Methacrylate, hexyl	Styrene	0.44	0.13	0.58	0.07	Y	179
Methacrylate, hydroxyethyl	Methacrylate, tetra(2-hydroxypropyl) ethylenediamine	0.606	0.416	1.44	1	Y	996
Methacrylate, hydroxyethyl	Methacrylate, tributyltin	2.33	0.185	0.282	0.424	N	945
Methacrylate, iso-butyl	Butadiene, 2-chloro-	0.9	0.088	1.8	0.06	N	1057
Methacrylte, isobornyl	Styrene	0.24	0.3	0.61	0.45		806
Methacrylate, isobutyl	Acetylene, phenyl-	1.9		0.27			565
Methacrylate, isobutyl	Acrylic acid	0.68		1.03			847
Methacrylate, isobutyl	Acrylonitrile	1.05	0.22	0.217	0.037	Y	165
Methacrylate, isobutyl	Furan, 2-vinyl-5-methyl	0.105	0.044	0.716	0.169	Y	1105
Methacrylate, isobutyl	Methacrylate, 2-chloroethyl	1.014	0.064	0.85	0.14	Y	179
Methacrylate, isobutyl	Methacrylate, methyl	1.88	0.07	0.62	0.08	N	30
Methacrylate, isobutyl	Methacrylate, methyl	1.2		0.89			541
Methacrylate, isobutyl	Methacrylate, methyl	0.488	0.029	0.92	0.15	Y	639
Methacrylate, isobutyl	Methacrylic acid	0.47		2.01			847
Methacrylate, isobutyl	Methacrylonitrile	0.68	0.05	0.74	0.07	N	44
Methacrylate, isobutyl	Methacrylonitrile	0.94	0.12	0.43	0.08	N	44
Methacrylate, isobutyl	Styrene	0.271	0.036	0.509	0.014	Y	179
Methacrylate, isobutyl	Styrene	0.58		0.56			463
Methacrylate, isobutyl	Styrene	0.42		0.5			463
Methacrylate, isobutyl	Styrene	0.4		0.55			487
Methacrylate, isobutyl	Styrene	0.74		0.47			541
Methacrylate, isobutyl	Vinyl acetate	29.7	24.16	−0.06	0.22	Y	165
Methacrylate, *m*-chlorophenyl	Styrene	0.209	0.013	0.375	0.05	Y	177
Methacrylate, *m*-nitrophenyl	Styrene	0.185	0.054	0.44	0.16	Y	177
Methacrylate, methoxymethyl	Styrene	0.586	0.069	0.395	0.014	Y	821
Methacrylate, methyl	2-Oxazoline, 2-isopropenyl-	0.69	0.02	0.99	0.07		894
Methacrylate, methyl	3-Pyridazone, 2-vinyl	0.63		1.56			897
Methacrylate, methyl	3-Pyridazone, 2-vinyl-6-methyl-	0.16		0.3			897
Methacrylate, methyl	3-Pyridazone, 2-vinyl-6-methyl-4,5-benz-3-	1.65		0.27			897
Methacrylate, methyl	3-Pyridazone, 2-vinyl-6-phenyl-	0.58		0.49			897
Methacrylate, methyl	4H-1,3-Oxazinium F_3CSO_3, 3-methyl-2-vinyl-5,6-dihydro-	0.37		0.31			909
Methacrylate, methyl	Acenaphthalene	0.36	0.04	1.05	0.14	N	326
Methacrylate, methyl	Acenaphthalene	0.38	0.04	0.99	0.15	N	326
Methacrylate, methyl	Acenaphthalene	0.44		2.25			575
Methacrylate, methyl	Acetamide, *N*-vinyl-	2.65		0.19			984
Methacrylate, methyl	Acetamide, *N*-vinyl-	1.18		0.71			984
Methacrylate, methyl	Acetamide, *N*-vinyl-	2.1		0.01			984
Methacrylate, methyl	Acetylene, phenyl-	−0.06	0.16	1.69	26.56	Y	357
Methacrylate, methyl	Acetylene, phenyl-	1.5		0.2			443
Methacrylate, methyl	Acetylene, phenyl-	1.111	0.095	0.07	0.016	Y	732
Methacrylate, methyl	Acrolein	1.136	0.05	0.76	0.12	Y	291
Methacrylate, methyl	Acrolein	1.33	0.4	0.59	0.3	N	292
Methacrylate, methyl	Acrolein, methyl-	0.1		0.4			589
Methacrylate, methyl	Acrylamide	2.34	0.17	2.29	0.44	N	314
Methacrylate, methyl	Acrylamide	3	0.09	0.53	0.09	N	314
Methacrylate, methyl	Acrylamide	2.53		0.82			314
Methacrylate, methyl	Acrylamide	3	0.45	0.9	1.07	N	691
Methacrylate, methyl	Acrylamide, 2-chloro-*N*,*N*-dimethyl-	2.71	0.398	−0.159	0.502	Y	917

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Acrylamide, *N,N*-dimethyl-	1.65	0.16	0.41	0.15	N	170
Methacrylate, methyl	Acrylamide, *N,N*-dimethyl-	2.15	0.08	0.57	0.08	N	315
Methacrylate, methyl	Acrylamide, *N,N*-dimethyl-	2.8	0.1	0.59	0.09	N	315
Methacrylate, methyl	Acrylamide, *N,N*-dimethyl-	2.64	0.15	0.21	0.21	N	691
Methacrylate, methyl	Acrylamide, *N*-methyl-	1.14	0.09	0.05	0.72	N	691
Methacrylate, methyl	Acrylamide, *N*-methylol-	1.62		0.7			593
Methacrylate, methyl	Acrylamide, *N*-methylol	1.62		0.7			596
Methacrylate, methyl	Acrylamide, *N*-octadecyl-	4.119	0.07	0.42	0.11	Y	290
Methacrylate, methyl	Acrylamide, *N*-*tert*-butyl-	0.25		2.83			709
Methacrylate, methyl	Acrylamide, α-fluoro-	2.13	0.136	0.148	0.081	Y	823
Methacrylate, methyl	Acrylamido, 1-,-1-deoxy-D-glucitol	3.75	0.24	0.05	0.09	N	258
Methacrylate, methyl	Acrylate, α-benzyl-, methyl	3.9	0.19	0.09	0.01	N	610
Methacrylate, methyl	Acrylate, α-chloro-methyl	0.11	0.09	1.92	0.08	N	31
Methacrylate, methyl	Acrylate, ferrocenylmethyl	2.9		0.08			293
Methacrylate, methyl	Acrylate, 2-(*O*-ethyl methyl-phosphonoxy)-, methyl	0.73	0.04	0.44	0.25		882
Methacrylate, methyl	Acrylate, 2-chloroethyl	2.15		0.37			790
Methacrylate, methyl	Acrylate, 2-nitrobutyl	1.19	0.12	0.27	0.04	N	234
Methacrylate, methyl	Acrylate, β-acetoxymethyl-, methyl	0.91		0.24			1091
Methacrylate, methyl	Acrylate, α-(*O*-ethyl methylphos-phenoxy)	0.73		0.44			851
Methacrylate, methyl	Acrylate, α-[2,2-bis(carbomethoxy)-ethyl]-, methyl	3.7		0.04			1092
Methacrylate, methyl	Acrylate, α-acetoxy-, ethyl	1.65	0.12	0.608	0.02	Y	244
Methacrylate, methyl	Acrylate, α-benzyl-, methyl	2.36	0.23	0.173	0.022	Y	610
Methacrylate, methyl	Acrylate, α-chloro-, methyl	0.31	0.24	1.13	0.19	Y	6
Methacrylate, methyl	Acrylate, α-cyano-, methyl	0.21	0.02	0.03	0.01	N	141
Methacrylate, methyl	Acrylate, α-cyano-, methyl	0.068	0.014	0.135	0.016	Y	182
Methacrylate, methyl	Acrylate, α-hydroxymethyl-, ethyl	1.26	0.17	1.34	0.062	N	1027
Methacrylate, methyl	Acrylate, α-phenoxymethyl-, methyl	1.13	0.038	0.755	0.061	Y	1048
Methacrylate, methyl	Acrylate, α-phenyl-, methyl	0.21		0			141
Methacrylate, methyl	Acrylate, α-phenyl-, methyl	0.3		0			49
Methacrylate, methyl	Acrylate, α-tetrafluoropropyloxymethyl-, methyl	1.43		0.61			1047
Methacrylate, methyl	Acrylate, α-trifluoromethyl-, methyl	1.8	0.23	−0.17	0.18	Y	681
Methacrylate, methyl	Acrylate, α-trifluoromethyl-, methyl	3.2	0.5	0	0.1	N	825
Methacrylate, methyl	Acrylate, α-trifluoromethyl-, methyl	2.3	0.2	0.1	0.1	N	825
Methacrylate, methyl	Acrylate, benzyl	2.23	0.14	0.19	0.2	Y	277
Methacrylate, methyl	Acrylate, butyl	0.92	0.2	0.13	0.15	N	30
Methacrylate, methyl	Acrylate, butyl	2.86	0.32	0.11	0.018	Y	639
Methacrylate, methyl	Acrylate, butyl	1.88	0.4	0.43	0.07	N	87
Methacrylate, methyl	Acrylate, ethyl	1.83		0.47			30
Methacrylate, methyl	Acrylate, ethyl	2		0.28			469
Methacrylate, methyl	Acrylate, ethyl	2.04	0.28	0.22	0.05	N	87
Methacrylate, methyl	Acrylate, ferrocenylmethyl	2.8	0.19	0.024	0.064	Y	293
Methacrylate, methyl	Acrylate, heptafluorobutyl	1.387	0.072	0.177	0.084	Y	206
Methacrylate, methyl	Acrylate, heptyl	2.51	0.13	0.46	0.02		980
Methacrylate, methyl	Acrylate, isobutyl	1.04	0.08	0.29	0.04	N	30
Methacrylate, methyl	Acrylate, isobutyl	4.1	0.5	0.135	0.02	Y	639
Methacrylate, methyl	Acrylate, *m*-nitrophenyl	0.928	0.248	1.04	0.135	Y	1074
Methacrylate, methyl	Acrylate, methyl	2.15	0.04	0.4	0.12	N	324
Methacrylate, methyl	Acrylate, *o*-chlorophenyl	1.25		0.4			621
Methacrylate, methyl	Acrylate, octadecyl	2.477	0.024	0.464	0.07	Y	290
Methacrylate, methyl	Acrylate, *p*-bromophenyl	0.926	0.056	0.191	0.014	Y	1074
Methacrylate, methyl	Acrylate, *p*-chlorophenyl	1.01	0.132	0.235	0.023	Y	1074
Methacrylate, methyl	Acrylate, *p*-chlorophenyl	1.09		0.3			621
Methacrylate, methyl	Acrylate, methylphenyl	1.45	0.275	0.223	0.036	Y	1074
Methacrylate, methyl	Acrylate, phenyl	1.56		0.45			621
Methacrylate, methyl	Acrylate, phenyl	1.54	0.14	0.416	0.041	Y	672
Methacrylate, methyl	Acrylate, α-*p*-chlorobenzyl-, methyl	1.87	0.222	0.255	0.034	Y	905
Methacrylate, methyl	Acrylate, α-*p*-methoxybenzyl-, methyl	1.71	0.109	0.13	0.008	Y	905
Methacrylate, methyl	Acrylic acid	0.418	0.02	1.73	0.096	N	964
Methacrylate, methyl	Acrylic acid, α-bromo-	0.37		0.11			733
Methacrylate, methyl	Acrylonitrile	1.322	0.05	0.138	0.037	Y	216
Methacrylate, methyl	Acrylonitrile, α-trifluoromethyl-	1.11	0.12	−0.016	0.048	Y	681

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Acrylonitrile, α-perfluoropropyl-	1.9	0.3	0	0.05		926
Methacrylate, methyl	Acryloyl chloride	0.48		1.51			508
Methacrylate, methyl	Acryloyl chloride	0.42		0.05			776
Methacrylate, methyl	Allyl acetate	99.24	24.6	− 2.42	37.66	N	210
Methacrylate, methyl	Allyl acetate	23		0			470
Methacrylate, methyl	Allyl alcohol	78.79	6.5	− 1.62	2.9	N	210
Methacrylate, methyl	Allyl chloride					Y	204
Methacrylate, methyl	Benzocyclobutane, α-methylene-	0.32		0.46			1083
Methacrylate, methyl	Benzocyclobutene, 4-vinyl-	0.6		1.47			1085
Methacrylate, methyl	Benzofuran, 2-vinyl-	0.006	0.02	3.89	0.617	N	1020
Methacrylate, methyl	Benzophenone, 2-hydroxy-4-(methacryloxy)-	0.315	0.036	1.65	0.114	Y	934
Methacrylate, methyl	Benzothiazole, vinylmercapto-	1.25	0.083	0.43	0.14	Y	763
Methacrylate, methyl	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	30.5		0			994
Methacrylate, methyl	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	108		0			994
Methacrylate, methyl	Butadiene	0.25		0.75			140
Methacrylate, methyl	Butadiene	0.027	0.004	0.504	0.024	Y	257
Methacrylate, methyl	Butadiene	0.32		0.7			467
Methacrylate, methyl	Butadiene, 2,3-dichloro-	0.08		11.04		Y	61
Methacrylate, methyl	Butadiene, 2-chloro-	0.08		6.33		Y	61
Methacrylate, methyl	Butadiene, 2-fluoro-	0.76	0.77	1.23	1.77	Y	174
Methacrylate, methyl	Carbamate, *N*-vinyl-*t*-butyl-	1.87	0.2	0.17	0.1		991
Methacrylate, methyl	Carbazole, *N*-vinyl-	1.55	0.16	0.14	0.03	N	11
Methacrylate, methyl	Carbazole, *N*-vinyl-	2.12	0.14	0.033	0.015	Y	13
Methacrylate, methyl	Carbazole, *N*-vinyl-	1.8		0.06			738
Methacrylate, methyl	Carbazole, *N*-vinyl-	0.57		0.75			738
Methacrylate, methyl	Carbazole, *N*-vinyl-	1.84	0.26	0.08	0.05	N	758
Methacrylate, methyl	Carbazole, *N*-vinyl-	0.44	0.22	0.33	0.18	N	758
Methacrylate, methyl	Carbazole, *N*-vinyl-	2.123	0.048	0.031	0.022	Y	98
Methacrylate, methyl	Citraconimide, *N*-(4-acetoxyphenyl)-	1.88	0.16	0.18	0.13	Y	728
Methacrylate, methyl	Citraconimide, *N*-(4-chlorophenyl)-	2.93	0.4	− 0.01	0.18	Y	728
Methacrylate, methyl	Citraconimide, *N*-(4-ethoxycarbonyl-phenyl)-	2.72	0.18	− 0.027	0.084	Y	728
Methacrylate, methyl	Citraconimide, *N*-(4-methoxyphenyl)-	3.16	0.73	− 0.1	0.19	Y	728
Methacrylate, methyl	Citraconimide, *N*-(1-menthylcarboxylatomethyl)-	3.47	0.335	0.109	0.115	Y	950
Methacrylate, methyl	Citraconimide, *N*-benzyl-	2.77	0.28	0.02	0.14	Y	714
Methacrylate, methyl	Citraconimide, *N*-butyl-	2.17	0.56	− 0.12	0.36	Y	714
Methacrylate, methyl	Citraconimide, *N*-ethyl-	3.25	0.79	− 0.04	0.33	Y	714
Methacrylate, methyl	Citraconimide, *N*-hexyl-	2.38	0.45	− 0.18	0.28	Y	714
Methacrylate, methyl	Citraconimide, *N*-isobutyl-	1.78	0.85	− 0.18	0.42	Y	714
Methacrylate, methyl	Citraconimide, *N*-isopropyl-	2.7	0.51	0.09	0.27	Y	714
Methacrylate, methyl	Citraconimide, *N*-methyl	3.24		0.15			460
Methacrylate, methyl	Citraconimide, *N*-phenyl	3.081	0.074	0.001	0.033	Y	728
Methacrylate, methyl	Citraconimide, *N*-propyl	3.23	0.98	− 0.03	0.43	Y	714
Methacrylate, methyl	Citraconimide, *N*-*tert*-butyl-	2.88	0.19	0.038	0.072	Y	714
Methacrylate, methyl	Citraconimide, *N*-tolyl-	2.75	0.19	0.003	0.088	Y	728
Methacrylate, methyl	Cyclopentene, 4-,-1,3-dione	8.11	0.38	0.094	0.017	Y	95
Methacrylate, methyl	Cyclopropane, 1,1-bis(ethoxy-carbonyl)-2-vinyl-	4.21	0.905	0.223	0.194	Y	1076
Methacrylate, methyl	Cyclopropane, 1,1-bis(ethoxy-carbonyl)-2-vinyl-	18.3	2.5	0.111	0.194	Y	1076
Methacrylate, methyl	Diallyl melamine					Y	201
Methacrylate, methyl	Diallyl phthalate	26.56	1.98	− 0.001	0.011	Y	153
Methacrylate, methyl	Diallyl phthalate	22.73	1.48	0.029	0.026	Y	153
Methacrylate, methyl	Diallyl phthalate	21.52	0.39	0.076	0.006	Y	153
Methacrylate, methyl	Diallylcyanamide	25		0.04			603
Methacrylate, methyl	Diallylcyanamide	25		0.04			604
Methacrylate, methyl	Dimethyleneheptanedioate, 2,6-dimethyl	2.36	0.25	0.53	0.02	N	795
Methacrylate, methyl	Ditiane, 2-methylene-1,3-	0.08		4.12			1031
Methacrylate, methyl	Ethylene					N	41

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Ethylene, 1,1-diphenyl-	2.1		0.09			65
Methacrylate, methyl	Ethylene, 1,1-diphenyl-	8.7		0			901
Methacrylate, methyl	Ethylene, chlorotrifluoro-	51.36	3.31	−0.074	0.062	Y	236
Methacrylate, methyl	Ethylene, tetrachloro-					Y	204
Methacrylate, methyl	Ethylene, trichloro-	100		0			470
Methacrylate, methyl	Fumarate, diethyl	40.3	0.6	0.04	0.004	N	28
Methacrylate, methyl	Fumarate, diethyl	2.1		0.05			394
Methacrylate, methyl	Fumarate, diisopropyl	23		0.17			1038
Methacrylate, methyl	Fumaronitrile	6.74	0.79	−0.064	0.096	Y	191
Methacrylate, methyl	Furan, 2-vinyl-5-methyl	0.183	0.146	0.867	0.292	Y	1105
Methacrylate, methyl	Hexatriene, tetrachloro-	0.504	0.057	1.76	0.28	Y	5
Methacrylate, methyl	Imidazole, 1-vinyl-	4.36	1.86	0.014	0.03	Y	364
Methacrylate, methyl	Imidazole, 1-vinyl-2-methyl-	4	0.54	0.047	0.088	Y	364
Methacrylate, methyl	Imidazole, 1-vinyl-2-methyl-	3.48		0.003			479
Methacrylate, methyl	Isoprene	0.26	0.21	0.65	0.23	Y	302
Methacrylate, methyl	Isoprene	0.25		0.64			698
Methacrylate, methyl	Isoprene	0.25		0.64			704
Methacrylate, methyl	Isoprene, 3-acetoxy-	0.16		2.81			770
Methacrylate, methyl	Isopropenyl acetate	17.36	1.95	−0.09	0.12	Y	100
Methacrylate, methyl	Isopropenyl, 3-(1-cyclohexenyl), acetate	0.81		0.4			770
Methacrylate, methyl	Isopropenylisocyanate	3.1		0.14			434
Methacrylate, methyl	Isopropenyltoluene	0.68		0.04			688
Methacrylate, methyl	Isopropenyltoluene	0.68		0.04			722
Methacrylate, methyl	Itaconamate, *N*-(4-chlorophenyl)-, ethyl	1.24		0.36			678
Methacrylate, methyl	Itaconamate, *N*-(4-chlorophenyl)-, propyl	1.26		0.31			678
Methacrylate, methyl	Itaconamate, *N*-(4-methoxyphenyl)-, ethyl	1.31		0.43			678
Methacrylate, methyl	Itaconamate, *N*-(4-carboethoxyphenyl)-ethyl	1.21		0.48			678
Methacrylate, methyl	Itaconamate, *N*-(4-methylphenyl)-, ethyl	1.43		0.63			678
Methacrylate, methyl	Itaconamate, *N*-(4-methoxyphenyl)-, propyl	1.03		0.4			678
Methacrylate, methyl	Itaconamate, *N*-(4-methylphenyl)-, propyl	1.11		0.28			678
Methacrylate, methyl	Itaconamate, *N*-phenyl-, ethyl	1.32		0.47			678
Methacrylate, methyl	Itaconamate, *N*-phenyl-, propyl	1.13		0.15			678
Methacrylate, methyl	Itaconamate, *N*-(4-carboethoxyphenyl)-propyl	1		0.53			678
Methacrylate, methyl	Itaconate, dibutyl	1.33	0.09	0.717	0.11		1073
Methacrylate, methyl	Itaconate, dibutyl	0.8		0.4			398
Methacrylate, methyl	Itaconate, dimethyl	3.34	0.557	−0.156	0.02	Y	975
Methacrylate, methyl	Itaconate, dimethyl	1.2		0.3			398
Methacrylate, methyl	Itaconate, monomethyl	1.1	0.071	0.139	0.103	Y	1010
Methacrylate, methyl	Itaconic acid	1.23		0			260
Methacrylate, methyl	Itaconic acid	1.14		0			408
Methacrylate, methyl	Itaconic anhydride	0.155	0.024	1.17	0.33	Y	1010
Methacrylate, methyl	Itaconimide, *N*-(2-chloroethyl)-	0	0.11	0.54	0.39	Y	642
Methacrylate, methyl	Itaconimide, *N*-benzyl-	0.46	0.18	1.06	0.75	Y	642
Methacrylate, methyl	Itaconimide, *N*-ethyl-	0.486	0.066	0.42	0.13	Y	642
Methacrylate, methyl	Itaconimide, *N*-methyl-	0.38	0.22	1.12	0.73	Y	642
Methacrylate, methyl	Maleate, dibutyl tin	72.7	5.93	−0.095	0.199	Y	987
Methacrylate, methyl	Maleate, diethyl	341	46	−0.1	0.05	N	28
Methacrylate, methyl	Maleate, diethyl	20		0			470
Methacrylate, methyl	Maleate, diethyl	285.8	35.9	−0.02	0.015	Y	873
Methacrylate, methyl	Maleic anhydride	4.18	0.31	−0.163	0.027	Y	169
Methacrylate, methyl	Maleic anhydride	6.36	0.64	−0.019	0.026	Y	260
Methacrylate, methyl	Maleic anhydride	0.46	0.69	0.08	1.77	N	320
Methacrylate, methyl	Maleic anhydride	5.2	0.47	0.02	0.004	N	33
Methacrylate, methyl	Maleic anhydride	3.1		0.01			524
Methacrylate, methyl	Maleic anhydride	3.85		0.01			524
Methacrylate, methyl	Maleic anhydride	3.4		0.01			524
Methacrylate, methyl	Maleic anhydride	3.85		0.02			524
Methacrylate, methyl	Maleimide	2.576	0.061	0.166	0.047	Y	251
Methacrylate, methyl	Maleimide	2.5		0.17			992

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Maleimide, 2,3-dimethyl-*N*-(2-methacryloyloxyethyl)	0.51	1.66	1.1	3.58	Y	619
Methacrylate, methyl	Maleimide, *N*-(4-hydroxyphenyl)-	1.392	0.001	0.345	0.001	Y	323
Methacrylate, methyl	Maleimide, *N*-(2-hydroxyethyl)-	1.396	0.089	0.201	0.083	Y	323
Methacrylate, methyl	Maleimide, *N*-(2,6-diethylphenyl)-	4.78		0.05			992
Methacrylate, methyl	Maleimide, *N*-(2,6-diisopropylphenyl)-	10.9		0.02			992
Methacrylate, methyl	Maleimide, *N*-(2,6-dimethylphenyl)-	3.62		0.07			992
Methacrylate, methyl	Maleimide, *N*-(2-chlorophenyl)-	2.1		0.1			992
Methacrylate, methyl	Maleimide, *N*-(2-methylphenyl)-	2.22		0.09			992
Methacrylate, methyl	Maleimide, *N*-(3,5-dimethylphenyl)-	1.63		0.28			992
Methacrylate, methyl	Maleimide, *N*-(3-methylphenyl)-	1.18		0.22			992
Methacrylate, methyl	Maleimide, *N*-(3-trifluoromethylphenyl)-	1.57		0.1			992
Methacrylate, methyl	Maleimide, *N*-(4-carboxyethylphenyl)-α-chloro-	0.472	0.114	− 0.004	0.168	Y	973
Methacrylate, methyl	Maleimide, *N*-(4-chlorophenyl)-α-chloro-	0.562	0.025	0.02	0.03	Y	973
Methacrylate, methyl	Maleimide, *N*-4-methoxyphenyl)-α-chloro-	0.556	0.145	0.064	0.189	Y	973
Methacrylate, methyl	Maleimide, *N*-(4-methylphenyl)-	0.83		0.34			992
Methacrylate, methyl	Maleimide, *N*-(4-methylphenyl)-α-chloro-	0.564	0.117	0.029	0.158	Y	973
Methacrylate, methyl	Maleimide, *N*-(β-chloroethyl)-α-chloro-	0.94	0.06	0.05	0.04		974
Methacrylate, methyl	Maleimide, *N*-(β-chloroethyl)-α-chloro-	0.59	0.06	0.11	0.05		974
Methacrylate, methyl	Maleimide, *N*-[*N*′-(α-methylbenzyl) aminocarbonylpentyl]-	1.37	0.291	0.582	0.359	Y	1009
Methacrylate, methyl	Maleimide, *N*-benzyl	1.28	0.23	0.03	0.23	Y	348
Methacrylate, methyl	Maleimide, *N*-butyl	1.41	0.19	− 0.1	0.16	Y	115
Methacrylate, methyl	Maleimide, *N*-cyclohexyl	1.35		0.24			992
Methacrylate, methyl	Maleimide, *N*-cyclohexyl	1.31		0.19			1100
Methacrylate, methyl	Maleimide, *N*-cyclohexyl	2.26	0.066	0.106	0.048	Y	348
Methacrylate, methyl	Maleimide, *N*-ethyl-α-chloro-	0.53	0.04	0.13	0.03		974
Methacrylate, methyl	Maleimide, *N*-hexyl-	1.9	0.2	0.1	0.15	Y	348
Methacrylate, methyl	Maleimide, *N*-hydroxymethyl-	1.745	0.03	0.263	0.026	Y	323
Methacrylate, methyl	Maleimide, *N*-methyl-α-chloro-	0.63	0.34	0.11	0.03		974
Methacrylate, methyl	Maleimide, *N*-phenyl-	0.98		0.3			323
Methacrylate, methyl	Maleimide, *N*-phenyl-	0.91		0.3			992
Methacrylate, methyl	Maleimide, *N*-phenyl-α-chloro-	0.657	0.083	0.077	0.098	Y	973
Methacrylate, methyl	Maleimide, *N*-phenyl-	1.014	0.06	0.164	0.065	Y	328
Methacrylate, methyl	Methacrylate, 2-acetoxyethyl	0.94	0.02	1.12	0.06	N	346
Methacrylate, methyl	Methacrylate, cyanomethyl	0.399	0.019	0.73	0.11	Y	625
Methacrylate, methyl	Methacrylate, diphenylmethyl	0.81		1.07			761
Methacrylate, methyl	Methacrylamide	1.57	0.11	1.27	0.24	N	316
Methacrylate, methyl	Methacrylamide	1.7	0.04	0.44	0.06	N	316
Methacrylate, methyl	Methacrylamide	1.39	0.074	0.425	0.085	Y	54
Methacrylate, methyl	Methacrylamide	1.65		0.49			55
Methacrylate, methyl	Methacrylamide, *N*-methoxymethyl-	1.678	0.048	0.265	0.009	Y	227
Methacrylate, methyl	Methacrylamide, *N*-*p*-bromophenyl-	3.48	0.2	0.38	0.2		968
Methacrylate, methyl	Methacrylamide, *N*-*p*-tolyl-	1.43	0.2	0.78	0.2		968
Methacrylate, methyl	Methacrylamide, *N*-phenyl	1.95	0.2	0.28	0.2		968
Methacrylate, methyl	Methacrylamide, *N*-phenyl-	1.42	0.096	0.56	0.12	Y	352
Methacrylate, methyl	Methacrylamide, 1-deoxy-D-glucitol	4.2		0.04			258
Methacrylate, methyl	Methacrylamide, *N*-*p*-nitrophenyl-	5.05	0.2	0.29	0.2		968
Methacrylate, methyl	Methacrylate, *tert*-butyl	0.96		1.35			761
Methacrylate, methyl	Methacrylate, α,α-dimethylbenzyl	0.81		0.92			761
Methacrylate, methyl	Methacrylate, (2,2-dimethyl-1,3-dioxolane)	0.9		1.1			807
Methacrylate, methyl	Methacrylate, 1,1-diphenylethyl	0.72		0.77			761
Methacrylate, methyl	Methacrylate, 1-naphthyl	0.77	0.14	1.8	0.73	Y	752
Methacrylate, methyl	Methacrylate, 1-naphthyl	0.809	0.078	1.68	0.38	Y	752
Methacrylate, methyl	Methacrylate, 1-naphthyl	0.851	0.084	2.62	0.47	Y	752
Methacrylate, methyl	Methacrylate, 1-naphthyl	0.61		1.52			761
Methacrylate, methyl	Methacrylate, 2,2-dimethylaminoethyl	0.42	0.02	1.01	0.54	N	691
Methacrylate, methyl	Methacrylate, 2,3-epithiopropyl	0.83		0.97			787
Methacrylate, methyl	Methacrylate, 2,6-(diphenyl)phenyl	1.42	0.06	0.071	0.004		1079
Methacrylate, methyl	Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	0.59		0.42			600

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Methacrylate, 2-bromoethyl	0.79		1.18			657
Methacrylate, methyl	Methacrylate, 2-chloro-2,3,3,3-fluoropropyl	0.984	0.395	0.583	1.17	N	927
Methacrylate, methyl	Methacrylate, 2-chloroethyl	1.156	0.082	0.97	0.18	Y	179
Methacrylate, methyl	Methacrylate, 2-chloroethyl	0.55		0.48			382
Methacrylate, methyl	Methacrylate, 2-hydroxyethyl	0.824	0.01	0.63	0.076	Y	350
Methacrylate, methyl	Methacrylate, 2-hydroxyethyl	0.192	0.09	0.81	1.02	Y	358
Methacrylate, methyl	Methacrylate, 2-hydroxyethyl	0.75		1.5			710
Methacrylate, methyl	Methacrylate, 2-hydroxypropyl	0.402	0.017	1.055	0.04	Y	333
Methacrylate, methyl	Methacrylate, 2-naphthyl	0.602	0.059	2.57	0.48	Y	760
Methacrylate, methyl	Methacrylate, 2-naphthyl	0.581	0.023	2.53	0.27	Y	760
Methacrylate, methyl	Methacrylate, 2-naphthyl	0.532	0.055	1.91	0.6	Y	760
Methacrylate, methyl	Methacrylate, 2-naphthyl	0.614	0.051	4.41	0.76	Y	760
Methacrylate, methyl	Methacrylate, 2-naphthyl	0.623	0.048	3.83	0.57	Y	760
Methacrylate, methyl	Methacrylate, 2-phenylethyl	0.75	0.16	0.85	0.34	Y	540
Methacrylate, methyl	Methacrylate, 3,5-dimethyladamantyl	0.68	0.04	0.45	0.16	N	335
Methacrylate, methyl	Methacrylate, 5-oxo-pyrrolidinylmethyl	0.421	0.033	0.694	0.087	Y	633
Methacrylate, methyl	Methacrylate, *N*-α-benzothiazolonyl-methyl	0.5	0.01	0.6	0.02		887
Methacrylate, methyl	Methacrylate, benzyl	0.808	0.03	1.112	0.093	Y	111
Methacrylate, methyl	Methacrylate, benzyl	0.93		1.05			32
Methacrylate, methyl	Methacrylate, benzyl	0.78		1.38			540
Methacrylate, methyl	Methacrylate, benzylmethylaminoethyl	0.523	0.134	0.296	0.123	Y	1081
Methacrylate, methyl	Methacrylate, butyl	0.52	0.07	2.11	0.08	N	30
Methacrylate, methyl	Methacrylate, butyl	1.27		1.2			844
Methacrylate, methyl	Methacrylate, chloromethyl	0.477	0.029	1.02	0.16	Y	712
Methacrylate, methyl	Methacrylate, diethylaminoethyl	0.843	0.128	1.44	0.085	Y	1081
Methacrylate, methyl	Methacrylate, dimethylaminoethyl	0.699	0.051	1.2	0.154	Y	1081
Methacrylate, methyl	Methacrylate, ethyl	0.81	0.22	0.86	0.12	N	32
Methacrylate, methyl	Methacrylate, ethyl	1.08		1.08			844
Methacrylate, methyl	Methacrylate, ethyl	1.16	0.19	1	0.09	N	87
Methacrylate, methyl	Methacrylate, glycidyl	0.71	0.08	0.52	0.06	Y	113
Methacrylate, methyl	Methacrylate, glycidyl	0.726	0.042	0.934	0.085	Y	226
Methacrylate, methyl	Methacrylate, glycidyl	0.8		1.05			463
Methacrylate, methyl	Methacrylate, glycidyl	0.688	0.076	0.501	0.027	Y	639
Methacrylate, methyl	Methacrylate, isobutyl	0.62	0.08	1.88	0.07	N	30
Methacrylate, methyl	Methacrylate, isobutyl	0.92	0.15	0.488	0.029	Y	639
Methacrylate, methyl	Methacrylate, isopropyl	0.89		1.2			541
Methacrylate, methyl	Methacrylate, methyl diphenylsilyl	0.438	0.075	0.38	0.178	Y	1069
Methacrylate, methyl	Methacrylate, methylthiomethyl	0.639	0.057	1.1	0.356	Y	920
Methacrylate, methyl	Methacrylate, *p*-acetylphenyl	0.47		0.67			769
Methacrylate, methyl	Methacrylate, *p*-chlorophenyl	0.54		1.08			769
Methacrylate, methyl	Methacrylate, *p*-methoxyphenyl	0.72		1.19			769
Methacrylate, methyl	Methacrylate, *p*-tolyl	0.59		1.28			769
Methacrylate, methyl	Methacrylate, phenyl	0.53		1.67			32
Methacrylate, methyl	Methacrylate, phenyl	0.58		1.69			32
Methacrylate, methyl	Methacrylate, phenyl	0.56		1.72			32
Methacrylate, methyl	Methacrylate, phenyl	0.66		1.55			761
Methacrylate, methyl	Methacrylate, phenyl	0.55		0.99			769
Methacrylate, methyl	Methacrylate, propyl	1.21		1.24			844
Methacrylate, methyl	Methacrylate, sulfolanyl	1.07	2.48	7.16	23.7	N	359
Methacrylate, methyl	Methacrylate, *t*-butyl dimethylsilyl	0.897	0.05	0.725	0.455	Y	1069
Methacrylate, methyl	Methacrylate, *t*-butyl diphenylsilyl	0.636	0.014	0.396	0.257	Y	1069
Methacrylate, methyl	Methacrylate, tributyltin	0.58		0.62			1082
Methacrylate, methyl	Methacrylate, tributyltin	0.62		0.87			1082
Methacrylate, methyl	Methacrylate, trimethyltin	0.63		1.07			1082
Methacrylate, methyl	Methacrylate, trimethyltin	0.6		0.68			1082
Methacrylate, methyl	Methacrylic acid	0.63	0.03	0.25	0.05		1071
Methacrylate, methyl	Methacrylic acid	0.1	0.01	1.06	0.02		1072
Methacrylate, methyl	Methacrylic acid	0.78	0.03	0.33	0.02		1072
Methacrylate, methyl	Methacrylic acid	0.31	0.02	0.63	0.02		1072
Methacrylate, methyl	Methacrylic acid	0.27	0.03	0.46	0.03		1072
Methacrylate, methyl	Methacrylic acid	0.1	0.01	1.06	0.02		1087
Methacrylate, methyl	Methacrylic acid	0.78	0.03	0.33	0.02		1087
Methacrylate, methyl	Methacrylic acid	0.32	0.02	0.63	0.02		1087

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Methacrylic acid	0.87	0.05	2.16	0.28	N	203
Methacrylate, methyl	Methacrylic acid	1.81	0.16	1.63	6.25	N	210
Methacrylate, methyl	Methacrylic acid	0.56	0.23	0.99	0.55	Y	216
Methacrylate, methyl	Methacrylic acid	0.29	0.04	1.18	0.19	N	276
Methacrylate, methyl	Methacrylic acid	1.28	0.1	0.48	0.1	N	276
Methacrylate, methyl	Methacrylic acid	0.77	0.05	1.84	0.24	N	312
Methacrylate, methyl	Methacrylic acid	0.36	0.08	1.38	0.27	N	313
Methacrylate, methyl	Methacrylic acid	1.18		0.63			313
Methacrylate, methyl	Methacrylic acid	0.55		1.55			424
Methacrylate, methyl	Methacrylic acid	0.209	0.05	1.26	0.2	Y	54
Methacrylate, methyl	Methacrylic acid	1.25		0.78			630
Methacrylate, methyl	Methacrylic acid	0.48		0.68			819
Methacrylate, methyl	Methacrylic anhydride	0.22	0.02	1.58	0.06	N	275
Methacrylate, methyl	Methacrylophenone, α-	1.79	0.07	0.11	0.02	N	798
Methacrylate, methyl	Methacrylophenone, α-	1.74	0.22	0.119	0.009	Y	798
Methacrylate, methyl	Methacryloyl chloride	0.45		0.2			591
Methacrylate, methyl	Methacryloyl chloride	0.45		0.2			593
Methacrylate, methyl	Methacryloyl fluoride	0.405	0.037	0.43	0.12	Y	617
Methacrylate, methyl	Methacryloyl fluoride	0.53	0.06	0.9	0.16	N	660
Methacrylate, methyl	Methacryloyl isocyanate	0.75		0.35			944
Methacrylate, methyl	Methacryloyloxy-, *o*-, benzoic acid	0.908	0.252	1.37	0.64	Y	938
Methacrylate, methyl	Methylenebutyrolactone	0.6		1.67			746
Methacrylate, methyl	Methyleneglutaronitrile, 2-	1.36	0.28	0.12	0.74	N	196
Methacrylate, methyl	Methyleneglutaronitrile, 2-	1.27		0.12			196
Methacrylate, methyl	Myrcene	0.256	0.013	0.448	0.06	Y	1062
Methacrylate, methyl	*N*,*N*-divinylaniline	1.06	0.18	0.005	0.018	Y	45
Methacrylate, methyl	*N*-Vinylimidazole	4.306	0.185	0.663	0.104	Y	879
Methacrylate, methyl	*N*-Vinylpyrrolidone	4.78	0.236	0.006	2.29		1084
Methacrylate, methyl	*N*-Vinylpyrrolidone	5.93	0.198	0.014	0.899		1084
Methacrylate, methyl	*N*-Vinylpyrrolidone	2.07	0.247	0.027	0.062		1084
Methacrylate, methyl	*N*-Vinylpyrrolidone	4.04	0.956	0.066	3.96		1084
Methacrylate, methyl	Naphthalene, 1-vinyl-	0.321	0.096	0.574	0.073		967
Methacrylate, methyl	Norbornadiene	14.68	16.78	−0.5	0.52	N	267
Methacrylate, methyl	Oxazolidone, *N*-vinyl-	6.75	0.37	0.04	0.13	Y	102
Methacrylate, methyl	Oxazolidone, *N*-vinyl-	9.46	0.39	0.027	0.008	Y	36
Methacrylate, methyl	Oxazoline, 2-,2-isopropenyl 4,4-dimethyl	0.53		0.82			596
Methacrylate, methyl	Oxazoline, 2-,2-isopropenyl	0.69		0.99			862
Methacrylate, methyl	Oxazoline, 2-,4-acryloxymethyl 2,4-dimethyl	0.41		0.11			596
Methacrylate, methyl	Oxazoline, 2-,4-methacryloxy- 2,4-dimethyl	1.17		0.19			596
Methacrylate, methyl	Pentadiene, *trans*-1,3-	0.404	0.038	0.379	0.013	Y	1058
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.555	0.032	3.39	0.263	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.424	0.022	2.02	0.141	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.591	0.046	3.06	0.349	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.443	0.032	1.67	0.183	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.34	0.031	1.24	0.168	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.57	0.023	1.72	0.123	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.606	0.045	1.69	0.236	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.269	0.027	0.72	0.12	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.715	0.048	1.55	0.224	N	1033
Methacrylate, methyl	Pentenoate, 3-oxo-4-, ethyl	0.528	0.02	1.09	0.09	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.597	0.03	2.56	0.218	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.38	0.034	0.748	0.155	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.513	0.022	1.14	0.109	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.43	0.034	0.952	0.164	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.474	0.023	1.67	0.143	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.581	0.025	1.04	0.111	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.616	0.024	1.05	0.108	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.663	0.023	0.725	0.08	N	1033
Methacrylate, methyl	Pentenoate, 4-methyl-3-oxo-4-, ethyl	0.528	0.02	1.09	0.09	N	1033
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	2.37	0.046	0.486	0.088	N	971
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	2.23	0.047	0.521	0.138	N	971
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	1.87	0.086	0.946	0.436	N	971

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	1.97	0.029	1.16	0.248	N	971
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	2.1	0.045	0.42	0.097	N	971
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	2.56	0.094	0.258	0.226	N	971
Methacrylate, methyl	Phosphate, 2-(acryloyloxy)ethyl diethyl	2.04	0.012	0.0701	0.052	N	971
Methacrylate, methyl	Phosphonate, α-bromovinyl-,diethyl	1.25	0.04				684
Methacrylate, methyl	Phosphonate, α-carboethoxyvinyl-, diethyl	1		0.05			684
Methacrylate, methyl	Phosphonate, α-carbomethoxyvinyl-, diethyl	4.7		0.01			684
Methacrylate, methyl	Phosphonate, isopropenyl-, dimethyl	30		0.2			684
Methacrylate, methyl	Phosphonate, vinyl-, bis(2-chloroethyl)	29.9		0.26			410
Methacrylate, methyl	Phosphonate, vinyl-, diethyl	11.1	0.04				684
Methacrylate, methyl	Phosphonic acid, α-phenylvinyl-	1.362	0.084	−0.063	0.077	Y	131
Methacrylate, methyl	Phthalimide,-*N*-)methacryloyloxy)-	0.69	0.048	1.45	0.151	Y	979
Methacrylate, methyl	Pinene, α-	10		0.08			48
Methacrylate, methyl	Propene, 2,3-dichloro-	6.02	1.66	0.18	0.1	N	11
Methacrylate, methyl	Propene, 2-chloro-3-hydroxy-	4.4		0			445
Methacrylate, methyl	Propenyl, 2-chloro-, acetate	1		0			445
Methacrylate, methyl	Propenyl, 2-methyl, acetate	10		0			470
Methacrylate, methyl	Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-	1.19	0.04	0.08	0.03	N	340
Methacrylate, methyl	Pyridazinone 3-(2-vinyl)-6-methyl-	0.86	0.02	0.56	0.04	N	340
Methacrylate, methyl	Pyridine, 2-methyl-5-vinyl-	0.42	0.09	0.54	0.19	N	232
Methacrylate, methyl	Pyridine, 2-vinyl-	0.42	0.02	0.73	0.06	N	231
Methacrylate, methyl	Pyridine, 2-vinyl-	0.4		0.86			532
Methacrylate, methyl	Pyridine, 2-vinyl-	0.35	0.19	0.76	0.12	Y	6
Methacrylate, methyl	Pyridine, 2-vinyl-	0.31		0.64			623
Methacrylate, methyl	Pyridine, 2-vinyl-	0.27	0.04	1.1	0.08	N	749
Methacrylate, methyl	Pyridine, 2-vinyl-5-ethyl-	0.39	0.02	0.68	0.06	N	231
Methacrylate, methyl	Pyridine, 4-vinyl-	0.57	0.02	0.77	0.07	N	231
Methacrylate, methyl	Pyridine, 4-vinyl-	0.54	0.01	0.99	0.18	N	691
Methacrylate, methyl	Pyrrolidone, 1-benzyl-3-methylene-5-methyl	0.387	0.07	2.28	0.47	Y	33
Methacrylate, methyl	Pyrrolidone, *N*-vinyl-					Y	213
Methacrylate, methyl	Pyrrolidone, *N*-vinyl-	5.62	0.3	−0.05	0.08	N	320
Methacrylate, methyl	Pyrrolidone, *N*-vinyl-	4.63	0.34	−0.032	0.068	Y	321
Methacrylate, methyl	Pyrrolidone, *N*-vinyl-	4.36	0.61	−0.052	0.028	Y	36
Methacrylate, methyl	Pyrrolidone, *N*-vinyl-	4.04	0.61	0.01	0.15	N	691
Methacrylate, methyl	Pyrrolidone, α-methylene-*N*-methyl-	0.577	0.058	0.24	0.14	Y	641
Methacrylate, methyl	Silane, γ-methacryloxypropyltrimethoxy-	0.788	0.082	2.06	0.309	Y	977
Methacrylate, methyl	Styrene	0.5		0.5			138
Methacrylate, methyl	Styrene	0.46		0.52			139
Methacrylate, methyl	Styrene	0.46		0.52			179
Methacrylate, methyl	Styrene	0.42		0.48			20
Methacrylate, methyl	Styrene	0.45		0.52			21
Methacrylate, methyl	Styrene	0.46		0.49			21
Methacrylate, methyl	Styrene	0.47		0.45			21
Methacrylate, methyl	Styrene	0.48		0.58			21
Methacrylate, methyl	Styrene	0.5		0.44			21
Methacrylate, methyl	Styrene	0.22	0.13	0.396	0.048	Y	241
Methacrylate, methyl	Styrene	0.32		0.42			241
Methacrylate, methyl	Styrene	0.418	0.085	0.49	0.14	Y	254
Methacrylate, methyl	Styrene	0.54	0.029	0.564	0.047	Y	254
Methacrylate, methyl	Styrene	0.478	0.011	0.585	0.007	Y	287
Methacrylate, methyl	Styrene	0.45	0.01	0.44	0.08	N	324
Methacrylate, methyl	Styrene	0.45		0.47			324
Methacrylate, methyl	Styrene	0.49		0.54			403
Methacrylate, methyl	Styrene	0.47		0.52			416
Methacrylate, methyl	Styrene	0.48		0.38			451
Methacrylate, methyl	Styrene	0.46		0.52			463
Methacrylate, methyl	Styrene	0.42		0.54			492
Methacrylate, methyl	Styrene	0.5		0.44			492
Methacrylate, methyl	Styrene	0.46		0.52			505
Methacrylate, methyl	Styrene	0.44		0.5			531
Methacrylate, methyl	Styrene	0.49		0.56			531
Methacrylate, methyl	Styrene	0.49		0.53			534

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Styrene	0.409	0.02	0.485	0.052	Y	751
Methacrylate, methyl	Styrene	0.504	0.026	0.48	0.059	Y	751
Methacrylate, methyl	Styrene	0.611	0.028	0.371	0.055	Y	751
Methacrylate, methyl	Styrene	0.59		0.62			753
Methacrylate, methyl	Styrene	0.6		0.52			753
Methacrylate, methyl	Styrene	0.63		0.5			753
Methacrylate, methyl	Styrene	0.58		0.55			753
Methacrylate, methyl	Styrene	0.64		0.55			753
Methacrylate, methyl	Styrene	0.41		0.41			753
Methacrylate, methyl	Styrene	0.454		0.472			824
Methacrylate, methyl	Styrene	0.464		0.497			824
Methacrylate, methyl	Styrene	0.422		0.432			824
Methacrylate, methyl	Styrene	0.41		0.57			835
Methacrylate, methyl	Styrene	0.314		0.275			860
Methacrylate, methyl	Styrene, 2,4,6-trimethyl-	1.511	0.072	0.083	0.045	Y	58
Methacrylate, methyl	Styrene, 2,4,6-trimethyl-	1.45	0.16	− 0.01	0.11	Y	58
Methacrylate, methyl	Styrene, 2,5-dichloro-	0.44	0.13	2.66	0.38	Y	3
Methacrylate, methyl	Styrene, 2,6-dichloro-	1.98	0.16	− 0.15	0.27	N	324
Methacrylate, methyl	Styrene, 3-methyl	0.48	0.04	0.53	0.04		1087
Methacrylate, methyl	Styrene, 3-methyl	0.38	0.03	0.36	0.06		1087
Methacrylate, methyl	Styrene, 3-methyl	0.41	0.04	0.51	0.05		1087
Methacrylate, methyl	Styrene, 3-tri-*n*-butylstannyl-	0.69		0.03			985
Methacrylate, methyl	Styrene, 4-methyl-	0.345	0.008	0.46	0.022	Y	929
Methacrylate, methyl	Styrene, α-methoxy-	2.5	0.39	− 0.02	0.04	N	142
Methacrylate, methyl	Styrene, α-methyl-	0.48	0.02	0.27	0.07	N	265
Methacrylate, methyl	Styrene, α-methyl-	0.55		0.51			265
Methacrylate, methyl	Styrene, α-methyl-	0.55		0.6			265
Methacrylate, methyl	Styrene, α-methyl-	0.5		0.14			532
Methacrylate, methyl	Styrene, α-methyl-	0.42		0.22			835
Methacrylate, methyl	Styrene, α-methyl-	0.47		0.48			899
Methacrylate, methyl	Styrene, *m*-bromo-	0.48		1.17			256
Methacrylate, methyl	Styrene, *m*-chloro-					Y	150
Methacrylate, methyl	Styrene, *m*-methyl-	0.512	0.036	0.486	0.02	Y	256
Methacrylate, methyl	Styrene, *m*-nitro-	0.35	0.11	0.8	0.32	Y	222
Methacrylate, methyl	Styrene, *p*-chloro-	0.5		1.37			532
Methacrylate, methyl	Styrene, *o*-chloro-	0.46		1.34			558
Methacrylate, methyl	Styrene, *p*-1-(2-hydroxypropyl)-	0.26		1			380
Methacrylate, methyl	Styrene, *p*-*N*,*N*-dimethylamino-	0.204	0.022	0.101	0.016	Y	256
Methacrylate, methyl	Styrene, *p*-bromo-	0.4		1.1			256
Methacrylate, methyl	Styrene, *p*-chloro-	0.334	0.016	0.77	0.12	Y	150
Methacrylate, methyl	Styrene, *p*-chloro-	0.42		0.89			256
Methacrylate, methyl	Styrene, *p*-chloro-	0.43		0.47			476
Methacrylate, methyl	Styrene, *p*-chloromethyl-	0.408	0.038	0.91	0.15	Y	756
Methacrylate, methyl	Styrene, *p*-cyano-	0.22		1.41			256
Methacrylate, methyl	Styrene, *p*-methoxy-	0.29		0.32			35
Methacrylate, methyl	Styrene, *p*-methyl-	0.4		0.44			256
Methacrylate, methyl	Styrene, *p*-octylamine sulfonate	0.6		2.6			817
Methacrylate, methyl	Styrene, *p*-*tert*-butyl-	0.44		0.5			634
Methacrylate, methyl	Styrene, pentachloro-	3.65	0.85	0.3	0.05	N	7
Methacrylate, methyl	Succinamete, potassium *N*-vinyl-	1.1	0.17	− 0.02	0.12	Y	771
Methacrylate, methyl	Succinimide, *N*-vinyl-	9.94	0.27	0.048	0.026	Y	104
Methacrylate, methyl	Succinimide, *N*-vinyl-	0.01	0.031	− 0.059	0.096	Y	693
Methacrylate, methyl	Tetrazole, 1-Vinyl-	7.13	0.093	0.262	0.026	Y	925
Methacrylate, methyl	Tetrazole, 2-methyl-5-vinyl-	1.026	0.029	0.486	0.075	Y	670
Methacrylate, methyl	Tetrazole, 2-phenyl-5(4′-vinyl) phenyl-	0.7		0.4			583
Methacrylate, methyl	Thiophene, 3-vinyl	0.563		0.25			1000
Methacrylate, methyl	Thioxanthone, 2-(acryloyloxy)-	1.36		0.5			986
Methacrylate, methyl	Toluenesulfonamide, *N*,*N*-methyl-vinyl-	1.87	0.19	− 1.83	0.26	Y	80
Methacrylate, methyl	Triallyl cyanurate	16.12	0.56	− 0.005	0.05	Y	201
Methacrylate, methyl	Triallyl isocyanurate	16.88	6.64	− 0.49	0.94	Y	201
Methacrylate, methyl	Triazole, 1,2,3-, 1-*p*-bromophenyl-4-vinyl	0.832	0.022	0.266	0.058	Y	670
Methacrylate, methyl	Triazole, 1,2,3-, 4(5)-vinyl-	0.839	0.055	0.27	0.13	Y	670
Methacrylate, methyl	Urea, *N*-vinyl-*N*′-ethyl-	1.85	0.23	− 0.008	0.029	Y	101

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Vinyl 2-chloroethyl ether	18.8		0			597
Methacrylate, methyl	Vinyl 4-chlorocyclohexyl ketone	0.77		0.51			668
Methacrylate, methyl	Vinyl acetate	2.71	0.25	−0.2	0.01		158
Methacrylate, methyl	Vinyl acetate	137.5	5.9	−0.81	1.17	N	210
Methacrylate, methyl	Vinyl acetate	26		0.03			272
Methacrylate, methyl	Vinyl acetate	28.6		0.04			383
Methacrylate, methyl	Vinyl acetate	22.21		0.07			471
Methacrylate, methyl	Vinyl benzoate	20.3		0.07			272
Methacrylate, methyl	Vinyl bromide	14.11	0.67	0.12	0.06	N	268
Methacrylate, methyl	Vinyl bromide	17.1		0.33			268
Methacrylate, methyl	Vinyl bromide	25.1	0.88	0.052	0.026	Y	34
Methacrylate, methyl	Vinyl bromide	19.84	2.58	0.05	0.074	Y	34
Methacrylate, methyl	Vinyl butyl ether					N	127
Methacrylate, methyl	Vinyl butyrate	25		0.03			272
Methacrylate, methyl	Vinyl chloride	8.99	2.97	0.07	0.047	Y	3
Methacrylate, methyl	Vinyl chloromethyl ketone	0.121	0.021	0.593	0.092	Y	356
Methacrylate, methyl	Vinyl ether	4.9	0.99	−0.15	0.16	Y	45
Methacrylate, methyl	Vinyl ethyl ether	37		0.01			106
Methacrylate, methyl	Vinyl ethyl ketone	0.42	0.17	0.65	0.42	Y	794
Methacrylate, methyl	Vinyl ethyl oxalate	4.74	2.95	−0.05	0.44	Y	124
Methacrylate, methyl	Vinyl ethyl sulfide	1.03	0.11	0.036	0.017	Y	303
Methacrylate, methyl	Vinyl ethyl sulfide	2.7		0.3			507
Methacrylate, methyl	Vinyl ethyl sulfoxide	11.17	0.48	0.37	0.06	Y	286
Methacrylate, methyl	Vinyl isobutyl sulfide	0.89	0.01	0.05	0.03	N	285
Methacrylate, methyl	Vinyl isobutyl sulfide	0.985	0.077	0.021	0.034	Y	303
Methacrylate, methyl	Vinyl isobutyl sulfide	0.88	0.02	0.03	0.02	N	336
Methacrylate, methyl	Vinyl isopropyl ketone	0.81		1.44			601
Methacrylate, methyl	Vinyl isopropyl ketone	0.54	0.22	0.6	0.47	Y	794
Methacrylate, methyl	Vinyl isopropyl sulfide	0.822	0.064	0.046	0.025	Y	303
Methacrylate, methyl	Vinyl isothiocyanate	0.85		0.6			422
Methacrylate, methyl	Vinyl *m*-cresyl ether	3.3		0.2			605
Methacrylate, methyl	Vinyl methyl sulfide	1		0.03			106
Methacrylate, methyl	Vinyl *o*-cresyl ether	1.8		0.1			605
Methacrylate, methyl	Vinyl *p*-cresyl ether	2.6		0			605
Methacrylate, methyl	Vinyl phenyl ether	11.34	5.76	0.01	0.32	Y	172
Methacrylate, methyl	Vinyl phenyl ether	2.8		0			605
Methacrylate, methyl	Vinyl phenyl ketone	0.71	0.6	0.59	1.9	Y	794
Methacrylate, methyl	Vinyl phenyl sulfide	0.79	0.06	0.06	0.09	N	239
Methacrylate, methyl	Vinyl phenyl sulfide	0.85		0.08			239
Methacrylate, methyl	Vinyl propionate	24		0.03			272
Methacrylate, methyl	Vinyl sulfone	4.5	0.49	0.1	0.16	Y	45
Methacrylate, methyl	Vinyl *tert*-butyl ketone	1.21	0.11	0.65	0.15	Y	794
Methacrylate, methyl	Vinyl, 4-, dithiobenzoate, methyl	0.151	0.092	0.3	0.29	Y	697
Methacrylate, methyl	Vinyl, *p*-,benzylmethylcarbinol	0.24	0.26	0.98	0.28	Y	48
Methacrylate, methyl	Vinyl-tris(trimethoxysiloxy)silane	34		0.02			482
Methacrylate, methyl	Vinylacetophenone, *p*-	0.33	0.36	1.65	3.81	Y	266
Methacrylate, methyl	Vinylanthracene, 9-	4.068	0.04	0.117	0.043	Y	123
Methacrylate, methyl	Vinylbenzoic acid, *p*-	0.398	0.097	1.16	0.3	Y	266
Methacrylate, methyl	Vinylbenzyl chloride	0.46		1.02			792
Methacrylate, methyl	Vinylene carbonate	126	298	−0.04	0.85	Y	103
Methacrylate, methyl	Vinylferrocene	1.22		0.52			294
Methacrylate, methyl	Vinylhydroquinone	0.49	0.21	0.02	0.13	Y	337
Methacrylate, methyl	Vinylhydroquinone dibenzoate	0.34		0.41			440
Methacrylate, methyl	Vinylidene chloride	2.6		0.3		Y	138
Methacrylate, methyl	Vinylidene chloride	2.38	0.02	0.36	0.03	N	324
Methacrylate, methyl	Vinylidene chloride	2.16	0.06	0.18	0.18	N	324
Methacrylate, methyl	Vinylidene chloride	2.5		0.5			426
Methacrylate, methyl	Vinylidene chloride	2.5		0.34			432
Methacrylate, methyl	Vinylidene chloride	2.1		0.09			538
Methacrylate, methyl	Vinylidene chloride	1.8	0.95	0.094	0.032	Y	65
Methacrylate, methyl	Vinylidene chloride	2.83		0.19			762
Methacrylate, methyl	Vinylidene chloride	1.23		0.02			762
Methacrylate, methyl	Vinylidene chloride	2.77	0.06	0.27	0.01	N	786
Methacrylate, methyl	Vinylidene cyanide		0.012		0.013	Y	82
Methacrylate, methyl	Vinylisocyanate	3.3		0.01			422

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylate, methyl	Vinylphenyldimethylsilane	29.79	1.89	−0.009	0.034	Y	482
Methacrylate, methyl	Vinyltrimethylsilane	35.66	0.85	0.028	0.016	Y	482
Methacrylate, methyl	Xanthate, *S*-methacryloyl *O*-ethyl	0.76	0.04	0.6	0.08		1086
Methacrylate, methyl diphenylsilyl	Methacrylate, methyl	0.38	0.178	0.438	0.075	Y	1069
Methacrylate, methylthiomethyl	Methacrylate, methyl	1.1	0.356	0.639	0.057	Y	920
Methacrylate, methylthiomethyl	Styrene	0.512	0.05	0.338	0.01	Y	920
Methacrylate, mono-,ethylene glycol	Acrylonitrile	1.5		0.19			682
Methacrylate, octyl	Styrene	0.56	0.16	0.65	0.1	Y	179
Methacrylate, octyl	Styrene	0.68		0.56			463
Methacrylate, octyl	Vinyl chloride	14		0.04			511
Methacrylate, *p*-(cinnamoylamino)phenyl	Styrene	0.31		0.62			685
Methacrylate, *p*-acetylphenyl	Methacrylate, methyl	0.67		0.47			769
Methacrylate, *p*-carbomethoxyphenyl	Styrene	0.178	0.027	0.482	0.084	Y	177
Methacrylate, *p*-chlorophenyl	Methacrylate, methyl	1.08		0.54			769
Methacrylate, *p*-chlorophenyl	Styrene	0.243	0.022	0.34	0.11	Y	177
Methacrylate, *p*-methoxyphenyl	Methacrylate, methyl	1.19		0.72			769
Methacrylate, *p*-methoxyphenyl	Styrene	0.244	0.026	0.499	0.089	Y	177
Methacrylate, *p*-methylphenyl	Styrene	0.225	0.04	0.49	0.25	Y	177
Methacrylate, *p*-methylphenyl	Styrene	0.185	0.039	0.223	0.09	Y	177
Methacrylate, *p*-tolyl	Methacrylate, methyl	1.28		0.59			769
Methacrylate, phenyl	Acrylonitrile	0.46		0.36			363
Methacrylate, phenyl	Methacrylate, 2-chloroethyl	0.785	0.083	1.02	0.21	Y	179
Methacrylate, phenyl	Methacrylate, benzyl	1.42	0.09	0.67	0.06	N	32
Methacrylate, phenyl	Methacrylate, methyl	1.67		0.53			32
Methacrylate, phenyl	Methacrylate, methyl	1.69		0.58			32
Methacrylate, phenyl	Methacrylate, methyl	1.72		0.56			32
Methacrylate, phenyl	Methacrylate, methyl	1.55		0.66			761
Methacrylate, phenyl	Methacrylate, methyl	0.99		0.55			769
Methacrylate, phenyl	Methacrylic, acid	1.89	0.17	0.211	0.018	Y	88
Methacrylate, phenyl	Methacrylic, acid	0.589	0.081	0.398	0.019	Y	88
Methacrylate, phenyl	*N*-Vinylpyrrolidone	4.17	0.756	−0.026	0.032	Y	1013
Methacrylate, phenyl	Styrene	0.48	0.23	0.246	0.049	Y	177
Methacrylate, phenyl	Styrene	0.55	0.33	0.247	0.064	Y	179
Methacrylate, phenyl	Styrene	0.51		0.26			463
Methacrylate, potassium	Acrylonitrile	0.203	0.086	0.226	0.04	Y	808
Methacrylate, propargyl	Itaconic acid mono(*p*-sulfamidoanilide)	1.65	0.02	0.58	0.05		957
Methacrylate, propyl	Methacrylate, methyl	1.24		1.21			844
Methacrylate, propyl	Styrene	0.38	0.11	0.565	0.081	Y	179
Methacrylate, sodium (2-sulphoxyethyl)-	Methacrylic, acid	1.2	0.19	0.78	0.08	N	745
Methacrylate, sulfolanyl	Methacrylate methyl	7.16	23.7	1.07	2.48	N	359
Methacrylate, sulfolanyl	Methacrylic, acid	0.81	0.24	0.81	0.03	N	359
Methacrylate, sufolanyl	Styrene	−0.2	2.46	0.2	0.1	N	359
Methacrylate, *t*-butyl dimethylsilyl	Acrylate, methyl	1.07	0.21	0.288	0.057	Y	1069
Methacrylate, *t*-butyl dimethylsilyl	Methacrylate, methyl	0.725	0.455	0.897	0.05	Y	1069
Methacrylate, *t*-butyl diphenylsilyl	Methacrylate, methyl	0.396	0.257	0.636	0.014	Y	1069
Methacrylate, *tert*-butyl	Methacrylate, methyl	1.35		0.96			761
Methacrylate, *tert*-butyl	Styrene	0.61	0.51	0.545	0.054	Y	179
Methacrylate, tetra(2-hydroxypropyl)-ethylenediamine	Methacrylate, hydroxyethyl	1.44	1	0.606	0.416	Y	996
Methacrylate, tetra(2-hydroxypropyl)-ethylenediamine	Methacrylic acid	0.328	0.181	1.56	0.237	Y	996
Methacrylate, tributyltin	Methacrylate, 2-ethoxyethyl	0.2	0.444	0.53	0.16	N	945
Methacrylate, tributyltin	Methacrylate, 2-hydroxypropyl	0.728	0.517	1.81	0.275	N	945
Methacrylate, tributyltin	Methacrylate, cyclohexyl	0.395	0.428	0.891	0.136	N	945
Methacrylate, tributyltin	Methacrylate, ethyl	0.299	0.607	0.601	0.123	N	945
Methacrylate, tributyltin	Methacrylate, hydroxyethyl	0.282	0.424	2.33	0.185	N	945
Methacrylate, tributyltin	Methacrylate, methyl	0.62		0.58			1082
Methacrylate, triethyltin	Methacrylate, methyl	0.87		0.62			1082
Methacrylate, trimethyltin	Methacrylate, methyl	1.07		0.63			1082
Methacrylate, triphenyltin	Methacrylate, methyl	0.68		0.6			1082
Methacrylic acid	Acrylamide	1.63		0.57			1028
Methacrylic acid	Acrylamide	4.4		0.58			852
Methacrylic acid	Acrylamide	0.15		0.56			852
Methacrylic acid	Acrylate, butyl	1.25	0.31	0.31	0.1	N	187

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylic acid	Acrylate, ethyl					N	1065
Methacrylic acid	Acrylic acid, 2-ethyl	1.12	0.132	0.194	0.027	Y	1004
Methacrylic acid	Acrylic acid, 2-ethyl	2.29	0.417	0.069	0.04	Y	1004
Methacrylic acid	Acrylic acid, 2-ethyl	1.14		0.23		Y	961
Methacrylic acid	Acrylonitrile	0.2	0.26	0.04	0.13	Y	16
Methacrylic acid	Acrylonitrile	2.38	0.29	0.092	0.06	Y	216
Methacrylic acid	Butadiene, 2-chloro-	−0.035	0.058	2.52	0.2	Y	259
Methacrylic acid	Diphenyl sulfone, 3,3′-bisitaconimido-*m,m*′-	0.564	0.032	0.015	0.058	Y	1042
Methacrylic acid	Maleimide, 2,3-dimethyl-*N*-(2-methacryl)	0.746	0.059	1.33	0.1	Y	619
Methacrylic acid	Methacrylamide	2.73	0.28	0.33	0.25	Y	190
Methacrylic acid	Methacrylamide	1.55		1.28			527
Methacrylic acid	Methacrylamide	2.006	0.09	0.2	0.014	Y	55
Methacrylic acid	Methacrylate, 2-hydroxypropyl	0.99		0.31			886
Methacrylic acid	Methacrylate, *N*-methyl-*N*-phenyl-2-amino	2.16	0.18	0.2	0.01	N	651
Methacrylic acid	Methacrylate, butyl	0.8	0.16	1.26	0.12	N	187
Methacrylic acid	Methacrylate, butyl	0.73	0.2	1.15	0.12	N	224
Methacrylic acid	Methacrylate, diethylaminoethyl	0.63	1.47	2.34	1.59	Y	16
Methacrylic acid	Methacrylate, ethyl	0.57		0.71			820
Methacrylic acid	Methacrylate, glycidyl	0.98	0.16	1.2	0.1	N	224
Methacrylic acid	Methacrylate, isopropyl	2.01		0.47			847
Methacrylic acid	Methacrylate, methyl	0.25	0.05	0.63	0.03		1071
Methacrylic acid	Methacrylate, methyl	1.06	0.02	0.1	0.01		1072
Methacrylic acid	Methacrylate, methyl	0.33	0.02	0.78	0.03		1072
Methacrylic acid	Methacrylate, methyl	0.63	0.02	0.31	0.02		1072
Methacrylic acid	Methacrylate, methyl	0.46	0.03	0.27	0.03		1072
Methacrylic acid	Methacrylate, methyl	1.06	0.02	0.1	0.01		1087
Methacrylic acid	Methacrylate, methyl	0.33	0.02	0.78	0.03		1087
Methacrylic acid	Methacrylate, methyl	0.63	0.02	0.32	0.02		1087
Methacrylic acid	Methacrylate, methyl	2.16	0.28	0.87	0.05	N	203
Methacrylic acid	Methacrylate, methyl	1.63	6.25	1.81	0.16	N	210
Methacrylic acid	Methacrylate, methyl	0.99	0.55	0.56	0.23	Y	216
Methacrylic acid	Methacrylate, methyl	1.18	0.19	0.29	0.04	N	276
Methacrylic acid	Methacrylate, methyl	0.48	0.1	1.28	0.1	N	276
Methacrylic acid	Methacrylate, methyl	1.84	0.24	0.77	0.05	N	312
Methacrylic acid	Methacrylate, methyl	1.38	0.27	0.36	0.08	N	313
Methacrylic acid	Methacrylate, methyl	0.63		1.18			313
Methacrylic acid	Methacrylate, methyl	1.55		0.55			424
Methacrylic acid	Methacrylate, methyl	1.26	0.2	0.209	0.05	Y	54
Methacrylic acid	Methacrylate, methyl	0.78		1.25			630
Methacrylic acid	Methacrylate, methyl	0.68		0.48			819
Methacrylic acid	Methacrylate, phenyl	0.211	0.018	1.89	0.17	Y	88
Methacrylic acid	Methacrylate, phenyl	0.398	0.019	0.589	0.081	Y	88
Methacrylic acid	Methacrylate, sodium (2-sulphoxyethyl)-	0.78	0.08	1.2	0.19	N	745
Methacrylic acid	Methacrylate, sulfolanyl	0.81	0.03	0.81	0.24	N	359
Methacrylic acid	Methacrylate, tetra(2-hydroxypropyl)ethylenediamine	1.56	0.237	0.328	0.181	Y	996
Methacrylic acid	Methacrylonitrile	1.74	0.1	0.64	0.07	N	44
Methacrylic acid	Methacrylonitrile	0.54	3.71	0.52	0.32	N	85
Methacrylic acid	*N*-Vinylimidazole	1.384	0.034	0.145	0.022	Y	879
Methacrylic acid	Phosphonate, vinyl-, diethyl	1.9		0.15			431
Methacrylic acid	Phosphonic acid, α-phenylvinyl-	1.49	0.16	0.17	0.3	Y	130
Methacrylic acid	Piperylene, *cis*-	0.4		0.38			773
Methacrylic acid	Piperylene, *trans*-	0.38		0.33			773
Methacrylic acid	Propene, 2,3-dichloro-	4		0			445
Methacrylic acid	Propene, 2-chloro-3-hydroxy-	4.5		0			445
Methacrylic acid	Pyridine, 2-methyl-5-vinyl-	0.43		0.85			552
Methacrylic acid	Pyridine, 2-vinyl-	0.58	0.21	1.69	0.71	Y	15
Methacrylic acid	Pyridine, 2-vinyl-	0.44		1.38			498
Methacrylic acid	Styrene	0.55	0.66	0.21	0.02	N	166
Methacrylic acid	Styrene	0.64		0.22			166
Methacrylic acid	Styrene	0.66		0.2			203
Methacrylic acid	Styrene	0.49	0.08	0.15	0.04	N	312

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylic acid	Styrene	0.56	0.19	0.2	0.04	N	313
Methacrylic acid	Styrene	0.28		0.38			313
Methacrylic acid	Styrene	0.602	0.088	0.124	0.092	Y	47
Methacrylic acid	Styrene	0.85		0.17			812
Methacrylic acid	Styrene	0.631	0.146	0.041	0.03	Y	842
Methacrylic acid	Styrene	0.6	0.249	0.067	0.046	Y	842
Methacrylic acid	Styrene	0.44	0.089	0.627	0.031	Y	842
Methacrylic acid	Styrene	0.39	0.199	0.55	0.06	Y	842
Methacrylic acid	Styrene	0.12	0.118	0.221	0.048	Y	842
Methacrylic acid	Styrene, 3-methyl	0.35	0.08	0.06	0.03		1087
Methacrylic acid	Styrene, 3-methyl	0.18	0.02	0.33	0.02		1087
Methacrylic acid	Styrene, 3-methyl	0.51	0.01	0.42	0.01		1087
Methacrylic acid	Styrene, *o*-chloro-	0.622	0.058	0.101	0.034	Y	6
Methacrylic acid	Sulfonic acid, *o*-methacryloylamino-benzene-	0.203	0.067	0.217	0.122	Y	1006
Methacrylic acid	Sulfonic acid, *o*-methacryloylamino-benzene-	0.188	0.076	0.523	0.195	Y	1006
Methacrylic acid	Sulfonic acid, *p*-methacryloylamino-benzene-	0.156	0.081	1.08	0.338	Y	1006
Methacrylic acid	Sulfonic acid, *p*-methacryloylamino-benzene-	0.155	0.052	1.65	0.27	Y	1006
Methacrylic acid	Vinyl acetate	0.2		0.01			377
Methacrylic acid	Vinyl chloride	23.52	0.98	0.064	0.008	Y	135
Methacrylic acid	Vinyl chloride	23.26	0.96	−0.022	0.02	Y	229
Methacrylic acid	Vinyl chloride	9.05		0.07			46
Methacrylic acid	Vinyl, mono-, diethyleneglycol ether	0		2.2			831
Methacrylic acid	Vinylethynyl-4-piperidinol, 1,2,5-trimethyl	0.4		0.05			734
Methacrylic acid	Vinylidene chloride	3.368	0.098	0.154	0.047	Y	6
Methacrylic anhydride	Acrylate, methyl	4.75		0.16			275
Methacrylic anhydride	Allyl chloroacetate	29.76	13	−0.01	0.13	Y	106
Methacrylic anhydride	Allylurea	29.01	18.48	−0.06	0.17	Y	106
Methacrylic anhydride	Methacrylate, methyl	1.58	0.06	0.22	0.02	N	275
Methacrylic anhydride	Methacrylonitrile	1.45	0.18	0.26	0.06	N	219
Methacrylic anhydride	Styrene	0.27	0.02	0.13	0.01	N	219
Methacrylic anhydride	Styrene	0.33		0.1			275
Methacrylic anhydride	Vinyl benzyl sulfide	0.97	0.27	−0.048	0.033	Y	106
Methacrylic anhydride	Vinyl chloroethyl ether					Y	106
Methacrylonitrile	Acenaphthalene	0.15		2.38			575
Methacrylonitrile	Acetylene, phenyl-	0.78		0.04			648
Methacrylonitrile	Acrolein	1.17	0.05	0.68	0.12	N	208
Methacrylonitrile	Acrolein	1.2		0.72			446
Methacrylonitrile	Acrolein, methyl-	0.41	0.01	1.78	0.07	N	208
Methacrylonitrile	Acrolein, methyl-	0.45		1.25			587
Methacrylonitrile	Acrolein, methyl-	0.45		1.25			589
Methacrylonitrile	Acrylate, 1,1,5-trihydroperfluoroamyl	1.03		0.14			809
Methacrylonitrile	Acrylate, α-chloro-, ethyl	0.45		2			638
Methacrylonitrile	Acrylate, α-cyano-, methyl	0.18	0.01	0.15	0.01	N	143
Methacrylonitrile	Acrylate, α-phenyl-, methyl	0.19		0.25			143
Methacrylonitrile	Acrylic anhydride	0.42	0.04	1	0.13	N	219
Methacrylonitrile	Acrylonitrile	1.67	0.12	0.43	0.04	N	198
Methacrylonitrile	Allylbenzene	16.24	1.36	−0.061	0.03	Y	351
Methacrylonitrile	Butadiene	0.053	0.016	0.39	0.15	Y	257
Methacrylonitrile	Ethylene 1,1-diphenyl-	0.48	0.1	−0.45	0.11	N	143
Methacrylonitrile	Fumarate, diisopropyl	85		0			1038
Methacrylonitrile	Itaconate, dimethyl	1.26		0.28			398
Methacrylonitrile	Methacrylate, butyl	0.56	0.15	0.75	0.07	N	44
Methacrylonitrile	Methacrylate, ethyl	0.46	0.04	0.83	0.05	N	44
Methacrylonitrile	Methacrylate, isobutyl	0.74	0.07	0.68	0.05	N	44
Methacrylonitrile	Methacrylate, isopropyl	0.43	0.08	0.94	0.12	N	44
Methacrylonitrile	Methacrylate, octyl	0.75	0.04	0.61	0.05	N	44
Methacrylonitrile	Methacrylic acid	0.64	0.07	1.74	0.1	N	44
Methacrylonitrile	Methacrylic acid	0.52	0.32	0.54	3.71	N	85
Methacrylonitrile	Methacrylic anhydride	0.26	0.06	1.45	0.18	N	219
Methacrylonitrile	Phosphonic acid, α-phenylvinyl-	2.24		0			590

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Methacrylonitrile	Styrene	0.41		0.37			311
Methacrylonitrile	Styrene	0.42		0.38			311
Methacrylonitrile	Styrene	0.28		0.43			542
Methacrylonitrile	Styrene	0.21		0.34			707
Methacrylonitrile	Styrene	0.25		0.25			75
Methacrylonitrile	Styrene	0.21		0.34			835
Methacrylonitrile	Styrene, α-methoxy-	0.83	0.04	−0.02	0.005	N	143
Methacrylonitrile	Styrene, α-methyl-	0.21		0.15			542
Methacrylonitrile	Styrene, *o*-chloro-	0.86		0.78			44
Methacrylonitrile	Vinyl acetate	12		0.01			75
Methacrylonitrile	Vinyl cinnamate	4.6		0.15			200
Methacrylonitrile	Vinylidene chloride	2.43	0.1	0.3	0.1	N	781
Methacrylonitrile	Vinylidene chloride	2.38	0.05	0.36	0.05	N	781
Methacrylophenone, α-	Methacrylate, methyl	0.11	0.02	1.79	0.07	N	798
Methacrylophenone, α-	Methacrylate, methyl	0.119	0.009	1.74	0.22	Y	798
Methacryloxymethylpentamethyldisiloxane	Methacrylate, 2-hydroxyethyl	0.33		0.97			822
Methacryloxypropyltrimethoxysilane	Styrene	0.58		0.36			951
Methacryloyl chloride	Acrylonitrile	2.8		0.35			580
Methacryloyl chloride	Methacrylate, methyl	0.2		0.45			591
Methacryloyl chloride	Methacrylate, methyl	0.2		0.45			593
Methacryloyl chloride	Pyrrolidone, *N*-vinyl-	0.58		0.05			599
Methacryloyl chloride	Vinyl chloride	2		0.3			432
Methacryloyl fluoride	Methacrylate, methyl	0.43	0.12	0.405	0.037	Y	617
Methacryloyl fluoride	Methacrylate, methyl	0.9	0.16	0.53	0.06	N	660
Methacryloyl fluoride	Styrene	0.164	0.045	0.069	0.014	Y	660
Methacryloyl fluoride, perfluoro-	Vinylidene fluoride	0.02		7.6			669
Methacryloyl isocyanate	Methacrylate, methyl	0.35		0.75			944
Methacryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	Acrylate, *N*-(2-hydroxyethyl)carbazolyl	0.08	0.026	1.04	0.14	Y	702
Methacryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	Acrylate, *N*-(2-hydroxyethyl)carbazolyl	1.364	0.018	0.334	0.022	Y	719
Methacryloyl-β-hydroxyethyl-3,5-dinitrobenzoate	Methacrylate, *N*-ethyl-3-hydroxymethyl-carbazolyl	0.554	0.019	0.729	0.051	Y	701
Methacryloylacetone	Acrylonitrile	3.74	0.22	0.01	0.004	Y	339
Methacryloylacetone	Pyrrolidone, *N*-vinyl-	5.66	0.4	0.008	0.004	Y	339
Methacryloylacetone	Styrene	1.66	0.16	0.067	0.007	Y	339
Methacryloyloxy, 2-benzoate methyl	Methacrylate, *N*-methyl-*N*-phenyl-2-amino ethyl	1.11	0.18	0.55	0.04	N	651
Methacryloyloxy, 2-benzoate methyl	Styrene	0.48	0.02	0.27	0.04	N	651
Methacryloyloxy, 2-benzoic acid methyl	Methacrylate, *N*-methyl-*N*-phenyl-2-amino ethyl	2.6	0.08	0.2	0.01	N	651
Methacryloyloxy, 2-benzoic acid	Styrene	1.17	0.03	0.15	0.04	N	651
Methacryloyloxy, 4-,2,2,6,6-tetramethylpiperidine	Styrene	0.32		0.6			687
Methacryloyloxy-, *o*-, benzoic acid	Methacrylate, methyl	1.37	0.64	0.908	0.252	Y	938
Methacryloyloxy-, *o*-, benzoic acid	Vinylchloride	11.26	3.5	0.004	0.052	Y	938
Methylenebutyrolactone	Acrylamide	2.85		0.3			746
Methylenebutyrolactone	Acrylonitrile	1.1		0.09			745
Methylenebutyrolactone	Methacrylate, methyl	1.67		0.6			746
Methylenebutyrolactone	Styrene	0.7		0.09			746
Methyleneglutaronitrile, 2-	Butadiene					N	196
Methyleneglutaronitrile, 2-	Methacrylate, methyl	0.12	0.74	1.36	0.28	N	196
Methyleneglutaronitrile, 2-	Methacrylate, methyl	0.12		1.27			196
Methyleneglutaronitrile, 2-	Styrene	−0.02	1.3	0.42	0.52	N	196
Methyleneglutaronitrile, 2-	Styrene	0.02		0.5			196
Methyleneglutaronitrile, 2-	Styrene	0.25		0.85			512
Methyleneglutaronitrile, 2-	Vinyl methyl ketone	1.24		5.05			512
Myrcene	Methacrylate, methyl	0.448	0.06	0.256	0.013	Y	1062
Myrcene	Styrene	1.38	0.081	0.891	0.015	Y	1062
Myrcene	Styrene *p*-fluoro-	0.87	0.143	0.362	0.022	Y	1062
N-*N*-Divinylaniline	Acrylonitrile	−0.006	0.07	0.246	0.014	Y	45
N-*N*-Divinylaniline	Methacrylate, methyl	0.005	0.018	1.06	0.18	Y	45
N-*N*-Divinylaniline	Styrene	0.033	0.067	5.38	0.36	Y	45
N-*N*-Divinylaniline	Styrene, *p*-methyl-	0.06	0.03	6.15	0.16	Y	45
N-*N*-Divinylaniline	Vinyl acetate	3.99	0.12	0.058	0.009	Y	45

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
N-Vinylimidazole	Acrylic acid	0.187	0.025	1.932	0.077	Y	879
N-Vinylimidazole	Acrylonitrile	0.832	0.044	3.393	0.008	Y	879
N-Vinylimidazole	Fumarate, diethyl	0.113	0.019	0.191	0.022	Y	879
N-Vinylimidazole	Fumarate, dimethyl	0.133	0.021	0.252	0.015	Y	879
N-Vinylimidazole	Fumaric acid	0.121	0.01	0.313	0.012	Y	879
N-Vinylimidazole	Maleate, diethyl	0.057	0.028	0.106	0.147	Y	879
N-Vinylimidazole	Maleate, dimethyl	0.046	0.046	0.046	0.438	Y	879
N-Vinylimidazole	Maleic acid	0.018	0.007	0.094	0.027	Y	879
N-Vinylimidazole	Methacrylate, methyl	0.663	0.104	4.306	0.185	Y	879
N-Vinylimidazole	Methacrylic acid	0.145	0.022	1.384	0.034	Y	879
N-Vinylimidazole	Styrene	0.68	0.02	8.377	0.149	Y	879
N-Vinylpyrolidone	Caprolactam, *N*-vinyl-	2.8	0.2	1.7	0.2		883
N-Vinylpyrolidone	Crotonate, hydrocortisone 21-	0.75	0.02	0.05	0.05		1022
N-Vinylpyrrolidone	2-Oxazoline, 2-isopropenyl-	0.01	0.02	3.5	1.2		894
N-Vinylpyrrolidone	Acrylamido-2-methylpropane sulfonate sodium salt	0.13		0.66			939
N-Vinylpyrrolidone	Acrylate, cyclohexyl	0.122	0.014	1.297	0.088		1061
N-Vinylpyrrolidone	Carbamate, *N*-vinyl-*t*-butyl-	0.4	0.06	2.4	0.5		991
N-Vinylpyrrolidone	Ethene, 2-phenyl-1,1-dicyano-					Y	947
N-Vinylpyrrolidone	Itaconate, bis(tri-*n*-butyltin)	0.21	0.013	0.065	0.04	Y	941
N-Vinylpyrrolidone	Methacrylate, 2-acetylsalicylicoyloxy-3-hydroxypropyl	0.34		0.85			1080
N-Vinylpyrrolidone	Methacrylate, furfuryl	0.0036	0.02	5.16	1.13	Y	1050
N-Vinylpyrrolidone	Methacrylate, glycidyl	0.003	0.018	4.29	0.498		1017
N-Vinylpyrrolidone	Methacrylate, methyl	0.006	2.29	4.78	0.236		1084
N-Vinylpyrrolidone	Methacrylate, methyl	0.014	0.899	5.93	0.198		1084
N-Vinylpyrrolidone	Methacrylate, methyl	0.027	0.062	2.07	0.247		1084
N-Vinylpyrrolidone	Methacrylate, methyl	0.066	3.96	4.04	0.956		1084
N-Vinylpyrrolidone	Methacrylate, phenyl	−0.026	0.032	4.17	0.756	Y	1013
N-Vinylpyrrolidone	Pyridine, 2-methyl-5-vinyl-	0.039	0.006	13	2		1070
N-Vinylpyrrolidone	Pyridine, 2-vinyl-	0.014	0.002	12.4	2.3		1070
N-Vinylpyrrolidone	Pyridine, 4-vinyl-	0.01	0.002	9.8	1.5		1070
N-Vinylpyrrolidone	Quinine	2.2		0.37			922
N-Vinylpyrrolidone	Styrene sulfonate, sodium salt	0.084		7.19			939
N-Vinylpyrrolidone	Vinyl trimethylammonioethyl ether iodide	11.6	0.03	0	0.02		1037
Naphthalene, 1-vinyl-	Acrylonitrile	0.451	0.088	0.107	0.028		967
Naphthalene, 1-vinyl-	Methacrylate, methyl	0.574	0.073	0.321	0.096		967
Naphthalene, 1-vinyl-	Styrene	2.02	0.401	0.699	0.233		967
Naphthalene, 1-vinyl-4-chloro-	Styrene	0.75	0.45	0.76	0.68		806
Naphthalene, 2-vinyl-	Styrene	1.345	0.093	0.395	0.049		806
Naphthalene, 2-vinyl-6-chloro-	Styrene	2.44	1.38	0.39	0.6		806
Naphthalene, 6-vinyl-2-*tert*-butyl	Styrene	1.014	0.244	0.616	0.069		806
Nickel diacrylate	Titanium, dicylopentadienyl-, dimethacrylate	0.95		0.65			895
Norbornadiene	Acrylate, ethyl	−0.01	0.03	2.39	0.44	N	267
Norbornadiene	Acrylonitrile	0.05	0.23	0.48	0.27	N	267
Norbornadiene	Acrylonitrile	0.44	0.05	0.66	0.01	N	69
Norbornadiene	Methacrylate, methyl	−0.5	0.52	14.68	16.78	N	267
Norbornadiene	Styrene, *p*-chloro-	0	0.12	69.93	24.19	Y	188
Norbornadiene	Vinyl acetate	1.354	0.07	0.818	0.019	Y	188
Norbornadiene	Vinyl chloride	0.41	0.01	0.67	0.02	N	267
Norbornadiene	Vinylidene chloride	0.09	0.17	1.36	0.63	N	267
Oct-1-ene, 4,8-dioxaspiro(2.5)-	Styrene	0.246	0.024	1.831	0.027	Y	838
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2.5)-	Acrylonitrile	1.484	1.078	0.985	0.675	Y	838
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2.5)-	Pyridine, 2-vinyl-	0.073	0.04	2.216	0.062	Y	838
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2.5)-	Pyrrolidone, *N*-vinyl-	0.552	0.075	−0.009	0.018	Y	838
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2.5)-	Styrene	0.271	0.109	1.93	0.098	Y	838
Octene-1	Vinyl chloride	−0.57	0.85	3.26	0.45	N	329
Oxazinium F3CSO3, 3-methyl-2-vinyl-5,6-dihydro-4H-1,3-	Methacrylate, methyl	0.31		0.37			909

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Oxazolidone, *N*-vinyl-	Methacrylate, decyl	– 0.052	0.049	12.19	1.35	Y	36
Oxazolidone, *N*-vinyl-	Methacrylate, methyl	0.04	0.13	6.75	0.37	Y	102
Oxazolidone, *N*-vinyl-	Methacrylate, methyl	0.027	0.008	9.46	0.39	Y	36
Oxazolidone, *N*-vinyl-	Styrene	– 0.029	0.014	29.42	2.19	Y	36
Oxazolidone, *N*-vinyl-	Vinyl acetate	1.55	0.28	0.602	0.038	Y	102
Oxazolidone, *N*-vinyl-	Vinyl acetate	2.04	0.13	0.55	0.18	Y	36
Oxazolidone, *N*-vinyl-	Vinyl chloride	0.822	0.048	0.313	0.095	Y	36
Oxazolidone, *N*-vinyl-	Vinylidene chloride	0.091	0.077	1.42	0.11	Y	102
Oxazoline, 2-, 2-isopropenyl-	Acrylate, butyl	1.4		0.24			862
Oxazoline, 2-, 2-isopropenyl-	Acrylate, ethyl	1.39		0.19			862
Oxazoline, 2-, 2-isopropenyl-	Acrylate, methyl	1.9		0.16			862
Oxazoline, 2-, 2-isopropenyl-	Acrylate, methyl	2.07	0.191	0.328	0.032	Y	877
Oxazoline, 2-, 2-isopropenyl-	Acrylonitrile	0.52		0.13			862
Oxazoline, 2-, 2-isopropenyl-	Methacrylate, methyl	0.99		0.69			862
Oxazoline, 2-, 2-isopropenyl-	Pyrrolidone, *N*-vinyl-	3.5		0.01			862
Oxazoline, 2-, 2-isopropenyl-	Styrene	0.64		0.67			862
Oxazoline, 2-, 2-isopropenyl-	Vinyl acetate	7.1		0.25			862
Oxazoline, 2-, 2-isopropenyl- 4,4-dimethyl-	Acrylate, methyl	1.3		0.46			596
Oxazoline, 2-, 2-isopropenyl- 4,4-dimethyl-	Acrylonitrile	1.83		0.24			596
Oxazoline, 2-, 2-isopropenyl- 4,4-dimethyl-	Methacrylate, methyl	0.82		0.53			596
Oxazoline, 2-, 2-isopropenyl- 4,4-dimethyl-	Styrene	0.68		0.55			596
Oxazoline, 2-, 4-acryloxymethyl- 2,4-dimethyl-	Acrylate, methyl	0.11		0.29			596
Oxazoline, 2-, 4-acryloxymethyl- 2,4-dimethyl-	Methacrylate, methyl	0.11		0.41			596
Oxazoline, 2-, 4-acryloxymethyl- 2,4-dimethyl-	Styrene	0.14		0.56			596
Oxazoline, 2-, 4-acryloxymethyl- 2,4-dimethyl-	Vinyl acetate	1.41		0.03			596
Oxazoline, 2-, 4-methacryloxy- 2,4-dimethyl-	Acrylate, methyl	0.56		0.4			596
Oxazoline, 2-, 4-methacryloxy- 2,4-dimethyl-	Acrylonitrile	0.89		0.11			596
Oxazoline, 2-, 4-methacryloxy- 2,4-dimethyl-	Methacrylate, methyl	0.19		1.17			596
Oxazoline, 2-, 4-methacryloxy- 2,4-dimethyl-	Vinyl acetate	6.2		0.05			596
Oxazoline, 2-isopropenyl-2-	Acrylate, butyl	1.4	0.08	0.24	0.01		894
Oxazoline, 2-isopropenyl-2-	Acrylate, ethyl	1.39	0.06	0.19	0.02		894
Oxazoline, 2-isopropenyl-2-	Acrylate, methyl	1.9	0.08	0.16	0.04		894
Oxazoline, 2-isopropenyl-2-	Acrylonitrile	0.52	0.06	0.13	0.04		894
Oxazoline, 2-isopropenyl-2-	Methacrylate, methyl	0.99	0.07	0.69	0.02		894
Oxazoline, 2-isopropenyl-2-	*N*-Vinylpyrrolidone	3.5	1.2	0.01	0.02		894
Oxazoline, 2-isopropenyl-2-	Styrene	0.64	0.03	0.67	0.02		894
Oxazoline, 2-isopropenyl-2-	Vinyl acetate	7.1	2	0.25	0.04		894
Oxazolinium BF_4, 3-methyl- 2-isopropenyl-2-	Acrylate, methyl	0.251	0.483	0.096	0.057	Y	908
Oxazolinium BF_4, 3-methyl- 2-isopropenyl-2-	Vinyl acetate	0.413	0.005	0.114	0.021	Y	908
Oxazolinium, 2-, tetrafluoroborate 3-methyl-2-isopropenyl-	Acrylate, methyl	0.344	0.105	0.552	0.043	Y	877
Oxazolinium, 2-, tetrafluoroborate 3-methyl-2-isopropenyl-	Vinyl acetate	0.366	0.151	0.43	0.057	Y	877
Oxazolinium, 2-isopropenyl-2-	Acrylate methyl	2.08	0.327	0.191	0.031	Y	908
Oxirane, 4-vinylphenyl-	Styrene	1.06		0.78			1001
Pentadiene, *cis*-1,3-	Acrylonitrile	0.172	0.012	0.026	0.018	Y	867
Pentadiene, *cis*-1,3-	Acrylonitrile	0.241	0.029	0.06	0.071	Y	867
Pentadiene, *cis*-1,3-	Acrylonitrile	0.017	0.012	0.026	0.173	Y	912
Pentadiene, *cis*-1,3-	Acrylonitrile	0.071	0.029	0.06	0.242	Y	912
Pentadiene, *cis*-1,3-	Acrylonitrile	0.198		0.056			952
Pentadiene, *cis*-1,3-	Acrylonitrile	0.188	0.011	0.033	0.017	N	997

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Pentadiene, *cis*-1,3-	Butadiene	0.26		0.63			743
Pentadiene, *cis*-1,3-	Pentadiene, *trans*-1,3-	0.86		0.37			743
Pentadiene, *trans*-1,3-	Acrylonitrile	0.104	0.01	0.07	0.017	Y	867
Pentadiene, *trans*-1,3-	Acrylonitrile	0.095	0.021	0.06	0.064	Y	867
Pentadiene, *trans*-1,3-	Acrylonitrile	0.018	0.01	0.069	0.104	Y	912
Pentadiene, *trans*-1,3-	Acrylonitrile	0.064	0.02	0.068	0.096	Y	912
Pentadiene, *trans*-1,3-	Acrylonitrile	0.132		0.085			952
Pentadiene, *trans*-1,3-	Acrylonitrile	0.114	0.009	0.079	0.018	N	997
Pentadiene, *trans*-1,3-	Butadiene	0.09		1.22			743
Pentadiene, *trans*-1,3-	Methacrylate, methyl	0.379	0.013	0.404	0.038	Y	1058
Pentadiene, *trans*-1,3-	Pentadiene, *cis*-1,3-	0.37		0.86			743
Pentadienoate, *trans*-4-ethoxy-2,4-,ethyl	Styrene	12.2		0.04			723
Pentadienoate, *trans*-4-ethoxy-2,4-,ethyl	Acrylonitrile	5.4		0.01			723
Pentadienoate, *trans*-4-ethoxy-2,4-	Styrene	11.8		0.08			723
Penten-2,4-one	Styrene	−0.033	0.055	13.84	0.57	Y	112
Pentene-1	Vinyl chloride	0.001		4			3
Pentene-1	Vinyl chloride	0.81	5.2	2.08	1.78	N	329
Pentene-1, 2-methyl-	Vinyl chloride	−1.16	2.31	1.59	0.68	N	329
Pentene-1, 5-cyclohexyl-	Acrylonitrile	−0.043	0.044	4.22	0.45	N	24
Pentene-1, 5-phenyl-	Acrylonitrile	−0.026	0.046	3.84	0.48	Y	24
Pentenoate, 3-oxo-4-, ethyl	Styrene	3.29	0.712	0.233	0.069	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	1.57	0.193	0.161	0.028	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	1.29	0.309	0.215	0.051	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	1.4	0.322	0.189	0.05	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	0.923	0.075	0.179	0.014	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	0.747	0.073	0.164	0.015	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	0.635	0.068	0.162	0.015	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	1.12	0.112	0.178	0.02	N	930
Pentenoate, 3-oxo-4-, ethyl	Styrene	0.568	0.035	0.217	0.009	N	930
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	3.39	0.263	0.555	0.032	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	2.02	0.141	0.424	0.022	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	3.06	0.349	0.591	0.046	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	1.67	0.183	0.443	0.032	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	1.24	0.168	0.34	0.031	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	1.72	0.123	0.57	0.023	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	1.69	0.236	0.606	0.045	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	0.72	0.12	0.269	0.027	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	1.55	0.224	0.715	0.048	N	1033
Pentenoate, 3-oxo-4-, ethyl	Methacrylate, methyl	1.09	0.09	0.528	0.02	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	2.56	0.218	0.597	0.03	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	0.748	0.155	0.38	0.034	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	1.14	0.109	0.513	0.022	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	0.952	0.164	0.43	0.034	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	1.67	0.143	0.474	0.023	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	1.04	0.111	0.581	0.025	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	1.05	0.108	0.616	0.024	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	0.725	0.08	0.663	0.023	N	1033
Pentenoate, 4-methyl-3-oxo-4-, ethyl	Methacrylate, methyl	1.09	0.09	0.528	0.02	N	1033
Phenol, 3-(methacryloylamino)-	Styrene	0.99	0.04	0.5	0.06		896
Phenol, 4-(methacryloylamino)-	Styrene	0.86	0.03	0.71	0.04		896
Phosphate diethyl isopropenyl	Acrylonitrile	0.03		15.2			650
Phosphate diethyl isopropenyl	Vinyl acetate	0.44		1.56			650
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	0.486	0.088	2.37	0.046	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	0.521	0.138	2.23	0.047	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	0.946	0.436	1.87	0.086	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	1.16	0.248	1.97	0.029	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	0.42	0.097	2.1	0.045	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	0.258	0.226	2.56	0.094	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Methacrylate, methyl	0.0701	0.052	2.04	0.012	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.171	0.01	0.629	0.003	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.15	0.05	0.612	0.004	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.146	0.073	0.595	0.005	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.168	0.355	0.597	0.044	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.094	0.02	0.633	0.002	N	971
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.23	0.187	0.61	0.018	N	971

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Phosphate, 2-(acryloyloxy)ethyl diethyl	Styrene	0.108	0.034	0.599	0.002	N	971
Phosphate, vinyl bis(chloroethyl)	Styrene	0.03	0.23	2.47	0.78	Y	133
Phosphate, vinyl diethyl	Vinyl chloride	0.15	0.047	3.4	0.21	Y	779
Phosphate, vinyl diethyl	Vinyl chloroacetate	0.374	0.046	2.01	0.2	Y	779
Phosphate, vinyl diphenyl	Vinyl chloride	0.327	0.023	3.009	0.077	Y	779
Phosphate, vinyl diphenyl	Vinyl chloroacetate	0.53	0.12	1.42	0.15	Y	779
Phosphazene, isopropenylpentafluoro-	Styrene	– 0.121	0.088	1.6	0.27	Y	765
Phosphazene, isopropenylpentafluoro-	Styrene, *p*-chloromethyl-	– 0.048	0.067	1.64	0.58	Y	765
Phosphine oxide, diphenylvinyl-	Acrylonitrile	0.16		3.8			843
Phosphine oxide, diphenylvinyl-	Vinyl acetate	1.7		0.38			843
Phosphonate, 2-(4-vinylphenyl)ethyl, diethyl	Styrene	1.36		0.55			796
Phosphonate, 4-vinylphenyl, diethyl	Styrene	1.4		0.7			796
Phosphonate, α-bromovinyl-, diethyl	Methacrylate, methyl	0.04		1.25			684
Phosphonate, α-carboethoxyvinyl-, diethyl	Methacrylate, methyl	0.05		1			684
Phosphonate, α-carboethoxyvinyl-, diethyl	Phosphonate, vinyl-, diethyl	0.55		0.62			684
Phosphonate, α-carboethoxyvinyl-, diethyl	Methacrylate, methyl	0.01		4.7			684
Phosphonate, isopropenyl-, dimethyl	Methacrylate, methyl	0.2		30			684
Phosphonate, isopropenyl-, dimethyl	Styrene	0.23		8.6			684
Phosphonate, isopropenyl-, dimethyl	Vinyl acetate	0.99		0.14			684
Phosphonate, vinyl-, bis(2-chloroethyl)	Ethylene	7.73	2.19	0.077	0.003	Y	801
Phosphonate, vinyl-, bis(2-chloroethyl)	Methacrylate, methyl	0.26		29.9			410
Phosphonate, vinyl-, bis(2-chloroethyl)	Styrene	0.02	0.39	2.46	0.43	Y	133
Phosphonate, vinyl-, bis(2-chloroethyl)	Styrene	0.16		2.3			410
Phosphonate, vinyl-, bis(2-chloroethyl)	Styrene	0.2		2.2			485
Phosphonate, vinyl-, bis(2-chloroethyl)	Styrene	0.18		6.32			592
Phosphonate, vinyl-, bis(2-chloroethyl)	Styrene	0.18		6.32			594
Phosphonate, vinyl-, bis(2-chloroethyl)	Vinyl acetate	0.85		0.09			592
Phosphonate, vinyl-, bis(2-chloroethyl)	Vinyl acetate	0.85		0.09			594
Phosphonate, vinyl-, bis(2-chloroethyl)	Vinyl acetate	0.47		0.33			595
Phosphonate, vinyl-, dibutyl	Styrene	– 0.12	2.33	4.97	3.44	Y	129
Phosphonate, vinyl-, diethyl	Methacrylate, methyl	0.04		11.1			684
Phosphonate, vinyl-, diethyl	Methacrylic acid	0.15		1.9			431
Phosphonate, vinyl-, diethyl	Phosphonate, α-carbomethoxyvinyl-, diethyl	0.62		0.55			684
Phosphonate, vinyl-, diethyl	Styrene	– 0.15	2.18	4.36	4.27	Y	129
Phosphonate, vinyl-, diethyl	Styrene	– 0.52	0.22	1.59	0.24	Y	18
Phosphonate, vinyl-, diethyl	Styrene	0.02		2.45			592
Phosphonate, vinyl-, diethyl	Styrene	0		3.88			684
Phosphonate, vinyl-, diethyl	Vinyl acetate	0.74		0.04			592
Phosphonate, vinyl-, diethyl	Vinyl acetate	0.6		0.09			684
Phosphonate, vinyl-, diisobutyl	Ethylene					Y	801
Phosphonate, vinyl-, diisobutyl	Styrene	– 0.32	1.46	3.87	1.59	Y	129
Phosphonate, vinyl-, diisopropyl	Styrene	– 0.52	2.52	2.57	2.13	Y	129
Phosphonate, vinyl-, dimethyl	Butadiene, 2-chloro-	0.1		7.5			594
Phosphonate, vinyl-, dimethyl	Styrene					Y	129
Phosphonate, vinyl-, dimethyl	Styrene	0.4		4.61			129
Phosphonate, vinyl-, dimethyl	Styrene	0.15		2.45			592
Phosphonate, vinyl-, dimethyl	Styrene	0.02		2.45			594
Phosphonate, vinyl-, dimethyl	Vinyl acetate	0.74		0.04			592
Phosphonate, vinyl-, dimethyl	Vinyl acetate	0.74		0.04			594
Phosphonate, vinyl-, diphenyl	Ethylene	1.66	2.22	0.088	0.01	Y	801
Phosphonate, vinyl-, diphenyl	Styrene	– 0.38	0.29	1.74	0.16	Y	129
Phosphonate, vinyl-, dipropyl	Styrene	– 0.41	0.72	3.81	0.68	Y	129
Phosphonic acid, α-phenylvinyl	Vinylidene cyanide	0.1		4.58			921
Phosphonic acid, α-phenylvinyl-	Acrylic acid	0.04	0.83	0.7	0.13	Y	132
Phosphonic acid, α-phenylvinyl-	Acrylonitrile	– 0.45	0.41	0.34	0.12	Y	132
Phosphonic acid, α-phenylvinyl-	Acrylonitrile	0		2.36			590
Phosphonic acid, α-phenylvinyl-	Butadiene, 2,3-dichloro-	0.07		7.75			588
Phosphonic acid, α-phenylvinyl-	Butadiene, 2,3-dichloro-	0.07		7.75			597
Phosphonic acid, α-phenylvinyl-	Butadiene, 2-chloro-	0.1		7.5			546
Phosphonic acid, α-phenylvinyl-	Butadiene, 2-chloro-	0.1		7.5			597
Phosphonic acid, α-phenylvinyl-	Methacrylate, methyl	– 0.063	0.077	1.362	0.084	Y	131
Phosphonic acid, α-phenylvinyl-	Methacrylic acid	0.17	0.3	1.49	0.16	Y	130
Phosphonic acid, α-phenylvinyl-	Methacrylonitrile	0		2.24			590

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Phthalide, 3-(4-vinylphenyl)-	Acrylonitrile	0.43	0.19	0.084	0.053	Y	721
Phthalimide, *N*-(4-vinylphenyl)-	Acrylate, methyl	1.56		1.14			636
Phthalimide, *N*-(methacryloyloxy)-	Acrylate, methyl	1.23	0.168	0.193	0.028	Y	979
Phthalimide, *N*-(methacryloyloxy)-	Acrylonitrile	1.45	0.072	0.204	0.016	Y	979
Phthalimide, *N*-(methacryloyloxy)-	Methacrylate, methyl	1.45	0.151	0.69	0.048	Y	979
Phthalimide, *N*-vinyl-	Acrylonitrile	0.24	0.02	0.43	0.01		1046
Phthalimide, *N*-vinyl-	Maleic anhydride	0.344	0.061	0.008	0.012	Y	284
Phthalimide, *N*-vinyl-	Styrene	0.07	0.11	6.27	0.66	Y	163
Pinene	Acrylonitrile	13.5	0.1	0.07	0.01		936
Pinene, α-	Methacrylate, methyl	0.08		10			848
Piperidinol, 4-, *N*–methyl-4-(vinylethynyl)-	Maleimide	2.05	0.03	0.49	0.01		948
Piperylene, *cis*-	Methacrylic acid	0.38		0.4			773
Piperylene, *trans*-	Methacrylic acid	0.33		0.38			773
Propanesulfonate, 3-[diethyl-[2-(2-methacroyloxyethoxy)ethyl	Acrylate, ethyl	0.19	0.02	3.97	1.03	Y	962
Propene, 3,3,3-trichloro-	Acrylonitrile	0.1		12.2			402
Propene, 3,3,3-trichloro-	Styrene	0		6.9			402
Propene, 3,3,3-trichloro-	Vinyl acetate	0.19		0.19			402
Propene, 1-chloro-*cis*-	Acrylonitrile	– 0.12	0.19	23.37	2.99	Y	181
Propene, 1-chloro-*cis*-	Maleic anhydride	– 0.022	0.08	0.347	0.082	Y	181
Propene, 1-chloro-*cis*-	Vinyl acetate	– 0.012	0.061	7.08	0.35	Y	181
Propene, 1-chloro-*cis*-	Vinyl chloride	0.1	0.63	11.52	2.14	Y	181
Propene, 1-chloro-*trans*-	Acrylonitrile	0.01	0.17	19.61	1.72	Y	181
Propene, 1-chloro-*trans*-	Maleic anhydride	0.05	0.015	0.28	0.012	Y	181
Propene, 1-chloro-*trans*-	Vinyl acetate	0.011	0.074	3.13	0.15	Y	181
Propene, 1-chloro-*trans*-	Vinyl chloride	0.33	0.4	4.45	0.81	Y	181
Propene, 2,3-dichloro-	Carbazole, *N*-vinyl-	0		1			376
Propene, 2,3-dichloro-	Methacrylate, methyl	0.18	0.1	6.02	1.66	N	11
Propene, 2,3-dichloro-	Methacrylic acid	0		4			445
Propene, 2,3-dichloro-	Styrene	0.05	0.01	3.51	0.18	N	11
Propene, 2,3-dichloro-	Styrene	0.036		3			983
Propene, 2-chloro-	Acrylonitrile	– 0.023	0.062	1.164	0.053	Y	181
Propene, 2-chloro-	Vinyl acetate	1.65	0.36	0.186	0.091	Y	181
Propene, 2-chloro-	Vinyl chloride	4.75	5.12	0.095	0.085	Y	181
Propene, 2-chloro-	Vinyl chloride	0.58		0.75			517
Propene, 2-chloro-	Vinylidene cyanide	0.001	0.003	0.204	0.079	Y	82
Propene, 2-chloro-3-hydroxy-	Methacrylate, methyl	0		4.4			445
Propene, 2-chloro-3-hydroxy-	Methacrylic acid	0		4.5			445
Propene, 2-chloro-3-hydroxy-	Styrene	0		12.5			445
Propene, 3-chloro-2-chloromethyl-	Styrene	0.01	0.1	3.37	0.73		806
Propenyl methyl ketone	Styrene	0.08	0.3	18.12	6.09		806
Propenyl, 2-, acetate	Vinyl chloride	0.25		2.2			189
Propenyl, 2-chloro-, acetate	Acrylate, methyl	0		0.7			445
Propenyl, 2-chloro-, acetate	Acrylic acid	0		1			445
Propenyl, 2-chloro-, acetate	Methacrylate, methyl	0		1			445
Propenyl, 2-chloro-, acetate	Styrene	0		4.1			445
Propenyl, 2-chloro-, acetate	Vinyl chloride	0		0.7			445
Propenyl, 2-methyl-, acetate	Methacrylate, methyl	0		10			470
Propenyl, 2-chloro-, acetate	Styrene	0		71			470
Propenyl, 2-methyl-, acetate	Vinylidene chloride	0		2.4			470
Propenyltriethoxysilane	Vinyl chloride					Y	237
Propiolactam, *N*-phenyl-α-methylene-	Styrene	0.406	0.106	0.626	0.025	Y	1002
Propionate, vinyl	Ethylene, chlorotrifluoro-	0.63	0.04	0.08	0.01		1097
Propylene	Acrylic acid					Y	183
Propylene	Ethylene			3.43			388
Propylene	Ethylene	0.62		3.2			477
Propylene	Ethylene, chlorotrifluoro-	0.08	0.07	0.02	0.08	N	318
Propylene	Vinyl chloride	0.196	0.023	2.35	0.14	Y	155
Propylene	Vinyl chloride	3.1	0.21	– 0.05	0.1	N	329
Propylene	Vinyl chloride	– 0.02	0.04	5.16	0.06	N	355
Propylene	Vinyl chloride	0.09		2.45			560
Propylene	Vinyl chloride			2.9			588
Pyrazole, 3-methyl-1-vinyl-	Pyrazole, 5-methyl-1-vinyl-	0.42		1.35			898
Pyrazole, 5-methyl-1-vinyl-	Pyrazole, 3-methyl-1-vinyl-	1.35		0.42			898
Pyrazole, *N*-vinyl-3,5-dimethyl-	Styrene	0.049	0.011	8.663	0.196		806

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Pyridazinone, 3-(2-vinyl)-6-methyl-	Acrylonitrile	0.19	0.04	0.32	0.02	N	340
Pyridazinone, 3-(2-vinyl)-6-methyl-	Methacrylate, methyl	0.56	0.04	0.86	0.02	N	340
Pyridazinone, 3-(2-vinyl)-6-methyl-	Styrene	0.85	0.05	0.9	0.03	N	340
Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro-	Acrylonitrile	0.02	0.02	0.74	0.02	N	340
Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro-	Methacrylate, methyl	0.08	0.03	1.19	0.04	N	340
Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro-	Styrene	0.13	0.03	5.92	0.1	N	340
Pyridazone, 2-vinyl-3-	Methacrylate, methyl	1.56		0.63			897
Pyridazone, 2-vinyl-3-	Styrene	0.43		0.53			897
Pyridazone, 2-vinyl-6-methyl-3-	Methacrylate, methyl	0.3		0.16			897
Pyridazone, 2-vinyl-6-methyl-3-	Styrene	1.2		0.9			897
Pyridazone, 2-vinyl-6-methyl-4,5-benz-3-	Methacrylate, methyl	0.27		1.65			897
Pyridazone, 2-vinyl-6-methyl-4,5-benz-3-	Styrene	0.24		0.7			897
Pyridazone, 2-vinyl-6-phenyl-3-	Methacrylate, methyl	0.49		0.58			897
Pyridazone, 2-vinyl-6-phenyl-3-	Styrene	1.45		0.51			897
Pyridine, 2-methyl-5-vinyl-	Acrylate, methyl	1	0.3	0.18	0.05	N	232
Pyridine, 2-methyl-5-vinyl-	Acrylonitrile	0.31	0.02	0.16	0.01	N	232
Pyridine, 2-methyl-5-vinyl-	Butadiene	0.47		0.61			462
Pyridine, 2-methyl-5-vinyl-	Butadiene	0.72		1.32			520
Pyridine, 2-methyl-5-vinyl-	Butadiene	0.41	0.02	1.29	0.02	N	56
Pyridine, 2-methyl-5-vinyl-	Caprolactam, *N*-vinyl-	11.58		0.04			589
Pyridine, 2-methyl-5-vinyl-	Caprolactam, *N*-vinyl-	11.58		0.04			592
Pyridine, 2-methyl-5-vinyl-	Itaconate, diethyl	0.51		0.17			545
Pyridine, 2-methyl-5-vinyl-	Itaconate, dimethyl	0.88		0.22			545
Pyridine, 2-methyl-5-vinyl-	Methacrylate, methyl	0.54	0.19	0.42	0.09	N	232
Pyridine, 2-methyl-5-vinyl-	Methacrylic acid	0.85		0.43			552
Pyridine, 2-methyl-5-vinyl-	*N*-Vinylpyrrolidone	13	2	0.039	0.006		1070
Pyridine, 2-methyl-5-vinyl-	Styrene	0.75	0.08	0.74	0.03	N	232
Pyridine, 2-methyl-5-vinyl-	Styrene	0.68		0.6			500
Pyridine, 2-methyl-5-vinyl-	Styrene	1.2		0.72			514
Pyridine, 2-methyl-5-vinyl-	Styrene	0.78	0.03	0.73	0.03	N	56
Pyridine, 2-methyl-5-vinyl-	Sulfonic acid, *o*-methacryloylaminobenzene-	– 0.002	0.031	1.83	0.218	Y	1006
Pyridine, 2-methyl-5-vinyl-	Sulfonic acid, *p*-methacryloylaminobenzene-	– 0.054	0.048	2.72	0.525	Y	1006
Pyridine, 2-methyl-5-vinyl-	Vinyl acetate	9		0.11			812
Pyridine, 2-vinyl-	Acetylene, phenyl-					Y	192
Pyridine, 2-vinyl-	Acrolein	– 0.12	0.03	2.64	0.14	N	208
Pyridine, 2-vinyl-	Acrylate, butyl	2.51		0.1			236
Pyridine, 2-vinyl-	Acrylate, butyl	2.59	0.14	0.11	0.01	N	78
Pyridine, 2-vinyl-	Acrylate, ethyl	0.28	0.1	0.21	0.06	N	250
Pyridine, 2-vinyl-	Acrylate, ethyl	2.25		0.21			832
Pyridine, 2-vinyl-	Acrylate, methyl	2.13	0.54	0.37	0.4	Y	2
Pyridine, 2-vinyl-	Acrylate, methyl	1.72	0.26	0.17	0.03	N	231
Pyridine, 2-vinyl-	Acrylate, methyl	2.12	0.1	0.2	0.03	N	749
Pyridine, 2-vinyl-	Acrylonitrile	21.9		0.05			456
Pyridine, 2-vinyl-	Acrylonitrile	0.44	0.08	0.1	0.03		50
Pyridine, 2-vinyl-	Butadiene, 1,4-dicarboxylate-, diethyl	0.41	0.07	0.69	0.23	N	327
Pyridine, 2-vinyl-	Butadiene, 1-carboxylate, ethyl	0.4		0.8			791
Pyridine, 2-vinyl-	Butadiene, 2-chloro-	0.06		5.19			457
Pyridine, 2-vinyl-	Caprolactam, *N*-vinyl-	4.35		0.12			589
Pyridine, 2-vinyl-	Caprolactam, *N*-vinyl-	4.35		0.12			592
Pyridine, 2-vinyl-	Isoprene	0.47		0.59			456
Pyridine, 2-vinyl-	Isoprene	0.46		0.58			458
Pyridine, 2-vinyl-	Methacrylate, 2-hydroxyethyl	0.64	0.16	0.56	0.04	N	342
Pyridine, 2-vinyl-	Methacrylate, methyl	0.73	0.06	0.42	0.02	N	231
Pyridine, 2-vinyl-	Methacrylate, methyl	0.86		0.4			532
Pyridine, 2-vinyl-	Methacrylate, methyl	0.76	0.12	0.35	0.19	Y	6
Pyridine, 2-vinyl-	Methacrylate, methyl	0.64		0.31			623
Pyridine, 2-vinyl-	Methacrylate, methyl	1.1	0.08	0.27	0.04	N	749
Pyridine, 2-vinyl-	Methacrylic acid	1.69	0.71	0.58	0.21	Y	15
Pyridine, 2-vinyl-	Methacrylic acid	1.38		0.44			498
Pyridine, 2-vinyl-	*N*-Vinylpyrrolidone	12.4	2.3	0.014	0.002		1070

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Pyridine, 2-vinyl-	Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro	2.216	0.062	0.073	0.04	Y	838
Pyridine, 2-vinyl-	Styrene	0.75	0.32	0.46	0.15	N	231
Pyridine, 2-vinyl-	Styrene	1.27		0.5			41
Pyridine, 2-vinyl-	Styrene	1.81		0.55			456
Pyridine, 2-vinyl-	Styrene	1.33		0.57			499
Pyridine, 2-vinyl-	Styrene	1.14		0.55			532
Pyridine, 2-vinyl-	Styrene, 2,5-dichloro-	0.62	0.12	0.14	0.18	N	2
Pyridine, 2-vinyl-	Vinyl acetate	13.65	3.64	−0.11	0.17	Y	6
Pyridine, 2-vinyl-	Vinyl acetate	30		0			6
Pyridine, 2-vinyl-5-ethyl-	Acrylate, methyl	1.32	0.03	0.18	0.004	N	231
Pyridine, 2-vinyl-5-ethyl-	Acrylonitrile	0.43		0.02			115
Pyridine, 2-vinyl-5-ethyl-	Acrylonitrile	0.43	0.18	0.06	0.07	N	50
Pyridine, 2-vinyl-5-ethyl-	Methacrylate, methyl	0.68	0.06	0.39	0.02	N	231
Pyridine, 2-vinyl-5-ethyl-	Styrene	1.09	0.12	0.74	0.05	N	231
Pyridine, 3-ethynyl-6-methyl-	Styrene	0.15		2.3			784
Pyridine, 3-vinyl-	Methacrylate, 2-hydroxyethyl	0.73	0.04	0.69	0.01	N	342
Pyridine, 4-vinyl-	Acrylate, (−)-menthyl	2.32	0.45	0.291	0.017	Y	667
Pyridine, 4-vinyl-	Acrylate, butyl	4.3	0.34	0.23	0.04	N	78
Pyridine, 4-vinyl-	Acrylate, ethyl	2.58		0.29			832
Pyridine, 4-vinyl-	Acrylate, methyl	1.78	0.32	0.2	0.03	N	231
Pyridine, 4-vinyl-	Acrylate, methyl	2.14		0.15			424
Pyridine, 4-vinyl-	Acrylonitrile	0.41		0.11			115
Pyridine, 4-vinyl-	Acrylonitrile	0.34	0.13	0.09	0.04	N	50
Pyridine, 4-vinyl-	Caprolactam, *N*-vinyl-	4.43		0.1			589
Pyridine, 4-vinyl-	Caprolactam, *N*-vinyl-	4.43		0.1			592
Pyridine, 4-vinyl-	Isoprene	2.49		0.32			424
Pyridine, 4-vinyl-	Methacrylate, 2-hydroxyethyl	0.9	0.09	0.62	0.04	N	342
Pyridine, 4-vinyl-	Methacrylate, methyl	0.77	0.07	0.57	0.02	N	231
Pyridine, 4-vinyl-	Methacrylate, methyl	0.99	0.18	0.54	0.01	N	691
Pyridine, 4-vinyl-	*N*-Vinylpyrrolidone	9.8	1.5	0.01	0.002		1070
Pyridine, 4-vinyl-	Styrene	0.69	0.16	0.52	0.07	N	231
Pyridine, 4-vinyl-	Styrene	1.04	0.22	−0.73	1.09	Y	79
Pyridine, 4-vinyl-	Vinyl chloride					Y	154
Pyridine, 4-vinyl-	Vinyl ether	32		0.03			395
Pyridine, 4-vinyl-	Vinylhydroquinone	0.53	0.4	−0.23	0.36	Y	337
Pyridine, *N*-oxide-, 2-vinyl-5-ethyl-	Styrene	2.27	0.88	0.06	0.11		806
Pyrimidine-2-one, 1,3-divinylhexahydro-	Acrylate, ethyl	−0.05	0.03	0.59	0.13	N	800
Pyrimidine, 2-*N*-*N*-dimethylamino-4-vinyl-	Styrene	1.404	0.071	0.338	0.017	Y	243
Pyrimidine, 4-vinyl-	Styrene	2.38	1.06	0.219	0.095	Y	243
Pyrrolidone, 1-benzyl-3-methylene-5-methyl-	Acrylate, methyl	1.58	0.24	0.125	0.025	Y	633
Pyrrolidone, 1-benzyl-3-methylene-5-methyl-	Methacrylate, methyl	2.28	0.47	0.387	0.07	Y	633
Pyrrolidone, 1-benzyl-3-methylene-5-methyl-	Styrene	0.71	0.17	0.555	0.053	Y	633
Pyrrolidone, *N*-vinyl-	Acenaphthalene					N	326
Pyrrolidone, *N*-vinyl-	Acrylate, 2,4,5-trichlorophenyl	0.012	0.008	0.163	0.02	Y	840
Pyrrolidone, *N*-vinyl-	Acrylate, 2-chloroethyl	0.03		0.52			790
Pyrrolidone, *N*-vinyl-	Acrylic acid	0.1	0.21	0.88	0.69	N	250
Pyrrolidone, *N*-vinyl-	Acrylic acid, α-bromo-	0.25		0.07			694
Pyrrolidone, *N*-vinyl-	Acrylonitrile					Y	213
Pyrrolidone, *N*-vinyl-	Acryloyl chloride	0.04		0.15			599
Pyrrolidone, *N*-vinyl-	Caprolactam, *N*-vinyl-	2.8		1.7			859
Pyrrolidone, *N*-vinyl-	Carbamate, *N*-vinyl-, ethyl	1.77	0.12	0.371	0.05	Y	81
Pyrrolidone, *N*-vinyl-	Cinnamate, α-cyano-, methyl	0.044	0.008	−0.001	0.001	Y	816
Pyrrolidone, *N*-vinyl-	Crotonaldehyde	0.42	0.02	−0.15	0.01	N	248
Pyrrolidone, *N*-vinyl-	Crotonic acid	0.84	0.07	0	0.03	N	245
Pyrrolidone, *N*-vinyl-	Dioxolane, 1,3,4-methylene-2-trichlor	2.98		0.04			647
Pyrrolidone, *N*-vinyl-	Dioxolane, 1,3-, 4,4-dimethyl-5-methyl	3.87		0.01			647
Pyrrolidone, *N*-vinyl-	Ethylene, chlorotrifluoro-	0.38		0.3			830
Pyrrolidone, *N*-vinyl-	Fumarate, dioctyl	0.02	0.01	0.04	0.04	N	121
Pyrrolidone, *N*-vinyl-	Imidazole, 1-vinyl-	0.16	0.074	0.96	0.19	Y	364
Pyrrolidone, *N*-vinyl-	Maleimide, *N*-(2-hydroxyethyl)-	0.002	0.002	0.038	0.01	Y	323
Pyrrolidone, *N*-vinyl-	Methacrylate, 2-bromoethyl	0.02		2.44			657
Pyrrolidone, *N*-vinyl-	Methacrylate, 2-hydroxyethyl	−0.019	0.046	4.841	0.133	Y	840

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Pyrrolidone, *N*-vinyl-	Methacrylate, ferrocenylmethyl	0.073	0.096	2.57	2.77	Y	325
Pyrrolidone, *N*-vinyl-	Methacrylate, methyl					Y	213
Pyrrolidone, *N*-vinyl-	Methacrylate, methyl	– 0.05	0.08	5.62	0.3	N	320
Pyrrolidone, *N*-vinyl-	Methacrylate, methyl	– 0.032	0.068	4.63	0.34	Y	321
Pyrrolidone, *N*-vinyl-	Methacrylate, methyl	– 0.052	0.028	4.36	0.61	Y	36
Pyrrolidone, *N*-vinyl-	Methacrylate, methyl	0.01	0.15	4.04	0.61	N	691
Pyrrolidone, *N*-vinyl-	Methacryloyl chloride	0.05		0.58			599
Pyrrolidone, *N*-vinyl-	Methacryloylacetone	0.008	0.004	5.66	0.4	Y	339
Pyrrolidone, *N*-vinyl-	Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro	– 0.009	0.018	0.552	0.075	Y	838
Pyrrolidone, *N*-vinyl-	Oxazoline, 2-, 2-isopropenyl-	0.01		3.5			862
Pyrrolidone, *N*-vinyl-	Styrene	0.057	0.028	17.2	1.55	Y	36
Pyrrolidone, *N*-vinyl-	Succinimide, *N*-vinyl-	0.97	0.42	3.67	0.89	N	96
Pyrrolidone, *N*-vinyl-	Triazine, 2-allyloxy-4,6-dichloro-	0.98		0.5			826
Pyrrolidone, *N*-vinyl-	Vinyl acetate	1.06	0.25	0.26	0.25	Y	103
Pyrrolidone, *N*-vinyl-	Vinyl acetate	1.75	2.79	0.19	1.77	N	121
Pyrrolidone, *N*-vinyl-	Vinyl acetate	3.4	0.21	0.195	0.057	Y	36
Pyrrolidone, *N*-vinyl-	Vinyl benzoate	2.507	0.039	0.408	0.03	Y	253
Pyrrolidone, *N*-vinyl-	Vinyl butyl ether	1.49	0.95	– 0.027	0.063	Y	215
Pyrrolidone, *N*-vinyl-	Vinyl chloride	0.38		0.53			40
Pyrrolidone, *N*-vinyl-	Vinyl chloride	0.34		0.55			582
Pyrrolidone, *N*-vinyl-	Vinyl chloride	0.73		0.74			582
Pyrrolidone, *N*-vinyl-	Vinyl cinnamate	0.01		1.2			200
Pyrrolidone, *N*-vinyl-	Vinyl cyclohexyl ether	1.91	9.39	– 0.11	0.59	Y	214
Pyrrolidone, *N*-vinyl-	Vinyl cymantrene	0.037	0.03	0.093	0.053	Y	308
Pyrrolidone, *N*-vinyl-	Vinyl ethylene glycol glycidyl ether	1.4		0.06			369
Pyrrolidone, *N*-vinyl-	Vinyl ethyleneglycol glycidyl ether	1.4		0.06			818
Pyrrolidone, *N*-vinyl-	Vinyl isopropyl ether	0.87	9.3	0.03	2.09	Y	215
Pyrrolidone, *N*-vinyl-	Vinyl phenyl ether	4.48	0.1	0.253	0.007	Y	214
Pyrrolidone, *N*-vinyl-	Vinylene carbonate	1.08	0.11	0.056	0.059	Y	103
Pyrrolidone, *N*-vinyl-	Vinylferrocene	0.364	0.068	0.71	0.16	Y	308
Pyrrolidone, α-methylene-*N*-methyl-	Methacrylate, methyl	0.24	0.14	0.577	0.058	Y	641
Quinine	*N*-Vinylpyrrolidone	0.37		2.2			922
Quinoline, 2-vinyl-	Butadiene, 2-chloro-	0.38		2.1			456
Quinoline, 2-vinyl-	Isoprene	0.53		1.88			456
Quinoline, 2-vinyl-	Styrene	2.09		0.49			456
Quinoline, 2-vinyl-	Styrene	2.69		0.49			458
S-Ethyl *N*-vinyl-*N*-methylthiolcarbamate	Styrene	– 0.11	0.26	10	1.72	Y	197
S-Ethyl *N*-vinyl-*N*-methylthiolcarbamate	Vinyl acetate	1.22	1.17	0.67	0.1	Y	197
S-Vinyl *N*, *N*-diethylthiolcarbamate	Styrene	0.1	0.34	4.45	0.48	Y	197
S-Vinyl *N*, *N*-diethylthiolcarbamate	Vinyl acetate	1.89	0.77	0.133	0.025	Y	197
Silane, γ-methacryloxypropyltrimethoxy-	Acrylonitrile	3.79	0.594	0.094	0.034	Y	977
Silane, γ-methacryloxypropyltrimethoxy-	Methacrylate, methyl	2.06	0.309	0.788	0.082	Y	977
Silane, γ-methacryloxypropyltrimethoxy-	Styrene	0.868	0.096	0.425	0.048	Y	977
Silane, methacryloxypropyldimethoxy-methyl-	Imidazole, *N*-Vinyl-	1.39		0.079			1095
Silane, methacryloxypropyltrimethoxy-	Imidazole, *N*-Vinyl-	2.27	1.12	0.158	0.04	Y	1088
Stilbene	Acenaphthalene	– 0.01	0.04	5.65	0.23	N	725
Stilbene	Styrene	0	0.09	3.92	0.17	N	725
Styrene	2-Oxazoline, 2-isopropenyl-	0.67	0.02	0.64	0.03		894
Styrene	3-Pyridazone, 2-vinyl-	0.53		0.43			897
Styrene	3-Pyridazone, 2-vinyl-6-methyl-	0.9		1.2			897
Styrene	3-Pyridazone, 2-vinyl-6-methyl-4,5-benz-3-	0.7		0.24			897
Styrene	3-Pyridazone, 2-vinyl-6-phenyl-	0.51		1.45			897
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.233	0.069	3.29	0.712	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.161	0.028	1.57	0.193	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.215	0.051	1.29	0.309	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.189	0.05	1.4	0.322	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.179	0.014	0.923	0.075	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.164	0.015	0.747	0.073	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.162	0.015	0.635	0.068	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.178	0.02	1.12	0.112	N	930
Styrene	4-Pentenoate, 3-oxo-, ethyl	0.217	0.009	0.568	0.035	N	930
Styrene	Acenaphthalene	3.81		0.33			525
Styrene	Acetylene, phenyl-	0.324	0.02	0.33	0.12	Y	357

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Aconitate, trimethyl	1.026	0.091	− 0.013	0.009	Y	147
Styrene	Acrolein	0.257	0.017	0.216	0.036	Y	291
Styrene	Acrolein	0.22	0.02	0.02	0.01	N	292
Styrene	Acrolein	0.205	0.006	0.32	0.002	Y	307
Styrene	Acrolein, 2-chloro-	0.02	0.05	0.15	0.07		806
Styrene	Acrolein, methyl-	0.173	0.017	0.833	0.092	Y	223
Styrene	Acrolein, methyl-	0.41		0.3			589
Styrene	Acrylamide	1.17	0.06	0.58	0.12	N	295
Styrene	Acrylamide	1.21	0.04	1.32	0.13	N	314
Styrene	Acrylamide	1.49	0.16	0.33	0.14	N	314
Styrene	Acrylamide	1.13		0.59			314
Styrene	Acrylamide	0.65	0.03	8.97	0.43	N	343
Styrene	Acrylamide	1.05		0.2			555
Styrene	Acrylamide, 2-chloro-*N,N*-dimethyl-	1.29	0.065	− 0.036	0.152	Y	917
Styrene	Acrylamide, *N,N*-dibutyl-	1.6	0.058	0.294	0.058		806
Styrene	Acrylamide, *N,N*-diethyl-	1.23		0.39			739
Styrene	Acrylamide, *N,N*-diethyl-	1.36		0.34			739
Styrene	Acrylamide, *N,N*-diethyl	1.54		0.18			739
Styrene	Acrylamide, *N,N*-dimethyl-	1.15	0.35	0.12	0.3	N	170
Styrene	Acrylamide, *N,N*-dimethyl-	1.37	0.1	0.49	0.15	N	315
Styrene	Acrylamide, *N,N*-dimethyl-	1.32	0.12	0.47	0.2	N	315
Styrene	Acrylamide, *N*-(2-propionamido)-	1.84	0.21	0.86	0.3	N	295
Styrene	Acrylamide, *N*-methylol-	0.03		0.48			596
Styrene	Acrylamide, *N*-methylol-	1.55	0.05	0.4	0.03		891
Styrene	Acrylamide, *N*-octadecyl-	2.08	0.12	0.54	0.14	Y	290
Styrene	Acrylamide, *N*-octyl-	2.715	0.244	0.258	0.119		806
Styrene	Acrylamido, 1- , -1-deoxy-D-glucitol	2.42	0.08	0.03	0.02	N	258
Styrene	Acrylamidomethylamino, *p*-, azobenzene	0.083		8.5			858
Styrene	Acrylate, 2,3-dibromopropyl	0.42		0.16			643
Styrene	Acrylate, 2,4,5-trichlorophenyl	0.277	0.048	0.23	0.021	Y	622
Styrene	Acrylate, 2,4,6-tribromophenyl	0.2		0.1			643
Styrene	Acrylate, 2-chloroethyl	0.55	0.47	0.1	0.17	Y	140
Styrene	Acrylate, 2-chloroethyl	0.494	0.097	0.139	0.083	Y	178
Styrene	Acrylate, 2-chloroethyl	0.54		0.12			790
Styrene	Acrylate, 2-chloroethylglucitol	0.49	0.2	0.14	0.09		806
Styrene	Acrylate, 2-cyanoethyl	0.399	0.032	0.128	0.074	Y	178
Styrene	Acrylate, 2-ethylhexyl	0.96	0.3	0.31	0.6	N	126
Styrene	Acrylate, 2-ethylhexyl	0.94		0.26			463
Styrene	Acrylate, 2-nitrobutyl	0.35	0.03	0.12	0.01	N	234
Styrene	Acrylate, 3,4-epoxyhexahydrobenzyl	0.27	0.3	1.97	0.35	N	680
Styrene	Acrylate, β-acetoxymethyl-, methyl	0.34		0.19			1091
Styrene	Acrylate, β-ethoxy-, ethyl	46.98	27.03	− 0.21	0.44	Y	194
Styrene	Acrylate, α-(4-chlorobenzyl)-, ethyl	0.04	0.09	1.03	0.13		806
Styrene	Acrylate, α-(4-cyanobenzyl)-, ethyl	0.06	0.05	0.65	0.09		806
Styrene	Acrylate, α-(4-methoxybenzyl)-, ethyl	0.33	0.3	0.71	0.24		806
Styrene	Acrylate, α-(hydroxymethyl)-, methyl	0.36		0.34			932
Styrene	Acrylate, α-[2,2-bis(carbomethoxy)-ethyl]-, methyl	0.58		0.09			1092
Styrene	Acrylate, α-acetoxy-, ethyl	0.557	0.031	0.173	0.01	Y	244
Styrene	Acrylate, α-benzyl-, ethyl	0.14	0.17	0.9	0.2		806
Styrene	Acrylate, α-benzyl-, methyl	0.57	0.028	0.175	0.053	Y	49
Styrene	Acrylate, α-bromo-, ethyl	0.02	0.04	0.44	0.08		806
Styrene	Acrylate, α-butyl-, methyl	0.812	0.043	0.205	0.053	Y	49
Styrene	Acrylate, α-chloro-, ethyl	0.08	0.07	0.32	0.11		806
Styrene	Acrylate, α-chloro-, methyl	0.25		0.3			74
Styrene	Acrylate, α-cyano-, methyl	0.05	0.01	0.61	0.05	N	141
Styrene	Acrylate, α-cyclohexyl-, methyl	1.615	0.048	− 0.001	0.034	Y	49
Styrene	Acrylate, α-ethyl-, methyl	0.758	0.014	0.197	0.014	Y	49
Styrene	Acrylate, α-ethyloxymethyl-, methyl	0.37		0.24			1047
Styrene	Acrylate, α-fluoro-, methyl	0.66	0.17	0.16	0.11		806
Styrene	Acrylate, α-hexafluoropropyloxymethyl-, methyl	0.23		0.07			1047
Styrene	Acrylate, α-hydroxymethyl-, ethyl	0.468	0.03	0.546	0.127	Y	982
Styrene	Acrylate, α-isobutyl-, methyl	0.974	0.022	0.202	0.042	Y	49

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Acrylate, α-isopropyl-, methyl	1.872	0.052	0.036	0.034	Y	49
Styrene	Acrylate, α-isopropyloxymethyl-, methyl	0.41		0.26			1047
Styrene	Acrylate, α-methoxy-, methyl	1.131	0.078	0.513	0.058		806
Styrene	Acrylate, α-phenoxymethyl-, methyl	0.176	0.05	0.256	0.102	Y	1048
Styrene	Acrylate, α-phenyl-, chloroethyl	0.025	0.015	0.201	0.09	Y	488
Styrene	Acrylate, α-phenyl-, methyl	0.06		1			141
Styrene	Acrylate, α-phenyl-, methyl	0.03		0.4			399
Styrene	Acrylate, α-phenyl-, methyl	0.06		0.45			488
Styrene	Acrylate, α-phenyl-, methyl	1.176	0.015	1.275	0.008	Y	49
Styrene	Acrylate, α-phenyl-, propyl	0.03	0.015	0.126	0.063	Y	488
Styrene	Acrylate, α-phenyl-, butyl	0.04	0.022	0.107	0.055	Y	488
Styrene	Acrylate, α-propyl-, methyl	0.821	0.029	0.208	0.07	Y	49
Styrene	Acrylate, α-propyloxymethyl-, methyl	0.47		0.29			1047
Styrene	Acrylate, α-*sec*-butyl-, methyl	2.29	0.068	0.004	0.024	Y	49
Styrene	Acrylate, α-tetrafluoropropyloxymethyl-, methyl	0.37		0.17			1047
Styrene	Acrylate, α-trifluoroethyloxymethyl-, methyl	0.26		0.2			1047
Styrene	Acrylate, α-trimethylsiloxy-, methyl	0.46		1.42			1101
Styrene	Acrylate, benzyl	0.494	0.05	0.2	0.12	Y	178
Styrene	Acrylate, benzyl	0.534	0.028	0.248	0.041	Y	277
Styrene	Acrylate, butyl	0.79	0.08	0.25	0.05		1032
Styrene	Acrylate, butyl	0.79	0.11	0.34	0.06		1032
Styrene	Acrylate, butyl	0.75	0.1	0.38	0.05		1032
Styrene	Acrylate, butyl	1.23	0.21	−0.106	0.099	N	19
Styrene	Acrylate, butyl	0.44	0.03	0.29	0.05	N	20
Styrene	Acrylate, butyl	0.84	0.2	0.18	0.03	N	38
Styrene	Acrylate, butyl	0.66		0.19			38
Styrene	Acrylate, butyl	0.82		0.21			463
Styrene	Acrylate, butyl	0.8		0.15			549
Styrene	Acrylate, butyl	0.698		0.164			612
Styrene	Acrylate, butyl	0.698		0.164			632
Styrene	Acrylate, *cis*-β-cyano-, methyl					N	1034
Styrene	Acrylate, cyclododecyl	0.47	0.14	0.34	0.15		806
Styrene	Acrylate, cyclododecyl	0.54	0.08	0.31	0.08		806
Styrene	Acrylate, cyclododecyl	0.461	0.07	0.301	0.072		806
Styrene	Acrylate, cyclohexyl	0.913	0.107	0.272	0.048		1061
Styrene	Acrylate, cyclohexyl	0.885	0.102	0.254	0.141		806
Styrene	Actylate, cyclohexyl	0.53	0.11	0.16	0.13		806
Styrene	Acrylate, cyclohexyl	0.7	0.12	0.17	0.09		806
Styrene	Acrylate, cyclohexyl	0.58	0.1	0.18	0.07		806
Styrene	Acrylate, di-, copper	1.74	0.03	0.56	0.09	N	829
Styrene	Acrylate, di-, copper	5.94	0.05	0.12	0.08	N	829
Styrene	Acrylate, di-, nickel	1.83	0.02	0.53	0.06	N	829
Styrene	Acrylate, di-, zinc	1.1	0.02	0.9	0.07	N	829
Styrene	Acrylate, diethylaluminum	−0.002	0.016	0.046	0.035	Y	652
Styrene	Acrylate, diethylaluminum					Y	652
Styrene	Acrylate, ethyl	0.699	0.072	0.139	0.085	Y	178
Styrene	Acrylate, ethyl	1.01		0.16			463
Styrene	Acrylate, ethyl	0.79		0.19			530
Styrene	Acrylate, ethyl	0.8		0.2			530
Styrene	Acrylate, ethyl	0.8		0.48			542
Styrene	Acrylate, ethyl	0.787		0.152			673
Styrene	Acrylate, ethyl	0.787		0.152			677
Styrene	Acrylate, ferrocenylmethyl	1.87	0.17	−0.016	0.06	Y	293
Styrene	Acrylate, ferrocenylmethyl	2.3		0.02			293
Styrene	Acrylate, ferrocenylmethyl	2.5		0.02			576
Styrene	Acrylate, glycidyl	0.6		0.17			114
Styrene	Acrylate, glycidyl	0.73	0.34	0.24	0.58	N	126
Styrene	Acrylate, heptafluorobutyl	0.31	0.01	0.049	0.013	Y	206
Styrene	Acrylate, isopropyl	0.755	0.024	0.195	0.027	Y	178
Styrene	Acrylate, methyl	0.82		0.24			139
Styrene	Acrylate, methyl	0.192	0.057	0.8	0.21	Y	14
Styrene	Acrylate, methyl	0.722	0.056	0.168	0.067	Y	151

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Acrylate, methyl	0.75		0.18			393
Styrene	Acrylate, methyl	0.75		0.18			397
Styrene	Acrylate, methyl	0.68		0.14			463
Styrene	Acrylate, methyl	0.9		0.07			495
Styrene	Acrylate, methyl	0.65		0.3			496
Styrene	Acrylate, methyl	0.4		0.16			496
Styrene	Acrylate, methyl	0.871	0.022	0.148	0.026	Y	865
Styrene	Acrylate, octadecyl	0.777	0.018	0.37	0.12	Y	290
Styrene	Acrylate, octadecyl	0.44		0.18			290
Styrene	Acrylate, octadecyl	0.79		0.31			290
Styrene	Acrylate, octadecyl	0.44		0.18			290
Styrene	Acrylate, octyl	0.39	0.11	0.01	0.53		806
Styrene	Acrylate, *p*-(cinnamoylamino)phenyl	1.08		0.35			685
Styrene	Acrylate, pentabromophenyl	0.16		0.1			643
Styrene	Acrylate, pentachlorophenyl	2.11		0.9			900
Styrene	Acrylate, tetrahydrofurfuryl	0.475	0.186	0.489	0.196		806
Styrene	Acrylate, thio-, butyl	0.439	0.14	0.421	0.17		806
Styrene	Acrylate, thio-, ethyl	0.18	0.038	0.291	0.075		806
Styrene	Acrylate, thio-, *tert*-butyl	0.157	0.034	0.368	0.055		806
Styrene	Acrylate, trifluoro-, methyl	1.4		0			595
Styrene	Acrylate, trifluoro-, methyl	1.4		0			598
Styrene	Acrylic acid	0.25		0.05			312
Styrene	Acrylic acid	1.1		0.08			312
Styrene	Acrylic acid	0.15		0.25			397
Styrene	Acrylic acid	0.22		0.35			414
Styrene	Acrylic acid	0.253	0.069	0.136	0.029	Y	47
Styrene	Acrylic acid	0.25		0.15			490
Styrene	Acrylic acid	0.25		0.45			542
Styrene	Acrylic acid	0.15		0.25			561
Styrene	Acrylic acid, 2-benzamido-	0.13		0.78			1019
Styrene	Acrylic acid, *N*-acetyl-α-amino-	0.91		0.44			661
Styrene	Acrylic anhydride	0.16	0.01	0.1	0.004	N	219
Styrene	Acrylonitrile	0.33		0			140
Styrene	Acrylonitrile	0.29	0.04	0.02	0.06	N	198
Styrene	Acrylonitrile	0.4		0.05			269
Styrene	Acrylonitrile	0.36		0.03			396
Styrene	Acrylonitrile	0.39		0.06			403
Styrene	Acrylonitrile	0.37		0.05			417
Styrene	Acrylonitrile	0.37		0.07			543
Styrene	Acrylonitrile	0.4		0.04			60
Styrene	Acrylonitrile	0.3		0.17			727
Styrene	Acrylonitrile	0.33		0.17			727
Styrene	Acrylonitrile	0.33		0.15			727
Styrene	Acrylonitrile	0.36		0.17			727
Styrene	Acrylonitrile	0.46		0.07			727
Styrene	Acrylonitrile	0.41		0.06			727
Styrene	Acrylonitrile	0.43		0.03			727
Styrene	Acrylonitrile	0.55		0.06			727
Styrene	Acrylonitrile	0.35		0.01			812
Styrene	Acrylonitrile- 2-chloro-	0.014	0.004	0.087	0.04	Y	884
Styrene	Acrylonitrile, 2-fluoro-					Y	884
Styrene	Acrylonitrile, α-chloro-	0.13	0.04	0.03	0.02		806
Styrene	Acrylonitrile, α-fluoro-	0.44		0.03			850
Styrene	Acrylonitrile, α-hydroxymethyl-	0.205	0.029	0.528	0.086	Y	981
Styrene	Acrylonitrile, α-methoxy-	0.534	0.069	0.312	0.054		806
Styrene	Acryloyl chloride	0.1	0.05	0.02	0.02	N	220
Styrene	Acryloyloxy, 2-, benzoic acid	0.06	0.02	0.64	0.02	N	651
Styrene	Adipate, divinyl	20.36	0.26	0.011	0.011	Y	815
Styrene	Allyl acetate	62.8	82.7	0.01	0.05	N	1053
Styrene	Allyl acetate	90		0			470
Styrene	Allyl chloride	35.55	15.82	0.05	0.16	Y	10
Styrene	Allyl chloride					Y	204
Styrene	Allyl chloride	36.8		0.03			438
Styrene	Allyl glycidyl hexahydrophthalate	34.3		0.06			782
Styrene	Allyl glycidyl phthalate	34.8		0.14			782

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Allyl trichloroacetate	2.32	0.15	0.81	0.02		913
Styrene	Azlactone, 2-vinyl-4,4-dimethyl-	0.175	0.054	0.237	0.129	Y	1011
Styrene	Azobenzene, 4-(acrylamidomethylamino)-	0.083	8.5				880
Styrene	Benzimidazole, vinylmercapto-	6.51	0.51	0.56	0.41	Y	764
Styrene	Benzothiazole, vinylmercapto-	2.171	0.07	0.349	0.087	Y	764
Styrene	Benzothiazole, vinylmercapto-	3.02	0.14	0.5	0.095	Y	764
Styrene	Benzothiazolone, *N*-[(methacroyloxy)methyl]	0.35	0.02	3.1	0.01		960
Styrene	Benzoxazole, vinylmercapto-	2.87	0.19	0.24	0.12	Y	764
Styrene	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	18.2		0			994
Styrene	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	89.2		0			994
Styrene	Borazine, β-vinyl	4.53	0.62	0.001	0.016		1018
Styrene	Butadiene	0.84	0.4	1.44	0.56	Y	140
Styrene	Butadiene	0.37	0.25	1.55	0.14	N	159
Styrene	Butadiene	0.38		1.37			173
Styrene	Butadiene					Y	21
Styrene	Butadiene	0.58		1.35			418
Styrene	Butadiene	0.44		1.59			428
Styrene	Butadiene	0.6		1.8			473
Styrene	Butadiene	0.44		1.4			486
Styrene	Butadiene	0.38		1.4			486
Styrene	Butadiene	0.68		0.5			491
Styrene	Butadiene	0.82	0.13	1.38	0.11	N	56
Styrene	Butadiene	0.83	0.21	1.83	0.41	Y	83
Styrene	Butadiene	0.64		1.38			83
Styrene	Butadiene, 1,4-dicarboxylate-, diethyl	0.09	0.014	0.55	0.1	Y	327
Styrene	Butadiene, 1-chloro-	0.27	0.27	1.44	3.1	Y	695
Styrene	Butadiene, 1-phthalimido-	0.299	0.049	1.56	0.63	Y	163
Styrene	Butadiene, 1-succinimido-	0.286	0.018	1.68	0.16	Y	163
Styrene	Butadiene, 2,3-dichloro-	0.25		8.65			587
Styrene	Butadiene, 2,3-dichloro-	0.05		10.6		Y	61
Styrene	Butadiene, 2,3-dimethyl-	0.534	0.035	1.048	0.066	Y	173
Styrene	Butadiene, 2-chloro-	0.05		7.84		Y	61
Styrene	Butadiene, 2-chloro-	0.025	0.047	5.98	0.5	Y	8
Styrene	Butadiene, 2-fluoro-	0.214	0.03	2.1	0.12	Y	174
Styrene	Butadiene, 2-fluoro-	0.22	0.15	1.24	0.61	Y	174
Styrene	Butadiene, 2-trimethylsilyloxy-	0.64		1.2			993
Styrene	Butadiene-1-carboxylate, *S*(-)-α-phenethyl	0.45	0.13	6.81	1.68	Y	748
Styrene	Butadiene-1-carboxylate, ethyl	0.12		0.56			791
Styrene	Butadiene-1-carboxylic acid	0.15		0.52			791
Styrene	Butadiene-1-carboxylic acid	0.08		5.55			799
Styrene	Butenoate, 3-phenyl-3-, methyl	1.97	0.364	−0.532	0.512	Y	1008
Styrene	Bntyrolactone, α-methylene-	0.14	0.01	0.85	0.06	N	663
Styrene	Caprolactam, *N*-vinyl-	0.2	0.01	1.02	0.01		916
Styrene	Carbamate, *N*, *N*-diethyl-, vinyl	29.56	3.59	−0.08	0.18	Y	197
Styrene	Carbazole, *N*-methyl-3-vinyl-	0.735	0.067	1.404	0.146		806
Styrene	Carbazole, *N*-vinyl-	6	1.34	−0.02	0.06	N	11
Styrene	Carbazole, *N*-vinyl-	5.93	1.05	0.026	0.034	Y	13
Styrene	Carbazole, *N*-vinyl-	5.72	0.4	0.032	0.057	Y	98
Styrene	Cinnamate, 2-chloroethyl	1.394	0.068	0.01	0.11	Y	488
Styrene	Cinnamate, α-cyano-, 2-ethylhexyl	0.58	0.004	−0.06	0.01	N	282
Styrene	Cinnamate, α-cyano-, benzyl	0.4	0.03	−0.16	0.17	N	282
Styrene	Cinnamate, α-cyano-, butyl	0.47	0.03	−0.09	0.08	N	282
Styrene	Cinnamate, α-cyano-, cyclohexyl	0.37	0.04	−0.24	0.22	N	282
Styrene	Cinnamate, α-cyano-, ethyl					Y	134
Styrene	Cinnamate, α-cyano-, hexyl	0.39	0.04	−0.17	0.26	N	282
Styrene	Cinnamate, α-cyano-, methyl	0.4	0.06	−0.21	0.35	N	282
Styrene	Cinnamate, benzyl	1.33	0.12	0.14	0.13	Y	488
Styrene	Cinnamate, butyl	1.757	0.082	0.04	0.15	Y	488
Styrene	Cinnamate, ethyl	1.52	0.31	−0.076	0.054	Y	200
Styrene	Cinnamate, ethyl	1.566	0.035	0.082	0.045	Y	488

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Cinnamate, methyl	1.799	0.073	0.04	0.13	Y	488
Styrene	Cinnamate, methyl	1.27		0.02			653
Styrene	Cinnamate, *p*-chloro-, methyl	2.24		0.04			653
Styrene	Cinnamate, *p*-methyl-, methyl	2.84		0			653
Styrene	Cinnamate, phenyl	1.66	0.12	0.029	0.055	Y	488
Styrene	Cinnamate, *tert*-butyl	1.692	0.087	0.1	0.12	Y	488
Styrene	Cinnamide, *N,N*-diethyl-	4.17		0.01			737
Styrene	Cinnamide, *p*-chloro-, *N,N*-diethyl-	2.99		0.01			737
Styrene	Cinnamide, *p*-methyl-, *N,N*-diethyl-	4.95		0.01			737
Styrene	Cinnamonitrile	2.549	0.092	− 0.008	0.021	Y	134
Styrene	Cinnamonitrile, α-cyano-					Y	134
Styrene	Citraconate, di-*sec*-butyl	2		0.13			841
Styrene	Citraconate, dibenzyl	1.55		0.047			841
Styrene	Citraconate, dibutyl	2.74		0.054			841
Styrene	Citraconate, dicyclohexyl	1.88		0.03			841
Styrene	Citraconate, diethyl	2.48		0.029			841
Styrene	Citraconate, diisobutyl	1.8		0.03			841
Styrene	Citraconate, diisopropyl	1.62		0.076			841
Styrene	Citraconate, dimethyl	1.58		0.049			841
Styrene	Citraconate, dipropyl	2.19		0.027			841
Styrene	Citraconic acid	1.36		0			1021
Styrene	Citraconic anhydride	0.16	0.15	0.021	0.058	Y	47
Styrene	Citraconimide, β-iso-, *N*-(4-acetylphenyl)-	0.42		0			608
Styrene	Citraconimide, β-iso-, *N*-(4-chlorophenyl)-	0.28		0			608
Styrene	Citraconimide, β-iso-, *N*-(4-ethoxycarbonylphenyl)-	0.3		0			608
Styrene	Citraconimide, β-iso-, *N*(4-methoxyphenyl)-	0.27		0			608
Styrene	Citraconimide, β-iso-, *N*-(*p*-tolyl)-	0.4		0			608
Styrene	Citraconimide, β-iso-, *N*-phenyl-	0.39		0			608
Styrene	Citraconimide, *N*-(4-acetoxyphenyl)-	0.151	0.054	0.015	0.086	Y	728
Styrene	Citraconimide, *N*-(4-chlorophenyl)-	0.181	0.057	0.075	0.093	Y	728
Styrene	Citraconimide, *N*-(4-ethoxycarbonylphenyl)-	0.148	0.018	0.004	0.033	Y	728
Styrene	Citraconimide, *N*-(4-methoxyphenyl)-	0.63	0.19	0.04	0.11	Y	728
Styrene	Citraconimide, *N*-allyl	0.142		0.004			959
Styrene	Citraconimide, *N*-benzyl-	0.19	0.087	− 0.066	0.082	Y	714
Styrene	Citraconimide, *N*-butyl-	0.169	0.028	0.03	0.045	Y	714
Styrene	Citraconimide, *N*-ethyl-	0.231	0.044	− 0.002	0.05	Y	714
Styrene	Citraconimide, *N*-hexyl-	0.316	0.086	− 0.03	0.11	Y	714
Styrene	Citraconimide, *N*-isobutyl-	0.326	0.094	0.07	0.14	Y	714
Styrene	Citraconimide, *N*-isopropyl-	0.244	0.055	− 0.014	0.063	Y	714
Styrene	Citraconimide, *N*-methyl-	0.15		0.24			460
Styrene	Citraconimide, *N*-methyl-	0.14		0.24			506
Styrene	Citraconimide, *N*-phenyl-	0.175	0.016	− 0.001	0.023	Y	728
Styrene	Citraconimide, *N*-propyl-	0.196	0.062	− 0.014	0.087	Y	714
Styrene	Citraconimide, *N*-*tert*-butyl-	0.465	0.039	0.045	0.05	Y	714
Styrene	Citraconimide, *N*-tolyl-	0.31	0.13	− 0.02	0.18	Y	728
Styrene	Citraconimide, α-iso-, *N*-(4-acetylphenyl)-	0.81		0			608
Styrene	Citraconimide, α-iso-, *N*-(4-chlorophenyl)-	1.03		0			608
Styrene	Citraconimide, α-iso-, *N*-(4-ethoxycarbonylphenyl)-	0.96		0			608
Styrene	Citraconimide, α-iso-, *N*-(4-methoxyphenyl)-	0.39		0			608
Styrene	Citraconimide, α-iso-, *N*-(*p*-tolyl)-	1.69		0			608
Styrene	Citraconimide, α-iso-, *N*-phenyl-	1.76		0			608
Styrene	Crotonaldehyde	14.7		0.03			428
Styrene	Crotonaldehyde	14.7		0.07			428
Styrene	Crotonaldehyde	14.7		0.12			428
Styrene	Crotonate, α-acetyl-, methyl	2.7		0			785
Styrene	Crotonate, α-bromo-, ethyl	4.42		0			785

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Crotonate, α-carboethoxy-, ethyl	8.24		0			785
Styrene	Crotonate, α-chloro-, ethyl	5.13		0			785
Styrene	Crotonate, α-cyano-, ethyl	0.26		0.02			785
Styrene	Crotonate, α-methoxy-, methyl	18.4		0.04			785
Styrene	Crotonate, α-methyl-, methyl	30.7		0.02			785
Styrene	Crotonate, ethyl	27		0			785
Styrene	Crotonate, methyl	9.68	1.86	−0.27	0.22	Y	112
Styrene	Crotonic acid	20		0			402
Styrene	Crotononitrile	23.29	1.7	−0.012	0.06	Y	112
Styrene	Crotononitrile	23.8		0			785
Styrene	Crotononitrile, α-phenyl-	0.43		0			785
Styrene	Cyclobutane, 1,2-dimethylene-	0.26		3.6			854
Styrene	Cyclobutane, 1,2-dimethylene-	0.28	0.05	3.6	0.16		885
Styrene	Cyclopentene, 4-, -1,3-dione					Y	263
Styrene	Diallyl melamine	36.96	4.02	−0.32	0.2	Y	201
Styrene	Diallyl phthalate	36.41	1.23	0.041	0.038	Y	152
Styrene	Diallyl phthalate	25.59	2.19	0.026	0.071	Y	152
Styrene	Diallyl phthalate	23.67	1.2	0.038	0.04	Y	152
Styrene	Diallyl phthalate	18.8		0.08			152
Styrene	Diallyl phthalate	27.5		0.09			152
Styrene	Diallyl phthalate	16.9		0.1			152
Styrene	Diallyl phthalate	23.8		0.1			152
Styrene	Diallyl phthalate	15.1		0.13			152
Styrene	Dihydroxydiphenylsulfone diallyl ether	0.975	0.015	0.92	0.16		1016
Styrene	Dithiane, 2-methylene-1,3-	0.03		3.35			1031
Styrene	Divinylbenzene, *m*-	0.58	0.15	0.58	0.04	N	262
Styrene	Divinylbenzene, *p*-	0.26	0.25	1.18	0.17	N	262
Styrene	Ethylene	14.88		0.05			615
Styrene	Ethylene, 1,1-diphenyl-	0.34	0.01	−0.02	0.01	N	281
Styrene	Ethylene, 1,1-diphenyl-	0.87		1.15			901
Styrene	Ethylene, 1-diphenyl-	0.33	0.02	0.01	0.02	N	189
Styrene	Ethylene, chlorotrifluoro-	4.38	0.99	−0.1	0.21	Y	236
Styrene	Ethylene, dichloro-, *cis*-	3.1		−3.1		Y	137
Styrene	Ethylene, dichloro-, *cis*-	63.1		−2.2		Y	137
Styrene	Ethylene, dichloro-, *cis*-	21.4	4.9	−0.28	0.12	Y	40
Styrene	Ethylene, dichloro-, *cis*-	161.3	30.3	−0.02	0.062	Y	9
Styrene	Ethylene, dichloro-, *cis*-	24.75	2.64	0.067	0.053	Y	9
Styrene	Ethylene, *p*-vinyl-1,1-diphenyl-	0.46		1.31			742
Styrene	Ethylene, tetrachloro-					Y	204
Styrene	Ethylene, tetrachloro-	200					204
Styrene	Ethylene, tetrachloro-					Y	40
Styrene	Ethylene, tetrachloro-	187		0			40
Styrene	Ethylene, tetrachloro-	185		0			59
Styrene	Ethylene, tetrafluoro-	5.2		0.01			567
Styrene	Ethylene, trichloro-	17.1		0			40
Styrene	Ethylene, trichloro-	16.5		0			40
Styrene	Ethylene, trichloro-	12.1		0			40
Styrene	Ethylene, trichloro-	12.7		0			40
Styrene	Ethylene, trichloro-	16	11	−0.006	0.37	Y	59
Styrene	Formaldehyde,-*S*-vinyl-*O*-ethylthioacetal	7.75	0.68	0.32	0.24	Y	273
Styrene	Fumarate, allyl methyl	0.25	0.01	0.03	0.02	N	713
Styrene	Fumarate, bis(2-butyl)	0.51	0.04	0	0.01	N	249
Styrene	Fumarate, bis(3-chloro-2-butyl)	0.26	0.04	−0.06	0.03	N	249
Styrene	Fumarate, di-(2-chloroethyl)	0.18		0			1038
Styrene	Fumarate, di-(2-cyanoethyl)	0.07		0.09			1038
Styrene	Fumarate, di-(2-methoxyethyl)	0.35		0.03			1038
Styrene	Fumarate, di-(2-phenylethyl)	0.27		0			1038
Styrene	Fumarate, di-*sec*-butyl	0.55		0.04			1038
Styrene	Fumarate, di-*tert*-amyl	0.69		0.08			1038
Styrene	Fumarate, di-*tert*-butyl	0.57		0.04			1038
Styrene	Fumarate, dibenzyl	0.32		0			1038
Styrene	Fumarate, dibutyl	0.35		0.04			1038
Styrene	Fumarate, dicyclohexyl	0.49		0.06			1038
Styrene	Fumarate, dicyclopentyl	0.3		0.06			1038

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Fumarate, diethyl	0.29		0.02			1038
Styrene	Fumarate, diethyl	6.3	0.26	0.081	0.005	Y	139
Styrene	Fumarate, diethyl	0.394	0.06	0.11	0.022	Y	139
Styrene	Fumarate, diethyl	0.3		0.07			139
Styrene	Fumarate, diethyl	0.31	0.02	0	0.01	N	249
Styrene	Fumarate, diethyl	0.36		0.1			562
Styrene	Fumarate, diethyl	0.29		0.02			640
Styrene	Fumarate, diisobutyl	0.37		0.05			1038
Styrene	Fumarate, diisopropyl	0.4		0.055			1038
Styrene	Fumarate, dimethyl	0.39		0.03			1038
Styrene	Fumarate, dipropyl	0.32		0.02			1038
Styrene	Fumarate, isopropyl butyl	0.42		0.01			1056
Styrene	Fumarate, isopropyl ethyl	0.3		0.01			1056
Styrene	Fumarate, isopropyl isobutyl	0.46		0.01			1056
Styrene	Fumarate, isopropyl methyl	0.3		0.16			1056
Styrene	Fumarate, isopropyl *sec*-butyl	0.54		0.02			1056
Styrene	Fumarate, methyl butyl	0.36		0.02			1056
Styrene	Fumarate, methyl ethyl	0.32		0.02			1056
Styrene	Fumarate, methyl isobutyl	0.32		0.03			1056
Styrene	Fumarate, methyl isopropyl	0.3		0.16			1056
Styrene	Fumarate, methyl propyl	0.28		0.05			1056
Styrene	Fumarate, methyl *sec*-butyl	0.45		0.02			1056
Styrene	Fumarate, methyl *tert*-amyl	0.53		0.06			1056
Styrene	Fumarate, methyl tert-butyl	0.45		0.03			1056
Styrene	Fumarate, mono-2-butyl	0.33	0.03	− 0.04	0.03	N	249
Styrene	Fumarate, *tert*-butyl 2-ethylhexyl	0.54		0.01			1056
Styrene	Fumarate, *tert*-butyl 4-methyl-2-pentyl	0.57		0.01			1056
Styrene	Fumarate, *tert*-butyl ethyl	0.25		0.04			1056
Styrene	Fumarate, *tert*-butyl isoamyl	0.45		0.06			1056
Styrene	Fumarate, *tert*-butyl methyl	0.45		0.03			1056
Styrene	Fumarate, *tert*-butyl *sec*-butyl	0.55		0.07			1056
Styrene	Fumaronitrile	0.202	0.058	− 0.016	0.021	Y	137
Styrene	Fumaronitrile					Y	191
Styrene	Fumaronitrile	0.294	0.044	0.006	0.031	Y	199
Styrene	Fumaronitrile	0.3		0			478
Styrene	Fumaronitrile					Y	77
Styrene	Fumaryl chloride					Y	91
Styrene	Furan, 2,3-dihydro-	20		0			806
Styrene	Hexatriene, tetrachloro-	0.123	0.0428	0.85	0.22	Y	4
Styrene	Hexene, 1-, 3,4-dioic anhydride	8.57	8.4	− 0.052	1	Y	933
Styrene	Hexene, 2-, 3,4-dioic anhydride	3.63	5.6	− 0.08	1.17	Y	933
Styrene	Hexene, 3-, 3,4-dioic anhydride	17.17	436	− 0.54	5.83	Y	933
Styrene	Hexene, 5-, 2,4-dione	0.031		1.22			931
Styrene	Hexene, 5-, 2,4-dione	0.049		1.38			931
Styrene	Hexene, 5-, 2,4-dione	0.066		1.52			931
Styrene	Hexene, 5-, 2,4-dione	0.07		1.73			931
Styrene	Hexene, 5-, 2,4-dione	0.171		1.91			931
Styrene	Hexene, 5-, 2,4-dione	0.179		1.91			931
Styrene	Hexene, 5-, 2,4-dione	0.173		2.07			931
Styrene	Hexene, 5-, 2,4-dione	0.121		2.46			931
Styrene	Hexene, 5-, 2,4-dione	0.24		2.69			931
Styrene	Hexene, 5-, 2,4-dione	0.014		2.93			931
Styrene	Hexene, 5-, 2,4-dione	0.044		3.19			931
Styrene	Hexene, 5-, 2,4-dione	0.028		4.11			931
Styrene	Hexene-1,5-dicarboxylate, dimethyl	0.678	0.031	0.196	0.043	Y	828
Styrene	Imidazole, 1-vinyl-	9.94	0.24	0.071	0.029	Y	364
Styrene	Imidazole, 1-vinyl-2-methyl-	8.87	0.62	0.09	0.064	Y	364
Styrene	Imidazole, 1-vinyl-2-methyl-	8.97		0.07			479
Styrene	Isoprene	0.513	0.02	1.922	0.016	Y	366
Styrene	Isoprene	0.476	0.018	1.957	0.011	Y	366
Styrene	Isoprene	0.44		1.98			544
Styrene	Isoprene	0.42		2.02			544
Styrene	Isoprene	0.48		1.3			83
Styrene	Isoprene, 3-acetoxy-	0.34		4.47			770
Styrene	Isopropenyl methyl ketone	0.44		0.29			542

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Isopropenyl methyl ketone	0.32		0.66			542
Styrene	Isopropenyl, 3-(1-cyclohexenyl), acetate	1.59		0.56			770
Styrene	Isopropenylacetophenone, *p*-	0.3	0.18	0.84	0.59	Y	266
Styrene	Isopropenylisocyanate	8.12		0.07			434
Styrene	Isopropenylisocyanate	6.84	0.18	0.122	0.047	Y	99
Styrene	Isopropylidene, 2,3:4,5-di-*O*-, -1-vinylbenzyl-	0.14	0.055	3.26	1.12	Y	772
Styrene	Itaconamate, *N*-(4-carboethoxyphenyl)-, butyl	0.2		0.61			678
Styrene	Itaconamate, *N*-(4-carboethoxyphenyl)-, ethyl	0.23		0.2			678
Styrene	Itaconamate, *N*-(4-carboethoxyphenyl)-, methyl	0.15		0.58			678
Styrene	Itaconamate, *N*-(4-carboethoxyphenyl)-, propyl	0.26		0.4			678
Styrene	Itaconamate, *N*-(4-chlorophenyl)-, ethyl	0.35		0.16			678
Styrene	Itaconamate, *N*-(4-chlorophenyl)-, methyl	0.38		0.18			678
Styrene	Itaconamate, *N*-(-chlorophenyl)-, propyl	0.39		0.31			678
Styrene	Itaconamate, *N*-(4-methoxyphenyl-, butyl	0.12		0.69			678
Styrene	Itaconamate, *N*-(4-methoxyphenyl)-, ethyl	0.33		0.34			678
Styrene	Itaconamate, *N*-(4-methoxyphenyl)-, methyl	0.26		0.41			678
Styrene	Itaconamate, *N*-(4-methoxyphenyl)-, propyl	0.38		0.4			678
Styrene	Itaconamate, *N*-(4-methylphenyl)-, butyl	0.19		0.31			678
Styrene	Itaconamate, *N*-(4-methlyphenyl)-, ethyl	0.38		0.26			678
Styrene	Itaconamate, *N*-(4-methylphenyl)-, methyl	0.3		0.16			678
Styrene	Itaconamate, *N*-(4-methylphenyl)-, propyl	0.54		0.19			678
Styrene	Itaconamate, *N*-phenyl, methyl	0.39		0.18			678
Styrene	Itaconamate, *N*-phenyl-, butyl	0.12		0.49			678
Styrene	Itaconamate, *N*-phenyl, ethyl	0.45		0.21			678
Styrene	Itaconamate, *N*-phenyl-, methyl	0.31		0.52			1059
Styrene	Itaconamate, *N*-phenyl-, propyl	0.5		0.18			678
Styrene	Itaconate, di-2[-2(2-methoxyethoxy)-ethoxy]ethyl	0.53	0.022	0.2	0.015		1098
Styrene	Itaconate, diamyl	0.36	0.05	0.5	0.09	N	39
Styrene	Itaconate, dibutyl	0.42	0.06	0.34	0.05	N	39
Styrene	Itaconate, diethyl	0.23	0.11	0.34	0.12	N	39
Styrene	Itaconate, dimenthyl	0.502	0.188	0.483	0.364	Y	975
Styrene	Itaconate, dimethyl					N	39
Styrene	Itaconate, dimethyl	0.48		0.14			398
Styrene	Itaconate, dimethyl	0.5		0.06			586
Styrene	Itaconate, dioctyl	0.33	0.16	0.14	0.12	N	39
Styrene	Itaconate, dipropyl	0.16	0.07	0.28	0.06	N	39
Styrene	Itaconate, ethyl hexafluoroisopropyl	0.435	0.025	0.039	0.035	N	1103
Styrene	Itaconate, glycidyl methyl	0.376	0.036	0.041	0.079		806
Styrene	Itaconate, mono-methyl	0.029	0.039	0.111	0.052	Y	656
Styrene	Itaconate, mono-methyl	0.34	0.077	0.33	0.15	Y	656
Styrene	Itaconate, mono-methyl	0.52	0.085	0.33	0.11	Y	656
Styrene	Itaconate, mono-methyl	0.404	0.06	0.218	0.086	Y	656
Styrene	Itaconic acid	0.34		0			420
Styrene	Itaconic acid	0.26	0.08	0.12	0.67	Y	76
Styrene	Itaconic anhydride	0.004	0.01	0.405	0.09	Y	365
Styrene	Itaconic anhydride	0.086	0.015	0.456	0.09	Y	62
Styrene	Itaconic anhydride	0.003	0.005	0.785	0.05	Y	62
Styrene	Itaconimide, *N*-(2-chloroethyl)-	0.069	0.045	0.162	0.092	Y	642
Styrene	Itaconimide, *N*-(4-acetoxyphenyl)-	0.35	0.12	0.21	0.21	Y	729
Styrene	Itaconimide, *N*-(4-chlorophenyl)-	0.159	0.084	0.2	0.18	Y	729

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	± 95%	r_2	± 95%	Conv.	Refs.
Styrene	Itaconimide, *N*-(4-ethoxycarbonylphenyl)	0.232	0.032	0.112	0.054	Y	729
Styrene	Itaconimide, *N*-(*p*-chlorophenyl)-	0.15		0.14			740
Styrene	Itaconimide, *N*-(*p*-tolyl)-	0.16		0.24			740
Styrene	Itaconimide, *N*-benzyl-	0.056	0.048	0.2	0.11	Y	642
Styrene	Itaconimide, *N*-butyl-	0.22	0.03	− 0.019	0.04	Y	642
Styrene	Itaconimide, *N*-ethyl	0.232	0.029	0.172	0.06	Y	642
Styrene	Itaconimide, *N*-isobutyl-	0.44	0.11	− 0.03	0.11	Y	642
Styrene	Itaconimide, *N*-Isopropyl-	0.308	0.043	0.045	0.064	Y	642
Styrene	Itaconimide, *N*-methyl-	0.153	0.069	0.12	0.12	Y	642
Styrene	Itaconimide, *N*-naphthyl-	0.08		0.35			740
Styrene	Itaconimide, *N*-phenyl-	0.116	0.043	0.109	0.082	Y	729
Styrene	Itaconimide, *N*-phenyl-	0.05		0.08			740
Styrene	Itaconimide, *N*-phenyl-	0.05	0.248	0.998	0.123	N	978
Styrene	Itaconimide, *N*-propyl-	0.28	0.12	0.04	0.18	Y	642
Styrene	Itaconimide, *N*-tolyl-	0.134	0.031	0.219	0.079	Y	729
Styrene	Maleamic acid, *N*-3-dimethylamino-6-methyl	0.55	0.03	− 0.19	0.03	N	679
Styrene	Maleate, allyl methyl	8.29	0.14	0.02	0.01	N	713
Styrene	Maleate, butyl stannyl, allyl	0.1	0.02	0.06	0.03	N	811
Styrene	Maleate, chloro-, diethyl	2.07	0.14	− 0.043	0.021	Y	14
Styrene	Maleate, dibutyl tin	2.08	0.118	0.194	0.121	Y	987
Styrene	Maleate, diethyl	6.59	0.46	− 0.013	0.022	Y	139
Styrene	Maleate, diethyl					Y	14
Styrene	Maleate, diethyl	8		0.07			640
Styrene	Maleate, diethyl	6.07	0.07	0.01	0.01	N	874
Styrene	Maleate, diethyl	6.592		0.001			888
Styrene	Maleate, dimethyl	10.65	2.81	0.15	0.12	Y	137
Styrene	Maleate, dimethyl	0.083	0.015	0.105	0.058	Y	317
Styrene	Maleate, monoallyl	0.14	0.01	0.07	0.02	N	811
Styrene	Maleic anhydride	0.097	0.002	0.001	0.008	N	105
Styrene	Maleic anhydride	0.04	0.12	0	0.13	Y	12
Styrene	Maleic anhydride	0.02	0.003	0.003	0.03	N	17
Styrene	Maleic anhydride	0	0.01	0.02	0.01	N	241
Styrene	Maleic anhydride	0.02		0			384
Styrene	Maleic anhydride	0.02		0			397
Styrene	Maleic anhydride	0.04		0.02			483
Styrene	Maleic anhydride	0.04		0.01			506
Styrene	Maleic anhydride	0.04		0.001			522
Styrene	Maleic anhydride	0.05		0.005			522
Styrene	Maleic anhydride	0.02		0.01			522
Styrene	Maleic anhydride	0.04		0.02			522
Styrene	Maleic anhydride	0.04		0.05			522
Styrene	Maleic anhydride					N	923
Styrene	Maleic anhydride, α-chloro-	0.07		0			845
Styrene	Maleimide	0.057	0.012	0.088	0.036	Y	251
Styrene	Maleimide, *N*-(2,6-diethylphenyl)-	0.19		0.02			992
Styrene	Maleimide, *N*-(2,6-dimethylphenyl)-	0.14		0.08			992
Styrene	Maleimide, *N*-(2-chlorophenyl)-	0.011	0.004	0.013	0.002	Y	853
Styrene	Maleimide, *N*-(2-chlorophenyl)-	0.038	0.006	0.028	0.003	Y	853
Styrene	Maleimide, *N*-(2-chlorophenyl)-	0.013	0.012	0.01	0.005	Y	910
Styrene	Maleimide, *N*-(2-chlorophenyl)-	0.038	0.028	0.006	0.003	Y	910
Styrene	Maleimide, *N*-(2-hydroxyethyl)-	0.046	0.017	0.011	0.027	Y	323
Styrene	Maleimide, *N*-(3-dimethylaminophenyl)-	0.03		0.19			747
Styrene	Maleimide, *N*-(4-bromophenyl)-	0.02	0.006	0.018	0.007	Y	1030
Styrene	Maleimide, *N*-(4-carboxyethylphenyl)-α-chloro-	0.059	0.021	0.022	0.041	Y	973
Styrene	Maleimide, *N*-(4-chlorophenyl)-α-chloro-	0.149	0.048	0.019	0.038	Y	973
Styrene	Maleimide, *N*-(4-hydroxyphenyl)-	− 0.059	0.041	0.13	0.1	Y	323
Styrene	Maleimide, *N*-(4-methoxyphenyl)-α-chloro-	0.112	0.031	0.049	0.061	Y	973
Styrene	Maleimide, *N*-(4-methylphenyl)-α-chloro-	0.107	0.048	0.019	0.078	Y	973
Styrene	Maleimide, *N*-(β-chloroethyl)-α-chloro-	0.29	0.05	0	0.06		974

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Maleimide, *N*-[*N'*-(α-methylbenzyl)-aminocarbonylpentyl]-	0.198	0.143	0.258	0.25	Y	1099
Styrene	Maleimide, *N*-[*N'*-(α-methylbenzyl)-aminocarbonylundecyl]-					Y	1099
Styrene	Maleimide, *N*-allyl	0.056		0.035			1003
Styrene	Maleimide, *N*-benzyl-	0.058	0.021	0.013	0.031	Y	348
Styrene	Maleimide, *N*-benzyl-α-chloro-	0.42	0.06	0	0.06		974
Styrene	Maleimide, *N*-butyl-					Y	115
Styrene	Maleimide, *N*-butyl-	0.02		0.06			50
Styrene	Maleimide, *N*-cyclohexyl-	0.102		0.1			1100
Styrene	Maleimide, *N*-cyclohexyl-	−0.01	0.017	0.162	0.054	Y	348
Styrene	Maleimide, *N*-ethyl-α-chloro-	0.9	0.05	0	0.04		974
Styrene	Maleimide, *N*-hexyl-	−0.041	0.069	0.09	0.16	Y	348
Styrene	Maleimide, *N*-hydroxymethyl-	−0.035	0.053	0.06	0.11	Y	323
Styrene	Maleimide, *N*-methyl-α-chloro-	0.63	0.04	0	0.03		974
Styrene	Maleimide, *N*-phenyl-					N	1026
Styrene	Maleimide, *N*-phenyl-	0.016	0.004	0.044	0.017	Y	328
Styrene	Maleimide, *N*-phenyl-	0.07		0.01			992
Styrene	Maleimide, *N*-phenyl-α-chloro-	0.087	0.04	−0.002	0.073	Y	973
Styrene	Maleimide-*N*,*N*-dimethylaniline, 4-(2-chlorophenyl)-	0.05		0.04			747
Styrene	Mesaconate, di-*sec*-butyldithiol	0.45		0.02			624
Styrene	Mesaconate, diamyl	1.27		0.02			658
Styrene	Mesaconate, dibenzyl	0.73		0.08			658
Styrene	Mesaconate, dibenzyldithiol	0.28		0.06			624
Styrene	Mesaconate, dibutyl	1.28		0.05			658
Styrene	Mesaconate, dibutyldithiol	0.41		0.05			624
Styrene	Mesaconate, dicyclohexyl	1.25		0.1			658
Styrene	Mesaconate, diethyl	1.24		0.06			658
Styrene	Mesaconate, diethyldithiol	0.4		0.03			624
Styrene	Mesaconate, dihexyl	1.51		0.1			658
Styrene	Mesaconate, diisoamyl	1.34		0.07			658
Styrene	Mesaconate, diisobutyl	1.29		0.1			658
Styrene	Mesaconate, diisobutyldithiol	0.41		0.03			624
Styrene	Mesaconate, diisopropyl	1.31		0.04			658
Styrene	Mesaconate, diisopropyldithiol	0.44		0.05			624
Styrene	Mesaconate, dimethyl	0.98		0.04			658
Styrene	Mesaconate, dimethyldithiol	0.35		0.07			624
Styrene	Mesaconate, dioctyl	1.23		0.01			658
Styrene	Mesaconate, diphenyl	0.45		0.07			658
Styrene	Mesaconate, diphenyldithiol	0.16		0.15			624
Styrene	Mesaconate, dipropyl	1.22		0.05			658
Styrene	Mesaconate, dipropyldithiol	0.39		0.06			624
Styrene	Mesaconic acid	1.6		0			1021
Styrene	Methacrylamide	1.4	0.13	0.48	0.2	N	316
Styrene	Methacrylamide	1.42	0.17	1.24	0.38	N	316
Styrene	Methacrylamide, 1-deoxy-D-glucitol	2.09		0.005			258
Styrene	Methacrylamide, *N*-phenyl-	1.24	0.06	0.88	0.17	N	352
Styrene	Methacrylate, 2,2,6,6,-tetramethyl-4-piperidinyl	0.63		0.3			664
Styrene	Methacrylate, 2,3-epithiopropyl	0.41		0.28			787
Styrene	Methacrylate, 2-(sulfonic acid)ethyl	0.37		0.6			564
Styrene	Methacrylate, 2-acetoxyethyl	0.44	0.02	0.58	0.04	N	346
Styrene	Methacrylate, 2-bromoethyl	0.32		0.41			657
Styrene	Methacrylate, 2-chloro-2,3,3,3-fluoropropyl	0.121	0.068	0.243	0.15	N	927
Styrene	Methacrylate, 2-chloroethyl	0.35	0.046	0.341	0.075	Y	179
Styrene	Methacrylate, 2-chloroethyl	0.345	0.048	0.34	0.08	Y	179
Styrene	Methacrylate, 2-chloroethyl	0.42		0.23			382
Styrene	Methacrylate, 2-hydroxyethyl	0.44	0.02	0.54	0.03	N	346
Styrene	Methacrylate, 2-hydroxyethyl	0.332	0.006	0.856	0.018	Y	350
Styrene	Methacrylate, 2-hydroxyethyl	0.57		0.65			463
Styrene	Methacrylate, 2-hydroxyethyl	0.5		1.65			878
Styrene	Methacrylate, 2-hydroxyethyl	0.59		0.53			878
Styrene	Methacrylate, 2-hydroxyethyl	0.53		0.59			903

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Methacrylate, 2-hydroxyethyl	0.5		1.65			903
Styrene	Methacrylate, 2-methoxyethyl	0.46		0.48			918
Styrene	Methacrylate, 2-naphthyl-, methyl	0.786	0.16	0.113	0.126	Y	924
Styrene	Methacrylate, 2-naphthyl-, methyl	0.486	0.117	0.321	0.098	Y	924
Styrene	Methacrylate, 2-naphthyl-, methyl	0.61	0.195	0.576	0.477	Y	924
Styrene	Methacrylate, 2-naphthyl-, methyl	0.384	0.225	0.216	0.422	Y	924
Styrene	Methacrylate, 2-phenethyl	0.56	0.025	0.534	0.099	Y	540
Styrene	Methacrylate, 3,5-dimethyladamantyl	0.89	0.14	0.63	0.21	N	335
Styrene	Methacrylate, 5-oxo-pyrrolidinylmethyl	0.342	0.013	0.411	0.033	Y	633
Styrene	Methacrylate, *N*-methyl-*N*-phenyl-2-aminoethyl	0.44	0.04	0.58	0.02	N	651
Styrene	Methacrylate, α-naphthoyloxy-, ethyl	0.216	0.043	0.242	0.018		1102
Styrene	Methacrylate, acetonyl	0.285	0.041	0.505	0.115	Y	958
Styrene	Methacrylate, amyl	0.52	0.11	0.46	0.2	Y	179
Styrene	Methacrylate, benzyl	0.463	0.041	0.658	0.084	Y	111
Styrene	Methacrylate, benzyl	0.435	0.026	0.467	0.048	Y	179
Styrene	Methacrylate, benzyl	0.45		0.51			487
Styrene	Methacrylate, benzyl	0.48		0.42			540
Styrene	Methacrylate, benzyl	0.8		0.3			602
Styrene	Methacrylate, bornyl	0.45	0.32	0.5	0.38		806
Styrene	Methacrylate, butyl	0.56	0.12	0.31	0.2	Y	179
Styrene	Methacrylate, butyl	−0.05	1.09	2.52	1.1	N	43
Styrene	Methacrylate, butyl	0.52		0.47			463
Styrene	Methacrylate, butyl	0.63		0.64			530
Styrene	Methacrylate, butyl	0.54		0.64			530
Styrene	Methacrylate, butyl	0.74		0.59			835
Styrene	Methacrylate, chloromethyl	0.208	0.006	0.298	0.03	Y	712
Styrene	Methacrylate, cyanomethyl	0.144	0.011	0.28	0.041	Y	625
Styrene	Methacrylate, cyclohexyl	0.586	0.088	0.57	0.28	Y	179
Styrene	Methacrylate, di-ethylene glycol	0.39	0.15	0.67	0.08	N	262
Styrene	Methacrylate, dodecyl	0.528	0.05	0.3	0.1	Y	179
Styrene	Methacrylate, ethyl	0.55	0.062	0.36	0.12	Y	179
Styrene	Methacrylate, ethyl	0.67		0.26			530
Styrene	Methacrylate, ethyl	0.65		0.29			530
Styrene	Methacrylate, ethyl	0.55		0.33			570
Styrene	Methacrylate, ferrocenylmethyl	3.63	0.14	−0.019	0.022	Y	293
Styrene	Methacrylate, ferrocenylmethyl	3.6		0.01			576
Styrene	Methacrylate, glycidyl	0.54	0.07	0.16	0.03	N	114
Styrene	Methacrylate, glycidyl	0.278	0.086	0.539	0.04	Y	217
Styrene	Methacrylate, glycidyl	0.47	0.02	0.46	0.08	N	225
Styrene	Methacrylate, glycidyl	0.44		0.54			225
Styrene	Methacrylate, glycidyl	0.45		0.55			463
Styrene	Methacrylate, glycidyl	0.31	0.04	0.74	0.1	N	849
Styrene	Methacrylate, glycidyl	0.11	0.045	0.73	0.284	N	893
Styrene	Methacrylate, glycidyl	0.435	0.033	0.514	0.098	Y	999
Styrene	Methacrylate, hexyl	0.58	0.07	0.44	0.13	Y	179
Styrene	Methacrylate, isobornyl	0.61	0.45	0.24	0.3		806
Styrene	Methacrylate, isobutyl	0.509	0.014	0.271	0.036	Y	179
Styrene	Methacrylate, isobutyl	0.56		0.58			463
Styrene	Methacrylate, isobutyl	0.55		0.4			487
Styrene	Methacrylate, isopropyl	0.5		0.42			463
Styrene	Methacrylate, isopropyl	0.47		0.74			541
Styrene	Methacrylate, *m*-chlorophenyl	0.375	0.05	0.209	0.013	Y	177
Styrene	Methacrylate, *m*-nitrophenyl	0.44	0.16	0.185	0.054	Y	177
Styrene	Methacrylate, methoxymethyl	0.395	0.014	0.586	0.069	Y	821
Styrene	Methacrylate, methyl	0.5		0.5			138
Styrene	Methacrylate, methyl	0.52		0.46			139
Styrene	Methacrylate, methyl	0.52		0.46			179
Styrene	Methacrylate, methyl	0.48		0.42			20
Styrene	Methacrylate, methyl	0.52		0.45			21
Styrene	Methacrylate, methyl	0.49		0.46			21
Styrene	Methacrylate, methyl	0.45		0.47			21
Styrene	Methacrylate, methyl	0.58		0.48			21
Styrene	Methacrylate, methyl	0.44		0.5			21
Styrene	Methacrylate, methyl	0.396	0.048	0.22	0.13	Y	241

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Methacrylate, methyl	0.42		0.32			241
Styrene	Methacrylate, methyl	0.49	0.14	0.418	0.085	Y	254
Styrene	Methacrylate, methyl	0.564	0.047	0.54	0.029	Y	254
Styrene	Methacrylate, methyl	0.585	0.007	0.478	0.011	Y	287
Styrene	Methacrylate, methyl	0.44	0.08	0.45	0.01	N	324
Styrene	Methacrylate, methyl	0.47		0.45			324
Styrene	Methacrylate, methyl	0.54		0.49			403
Styrene	Methacrylate, methyl	0.52		0.47			416
Styrene	Methacrylate, methyl	0.38		0.48			451
Styrene	Methacrylate, methyl	0.52		0.46			463
Styrene	Methacrylate, methyl	0.54		0.42			492
Styrene	Methacrylate, methyl	0.44		0.5			492
Styrene	Methacrylate, methyl	0.52		0.46			505
Styrene	Methacrylate, methyl	0.5		0.44			531
Styrene	Methacrylate, methyl	0.56		0.49			531
Styrene	Methacrylate, methyl	0.53		0.49			534
Styrene	Methacrylate, methyl	0.485	0.052	0.409	0.02	Y	751
Styrene	Methacrylate, methyl	0.48	0.059	0.504	0.026	Y	751
Styrene	Methacrylate, methyl	0.371	0.055	0.611	0.028	Y	751
Styrene	Methacrylate, methyl	0.62		0.59			753
Styrene	Methacrylate, methyl	0.52		0.6			753
Styrene	Methacrylate, methyl	0.5		0.63			753
Styrene	Methacrylate, methyl	0.55		0.58			753
Styrene	Methacrylate, methyl	0.55		0.64			753
Styrene	Methacrylate, methyl	0.41		0.41			753
Styrene	Methacrylate, methyl	0.472		0.454			824
Styrene	Methacrylate, methyl	0.497		0.464			824
Styrene	Methacrylate, methyl	0.432		0.422			824
Styrene	Methacrylate, methyl	0.57		0.41			835
Styrene	Methacrylate, methyl	0.275		0.314			860
Styrene	Methacrylate, methylthiomethyl	0.338		0.512	0.05	Y	920
Styrene	Methacrylate, octyl	0.65	0.1	0.56	0.16	Y	179
Styrene	Methacrylate, octyl	0.56		0.68			463
Styrene	Methacrylate, *p*-(cinnamoylamino)-phenyl	0.62		0.31			685
Styrene	Methacrylate, *p*-carbomethoxyphenyl	0.482	0.084	0.178	0.027	Y	177
Styrene	Methacrylate, *p*-chlorophenyl	0.34	0.11	0.243	0.022	Y	177
Styrene	Methacrylate, *p*-methoxyphenyl	0.499	0.089	0.244	0.026	Y	177
Styrene	Methacrylate, *p*-methylphenyl	0.49	0.25	0.225	0.04	Y	177
Styrene	Methacrylate, *p*-nitrophenyl	0.223	0.09	0.185	0.039	Y	177
Styrene	Methacrylate, phenyl	0.246	0.049	0.48	0.23	Y	177
Styrene	Methacrylate, phenyl	0.247	0.064	0.55	0.33	Y	179
Styrene	Methacrylate, phenyl	0.26		0.51			463
Styrene	Methacrylate, propyl	0.565	0.081	0.38	0.11	Y	179
Styrene	Methacrylate, sulfolanyl	0.2	0.1	−0.2	2.46	N	359
Styrene	Methacrylate, *tert*-butyl	0.545	0.054	0.61	0.51	Y	179
Styrene	Methacrylic acid	0.21	0.02	0.55	0.66	N	166
Styrene	Methacrylic acid	0.22		0.64			166
Styrene	Methacrylic acid	0.2		0.66			203
Styrene	Methacrylic acid	0.15	0.04	0.49	0.08	N	312
Styrene	Methacrylic acid	0.2	0.04	0.56	0.19	N	313
Styrene	Methacrylic acid	0.38		0.28			313
Styrene	Methacrylic acid	0.124	0.092	0.602	0.088	Y	47
Styrene	Methacrylic acid	0.17		0.85			812
Styrene	Methacrylic acid	0.041	0.03	0.631	0.146	Y	842
Styrene	Methacrylic acid	0.067	0.046	0.6	0.249	Y	842
Styrene	Methacrylic acid	0.627	0.031	0.44	0.089	Y	842
Styrene	Methacrylic acid	0.55	0.06	0.39	0.199	Y	842
Styrene	Methacrylic acid	0.221	0.048	0.12	0.118	Y	842
Styrene	Methacrylic anhydride	0.13	0.01	0.27	0.02	N	219
Styrene	Methacrylic anhydride	0.1		0.33			275
Styrene	Methacrylonitrile	0.37		0.41			311
Styrene	Methacrylonitrile	0.38		0.42			311
Styrene	Methacrylonitrile	0.43		0.28			542
Styrene	Methacrylonitrile	0.34		0.21			707

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Methacrylonitrile	0.25		0.25			75
Styrene	Methacrylonitrile	0.34		0.21			835
Styrene	Methacryloxypropyltrimethoxysilane	0.36		0.58			951
Styrene	Methacryloyl fluoride	0.069	0.014	0.164	0.045	Y	660
Styrene	Methacryloylacetone	0.067	0.007	1.66	0.16	Y	339
Styrene	Methacryloyloxy, 2-, benzoate, methyl	0.27	0.04	0.48	0.02	N	651
Styrene	Methacryloyloxy, 2-, benzoic acid	0.15	0.04	1.17	0.03	N	651
Styrene	Methacryloyloxy, 4-, 2,2,6,6-tetramethyl	0.6		0.32			687
Styrene	Methylenebutyrolactone	0.09		0.7			746
Styrene	Methyleneglutaronitrile, 2-	0.42	0.52	−0.02	1.3	N	196
Styrene	Methyleneglutaronitrile, 2-	0.5		0.02			196
Styrene	Methyleneglutaronitrile, 2-	0.85		0.25			512
Styrene	Myrcene	0.891	0.015	1.38	0.081	Y	1062
Styrene	*N,N*-Divinylaniline	5.38	0.36	0.033	0.067	Y	45
Styrene	*N*-Vinylimidazole	8.377	0.149	0.68	0.02	Y	879
Styrene	Naphthalene, 1-vinyl-	0.699	0.233	2.02	0.401		967
Styrene	Naphthalene, 1-vinyl-4-chloro-	0.76	0.68	0.75	0.45		806
Styrene	Naphthalene, 2-vinyl-	0.395	0.049	1.345	0.093		806
Styrene	Naphthalene, 2-vinyl-6-chloro-	0.39	0.6	2.44	1.38		806
Styrene	Naphthalene, 6-vinyl-2-*tert*-butyl	0.616	0.069	1.014	0.244		806
Styrene	Oct-1-ene, 4,8-dioxaspiro(2,5)-	1.831	0.027	0.246	0.024	Y	838
Styrene	Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro	1.93	0.098	0.271	0.109	Y	838
Styrene	Oxazolidone, *N*-vinyl-	29.42	2.19	−0.029	0.014	Y	36
Styrene	Oxazoline, 2-, 2-isopropenyl-4,4-dimethyl	0.55		0.68			596
Styrene	Oxazoline, 2-, 4-acryloxymethyl-2,4-dimethyl	0.56		0.14			596
Styrene	Oxazoline, 2-isopropenyl-	0.67		0.64			862
Styrene	Oxirane, 4-vinylphenyl-	0.78		1.06			1001
Styrene	Pentadienoate, *trans*-4-ethoxy-2,4-, ethyl	0.04		12.2			723
Styrene	Pentadienonitrile, *trans*-4-ethoxy-2,4-	0.08		11.8			723
Styrene	Penten, 2-, -4-one	13.84	0.57	−0.033	0.055	Y	112
Styrene	Phenol, 3-(methacryloylamino)-	0.5	0.06	0.99	0.04		896
Styrene	Phenol, 4-(methacryloylamino)-	0.71	0.04	0.86	0.03		896
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.629	0.003	0.171	0.01	N	971
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.612	0.004	0.15	0.05	N	971
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.595	0.005	0.146	0.073	N	971
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.597	0.044	0.168	0.355	N	971
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.633	0.002	0.094	0.02	N	971
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.61	0.018	0.23	0.187	N	971
Styrene	Phosphate, 2-(acryloyloxy)ethyl diethyl	0.599	0.002	0.108	0.034	N	971
Styrene	Phosphate, vinyl bis(chloroethyl)	2.47	0.78	0.03	0.23	Y	133
Styrene	Phosphazene, isopropenylpentafluoro-	1.6	0.27	−0.121	0.088	Y	765
Styrene	Phosphonate, 2-(4-vinylphenyl)ethyl, diethyl	0.55		1.36			796
Styrene	Phosphonate, 4-vinylphenyl, diethyl	0.7		1.4			796
Styrene	Phosphonate, α-carbomethoxyvinyl-, diethyl	3.88		0			684
Styrene	Phosphonate, isopropenyl-, dimethyl	8.6		0.23			684
Styrene	Phosphonate, vinyl-, bis(2-chloroethyl)	2.46	0.43	0.02	0.39	Y	133
Styrene	Phosphonate, vinyl-, bis(2-chloroethyl)	2.3		0.16			410
Styrene	Phosphonate, vinyl-, bis(2-chloroethyl)	2.2		0.2			485
Styrene	Phosphonate, vinyl-, bis(2-chloroethyl)	6.32		0.18			592
Styrene	Phosphonate, vinyl-, bis(2-chloroethyl)	6.32		0.18			594
Styrene	Phosphonate, vinyl-, dibutyl	4.97	3.44	−0.12	2.33	Y	129
Styrene	Phosphonate, vinyl-, diethyl	4.36	4.27	−0.15	2.18	Y	129
Styrene	Phosphonate, vinyl-, diethyl	1.59	0.24	−0.52	0.22	Y	18
Styrene	Phosphonate, vinyl-, diethyl	2.45		0.02			592
Styrene	Phosphonate, vinyl-, diisobutyl	3.87	1.59	−0.32	1.46	Y	129
Styrene	Phosphonate, vinyl-, diispropyl	2.57	2.13	−0.52	2.52	Y	129
Styrene	Phosphonate, vinyl-, dimethyl					Y	129
Styrene	Phosphonate, vinyl-, dimethyl	4.61		0.4			129
Styrene	Phosphonate, vinyl-, dimethyl	2.45		0.15			592
Styrene	Phosphonate, vinyl-, dimethyl	2.45		0.02			594

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Phosphonate, vinyl-, diphenyl	1.74	0.16	−0.38	0.29	Y	129
Styrene	Phosphonate, vinyl-, dipropyl	3.81	0.68	−0.41	0.72	Y	129
Styrene	Phthalimide, *N*-vinyl-	6.27	0.66	0.07	0.11	Y	163
Styrene	Propene, 2,3-dichloro-	3.51	0.18	0.05	0.01	N	11
Styrene	Propene, 2,3-dichloro-	3		0.036			983
Styrene	Propene, 2-chloro-3-hydroxy-	12.5		0			445
Styrene	Propene 3,3,3-trichloro-	6.9		0			402
Styrene	Propene, 3-chloro-2-chloromethyl-	3.37	0.73	0.01	0.1		806
Styrene	Propneyl methyl ketone	18.12	6.09	0.08	0.3		806
Styrene	Propenyl, 2-chloro-, acetate	4.1		0			445
Styrene	Propenyl, 2-methyl, acetate	71		0			470
Styrene	Propiolactam, *N*-phenyl-α-methylene-	0.626	0.025	0.406	0.106	Y	1002
Styrene	Pyrazole, *N*-vinyl-3,5-dimethyl-	8.663	0.196	0.049	0.011		806
Styrene	Pyridazinone, 3-(2-vinyl)-6-methyl-	0.9	0.03	0.85	0.05	N	340
Styrene	Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro	5.92	0.1	0.13	0.03	N	340
Styrene	Pyridine, 2-methyl-5-vinyl-	0.74	0.03	0.75	0.08	N	232
Styrene	Pyridine, 2-methyl-5-vinyl-	0.6		0.68			500
Styrene	Pyridine, 2-methyl-5-vinyl-	0.72		1.2			514
Styrene	Pyridine, 2-methyl-5-vinyl-	0.73	0.03	0.78	0.23	N	56
Styrene	Pyridine, 2-vinyl-	0.46	0.15	0.75	0.32	N	231
Styrene	Pyridine, 2-vinyl-	0.5		1.27			41
Styrene	Pyridine, 2-vinyl-	0.55		1.81			456
Styrene	Pyridine, 2-vinyl-	0.57		1.33			499
Styrene	Pyridine, 2-vinyl-	0.55		1.14			532
Styrene	Pyridine, 2-vinyl-5-ethyl-	0.74	0.05	1.09	0.12	N	231
Styrene	Pyridine, 3-ethynyl-6-methyl-	2.3		0.15			784
Styrene	Pyridine, 4-vinyl-	0.52	0.07	0.69	0.16	N	231
Styrene	Pyridine, 4-vinyl-	−0.73	1.09	1.04	0.22	Y	79
Styrene	Pyridine, *N*-oxide-, 2-vinyl-5-ethyl-	0.06	0.11	2.27	0.88		806
Styrene	Pyrimidine, 2-*N*,*N*-dimethylamino-4-vinyl	0.338	0.017	1.404	0.071	Y	243
Styrene	Pyrimidine, 4-vinyl-	0.219	0.095	2.38	1.06	Y	243
Styrene	Pyrrolidone, 1-benzyl-3-methylene-5-methyl	0.555	0.053	0.71	0.17	Y	633
Styrene	Pyrrolidone, *N*-vinyl-	17.2	1.55	0.057	0.028	Y	36
Styrene	Quinoline, 2-vinyl-	0.49		2.09			456
Styrene	Quinoline, 2-vinyl-	0.49		2.69			458
Styrene	*S*-Ethyl *N*-vinyl-*N*-methylthiol-carbamate	10	1.72	−0.11	0.26	Y	197
Styrene	*S*-Vinyl *N*,*N*-diethylthiolcarbamate	4.45	0.48	0.1	0.34	Y	197
Styrene	Silane, γ-methacryloxypropyl-trimethoxy-	0.425	0.048	0.868	0.096	Y	977
Styrene	Stilbene	3.92	0.17	0	0.09	N	725
Styrene	Styrene, 2,4-dibromo-	0.14	1.61	0.91	2.88		806
Styrene	Styrene, 2,5-dichloro-	0.268	0.08	0.81	0.14	Y	14
Styrene	Styrene, 2,5-dichloro-	0.18		0.25			411
Styrene	Styrene, 2,5-dichloro-	0.23		2.2			419
Styrene	Styrene, 2,5-dichloro-	0.26	0.17	0.14	0.04	N	84
Styrene	Styrene, 2,4,5-tribromo-	0.23		2.78			1054
Styrene	Styrene, 3-*tri*-*n*-butylstannyl-	18.5		0.03			985
Styrene	Styrene, 4-(*t*-butyldimethylsilyloxy)-	0.877	0.351	0.863	0.193	Y	976
Styrene	Styrene, 4-(trimethylsilyl)-	0.48		0.28			1036
Styrene	Styrene, 4-phenoxy-	1.38		0.94			602
Styrene	Styrene, α-(trimethylsilyloxy)-	1.48		0			970
Styrene	Styrene, α-methoxy-	2.51	0.34	0.07	0.05	N	142
Styrene	Styrene, α-methyl-	1.21	0.41	0.14	0.06	N	171
Styrene	Styrene, α-methyl-	0.96	0.03	0.05	0.13	N	281
Styrene	Styrene, α-methyl-	1.09		0.3			281
Styrene	Styrene, α-methyl-	1.13		0.4			281
Styrene	Styrene, α-methyl-	1.08	0.11	0.521	0.084	Y	289
Styrene	Styrene, α-methyl-	1.12		0.63			289
Styrene	Styrene, *m*-amino-	1.04		1.16			775
Styrene	Styrene, *m*-amino-	0.786	0.01	1.18	0.007	Y	989
Styrene	Styrene, *m*-bromo-	0.5		1.6			168
Styrene	Styrene, *m*-bromo-	0.55		1.05			256

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Styrene, *m*-chloro-	0.57		2.3			168
Styrene	Styrene, *m*-chloro-	0.64		1.09			256
Styrene	Styrene, *m*-cyano-	0.851	0.534	0.363	0.08		806
Styrene	Styrene, *m*-diethylaminoethyl-	1.2	0.28	1.21	0.26		806
Styrene	Styrene, *m*-dimethylamino-	1.027	0.248	0.617	0.264		806
Styrene	Styrene, *m*-hydroxy-	0.78	0.07	1.33	0.06	N	35
Styrene	Styrene, *m*-methoxy-	1.742	0.456	0.661	0.232		806
Styrene	Styrene, *m*-nitro-	0.279	0.055	0.5	0.14	Y	222
Styrene	Styrene, *m*-sulfonic acid fluoride	0.788	0.183	1.268	0.236		806
Styrene	Styrene, *p*-2-methoxyphenyl ketone	0.23	0.07	1.52	0.58		806
Styrene	Styrene, *p*-4-methoxyphenyl ketone	0.423	0.071	1.85	0.93		806
Styrene	Styrene, *p*-phenyl ketone	0.11	0.15	2.58	0.83		806
Styrene	Styrene, *p*-phenyl ketone	0.13	0.02	0.55	9.44		806
Styrene	Styrene, *p*-1-(2-hydroxypropyl)-	0.97		0.91			380
Styrene	Styrene, *p*-2-(2-hydroxypropyl)-	0.5		0.56			390
Styrene	Styrene, *p*-2-(2-hydroxypropyl)-	0.79		1.25			547
Styrene	Styrene, *p*-acetoxy-	0.835	0.029	1.305	0.05		806
Styrene	Styrene, *p*-acetoxy-	0.887	0.034	1.218	0.069		806
Styrene	Styrene, *p*-amino-	0.41		0.22			775
Styrene	Styrene, *p*-amino-	0.876	0.007	1.07	0.004	Y	989
Styrene	Styrene, *p*-bromo-	0.7	0.03	1.05	0.07	N	125
Styrene	Styrene, *p*-bromo-	0.67	0.09	1.1	0.05	N	128
Styrene	Styrene, *p*-bromo-	0.71	0.14	0.99	0.11	Y	256
Styrene	Styrene, *p*-bromo-	0.71		1.05			447
Styrene	Styrene, *p*-bormo-	0.69		1			554
Styrene	Styrene, *p*-chloro-	0.62	0.1	1.08	0.07	N	128
Styrene	Styrene, *p*-chloro-	0.744	0.08	1.029	0.056	Y	139
Styrene	Styrene, *p*-chloro-	0.816	0.029	1.062	0.014	Y	139
Styrene	Styrene, *p*-chloro-	0.74		1.03			140
Styrene	Styrene, *p*-chloro-	0.39	0.043	0.76	0.12	Y	150
Styrene	Styrene, *p*-chloro-	0.76		1.76			523
Styrene	Styrene, *p*-chloro-	0.74		1.02			554
Styrene	Styrene, *p*-chloromethyl-	0.622	0.047	1.12	0.17	Y	756
Styrene	Styrene, *p*-chloromethyl-	0.62	0.15	1.12	0.2		806
Styrene	Styrene, *p*-chloromethyl-	0.6	0.3	1.66	0.46		806
Styrene	Styrene, *p*-cyano-	0.24	0.07	1.22	0.11	N	128
Styrene	Styrene, *p*-cyano-	0.28		1.16			256
Styrene	Styrene, *p*-decyl-	0.88	0.22	0.26	1.32		806
Styrene	Styrene, *p*-diethylaminoethyl-	1.12	0.19	0.59	0.19		806
Styrene	Styrene, *p*-ethoxy	0.98	0.19	0.71	0.14		806
Styrene	Styrene, *p*-fluoromethyl-	0.474	0.151	1.399	0.236		806
Styrene	Styrene, *p*-formyl-	0.2		3			1025
Styrene	Styrene, *p*-formyl-	0.16		1.43			956
Styrene	Styrene, *p*-iodo-	0.485	0.093	1.044	0.159		806
Styrene	Styrene, *p*-iodo-	0.629	0.039	0.965	0.124	Y	839
Styrene	Styrene, *p*-mercapto-	0.607	0.188	0.907	0.223		806
Styrene	Styrene, *p*-methoxy-	0.85	0.19	0.69	0.1	N	128
Styrene	Styrene, *p*-methoxy-	1.14	0.6	1.01	1.27	N	160
Styrene	Styrene, *p*-methoxy-	1.16		0.82			256
Styrene	Styrene, *p*-methoxy-	1.05		0.79			535
Styrene	Styrene, *p*-methyl-	0.891	0.086	0.993	0.028	Y	261
Styrene	Styrene, *p*-nitro-	0.193	0.092	1.13	0.13	Y	256
Styrene	Styrene, *p*-octylamine sulfonate	0.7		2.7			817
Styrene	Styrene, *p*-sulfonic acid fluoride	0.171	0.045	1.372	0.188		806
Styrene	Styrene, *p*-trimethoxysilyl-	0.774	0.126	1.581	0.342		806
Styrene	Styrene, *p*-trimethylsilyl-	1.26	0.47	1.15	0.72		806
Styrene	Styrene, pentachloro-	1.33	0.19	0.07	0.1	N	7
Styrene	Succinimide, *N*-vinyl-	10.74	0.49	0.045	0.036	Y	104
Styrene	Succinimide, *N*-vinyl-	10.09	0.46	0.045	0.072	Y	163
Styrene	Succinimide, *N*-vinyl-	2.31	0.98	0.01	0.23	Y	693
Styrene	Succinimide, *N*-vinyl-	0.052	0.032	7	1.6	Y	80
Styrene	Terpyridinyl, 4′-vinyl-2,2′:6′,2″-	0.53	0.384	1.26	0.33	N	953
Styrene	Tetrazole, 1-vinyl-	3.85	0.045	0.184	0.031	Y	925
Styrene	Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	0.65		1.3			583
Styrene	Tetrazole, 2-methyl-5-vinyl-	1.124	0.081	0.62	0.21	Y	670

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	0.95		1			583
Styrene	Tetrazole, 5-phenyl-2-(4′vinyl)phenyl-	0.48		2.2			583
Styrene	Tetrazole, 5-vinyl-	0.78		0.31			870
Styrene	Tetrazole, 5-vinyl-	0.78	0.3	0.31	0.02		902
Styrene	Toluenesulfonamide, *N,N*-methyl-vinyl-	5.6	1.13	− 0.58	0.44	Y	80
Styrene	Triallyl citrate	20.02	0.81	0.076	0.041	Y	367
Styrene	Triallyl cyanurate	32.45	1.27	0.22	0.12	Y	201
Styrene	Triallyl isocyanurate	28.6	1.39	− 0.05	0.11	Y	201
Styrene	Triazine, 1,3,5-, 2-amino-4-(*N*-methyl-*p*-aminoanilino)-	0.306	0.054	0.44	0.12	Y	364
Styrene	Triazine, 1,3,5-, 2-amino-4-(*N*-methyl-*p*-nitroanilino)-	0.169	0.013	1.676	0.065	Y	364
Styrene	Triazine, 1,3,5-, 2-amino-4-(*p*-nitroanil)-	0.257	0.062	0.91	0.18	Y	364
Styrene	Triazine, 4,6-diamino-2-vinyl-	1.104	0.157	0.538	0.141		806
Styrene	Triazole, 1,2,3-, 1-*p*-bromophenyl-4-vi	1.32	0.15	0.73	0.4	Y	670
Styrene	Triazole, 1,2,3-, 4(5)-vinyl-	1.48	0.12	0.52	0.26	Y	670
Styrene	Urea, 1,3-divinyl-1,3-diphenyl-	3.62	0.98	− 1.76	1.36	Y	800
Styrene	Urea, *N*-acryloyl-*N*′-benzoyl-	0.404		0.053			1090
Styrene	Urea, *N*-vinyl-*N*′-ethyl-	10.78	2.07	− 0.33	0.33	Y	101
Styrene	Valerolactone, α-methylen-	0.097		1.42			919
Styrene	Valerolactone, α-methylene-	0.096		1.44			855
Styrene	Vinyl 2-, 1,1-dichlorocyclopropane	17.98	0.59	0	0.034		806
Styrene	Vinyl 2-, 2-methyl-4,4,6-6-tetraphenyl cyclotrisiloxane	0.11		0.8			626
Styrene	Vinyl 2-chloroethyl ether	160		0.07			597
Styrene	Vinyl 4, dithiobenzoate methyl	0.111	0.009	2.08	0.81	Y	697
Styrene	Vinyl 4-chlorocyclohexyl ketone	0.53		0.58			668
Styrene	Vinyl acetate	42.48	26.85	− 0.04	0.072	Y	158
Styrene	Vinyl acetate	18.8	2.87	0.02	0.12	Y	241
Styrene	Vinyl acetate	56		0.01			481
Styrene	Vinyl acetate	48		0.05			481
Styrene	Vinyl acetate	60		0.16			481
Styrene	Vinyl acetate	57.8		0.08			812
Styrene	Vinyl acetoxymethyl ketone	0.103	0.011	0.368	0.018		806
Styrene	Vinyl benzoate	34.8	29.3	− 0.02	1.62	Y	26
Styrene	Vinyl benzoate	31.56	4.33	0.06	0.15	N	696
Styrene	Vinyl benzyl sulfide	2.32	0.25	0.04	0.17	Y	303
Styrene	Vinyl bromide	16.88	0.94	0.012	0.049	Y	34
Styrene	Vinyl bromide	18		0.06			34
Styrene	Vinyl bromide	15	8.26	0.09	0.2	N	368
Styrene	Vinyl butyl ether	21.25	16.53	− 0.08	0.78	Y	241
Styrene	Vinyl butyl sulfide	2.69	0.25	− 0.06	0.18	Y	303
Styrene	Vinyl butylsulfonate	1.74	0.27	0	0.16	Y	185
Styrene	Vinyl chloride	27.54	7.35	− 0.06	0.08	Y	109
Styrene	Vinyl chloride	17.24	1.12	0.058	0.003	Y	238
Styrene	Vinyl chloride	23.92	3.6	0.16	0.08	N	242
Styrene	Vinyl chloride	25	5	0.005	0.031	Y	46
Styrene	Vinyl chloride	12.4		0.04			516
Styrene	Vinyl chloride	14.7	29.2	0.01	0.87	Y	59
Styrene	Vinyl chloroacetate	14.57	62.41	− 0.04	0.24	Y	212
Styrene	Vinyl chloroacetate	45		0.03			542
Styrene	Vinyl chloromethyl ketone	0.127	0.047	0.507	0.039	Y	353
Styrene	Vinyl cymantrene	2.324	0.06	0.096	0.014	Y	354
Styrene	Vinyl dichloroacetate	20		0.28			542
Styrene	Vinyl dodecyl ether	27		0			374
Styrene	Vinyl dodecyl ether	56		0			374
Styrene	Vinyl ether	152	185	1.2	5.3	Y	45
Styrene	Vinyl ethyl ether	90		0			140
Styrene	Vinyl ethyl ether	111	15.5	− 0.122	0.066	Y	194
Styrene	Vinyl ethyl ketone	13.83	1.44	− 0.033	0.023	Y	112
Styrene	Vinyl ethyl ketone	0.2	0.08	0.43	0.06	N	344
Styrene	Vinyl ethyl ketone	0.29	0.16	0.332	0.043	Y	353
Styrene	Vinyl ethyl ketone	0.665	0.021	0.122	0.017	Y	550
Styrene	Vinyl ethyl oxalate	5.62	1.06	− 0.12	0.19	Y	124
Styrene	Vinyl ethyl sulfide	4.76	0.2	0.113	0.032	Y	303

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Vinyl ethyl sulfide	6		0.25			507
Styrene	Vinyl ethyl sulfioxde	9.64	0.54	0.101	0.044	Y	286
Styrene	Vinyl ethyl sulfoxide	6		0.1			286
Styrene	Vinyl hendecanoate	24.89	1.22	−0.17	0.18	Y	145
Styrene	Vinyl iodide	7.401	0.315	0.126	0.035		806
Styrene	Vinyl isobutyl ether	11.58	1.91	0.65	0.39	N	349
Styrene	Vinyl isobutyl ether	11.96	2.32	0.29	0.33	N	349
Styrene	Vinyl isobutyl ether	50		0.01			490
Styrene	Vinyl isobutyl sulfide	2.38	0.41	−0.11	0.2	Y	303
Styrene	Vinyl isopropyl ketone	0.46	0.05	0.26	0.07	N	344
Styrene	Vinyl isopropyl ketone	0.36	0.1	0.272	0.046	Y	353
Styrene	Vinyl isopropyl ketone	0.4		0.3			599
Styrene	Vinyl isopropyl sulfide	4.61	0.18	0.16	0.068	Y	303
Styrene	Vinyl isothiocyanate	0.65		0.37			422
Styrene	Vinyl isothiocyanate	0.8		0.5			542
Styrene	Vinyl methyl ketone	0.288	0.092	0.349	0.068	Y	140
Styrene	Vinyl methyl ketone	0.237	0.023	0.348	0.009	Y	353
Styrene	Vinyl methyl ketone	0.35		0.27			550
Styrene	Vinyl methyl sulfide	4.5		0.15			193
Styrene	Vinyl methyl sulfide	4.46	0.11	0.066	0.056	Y	195
Styrene	Vinyl methyl sulfide	5	0.24	0.046	0.084	Y	303
Styrene	Vinyl methyl sulfone	1.146	0.087	−0.22	0.17	Y	195
Styrene	Vinyl methyl sulfoxide	3.57		0.01			737
Styrene	Vinyl octyl ether	65		0			374
Styrene	Vinyl pelargonate	49.5		0.01			145
Styrene	Vinyl phenyl ether	1.7		0.01			423
Styrene	Vinyl phenyl ketone	0.24	0.04	0.3	0.02	N	344
Styrene	Vinyl phenyl ketone	0.21	0.042	0.465	0.03	Y	353
Styrene	Vinyl phenyl sulfide	3.63	0.12	0.019	0.054	Y	193
Styrene	Vinyl phenyl sulfide	3.96	0.27	0.26	0.18	N	239
Styrene	Vinyl phenyl sulfone	1.562	0.091	−0.31	0.16	Y	193
Styrene	Vinyl stearate	15.96	13.32	−0.39	0.71	Y	145
Styrene	Vinyl sulfone	0.731	0.058	−0.027	0.047	Y	45
Styrene	Vinyl *tert*-butyl ketone	0.3	0.31	3.2	0.46	N	344
Styrene	Vinyl *tert*-butyl ketone	0.36	0.11	0.248	0.05	Y	353
Styrene	Vinyl *tert*-butyl sulfide	4.36	0.76	0.158	0.073	Y	303
Styrene	Vinyl thiolacetate	4		0.25			566
Styrene	Vinyl, 1-cyano, acetate	0.181	0.409	0.147	0.033		806
Styrene	Vinyl, 2-bromo-, ethyl ether					Y	194
Styrene	Vinyl, *p*-benzylmethylcarbinol	0.98	0.32	0.94	0.15	Y	48
Styrene	Vinyl-*tris*(trimethoxysiloxy)silane	26		0			209
Styrene	Vinyl-*tris*(trimethoxysiloxy)silane	24		0.01			482
Styrene	Vinylacetophenone, *p*-	0.246	0.072	1.12	0.42	Y	266
Styrene	Vinylanthracene, 9-	2.12		0.25			123
Styrene	Vinylanthracene, 9-	2.12		0.3			48
Styrene	Vinylbenzoic acid, *p*-	0.282	0.011	1.029	0.06	Y	266
Styrene	Vinylene carbonate	411		3.16		Y	103
Styrene	Vinylene carbonate	21.03	23.45	−0.73	0.98	Y	120
Styrene	Vinylferrocene	4.37	1.44	0.2	0.1	Y	274
Styrene	Vinylferrocene	2.76	0.22	0.14	0.14	Y	294
Styrene	Vinylhydroquinone dibenzoate	0.22		0.43			440
Styrene	Vinylidene chloride	1.81	0.35	0.134	0.48	Y	138
Styrene	Vinylidene chloride	1.79	0.14	0.098	0.01	Y	238
Styrene	Vinylidene chloride	1.8		1.5			393
Styrene	Vinylidene chloride	1.839	0.024	0.87	0.007	Y	59
Styrene	Vinylidene chloride	1.81		0.15			812
Styrene	Vinylidene chloride	1.7	0.12	0.11	0.005	N	93
Styrene	Vinylidene cyanide	0.015	0.007	0.72	0.16	Y	134
Styrene	Vinylidene cyanide	0.003	0.001	0.001	0.001	Y	82
Styrene	Vinylisocyanate	8.13		0.08			435
Styrene	Vinylisocyanate	6.9		0.1			533
Styrene	Vinylmethyldiacetoxysilane	4.08	0.14	0	0.15	Y	754
Styrene	Vinylmethyldiethoxysilane	5.68	0.1	0.08	0.14	Y	754
Styrene	Vinylmethyldiethoxysilane	11.29	0.43	−0.08	0.2	Y	754
Styrene	Vinylphenyldimethylsilane	32.53	0.49	0.024	0.016	Y	482

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene	Vinylphenylpropanol, 2-*p*-	0.48	0.3	0.41	0.4	Y	72
Styrene	Vinyltriethoxysilane	20.86	1.99	– 0.09	0.14	Y	209
Styrene	Vinyltrimethylsilane	14.66	5.15	– 0.19	0.36	Y	209
Styrene	Vinyltrimethylsilane					Y	482
Styrene	Vinyltrimethylsilane	5.98	0.18	0.049	0.025	Y	73
Styrene	Xanathate, *S*-methacryloyl *O*-ethyl	0.44	0.06	0.36	0.08		1086
Styrene sulfonate, sodium salt	*N*-Vinylpyrrolidone	7.19		0.084			939
Styrene, 2,4,6-trimethyl-	Acrylonitrile	0.065	0.048	0.874	0.051	Y	58
Styrene, 2,4,6-trimethyl-	Methacrylate, methyl	0.083	0.045	1.511	0.072	Y	58
Styrene, 2,4,6-trimethyl-	Methacrylate, methyl	– 0.01	0.11	1.45	0.16	Y	58
Styrene, 2,4,6-trimethyl-	Styrene, *p*-chloro-	0.34	1.05	17.83	5.24	Y	58
Styrene, 2,4-dibromo-	Styrene	0.91	2.88	0.14	1.61		806
Styrene, 2,5-dichloro-	Acrylate, methyl	3.93	1.38	0.142	0.054	Y	136
Styrene, 2,5-dichloro-	Acrylate, methyl	4.47	0.15	0.288	0.069	Y	2
Styrene, 2,5-dichloro-	Acrylonitrile	0.08	0.03	0.22	0.01	N	84
Styrene, 2,5-dichloro-	Acrylonitrile	0.07		0.25			84
Styrene, 2,5-dichloro-	Acrylonitrile	0.09		0.26			84
Styrene, 2,5-dichloro-	Butadiene	0.45	0.17	0.449	0.043	Y	255
Styrene, 2,5-dichloro-	Butadiene	0.187	0.049	0.662	0.017	Y	8
Styrene, 2,5-dichloro-	Methacrylate, methyl	2.66	0.38	0.44	0.13	Y	3
Styrene, 2,5-dichloro-	Pyridine, 2-vinyl-	0.14	0.18	0.62	0.12	N	2
Styrene, 2,5-dichloro-	Styrene	0.81	0.14	0.268	0.08	Y	14
Styrene, 2,5-dichloro-	Styrene	0.25		0.18			411
Styrene, 2,5-dichloro-	Styrene	2.2		0.23			419
Styrene, 2,5-dichloro-	Styrene	0.14	0.04	0.26	0.17	N	84
Styrene, 2,5-dichloro-	Styrene, 2,5-dimethyl-	1.543	0.068	0.263	0.022	Y	91
Styrene, 2,5-dichloro-	Styrene, α-methyl-	3		0.14			377
Styrene, 2,5-dichloro-	Vinyl methyl ketone	2		0.5			375
Styrene, 2,5-dichloro-	Vinylidene cyanide	0.026	0.006	0.005	0.009	Y	82
Styrene, 2,5-dimethyl-	Styrene, 2,5-dichloro-	0.263	0.022	1.543	0.068	Y	91
Styrene, 2,6-dichloro-	Methacrylate, methyl	– 0.15	0.27	1.98	0.16	N	324
Styrene, 2,4,5-tribromo-	Styrene	2.78		0.23			1054
Styrene, 3-tri-*n*-butylstannyl-	Acrylate, ethyl	0.01		10.4			985
Styrene, 3-tri-*n*-butylstannyl-	Acrylonitrile	0.001		4.88			985
Styrene, 3-tri-*n*-butylstannyl-	Methacrylate, methyl	0.03		0.69			985
Styrene, 3-tri-*n*-butylstannyl-	Styrene	0.03		18.5			985
Styrene, 3-tri-*n*-butylstannyl-	Vinyl acetate	0.38		5.33			985
Styrene, 4-(*tert*-butyldimethylsilyloxy)-	Styrene	0.863	0.193	0.877	0.351	Y	976
Styrene, 4-(trimethylsilyl)-	Styrene	0.28		0.48			1036
Styrene, 4-methyl-	Acrylonitrile	0.227	0.021	0.079	0.005	Y	929
Styrene, 4-methyl-	Methacrylate, methyl	0.46	0.022	0.345	0.008	Y	929
Styrene, 4-phenoxy-	Styrene	0.94		1.38			602
Styrene, α-(trimethylsilyloxy)-	Acrylonitrile	0		0.05			970
Styrene, α-(trimethylsilyloxy)-	Styrene	0		1.48			970
Styrene, α-methoxy-	Acrylate, methyl	0.003	0.01	0.17	0.02	N	142
Styrene, α-methoxy-	Acrylonitrile	– 0.002	0.01	0.06	0.01	N	142
Styrene, α-methoxy-	Methacrylate, methyl	– 0.02	0.04	2.5	0.39	N	142
Styrene, α-methoxy-	Methacrylonitrile	– 0.02	0.005	0.83	0.04	N	143
Styrene, α-methoxy-	Styrene	0.07	0.05	2.51	0.34	N	142
Styrene, α-methyl-	Acrylate, 2-cyano-, methyl	0.05		0.001			452
Styrene, α-methyl-	Acrylonitrile	0.08	0.03	0.07	0.04	N	171
Styrene, α-methyl-	Acrylonitrile	0.14	0.03	0.04	0.005	N	265
Styrene, α-methyl-	Acrylonitrile	0.17		0.04			265
Styrene, α-methyl-	Acrylonitrile	0.24		0.04			265
Styrene, α-methyl-	Acrylonitrile	0.09	0.024	0.063	0.041	Y	75
Styrene, α-methyl-	Acrylonitrile	0.103	0.036	0.34	0.15	Y	75
Styrene, α-methyl-	Acrylonitrile	0.14		0.03			835
Styrene, α-methyl-	Acrylonitrile	0.08	0.07	– 0.02	0.27	N	94
Styrene, α-methyl-	Butadiene	0.139	0.087	1.5	0.13	Y	70
Styrene, α-methyl-	Butadiene, 2-fluoro-	0.72	0.24	2.22	0.7	Y	174
Styrene, α-methyl-	Fumaronitrile	0.094	0.02	– 0.01	0.078	Y	77
Styrene, α-methyl-	Maleic anhydride	0.04		0.08			492
Styrene, α-methyl-	Methacrylate, methyl	0.27	0.07	0.48	0.02	N	265
Styrene, α-methyl-	Methacrylate, methyl	0.51		0.55			265
Styrene, α-methyl-	Methacrylate, methyl	0.6		0.55			265

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene, α-methyl-	Methacrylate, methyl	0.14		0.5			532
Styrene, α-methyl-	Methacrylate, methyl	0.22		0.42			835
Styrene, α-methyl-	Methacrylate, methyl	0.48		0.47			899
Styrene, α-methyl-	Methacrylonitrile	0.15		0.21			542
Styrene, α-methyl-	Styrene	0.14	0.06	1.21	0.41	N	171
Styrene, α-methyl-	Styrene	0.05	0.13	0.96	0.03	N	281
Styrene, α-methyl-	Styrene	0.3		1.09			281
Styrene, α-methyl-	Styrene	0.4		1.13			281
Styrene, α-methyl-	Styrene	0.521	0.084	1.08	0.11	Y	289
Styrene, α-methyl-	Styrene	0.63		1.12			289
Styrene, α-methyl-	Styrene, 2,5-dichloro-	0.14		3			377
Styrene, α-methyl-	Styrene, *p*-chloro-	0.21	0.2	1.56	0.42	Y	218
Styrene, α-methyl-	Vinyl chloromethyl ketone	0.009	0.01	0.386	0.034	Y	356
Styrene, α-methyl-	Vinylhydroquinone dibenzoate	0.11		0.3			440
Styrene, *m*-amino-	Styrene	1.16		1.04			775
Styrene, *m*-amino-	Styrene	1.18	0.007	0.786	0.01	Y	989
Styrene, *m*-amino-	Styrene, *p*-amino-	0.63		0.49			774
Styrene, *m*-bromo-	Methacrylate, methyl	1.17		0.48			256
Styrene, *m*-bromo-	Styrene	1.6		0.5			168
Styrene, *m*-bromo-	Styrene	1.05		0.55			256
Styrene, *m*-bromo-	Styrene, *p*-methoxy-	1.4		0.25			168
Styrene, *m*-bromo-	Methacrylate, methyl					Y	150
Styrene, *m*-chloro-	Styrene	2.3		0.57			168
Styrene, *m*-chloro-	Styrene	1.09		0.64			256
Styrene, *m*-chloro-	Styrene, *p*-methoxy-	1.9		0.2			168
Styrene, *m*-cyano-	Styrene	0.363	0.08	0.851	0.534		806
Styrene, *m*-diethylaminoethyl-	Styrene	1.21	0.26	1.2	0.28		806
Styrene, *m*-dimethylamino-	Styrene	0.617	0.264	1.027	0.248		806
Styrene, *m*-hydroxy-	Styrene	1.33	0.06	0.78	0.07	N	35
Styrene, *m*-methoxy-	Styrene	0.661	0.232	1.742	0.456		806
Styrene, *m*-methyl	Methacrylate, methyl	0.53	0.04	0.48	0.04		1087
Styrene, *m*-methyl	Methacrylate, methyl	0.36	0.06	0.38	0.03		1087
Styrene, *m*-methyl	Methacrylate, methyl	0.51	0.05	0.41	0.04		1087
Styrene, *m*-methyl	Methacrylic acid	0.06	0.03	0.35	0.08		1087
Styrene, *m*-methyl	Methacrylic acid	0.33	0.02	0.18	0.02		1087
Styrene, *m*-methyl	Methacrylic acid	0.42	0.01	0.51	0.01		1087
Styrene, *m*-methyl	Acrylate, methyl	1.65		0.14			558
Styrene, *m*-methyl-	Acrylonitrile	0.43		0.07			378
Styrene, *m*-methyl-	Methacrylate, methyl	0.486	0.02	0.512	0.036	Y	256
Styrene, *m*-nitro-	Methacrylate, methyl	0.8	0.32	0.35	0.11	Y	222
Styrene, *m*-nitro-	Styrene	0.5	0.14	0.279	0.055	Y	222
Styrene, *m*-nitro-	Styrene, *p*-chloro-	1.73	0.47	0.3	0.14	Y	222
Styrene, *m*-sulfonic acid fluoride	Styrene	1.268	0.236	0.788	0.183		806
Styrene, *o*-chloro-	Acrylate, butyl	2.25		0.2			558
Styrene, *o*-chloro-	Indene	2.86	0.83	−0.069	0.066	Y	6
Styrene, *o*-chloro-	Methacrylate, butyl	1.24		0.32			558
Styrene, *o*-chloro-	Methacrylate, ethyl	1.34		0.45			558
Styrene, *o*-chloro-	Methacrylate, methyl	1.37		0.5			532
Styrene, *o*-chloro-	Methacrylate, methyl	1.34		0.46			558
Styrene, *o*-chloro-	Methacrylic acid	0.101	0.034	0.622	0.058	Y	6
Styrene, *o*-chloro-	Methacrylonitrile	0.78		0.86			44
Styrene, *p*-2-methoxyphenyl ketone	Styrene	1.52	0.58	0.23	0.07		806
Styrene, *p*-phenyl ketone	Styrene	2.58	0.83	0.11	0.15		806
Styrene, *p*-phenyl ketone	Styrene	0.55	9.44	0.13	0.02		806
Styrene, *p*-1-(2-hydroxybutyl)-	Acrylate, butyl	0.4		0.17			548
Styrene, *p*-1-(2-hydroxybutyl)-	Acrylate, methyl	0.48		0.18			548
Styrene, *p*-1-(2-hydroxybutyl)-	Acrylonitrile	0.31		0.04			548
Styrene, *p*-1-(2-hydroxypropyl)-	Acrylonitrile	0.53		0.1			380
Styrene, *p*-1-(2-hydroxypropyl)-	Methacrylate, methyl	1		0.26			380
Styrene, *p*-1-(2-hydroxypropyl)-	Styrene	0.91		0.97			380
Styrene, *p*-1-(2-hydroxypropyl)-	Styrene, *p*-chloro-	0.63		0.91			380
Styrene, *p*-2-(2-hydroxypropyl)-	Acrylonitrile	0.41		0.05			547
Styrene, *p*-2-(2-hydroxypropyl)-	Styrene	0.56		0.5			390
Styrene, *p*-2-(2-hydroxypropyl)-	Styrene	1.25		0.79			547
Styrene, *p*-2-(2-hydroxypropyl)-	Styrene, *p*-chloro-	0.53		1.24			547

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene, *p*-4-methoxyphenyl ketone	Styrene	1.85	0.93	0.423	0.071		806
Styrene, *p*–*N*,*N*-dimethylamino-	Acrylate, methyl	0.38	0.16	0.06	0.01	Y	866
Styrene, *p*-*N*,*N*-dimethylamino-	Benzophenone, *p*-vinyl-	0.07	0.05	0.84	0.18	Y	866
Styrene, *p*-*N*,*N*-dimethylamino-	Methacrylate, methyl	0.101	0.016	0.204	0.022	Y	256
Styrene, *p*-*N*,*N*-dimethylaminomethyl-	Benzophenone, *p*-vinyl	0.26	0.017	2.54	0.136	Y	86
Styrene, *p*-acetoxy-	Acrylonitrile	0.4	0.03	0.07	0.01	N	47
Styrene, *p*-acetoxy-	Styrene	1.305	0.05	0.835	0.029		806
Styrene, *p*-acetoxy-	Styrene	1.218	0.069	0.887	0.034		806
Styrene, *p*-amino-	Styrene	0.22		0.41			775
Styrene, *p*-amino-	Styrene	1.07	0.004	0.876	0.007	Y	989
Styrene, *p*-amino-	Styrene, *m*-amino-	0.49		0.63			774
Styrene, *p*-bromo-	Methacrylate, methyl	1.1		0.4			256
Styrene, *p*-bromo-	Styrene	1.05	0.07	0.7	0.03	N	125
Styrene, *p*-bromo-	Styrene	1.1	0.05	0.67	0.09	N	128
Styrene, *p*-bromo-	Styrene	0.99	0.11	0.71	0.14	Y	256
Styrene, *p*-bromo-	Styrene	1.05		0.71			447
Styrene, *p*-bromo-	Styrene	1		0.69			554
Styrene, *p*-bromo-	Styrene, *p*-methoxy-	1.15	0.08	0.44	0.02	N	128
Styrene, *p*-chloro-	Acrylate, α-trifluoromethyl-, methyl	0.24	0.02	0	0.03	N	825
Styrene, *p*-chloro-	Acrylonitrile, α-trifluoromethyl-	0.92	0.06	− 0.09	0.06	N	825
Styrene, *p*-chloro-	Butadiene	1.6	5.7	1.22	2.16	Y	255
Styrene, *p*-chloro-	Butadiene, 1-(2-hydroxyethylthio)-	0.24		3.27			810
Styrene, *p*-chloro-	Carbazole, *N*-vinyl-	7		0.02			551
Styrene, *p*-chloro-	Cyclopentene, 4-, -1,3-dione	0.294	0.081	0.014	0.006	Y	264
Styrene, *p*-chloro-	Itaconate, dimethyl	0.69		0.15			398
Styrene, *p*-chloro-	Methacrylate, butyl	1.036	0.1	0.517	0.1	N	872
Styrene, *p*-chloro-	Methacrylate, butyl	1.025	0.124	0.564	0.131		966
Styrene, *p*-chloro-	Methacrylate, methyl	0.77	0.12	0.334	0.016	Y	150
Styrene, *p*-chloro-	Methacrylate, methyl	0.89		0.42			256
Styrene, *p*-chloro-	Methacrylate, methyl	0.47		0.43			476
Styrene, *p*-chloro-	Norbornadiene	69.93	24.19	0	0.12	Y	188
Styrene, *p*-chloro-	Styrene	1.08	0.07	0.62	0.1	N	128
Styrene, *p*-chloro-	Styrene	1.029	0.056	0.744	0.08	Y	139
Styrene, *p*-chloro-	Styrene	1.062	0.014	0.816	0.029	Y	139
Styrene, *p*-chloro-	Styrene	1.03		0.74			140
Styrene, *p*-chloro-	Styrene	0.76	0.12	0.39	0.043	Y	150
Styrene, *p*-chloro-	Styrene	1.76		0.76			523
Styrene, *p*-chloro-	Styrene	1.02		0.74			554
Styrene, *p*-chloro-	Styrene, 2,4,6-trimethyl-	17.83	5.24	0.34	1.05	Y	58
Styrene, *p*-chloro-	Styrene, α-methyl-	1.56	0.42	0.21	0.2	Y	218
Styrene, *p*-chloro-	Styrene, *m*-nitro-	0.3	0.14	1.73	0.47	Y	222
Styrene, *p*-chloro-	Styrene, *p*-1-(2-hydroxypropyl)-	0.91		0.63			380
Styrene, *p*-chloro-	Styrene, *p*-2-(2-hydroxypropyl)-	1.24		0.53			547
Styrene, *p*-chloro-	Styrene, *p*-cyano-	0.26	0.08	1.28	0.13	N	128
Styrene, *p*-chloro-	Styrene, *p*-methoxy-	0.47	0.16	0.41	0.08	N	128
Styrene, *p*-chloro-	Styrene, *p*-methoxy-	0.86		0.56			256
Styrene, *p*-chloro-	Styrene, *p*-methyl-	1.15		0.61			256
Styrene, *p*-chloro-	Vinyl methyl sulfoxide	6.46		0.01			737
Styrene, *p*-chloro-	Vinyl, *p*-, benzylmethylcarbinol	1		1		Y	48
Styrene, *p*-chloromethyl-	Acrylonitrile	0.56		0.067			1035
Styrene, *p*-chloromethyl-	Butadiene	0.42		0.87			1075
Styrene, *p*-chloromethyl-	Methacrylate, butyl	1.46		0.38			1035
Styrene, *p*-chloromethyl-	Methacrylate, ethyl	1.29		0.36			1035
Styrene, *p*-chloromethyl-	Methacrylate, methyl	0.91	0.15	0.408	0.038	Y	756
Styrene, *p*-chloromethyl-	Phosphazene, isopropenylpentafluoro-	1.64	0.58	− 0.048	0.067	Y	765
Styrene, *p*-chloromethyl-	Styrene	1.12	0.17	0.622	0.047	Y	756
Styrene, *p*-chloromethyl-	Styrene	1.12	0.2	0.62	0.15		806
Styrene, *p*-chloromethyl-	Styrene	1.66	0.46	0.6	0.3		806
Styrene, *p*-cyano-	Methacrylate, methyl	1.41		0.22			256
Styrene, *p*-cyano-	Styrene	1.22	0.11	0.24	0.07	N	128
Styrene, *p*-cyano-	Styrene	1.16		0.28			256
Styrene, *p*-cyano-	Styrene, *p*-chloro	1.28	0.13	0.26	0.08	N	128
Styrene, *p*-cyano-	Styrene, *p*-methoxy-	0.89	0.03	0.14	0.05	N	128
Styrene, *p*-decyl-	Styrene	0.26	1.32	0.88	0.22		806
Styrene, *p*-diethylaminoethyl-	Styrene	0.59	0.19	1.12	0.19		806

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Styrene, *p*-dimethylamino-	Acrylate, methyl	0.372	0.055	0.192	0.01	Y	911
Styrene, *p*-dimethylamino-	Benzophenone, *p*-vinyl-	0.176	0.046	0.842	0.072	Y	911
Styrene, *p*-dimethylaminomethyl-	Benzophenone, *p*-vinyl-	0.135	0.017	2.54	0.259	Y	911
Styrene, *p*-ethoxy-	Styrene	0.71	0.14	0.98	0.19		806
Styrene, *p*-fluoro-	Myrcene	0.362	0.022	0.87	0.143	Y	1062
Styrene, *p*-fluoromethyl-	Styrene	1.399	0.236	0.474	0.151		806
Styrene, *p*-formyl-	Styrene	3		0.2			1025
Styrene, *p*-formyl-	Styrene	1.43		0.16			956
Styrene, *p*-iodo-	Styrene	1.044	0.159	0.485	0.093		806
Styrene, *p*-iodo-	Styrene	0.965	0.124	0.629	0.039	Y	839
Styrene, *p*-mercapto-	Styrene	0.907	0.223	0.607	0.188		806
Styrene, *p*-methoxy-	Acrylate, methyl	2		0.07			558
Styrene, *p*-methoxy	Methacrylate, methyl	0.32		0.29			35
Styrene, *p*-methoxy	Styrene	0.69	0.1	0.85	0.19	N	128
Styrene, *p*-methoxy	Styrene	1.01	1.27	1.14	0.6	N	160
Styrene, *p*-methoxy	Styrene	0.82		1.16			256
Styrene, *p*-methoxy	Styrene	0.79		1.05			535
Styrene, *p*-methoxy	Styrene, *m*-bromo-	0.25		1.4			168
Styrene, *p*-methoxy	Styrene, *m*-chloro-	0.2		1.9			168
Styrene, *p*-methoxy	Styrene, *p*-bromo-	0.44	0.02	1.15	0.08	N	128
Styrene, *p*-methoxy	Styrene, *p*-chloro-	0.41	0.08	0.47	0.16	N	128
Styrene, *p*-methoxy	Styrene, *p*-chloro-	0.56		0.86			256
Styrene, *p*-methoxy	Styrene, *p*-cyano-	0.14	0.05	0.89	0.03	N	128
Styrene, *p*-methyl	Acrylate, methyl	1.54		0.17			558
Styrene, *p*-methyl	Acrylonitrile	0.33		0.05			378
Styrene, *p*-methyl	Methacrylate, methyl	0.44		0.4			256
Styrene, *p*-methyl	*N*,*N*-Divinylaniline	6.15	0.16	0.06	0.03	Y	45
Styrene, *p*-methyl	Styrene	0.993	0.028	0.891	0.086	Y	261
Styrene, *p*-methyl	Styrene, *p*-chloro-	0.61		1.15			256
Styrene, *p*-methyl	Vinyl methyl sulfoxide	2.73		0.01			737
Styrene, *p*-nitro	Styrene	1.13	0.13	0.193	0.092	Y	256
Styrene, *p*-octylamine sulfonate	Acrylate, butyl	2.3		0.3			817
Styrene, *p*-octylamine sulfonate	Methacrylate, butyl	1.5		0.7			817
Styrene, *p*-octylamine sulfonate	Methacrylate, methyl	2.6		0.6			817
Styrene, *p*-octylamine sulfonate	Styrene	2.7		0.7			817
Styrene, *p*-sulfonic acid fluoride	Styrene	1.372	0.188	0.171	0.045		806
Styrene, *p*-*tert*-butyl-	Methacrylate, methyl	0.5		0.44			634
Styrene, *p*-*tert*-butyl-	Styrene	1.581	0.342	0.774	0.126		806
Styrene, *p*-trimethoxysilyl-	Imidazole, *N*-vinyl-	6.9		0.002			1095
Styrene, *p*-trimethylsilyl-	Styrene	1.15	0.72	1.26	0.47		806
Styrene, pentachloro-	Methacrylate, methyl	0.3	0.05	3.65	0.85	N	7
Styrene, pentachloro-	Styrene	0.07	0.1	1.33	0.19	N	7
Styrene, pentachloro-	Vinyl chloride	5.3		0.43			516
Styrene, *tert*-butoxy-	Fumarate, dibutyl	0.18		0.01			1077
Styrenesulfonate, *p*-, sodium	Acrolein	0.047	0.071	0.26	0.16	Y	57
Styrenesulfonate, *p*-, sodium	Acrolein	0.327	0.033	0.395	0.092	Y	57
Styrenesulfonate, *p*-, sodium	Acrolein	0.01	0.009	0.113	0.018	Y	57
Styrenesulfonate, *p*-, sodium	Acrylate, α-chloro-, sodium	1.44	0.31	0.27	0.06	Y	834
Succinamate, potassium *N*-vinyl-	Methacrylate, methyl	−0.02	0.12	1.1	0.17	Y	771
Succinimide, *N*-vinyl-	Acrylamide	0.17		1.86			600
Succinimide, *N*-vinyl-	Acrylate, butyl	0.15		1.54			789
Succinimide, *N*-vinyl-	Acrylate, methyl	0.9	0.17	0.357	0.063	Y	80
Succinimide, *N*-vinyl-	Acrylonitrile	0.516	0.081	0.116	0.024	Y	80
Succinimide, *N*-vinyl-	Carbazole, *N*-vinyl-	0.11	0.83	0.04	0.09	Y	284
Succinimide, *N*-vinyl-	Maleate, dimethyl	1.25	0.16	−0.012	0.021	Y	284
Succinimide, *N*-vinyl-	Maleic anhydride	0.148	0.073	0.021	0.027	Y	284
Succinimide, *N*-vinyl-	Methacrylate, methyl	0.048	0.026	9.94	0.27	Y	104
Succinimide, *N*-vinyl-	Methacrylate, methyl	−0.059	0.096	0.01	0.031	Y	693
Succinimide, *N*-vinyl-	Pyrrolidone, *N*-vinyl-	3.67	0.89	0.97	0.42	N	96
Succinimide, *N*-vinyl-	Styrene	0.045	0.036	10.74	0.49	Y	104
Succinimide, *N*-vinyl-	Styrene	0.045	0.072	10.09	0.46	Y	163
Succinimide, *N*-vinyl-	Styrene	0.01	0.23	2.31	0.98	Y	693
Succinimide, *N*-vinyl-	Styrene	7	1.6	0.052	0.32	Y	80
Succinimide, *N*-vinyl-	Vinyl acetate	5.68	0.12	0.072	0.009	Y	104
Succinimide, *N*-vinyl-	Vinyl acetate	4.49	9.49	0.18	0.54	Y	167

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Succinimide, *N*-vinyl-	Vinyl acetate	1.99	0.43	0.229	0.06	Y	80
Succinimide, *N*-vinyl-	Vinyl thiolacetate	0.17	0.15	2.47	0.37	N	97
Succinimide, *N*-vinyl-	Vinylidene chloride	0.311	0.058	1.441	0.061	Y	104
Sulfonate, 2-acrylamido-2-methylpropane-, sodium	Acrylamide, *N*,*N*-dimethyl-	0.162	0.949	1.108	0.59	Y	857
Sulfonic acid, *o*-methacryloylamino-benzene-	Methacrylic acid	0.217	0.122	0.203	0.067	Y	1006
Sulfonic acid, *o*-methacryloylamino-benzene-	Methacrylic acid	0.523	0.195	0.188	0.076	Y	1006
Sulfonic acid, *o*-methacryloylamino-benzene-	Pyridine, 2-methyl-5-vinyl-	1.83	0.218	− 0.002	0.031	Y	1006
Sulfonic acid, *p*-methacryloylamino-benzene-	Methacrylic acid	1.08	0.338	0.156	0.081	Y	1006
Sulfonic acid, *p*-methacryloylamino benzene-	Methacrylic acid	1.65	0.27	0.155	0.052	Y	1006
Sulfonic acid, *p*-methacryloylamino benzene-	Pyridine, 2-methyl-5-vinyl-	2.72	0.525	− 0.054	0.048	Y	1006
Terpyridinyl 4′-vinyl-2,2′:6′,2′′-	Styrene	1.26	0.33	0.53	0.384	N	953
Tetrazole, 1-vinyl-	Acrylonitrile	0.314	0.066	0.54	0.032	Y	925
Tetrazole, 1-vinyl-	Methacrylate, methyl	0.262	0.026	7.13	0.093	Y	925
Tetrazole, 1-vinyl-	Styrene	0.184	0.031	3.85	0.045	Y	925
Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	Acrylonitrile	1.1		0.42			583
Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	Styrene	1.3		0.65			583
Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	Vinylidene chloride	1.9		0.13			583
Tetrazole, 2-methyl-5-vinyl-	Methacrylate, methyl	0.486	0.075	1.026	0.029	Y	670
Tetrazole, 2-methyl-5-vinyl-	Styrene	0.62	0.21	1.124	0.081	Y	670
Tetrazole, 2-methyl-5-vinyl-	Vinyl acetate	28.51	31.34	0.04	0.16	Y	670
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	Methacrylate, methyl	0.4		0.7			583
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	Styrene	1		0.95			583
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	Vinylidene chloride	1.8		0.25			583
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	Acrylonitrile	1.4		0.32			583
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	Styrene	2.2		0.48			583
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	Vinylidene chloride	1.9		0.11			583
Tetrazole, 5-vinyl-	Styrene	0.31		0.78			870
Tetrazole, 5-vinyl-	Styrene	0.31	0.02	0.78	0.3		902
Thioindigoid	Methacrylate, butyl	0.5		11.5			1007
Thiophene, 3-vinyl	Acrylate, butyl	0.499		0.386			1000
Thiophene, 3-vinyl	Methacrylate, methyl	0.25		0.563			1000
Thioxanthone, 2-(acryloyloxy)-	Methacrylate, methyl	0.5		1.36			986
Titanium, dicylopentadienyl-, dimethacrylate	Copper diacrylate	0.89		1.09			895
Titanium, dicylopentadienyl-, dimethacrylate	Nickel diacrylate	0.65		0.95			895
Toluenesulfonamide, *N*,*N*-methyl-vinyl-	Acrylonitrile	0.04	1.04	0.42	0.12	Y	80
Toluenesulfonamide, *N*,*N*-methyl-vinyl-	Methacrylate methyl	− 1.83	0.26	1.87	0.19	Y	80
Toluenesulfonamide, *N*,*N*-methyl-vinyl-	Styrene	− 0.58	0.44	5.6	1.13	Y	80
Toluenesulfonamide, *N*,*N*-methyl-vinyl-	Vinyl butyl ether	− 0.31	0.29	3.37	1.65	Y	80
Triallyl citrate	Acrylonitrile	− 0.08	0.1	1.76	0.082	Y	367
Triallyl citrate	Allylbenzene	2.01	0.5	0.339	0.039	Y	367
Triallyl citrate	Styrene	0.076	0.041	20.02	0.81	Y	367
Triallyl citrate	Vinyl acetate	2.97	0.38	0.222	0.025	Y	367
Triallyl citrate	Vinyl chloride	1.03	0.17	0.605	0.033	Y	367
Triallyl cyanurate	Methacrylate, methyl	− 0.005	0.05	16.12	0.56	Y	201
Triallyl cyanurate	Styrene	0.22	0.12	32.45	1.27	Y	201
Triallyl cyanurate	Vinyl acetate	1.29	0.42	0.197	0.053	Y	201
Triallyl isocyanurate	Methacrylate, methyl	− 0.49	0.94	16.88	6.64	Y	201
Triallyl isocyanurate	Styrene	− 0.05	0.11	28.6	1.39	Y	201
Triallyl isocyanurate	Vinyl acetate	1.95	0.42	0.278	0.043	Y	201
Triazine, 4,6-diamino-2-vinyl-	Styrene	0.538	0.141	1.104	0.157		806
Triazine, 1,3,5-2-amino-4-(*N*-methyl-*p*-aminoanilino)-6-isopropenyl-	Styrene	0.44	0.12	0.306	0.054	Y	364
Triazine, 1,3,5-2-amino-4-(*N*-methyl-*p*-aminoanilino)-6-isopropenyl-	Styrene	1.676	0.065	0.169	0.013	Y	364
Triazine, 1,3,5-2-amino-4-(*p*-nitroanilino)-6-isopropenyl-	Styrene	0.91	0.18	0.257	0.062	Y	364

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Triazine, 2-allyloxy-4,6-dichloro-	Pyrrolidone, *N*-vinyl-	0.5		0.98			826
Triazine, 4,6-diamino-2-vinyl-	Vinyl methyl ketone	1.35	0.68	0.17	0.11	Y	243
Triazole, 1,2,3-, 1-*p*-bromophenyl-4-vinyl-	Methacrylate, methyl	0.266	0.058	0.832	0.022	Y	670
Triazole, 1,2,3-, 1-*p*-bromophenyl-4-vinyl-	Styrene	0.73	0.4	1.32	0.15	Y	670
Triazole, 1,2,3-, 1-*p*-bromophenyl-4-vinyl-	Vinyl acetate	42.47	9.84	−0.011	0.008	Y	670
Triazole, 1,2,3-, 4(5)-vinyl-	Methacrylate, methyl	0.27	0.13	0.839	0.055	Y	670
Triazole, 1,2,3-, 4(5)-vinyl-	Styrene	0.52	0.26	1.48	0.12	Y	670
Triazole, 1-*N*-vinyl-1,2,4-	Imidazole, 1-*N*-vinyl					N	972
Tricyclo[4,2,2,0{2,5}]dec-7-ene-3,4,9,10-tetracarboxylicacid	Acrylonitrile	0.25		2.75			963
Tropone, 2-methacryloyloxy-	Acrylate, ethyl	3.13	0.528	0.387	0.027	Y	1104
Urea, 1,3-divinyl-1,3-diphenyl-	Styrene	−1.76	1.36	3.62	0.98	Y	800
Urea, *N*-acryloyl-*N*′-benzoyl-	Styrene	0.053		0.404			1090
Urea, *N*-vinyl-*N*′-ethyl-	Methacrylate, methyl	−0.008	0.029	1.85	0.23	Y	101
Urea, *N*-vinyl-*N*′-ethyl-	Styrene	−0.33	0.33	10.78	2.07	Y	101
Urea, *N*-vinyl-*N*′-ethyl-	Vinyl acetate	0.621	0.081	0.463	0.029	Y	101
Urea, *N*-vinyl-*N*′-ethyl-	Vinyl acetate	3.61		0.16			683
Urea, *N*-vinyl-*N*′-ethyl-	Vinyl acetate	1.45		0.38			683
Valerolactone, α-methylene-	Styrene	1.42		0.097			919
Valerolactone, α-methylene-	Styrene	1.44		0.096			855
Vinyl 1-cyano- acetate	Styrene	0.147	0.033	0.181	0.409		806
Vinyl 12-ketostearate	Acrylonitrile	−0.18	0.36	3.3	0.5	Y	146
Vinyl 12-ketostearate	Vinyl acetate	−0.28		0.18		Y	146
Vinyl 12-ketostearate	Vinyl chloride	−0.01		0.03		Y	146
Vinyl 12-ketostearate	Vinylidene chloride	0.26	2.61	4.4	4.8	Y	146
Vinyl 2-, 1,1-dichlorocyclopropane	Styrene	0	0.034	17.98	0.59		806
Vinyl 2-bromo-ethyl ether	Acrylate, methyl	−0.79	0.32	16.83	2.34	Y	194
Vinyl 2-bromo-ethyl ether	Styrene					Y	194
Vinyl 2-chlorocyclohexyl ketone	Maleic anhydride	1.7		0.83			836
Vinyl 2-chloroethyl ether	Acrylate, ethyl	0.15		5			439
Vinyl 2-chloroethyl ether	Acrylate, ethyl	0		4.65			726
Vinyl 2-chloroethyl ether	Acrylate, methyl	0		3.27			726
Vinyl 2-chloroethyl ether	Acrylonitrile	0		1.09			597
Vinyl 2-chloroethyl ether	Methacrylate, methyl	0		18.8			597
Vinyl 2-chloroethyl ether	Styrene	0.07		160			597
Vinyl 2-chloroethyl ether	Vinyl acetate	0.16		2.36			597
Vinyl 2-chloroethyl ether	Vinyl chloride	−0.07	0.11	2.46	0.52	Y	304
Vinyl 2-ethylhexanoate	Acrylonitrile	−0.047	0.05	9.24	1.96	Y	47
Vinyl 3,3-bis(ethoxycarbonyl)propyl ether	Acrylonitrile	0.06		1.02			1015
Vinyl 4-dithiobenzoate methyl	Methacrylate, methyl	0.3	0.29	0.151	0.092	Y	697
Vinyl 4-dithiobenzoate methyl	Styrene	2.08	0.81	0.111	0.009	Y	697
Vinyl 4-chlorocyclohexyl ketone	Maleic anhydride	0.12		0.08			836
Vinyl 4-chlorocyclohexyl ketone	Methacrylate, methyl	0.51		0.77			668
Vinyl 4-chlorocyclohexyl ketone	Styrene	0.58		0.53			668
Vinyl 4-chlorocyclohexyl ketone	Vinyl acetate	0.15		0.1			668
Vinyl 4-chlorocyclohexyl ketone	Vinyl cyclohexyl ketone	0.5		1.6			668
Vinyl *N,N*-methylacetamide	Vinyl acetate	0.93		0.49			631
Vinyl α-chloro-, triethoxysilane	Acrylonitrile					Y	237
Vinyl acetate	2-Oxazoline, 2-isopropenyl-	0.25	0.04	7.1	2		894
Vinyl acetate	2-Oxazolinium BF4, 3-methyl-2-isopropenyl-	0.114	0.021	0.413	0.005	Y	908
Vinyl acetate	Acetamide, *N*-vinyl-	0.6		5.5			984
Vinyl acetate	Acetamide, *N*-vinyl-	0		21			984
Vinyl acetate	Acetate, 2-chloro-, vinyl	0.8		1.18			892
Vinyl acetate	Acetate, allyl	1.8		0.43			1045
Vinyl acetate	Acetate, chloro-, allyl	0.77		0.69			1045
Vinyl acetate	Acetate, dichloro-, allyl	0.57		0.54			1045
Vinyl acetate	Acetate, trichloro-, allyl	0.41		0.28			1045
Vinyl acetate	Acrolein	−0.02	0.12	3.04	0.43	N	207
Vinyl acetate	Acrolein, methyl	0.15		0.98			589
Vinyl acetate	Acrylamide, *N*-octadecyl-	0.004	0.011	8.25	1.46	Y	119
Vinyl acetate	Acrylamido, 1-, -1-deoxy-D-glucitol	0.03	0.17	0.98	0.87	N	258
Vinyl acetate	Acrylamido, 2-, -2-methylpropane-sulfonate	0.05		11.6			700

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl acetate	Acrylamidomethylamino, *p*-, azobenzene	0.126		12.98			858
Vinyl acetate	Acrylate, 2-cyano-, methyl	0.005		0.05			452
Vinyl acetate	Acrylate, 2-ethylhexyl	0.04		7.5			570
Vinyl acetate	Acrylate, α-acetoxy-, ethyl	0.08	0.021	5.621	0.094	Y	244
Vinyl acetate	Acrylate, α-chloro-, ethyl	0.03		30			638
Vinyl acetate	Acrylate, butyl	0.018	0.072	3.48	3.39	Y	301
Vinyl acetate	Acrylate, glycidyl	0.003		7.6			553
Vinyl acetate	Acrylate, methyl	0.04	0.01	7.28	0.37		1067
Vinyl acetate	Acrylate, methyl	0.03		6.38		Y	158
Vinyl acetate	Acrylate, methyl	0.405	0.043	2.58	0.3	Y	25
Vinyl acetate	Acrylate, methyl	0.03		6.7			489
Vinyl acetate	Acrylate, methyl	0.03		6.3			568
Vinyl acetate	Acrylate, sodium					Y	37
Vinyl acetate	Acrylate, trifluoro-, methyl	0.24		0			595
Vinyl acetate	Actylate, trifluoro-, methyl	0.24		0			598
Vinyl acetate	Acrylic acid	0.021	0.059	8.66	6.63	Y	37
Vinyl acetate	Acrylonitrile	0.04	0.067	4.05	0.82	Y	158
Vinyl acetate	Acrylonitrile					N	235
Vinyl acetate	Acrylonitrile	0.06	0.22	5.51	0.91	Y	6
Vinyl acetate	Acrylonitrile	– 0.06	0.08	5.29	1.13	Y	75
Vinyl acetate	Acrylonitrile	– 0.03	0.09	9.2	6.39	Y	75
Vinyl acetate	Allyl acetate	0.6		0.45			140
Vinyl acetate	Allyl acetate	1		0.7			502
Vinyl acetate	Allyl acetate	1		0.7			998
Vinyl acetate	Allyl acrylate	0.11		17.35			578
Vinyl acetate	Allyl butyrate	0.97		0.64			998
Vinyl acetate	Allyl chloride	1.355	0.089	– 2.4	3.21	Y	204
Vinyl acetate	Allyl chloride	0.66	0.15	0.61		Y	3
Vinyl acetate	Allyl chloride	0.34		0.75	0.15		438
Vinyl acetate	Allyl isobutyrate	1.04		0.51			998
Vinyl acetate	Allyl propionate	1.29		0.42			998
Vinyl acetate	Allyl trimethylacetate	1.15		0.34			998
Vinyl acetate	Allyl valerate	1.07		0.58			998
Vinyl acetate	Allystearamide, *N*-	0.923	0.092	0.68	0.26	Y	119
Vinyl acetate	Azobenzene, 4-(acrylamidomethyl-amino)-	0.126		12.98			880
Vinyl acetate	Benzothiazole, vinylmercapto-	0.013	0.037	2.53	0.47	Y	763
Vinyl acetate	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	1.26		0.35			994
Vinyl acetate	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	1.46			0.15		994
Vinyl acetate	Bicyclo[2,2,1]hept-2-ene-5,6-dicarboximide, *N*-benzyl	1.99		0.014			994
Vinyl acetate	Butadiene, 2-chloro-	– 0.02	0.09	33.52	8.98	N	247
Vinyl acetate	Butene-1	1.55	0.24	0.11	0.42	Y	211
Vinyl acetate	Butene-2, *cis*-	8.27	1.05	0.03	0.25	Y	211
Vinyl acetate	Butene-2, *trans*-	7.2	1.69	– 0.03	0.44	Y	211
Vinyl acetate	Caprolactam, *N*-vinyl-	0.63		0.31			557
Vinyl acetate	Caprolactam, *N*-vinyl-	0.35		2.5			859
Vinyl acetate	Caprolactam, *N*-vinyl-	0.35		2.5			883
Vinyl acetate	Carbamate, *N,N*-diethyl-, vinyl	1.7	0.04	0.13	0.19	Y	197
Vinyl acetate	Carbamate, *N*-vinyl-, ethyl	0.39		2.09			629
Vinyl acetate	Carbamate, *N*-vinyl-, ethyl	0.418	0.063	0.4	0.26	Y	81
Vinyl acetate	Carbamate, *N*-vinyl-, *tert*-butyl	0.07	1.12	0.46	0.03	N	827
Vinyl acetate	Carbazole, *N*-vinyl-	0.126	0.023	2.67	0.13	Y	246
Vinyl acetate	Carbazole, *N*-vinyl-	0.15		3.02			246
Vinyl acetate	Carbazole, *N*-vinyl-	0.13		3.9			551
Vinyl acetate	Carbon monoxide	0.24		0.33			474
Vinyl acetate	Crotonic acid	0.317	0.081	0.04	0.14	Y	47
Vinyl acetate	Crotonic acid	0.3		0.01			526
Vinyl acetate	Crotonic acid	0.31	0.07	0.001	0.1	N	94
Vinyl acetate	Diallyl β-cyanoethylisocyanurate	0.06		4.6			778
Vinyl acetate	Diallyl melamine	0.68	0.026	0.318	0.073	Y	201
Vinyl acetate	Diallyl phthalate	0.336	0.049	2.19	0.34	Y	297

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl acetate	Diallyl phthalate	0.414	0.029	1.66	0.16	Y	297
Vinyl acetate	Diallyl phthalate	0.72		2			509
Vinyl acetate	Diallyl, 1,3-, 5-(2-hydroxy-3-phenoxypropyl)	0.15		5.5			671
Vinyl acetate	Diallyl, 1,3-, 5-(2-hydroxy-3-phenoxypropyl)	0.16		3.65			676
Vinyl acetate	Diallylcyanamide	0.01		1.62			581
Vinyl acetate	Diallyldimethylammonium chloride	0.35		1.95			1029
Vinyl acetate	Ethylene	0.72	1.2	0.16	0.03	N	309
Vinyl acetate	Ethylene					N	41
Vinyl acetate	Ethylene	1.14		0.28			413
Vinyl acetate	Ethylene	1.03	0.77	0.88	0.52	N	42
Vinyl acetate	Ethylene	1.52		0.74			559
Vinyl acetate	Ethylene	3.74	0.64	0.67	0.03	N	68
Vinyl acetate	Ethylene	1.23	0.21	0.13	0.01	N	68
Vinyl acetate	Ethylene	1.4		0.79			766
Vinyl acetate	Ethylene	0.33	0.58	− 0.13	0.36	Y	6
Vinyl acetate	Ethylene, chlorotrifluoro-	0.68	0.11	0.04	0.02		1097
Vinyl acetate	Ethylene, chlorotrifluoro-	0.47		− .0.02		Y	236
Vinyl acetate	Ethylene, dichloro-, *cis-*	1.02	0.27	0.055	0.024	Y	137
Vinyl acetate	Ethylene, dichloro-, *cis-*	6.4		0.01		Y	137
Vinyl acetate	Ethylene, dichloro-, *cis-*	0.898	0.06	0.058	0.03	Y	9
Vinyl acetate	Ethylene, dichloro-, *cis-*	4.13	1.94	0.1	0.14	Y	9
Vinyl acetate	Ethylene, tetrachloro-	4.45	1.87	− 0.07	0.015	Y	3
Vinyl acetate	Ethylene, tetrachloro-					Y	59
Vinyl acetate	Ethylene, trichloro-	0.607	0.076	− 0.06	0.34	Y	158
Vinyl acetate	Ethylene, trichloro-	0.7	0.1	− 0.006	0.019	Y	9
Vinyl acetate	Fumarate, diethyl	0.011	0.004	0.443	0.007	Y	137
Vinyl acetate	Fumarate, diethyl	0.09		0.33			718
Vinyl acetate	Fumarate, diisopropyl	0.012		0.9			1038
Vinyl acetate	Fumaryl chloride					Y	91
Vinyl acetate	Hexatriene, tetrachloro-					Y	4
Vinyl acetate	Imidazole, 1-vinyl-	− 0.11	1.17	1.9	6.99	Y	364
Vinyl acetate	Indene	0.39	0.2	8.64	2.8	Y	360
Vinyl acetate	Isobutylene	1.66	0.18	0.17	0.19	Y	211
Vinyl acetate	Isobutylene, 3-chloro-	0.13		0			475
Vinyl acetate	Isopropenyl acetate	1.171	0.038	1.082	0.074	Y	100
Vinyl acetate	Itaconate, dimenthyl					Y	975
Vinyl acetate	Itaconic anhydride	− 0.019	0.045	1.57	0.36	Y	365
Vinyl acetate	Itaconic anhydride	− 0.04	0.024	2.87	0.32	Y	365
Vinyl acetate	Maleate, di-*tert*-butyl	0.005	0.024	0.199	0.02	Y	1049
Vinyl acetate	Maleate, diethyl	0.171	0.025	0.04	0.012	Y	137
Vinyl acetate	Maleate, dimethyl	− 0.006	0.084	0.257	0.086	Y	1049
Vinyl acetate	Maleic anhydride	0.019	0.008	− 0.058	0.074	Y	260
Vinyl acetate	Maleimide, *N*-(2-hydroxyethyl)-	− 0.014	0.037	0.61	0.12	Y	323
Vinyl acetate	Maleimide, *N*-(2-hydroxyethyl)-	0.01	0.041	0.88	0.17	Y	323
Vinyl acetate	Maleimide, *N*-(2-hydroxyphenyl)-	− 0.011	0.027	1.75	0.17	Y	323
Vinyl acetate	Maleimide, *N*-hydroxymethyl-	0.017	0.037	1.45	0.21	Y	323
Vinyl acetate	Maleimide, *N*-phenyl-	− 0.003	0.006	1.284	0.046	Y	328
Vinyl acetate	Methacrylamide, 1-deoxy-D-glucitol	0.16		0.56			258
Vinyl acetate	Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	0.2		13.7			664
Vinyl acetate	Methacrylate, butyl	− 0.003	0.15	30.18	14.47	Y	165
Vinyl acetate	Methacrylate, di-, di-*n*-butylstannyl	0.013	0.018	0.013	0.036	Y	949
Vinyl acetate	Methacrylate, ethyl	− 0.77	5.29	131.8	29.8	N	210
Vinyl acetate	Methacrylate, ferrocenylmethyl	0.2		1.52			293
Vinyl acetate	Methacrylate, isobutyl	− 0.06	0.22	29.7	24.16	Y	165
Vinyl acetate	Methacrylate, methyl	− 0.2	0.01	2.71	0.25	Y	158
Vinyl acetate	Methacrylate, methyl	− 0.81	1.17	137.5	5.9	N	210
Vinyl acetate	Methacrylate, methyl	0.03		26			272
Vinyl acetate	Methacrylate, methyl	0.04		28.6			383
Vinyl acetate	Methacrylate, methyl	0.07		22.21			471
Vinyl acetate	Methacrylate acid	0.01		0.2			377
Vinyl acetate	Methacrylonitrile	0.01		12			75
Vinyl acetate	*N,N*-Divinylaniline	0.058	0.009	3.99	0.12	Y	45

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl acetate	Norbornadiene	0.818	0.019	1.354	0.07	Y	188
Vinyl acetate	Oxazolidone, *N*-vinyl-	0.602	0.038	1.55	0.28	Y	102
Vinyl acetate	Oxazolidone, *N*-vinyl-	0.55	0.18	2.04	0.13	Y	36
Vinyl acetate	Oxazoline, 2-, 2-isopropenyl-	0.25		7.1			862
Vinyl acetate	Oxazoline, 2-, 4-acryloxymethyl-dimethyl-2,4-dimethyl	0.03		1.41			596
Vinyl acetate	Oxazoline, 2-, 4-methacryloxy-2,4-dimethyl	0.05		6.2			596
Vinyl acetate	Oxazolinium, 2- tetrafluoroborate, 3-methyl	0.43	0.057	0.366	0.151	Y	877
Vinyl acetate	Phosphate, diethyl isopropenyl	1.56		0.44			650
Vinyl acetate	Phosphine oxide, diphenylvinyl-	0.38		1.7			843
Vinyl acetate	Phosphonate, α-carbomethoxyvinyl-, diethyl	0.09		0.6			684
Vinyl acetate	Phosphonate, isopropenyl-, dimethyl	0.14		0.99			684
Vinyl acetate	Phosphonate, vinyl-, bis(2-chloroethyl)	0.09		0.85			592
Vinyl acetate	Phosphonate, vinyl-, bis(2-chloroethyl)	0.09		0.85			594
Vinyl acetate	Phosphonate, vinyl-, bis(2-chloroethyl)	0.33		0.47			595
Vinyl acetate	Phosphonate, vinyl-, diethyl	0.04		0.74			592
Vinyl acetate	Phosphonate, vinyl-, dimethyl	0.04		0.74			592
Vinyl acetate	Phosphonate, vinyl-, dimethyl	0.04		0.74			594
Vinyl acetate	Propene, 1-chloro-, *cis*-	7.08	0.35	−0.012	0.061	Y	181
Vinyl acetate	Propene, 1-chloro-, *trans*-	3.13	0.15	0.011	0.074	Y	181
Vinyl acetate	Propene, 2-chloro-	0.186	0.091	1.65	0.36	Y	181
Vinyl acetate	Propene, 3,3,3-trichloro-	0.19		0.19			402
Vinyl acetate	Pyridine, 2-methyl-5-vinyl-	0.11		9			812
Vinyl acetate	Pyridine, 2-vinyl-	−0.11	0.17	13.65	3.64	Y	6
Vinyl acetate	Pyridine, 2-vinyl-	0		30			6
Vinyl acetate	Pyrrolidone, *N*-vinyl-	0.26	0.25	1.06	0.25	Y	103
Vinyl acetate	Pyrrolidone, *N*-vinyl-	0.19	1.77	1.75	2.79	N	121
Vinyl acetate	Pyrrolidone, *N*-vinyl-	0.195	0.057	3.4	0.21	Y	36
Vinyl acetate	*S*-Ethyl *N*-vinyl-*N*-methylthiolcarbamate	0.67	0.1	1.22	1.17	Y	197
Vinyl acetate	*S*-Vinyl *N,N*-diethylthiolcarbamate	0.133	0.025	1.89	0.77	Y	197
Vinyl acetate	Styrene	−0.04	0.072	42.48	26.85	Y	158
Vinyl acetate	Styrene	0.02	0.12	18.8	2.87	Y	241
Vinyl acetate	Styrene	0.01		56			481
Vinyl acetate	Styrene	0.05		48			481
Vinyl acetate	Styrene	0.16		60			481
Vinyl acetate	Styrene	0.08		57.8			812
Vinyl acetate	Styrene, 3-*tri*-*n*-butylstannyl-	5.33		0.38			985
Vinyl acetate	Succinimide, *N*-vinyl-	0.072	0.009	5.68	0.12	Y	104
Vinyl acetate	Succinimide, *N*-vinyl-	0.18	0.54	4.49	9.49	Y	167
Vinyl acetate	Succinimide, *N*-vinyl-	0.229	0.06	1.99	0.43	Y	80
Vinyl acetate	Tetrazole, 2-methyl-5-vinyl-	0.04	0.16	28.51	31.34	Y	670
Vinyl acetate	Triallyl citrate	0.222	0.025	2.97	0.38	Y	367
Vinyl acetate	Triallyl cyanurate	0.197	0.053	1.29	0.42	Y	201
Vinyl acetate	Triallyl isocyanurate	0.278	0.043	1.95	0.42	Y	201
Vinyl acetate	Triazole, 1,2,3-, 1-*p*-bromophenyl-4-vinyl-	−0.011	0.008	42.47	9.84	Y	670
Vinyl acetate	Urea, *N*-vinyl-*N′*-ethyl-	0.463	0.029	0.621	0.081	Y	101
Vinyl acetate	Urea, *N*-vinyl-*N′*-ethyl-	0.16		3.61			683
Vinyl acetate	Urea, *N*-vinyl-*N′*-ethyl-	0.38		1.45			683
Vinyl acetate	Vinyl 12-ketostearate	0.18		−0.28		Y	146
Vinyl acetate	Vinyl 2-chloroethyl ether	2.36		0.16			597
Vinyl acetate	Vinyl 4-chlorocyclohexyl ketone	0.1		0.15			668
Vinyl acetate	Vinyl benzenesulfonate	0.628	0.036	−1.34	1.7	Y	942
Vinyl acetate	Vinyl benzoate	0.455	0.069	1.07	0.27	Y	253
Vinyl acetate	Vinyl benzoate	0.35		0.99			253
Vinyl acetate	Vinyl benzoate	0.78	0.52	1.64	1.93	Y	26
Vinyl acetate	Vinyl benzoate	0.7		1.13			272
Vinyl acetate	Vinyl benzoate	0.66		1.74			430
Vinyl acetate	Vinyl benzoate	0.24	0.2	1.98	0.98	N	696
Vinyl acetate	Vinyl bromide	0.41	0.13	5.26	1.23	Y	158
Vinyl acetate	Vinyl bromide	0.6	0.09	1.92	0.35	N	268
Vinyl acetate	Vinyl bromide	0.38		3			268

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl acetate	Vinyl butyl ether	3.72	0.09	0.01	0.02	N	345
Vinyl acetate	Vinyl butyl ether	0.71		0.2			448
Vinyl acetate	Vinyl butyl ether	2.5		0.16			553
Vinyl acetate	Vinyl butylsulfonate	0.025	0.006	0.13	0.33	Y	185
Vinyl acetate	Vinyl butyrate	1		0.97			272
Vinyl acetate	Vinyl butyrate	1.35		1.25			515
Vinyl acetate	Vinyl chloride	0.43	0.14	1.63	0.32	Y	109
Vinyl acetate	Vinyl chloride	0.981	0.036	1.032	0.097	Y	148
Vinyl acetate	Vinyl chloride	0.24	0.15	1.84	0.68	Y	158
Vinyl acetate	Vinyl chloride	0.263	0.028	2.13	0.2	Y	283
Vinyl acetate	Vinyl chloride	0.25	0.15	1.64	0.12	Y	3
Vinyl acetate	Vinyl chloride	0.65		1.35			450
Vinyl acetate	Vinyl chloride	0.26	0.14	2.3	0.64	N	86
Vinyl acetate	Vinyl chloroacetate	0.83	0.12	1.39	0.3	N	71
Vinyl acetate	Vinyl chloroacetate	0.803	0.089	0.88	0.19	Y	779
Vinyl acetate	Vinyl chloroacetate	0.8		1.18		Y	861
Vinyl acetate	Vinyl chloroformate	0.67	0.16	0.579	0.076	Y	675
Vinyl acetate	Vinyl chloroformate	0.66	0.12	0.586	0.052	Y	706
Vinyl acetate	Vinyl chloromethyl ketone	0.044	0.054	49.52	15.79		356
Vinyl acetate	Vinyl cinnamate	0.04		1.2			200
Vinyl acetate	Vinyl cyclohexyl ketone	0.08		13.76			846
Vinyl acetate	Vinyl cymantrene	0.072	0.003	7.21	1.01	Y	354
Vinyl acetate	Vinyl dodecyl ether	3.67		0			372
Vinyl acetate	Vinyl ethyl ether	3.42		0.26		Y	158
Vinyl acetate	Vinyl ethyl ketone	−0.13	0.18	10.18	6.62	Y	794
Vinyl acetate	Vinyl ethyl oxalate	1.35	0.84	9.89	8.44	Y	124
Vinyl acetate	Vinyl fluoride	3.5		0.25			755
Vinyl acetate	Vinyl formate	0.94	0.14	0.98	0.06	N	272
Vinyl acetate	Vinyl formate	1.41		0.68			401
Vinyl acetate	Vinyl isopropyl ketone	0.3		7.87			601
Vinyl acetate	Vinyl isopropyl ketone	−0.154	0.073	6.47	2.18	Y	794
Vinyl acetate	Vinyl laurate	1.4		0.7			503
Vinyl acetate	Vinyl methanesulfonate	0.639	0.014	0.206	0.427	Y	942
Vinyl acetate	Vinyl methyl ketone					Y	91
Vinyl acetate	Vinyl methyl sulfone	0	0.02	0.355	0.21	Y	195
Vinyl acetate	Vinyl octadecyl ether	4.5		0			372
Vinyl acetate	Vinyl octyl ether	3.47		0			372
Vinyl acetate	Vinyl phenyl carbonate	0.85	0.23	0.384	0.083	Y	675
Vinyl acetate	Vinyl phenyl carbonate	0.85	0.23	0.384	0.083	Y	705
Vinyl acetate	Vinyl phenyl ketone	−0.06	0.057	5.81	0.96	Y	794
Vinyl acetate	Vinyl phenyl sulfone	0.171	0.064	−0.35	0.37	Y	193
Vinyl acetate	Vinyl propionate	0.98		0.98			272
Vinyl acetate	Vinyl propionate	0.9		1			425
Vinyl acetate	Vinyl stearate	0.953	0.015	0.96	0.17	Y	1
Vinyl acetate	Vinyl stearate	0.9		0.73			537
Vinyl acetate	Vinyl *tert*-butyl sulfide	13		0.07			598
Vinyl acetate	Vinyl *tert*-butyl sulfide	13		0.07			601
Vinyl acetate	Vinyl thiolacetate	0.05		5.5			566
Vinyl acetate	Vinyl, *N*-, *N*-methylacetamide	0.49		0.93			631
Vinyl acetate	Vinylene carbonate	3.2	0.62	0.3	0.3	Y	103
Vinyl acetate	Vinylene carbonate	3		0.27			103
Vinyl acetate	Vinylene carbonate	7.16	0.64	0.05	0.16	Y	120
Vinyl acetate	Vinylene carbonate	7.3		0.13			120
Vinyl acetate	Vinylene carbonate	3.83	0.18	0.044	0.039	Y	144
Vinyl acetate	Vinylene carbonate	3.92	0.32	0.08	0.11	Y	90
Vinyl acetate	Vinylidene chloride	0.03	0.1	4.66	0.26	Y	3
Vinyl acetate	Vinylidene chloride	0.05		6.7			432
Vinyl acetate	Vinylidene chloride	0.05		5			436
Vinyl acetate	Vinylidene chloride	−0.002	0.026	3.49	0.17	Y	59
Vinyl acetate	Vinylidene chloride	0.12		4.7			812
Vinyl acetate	Vinylidene cyanide	0.003	0.002	0.1	0.11	Y	82
Vinyl acetate	Vinylidene fluoride	6		0.08			627
Vinyl acetoxymethyl ketone	Styrene	0.368	0.018	0.103	0.011		806
Vinyl benzenesulfonate	Vinyl acetate	−1.34	1.7	0.628	0.036	Y	942
Vinyl benzoate	Acrylonitrile	0.019	0.051	5.03	1.08	Y	47

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl benzoate	Allyl chloride	0.46		0.88			438
Vinyl benzoate	Methacrylate, methyl	0.07		20.3			272
Vinyl benzoate	Pyrrolidone, *N*-vinyl-	0.408	0.03	2.507	0.039	Y	253
Vinyl benzoate	Styrene	– 0.02	1.62	34.8	29.3	Y	26
Vinyl benzoate	Styrene	0.06	0.15	31.56	4.33	N	696
Vinyl benzoate	Vinyl acetate	1.07	0.27	0.455	0.069	Y	253
Vinyl benzoate	Vinyl acetate	0.99		0.35			253
Vinyl benzoate	Vinyl acetate	1.64	1.93	0.78	0.52	Y	26
Vinyl benzoate	Vinyl acetate	1.13		0.7			272
Vinyl benzoate	Vinyl acetate	1.74		0.66			430
Vinyl benzoate	Vinyl acetate	1.98	0.98	0.24	0.2	N	696
Vinyl benzoate	Vinyl chloride	0.343	0.036	1.66	0.16	Y	283
Vinyl benzoate	Vinyl chloride	0.5		1.7			450
Vinyl benzoate	Vinyl chloride	0.28		0.72			519
Vinyl benzoate	Vinyl *p*-bromobenzoate	0.716	0.031	1.17	0.13	Y	110
Vinyl benzoate	Vinyl *p*-chlorobenzoate	0.832	0.028	0.81	0.072	Y	110
Vinyl benzoate	Vinyl *p*-cyanobenzoate	0.659	0.033	0.878	0.094	Y	110
Vinyl benzoate	Vinylidene chloride	0.065	0.093	5.58	1.76	Y	47
Vinyl benzoate	Vinylidene cyanide	0	0.017	0.061	0.047	Y	82
Vinyl benzyl sulfide	Methacrylic anhydride	– 0.048	0.033	0.97	0.27	Y	106
Vinyl benzyl sulfide	Styrene	0.04	0.17	2.32	0.25	Y	303
Vinyl bromide	Acrylate, butyl	0.18	0.16	4.07	0.44	N	268
Vinyl bromide	Acrylate, butyl	0.19		3.7			268
Vinyl bromide	Acrylonitrile	0.06		2.25			268
Vinyl bromide	Acrylonitrile	0.06	0.04	2.79	0.2	N	286
Vinyl bromide	Methacrylate, methyl	0.12	0.06	14.11	0.67	N	268
Vinyl bromide	Methacrylate, methyl	0.33		17.1			268
Vinyl bromide	Methacrylate, methyl	0.052	0.026	25.1	0.88	Y	34
Vinyl bromide	Methacrylate, methyl	0.05	0.074	19.84	2.58	Y	34
Vinyl bromide	Styrene	0.012	0.049	16.88	0.94	Y	34
Vinyl bromide	Styrene	0.06		18			34
Vinyl bromide	Styrene	0.09	0.2	15	8.26	N	368
Vinyl bromide	Vinyl acetate	5.26	1.23	0.41	0.13	Y	158
Vinyl bromide	Vinyl acetate	1.92	0.35	0.6	0.09	N	268
Vinyl bromide	Vinyl acetate	3		0.38			268
Vinyl butyl ether	Acrylate, 2-chloroethyl	0		2.01			790
Vinyl butyl ether	Acrylate, methyl	0.01	0.01	3.65	0.07	N	345
Vinyl butyl ether	Acrylate, methyl	0		3.6			574
Vinyl butyl ether	Acrylonitrile					N	345
Vinyl butyl ether	Acrylonitrile	– 0.03	0.01	0.98	0.13	N	347
Vinyl butyl ether	Benzenesulfamide, *p*-methacrylamide-	0		3.4	0.1		1005
Vinyl butyl ether	Caprolactam, *N*-vinyl-	0.03	0.73	3.1	5.3	Y	215
Vinyl butyl ether	Methacrylate, 2-bromoethyl	0		13.7			657
Vinyl butyl ether	Methacrylate, methyl					N	127
Vinyl butyl ether	Pyrrolidone, *N*-vinyl	– 0.027	0.063	1.49	0.95	Y	215
Vinyl butyl ether	Styrene	– 0.08	0.78	21.25	16.53	Y	241
Vinyl butyl ether	Toluenesulfonamide, *N,N*-methyl-vinyl-	3.37	1.65	– 0.31	0.29	Y	80
Vinyl butyl ether	Vinyl acetate	0.01	0.02	3.72	0.09	N	345
Vinyl butyl ether	Vinyl acetate	0.2		0.71			448
Vinyl butyl ether	Vinyl acetate	0.16		2.5			553
Vinyl butyl ether	Vinyl chloride	0.023	0.001	2.084	0.016	Y	279
Vinyl butyl ether	Vinyl chloroacetate	0.12	4.39	1.49	34.5	Y	212
Vinyl butyl ether	Vinylidene chloride	0.004	0.001	1.75	0.11	Y	279
Vinyl butyl sulfide	Acrylonitrile	0.041	0.028	0.086	0.01	Y	303
Vinyl butyl sulfide	Styrene	– 0.06	0.18	2.69	0.25	Y	303
Vinyl butylsulfonate	Acrylate, methyl	0	0.14	4.14	0.58	Y	185
Vinyl butylsulfonate	Styrene	0	0.16	1.74	0.27	Y	185
Vinyl butylsulfonate	Vinyl acetate	0.13	0.33	0.025	0.006	Y	185
Vinyl butylsulfonate	Vinyl chloride	0.267	0.046	0.325	0.013	Y	185
Vinyl butylsulfonate	Vinyl chloride	0.083	0.096	8.47	0.86	Y	185
Vinyl butyrate	Allyl chloride	0.31		1.15			438
Vinyl butyrate	Butadiene, 2-chloro-					N	247
Vinyl butyrate	Carbazole, *N*-vinyl-	0.07	0.12	1.33	0.34	Y	246
Vinyl butyrate	Ethylene	1.5		0.7			605
Vinyl butyrate	Methacrylate, methyl	0.03		25			272

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl butyrate	Vinyl acetate	0.97		1			272
Vinyl butyrate	Vinyl acetate	1.25		1.35			515
Vinyl butyrate	Vinyl chloride	0.302	0.013	2.092	0.074	Y	283
Vinyl butyrate	Vinyl chloride	0.55		1.75			400
Vinyl butyrate	Vinyl chloride	0.65		1.35			494
Vinyl caproate	Vinyl chloride	0.348	0.05	2.26	0.22	Y	283
Vinyl chloride	Aconitate, trimethyl	0.04		0.19		Y	147
Vinyl chloride	Acrolein	0.03	0.11	5.22	0.13	N	271
Vinyl chloride	Acrylamide					Y	156
Vinyl chloride	Acrylamide, *N*-methylol-					Y	157
Vinyl chloride	Acrylate, 2-ethylhexyl	0.16		4.15			510
Vinyl chloride	Acrylate, butyl	0.07		4.4			518
Vinyl chloride	Acrylate, methyl	0.093	0.002	4.4	0.22	Y	151
Vinyl chloride	Acrylate, methyl	0.002	0.01	7.66	0.5	Y	46
Vinyl chloride	Acrylate, methyl	0		5			470
Vinyl chloride	Acrylate, methyl	0.06		4			518
Vinyl chloride	Acrylate, octyl	0.12		4.8			518
Vinyl chloride	Acrylate, trifluoro-, methyl	1.5		0			595
Vinyl chloride	Acrylate, trifluoro-, methyl	1.5		0			598
Vinyl chloride	Acrylic acid	0.107	0.011	6.69	0.88	Y	135
Vinyl chloride	Acrylic acid	0.03	0.09	9.28	0.51	N	229
Vinyl chloride	Acrylic acid	0.024	0.069	7.04	0.33	Y	288
Vinyl chloride	Acrylic acid	0.11		6.8			379
Vinyl chloride	Acrylonitrile	−0.01	0.037	3.26	0.34	Y	140
Vinyl chloride	Acrylonitrile	0.07	0.03	2.55	0.12	N	202
Vinyl chloride	Acrylonitrile	0.02	0.08	2.62	0.25	N	22
Vinyl chloride	Acrylonitrile	0.044	0.002	3.62	0.21	Y	238
Vinyl chloride	Acrylonitrile	0.052	0.01	3.65	0.22	Y	46
Vinyl chloride	Acrylonitrile	0.04		4			529
Vinyl chloride	Acryloyl chloride	0.02	0.029	3.03	0.22	Y	288
Vinyl chloride	Allyl acetate	1.2					470
Vinyl chloride	Allyl acetate	1.16		0			475
Vinyl chloride	Allyltriethoxysilane	1.68	0.38	−0.94	0.48	Y	237
Vinyl chloride	Butadiene	0.04		8.8			517
Vinyl chloride	Butadiene	−0.11	0.31	5.27	3.35	Y	717
Vinyl chloride	Butene-1	3.34	0.58	0.12	0.12	Y	230
Vinyl chloride	Butene-1, 2-ethyl-	1.56	0.26	−1.05	0.89	N	329
Vinyl chloride	Butene-1, 2-methyl-	1.01	0.31	−1.18	1.2	N	329
Vinyl chloride	Butene-1,3, 3-dimethyl-	5.64	0.2	−0.44	0.28	N	329
Vinyl chloride	Butene-1,3, 3-dimethyl-	6.18	13.57	−0.07	2.5	Y	6
Vinyl chloride	Butene-2	3.3	2.18	−1.79	5.22	N	329
Vinyl chloride	Butene-2, 2-methyl-	8.52	10.54	0.3	5.31	N	329
Vinyl chloride	Butene-2, *cis*-	8.8		0			230
Vinyl chloride	Carbazole, *N*-vinyl-	0.17		4.77			427
Vinyl chloride	Carbon monoxide	13.52	0.25	0.121	0.011	Y	184
Vinyl chloride	Crotonaldehyde	1.55	0.26	−0.56	0.25	N	271
Vinyl chloride	Diallyl phthalate	0.833	0.012	0.7	0.046	Y	296
Vinyl chloride	Diallylcyanamide	0.44		0.68			602
Vinyl chloride	Diallylcyanamide	0.44		0.68			603
Vinyl chloride	Ethylene	3.82	0.59	0.02	0.06	N	161
Vinyl chloride	Ethylene	1.99	0.42	0.19	0.17	N	180
Vinyl chloride	Ethylene	1.74	0.58	0.24	0.13	N	270
Vinyl chloride	Ethylene	4.38	0.44	0.34	0.13	N	42
Vinyl chloride	Ethylene	2		0.2			472
Vinyl chloride	Ethylene	3.21		0.21			536
Vinyl chloride	Ethylene	1.85	0.1	0.21	0.01	N	63
Vinyl chloride	Ethylene	0.96	0.22	0.14	0.12	N	63
Vinyl chloride	Ethylene	1.63	0.22	0.23	0.01	N	64
Vinyl chloride	Ethylene	1.55	0.18	0.16	0.01	N	68
Vinyl chloride	Ethylene, chlorotrifluoro-	2.53		0.01			454
Vinyl chloride	Fumarate, diethyl	0.13	0.1	0.48	0.1	Y	137
Vinyl chloride	Fumarate, diisopropyl	0.29		0.49			1038
Vinyl chloride	Hexene-1	1.54	0.98	−1.72	9.23	N	329
Vinyl chloride	Imidazole, 1-vinyl-2-methyl-	0.188	0.077	2.15	0.26	Y	154
Vinyl chloride	Isobutylene	2.04	1.82	0.06	0.8	Y	140

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl chloride	Isobutylene	2.12	0.2	0.268	0.043	Y	155
Vinyl chloride	Isobutylene	1.2	2.05	−0.54	5.8	N	329
Vinyl chloride	Isobutylene	1.54		0.08			560
Vinyl chloride	Isobutylene, 3-chloro-	0.31		0			475
Vinyl chloride	Isopropenyl acetate	2.26	0.13	0.23	0.16	Y	100
Vinyl chloride	Isopropenylisocyanate	0.39		3			777
Vinyl chloride	Itaconate, diethyl	0.06		5.65			480
Vinyl chloride	Itaconate, dimethyl	0.05		5			479
Vinyl chloride	Maleate, diethyl	0.768	0.078	−0.003	0.044	Y	137
Vinyl chloride	Maleate, diethyl	0.8		0			449
Vinyl chloride	Maleate, diethyl	0.9	0.11	0.046	0.07	Y	6
Vinyl chloride	Maleate, dioctyl	0.05	0.14	0.608	0.099	Y	3
Vinyl chloride	Maleic anhydride	0.098	0.042	−0.22	0.38	Y	260
Vinyl chloride	Maleic anhydride	0.04		0.4			521
Vinyl chloride	Maleic anhydride	0.1		0.67			521
Vinyl chloride	Maleimide, *N*-(4-carboxyethylphenyl)-	0.04	0.03	3.29	0.18	N	306
Vinyl chloride	Maleimide, *N*-(4-chlorophenyl)-	0.026	0.044	3.65	0.39	Y	306
Vinyl chloride	Maleimide, *N*-(4-methylphenyl)-	0.022	0.048	4.49	0.34	Y	306
Vinyl chloride	Maleimide, *N*-butyl-	0.24	1.13	−12.7	106.2	Y	305
Vinyl chloride	Maleimide, *N*-phenyl-	0.023	0.026	4.01	0.18	Y	306
Vinyl chloride	Maleimide, *N*-propyl-	0.06	0.05	2.38	0.16	N	305
Vinyl chloride	Methacrylate, 3,5-dimethyladamantyl	0.21	0.04	1.85	8.87	N	335
Vinyl chloride	Methacrylate, β-(2-benzothiazolylthio)-ethyl	0.64		0.26			741
Vinyl chloride	Methacrylate, butyl	0.05		13.5			519
Vinyl chloride	Methacrylate, methyl	0.07	0.047	8.99	2.97	Y	3
Vinyl chloride	Methacrylate, octyl	0.04		14			511
Vinyl chloride	Methacrylic acid	0.064	0.008	23.52	0.98	Y	135
Vinyl chloride	Methacrylic acid	−0.022	0.02	23.26	0.96	Y	229
Vinyl chloride	Methacrylic acid	0.07		9.05			46
Vinyl chloride	Methacryloyl chloride	0.3		2			432
Vinyl chloride	Methacryloyloxy-, *o*-, benzoic acid	0.004	0.052	11.26	3.5	Y	938
Vinyl chloride	Norbornadiene	0.67	0.02	0.41	0.01	N	267
Vinyl chloride	Octene-1	3.26	0.45	−0.57	0.85	N	329
Vinyl chloride	Oxazolidone, *N*-vinyl-	0.313	0.095	0.822	0.048	Y	36
Vinyl chloride	Pentene-1	4		0.001		Y	3
Vinyl chloride	Pentene-1	2.08	1.78	0.81	5.2	N	329
Vinyl chloride	Pentene-1, 2-methyl-	1.59	0.68	−1.16	2.31	N	329
Vinyl chloride	Phosphate, vinyl diethyl	3.4	0.21	0.15	0.047	Y	779
Vinyl chloride	Phosphate, vinyl diphenyl	3.009	0.077	0.327	0.023	Y	779
Vinyl chloride	Propene, 1-chloro-, *cis*-	11.52	2.14	0.1	0.63	Y	181
Vinyl chloride	Propene, 1-chloro-, *trans*-	4.45	0.81	0.33	0.4	Y	181
Vinyl chloride	Propene, 2-chloro-	0.095	0.085	4.75	5.12	Y	181
Vinyl chloride	Propene, 2-chloro-	0.75		0.58			517
Vinyl chloride	Propenyl, 2-, acetate	2.2		0.25			189
Vinyl chloride	Propenyl, 2-chloro-, acetate	0.7		0			445
Vinyl chloride	Propenyltriethoxysilane					Y	237
Vinyl chloride	Propylene	2.35	0.14	0.196	0.023	Y	155
Vinyl chloride	Propylene	−0.05	0.1	3.1	0.21	N	329
Vinyl chloride	Propylene	5.16	0.06	−0.02	0.04	N	355
Vinyl chloride	Propylene	2.45		0.09			560
Vinyl chloride	Propylene	2.9					588
Vinyl chloride	Pyridine, 4-vinyl-					Y	154
Vinyl chloride	Pyrrolidone, *N*-vinyl-	0.53		0.38			40
Vinyl chloride	Pyrrolidone, *N*-vinyl-	0.55		0.34			582
Vinyl chloride	Pyrrolidone, *N*-vinyl-	0.74		0.73			582
Vinyl chloride	Styrene	−0.06	0.08	27.54	7.35	Y	109
Vinyl chloride	Styrene	0.058	0.003	17.24	1.12	Y	238
Vinyl chloride	Styrene	0.16	0.08	23.92	3.6	N	242
Vinyl chloride	Styrene	0.005	0.031	25	5	Y	46
Vinyl chloride	Styrene	0.04		12.4			516
Vinyl chloride	Styrene	0.01	0.87	14.7	29.2	Y	59
Vinyl chloride	Styrene, pentachloro-	0.43		5.3			516
Vinyl chloride	Triallyl citrate	0.605	0.033	1.03	0.17	Y	367
Vinyl chloride	Vinyl 12-ketostearate	0.03		−0.01		Y	146

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl chloride	Vinyl 2-chloroethyl ether	2.46	0.52	– 0.07	0.11	Y	304
Vinyl chloride	Vinyl acetate	1.63	0.32	0.43	0.14	Y	109
Vinyl chloride	Vinyl acetate	1.032	0.097	0.981	0.036	Y	148
Vinyl chloride	Vinyl acetate	1.84	0.68	0.24	0.15	Y	158
Vinyl chloride	Vinyl acetate	2.13	0.2	0.263	0.028	Y	283
Vinyl chloride	Vinyl acetate	1.64	0.12	0.25	0.15	Y	3
Vinyl chloride	Vinyl acetate	1.35		0.65			450
Vinyl chloride	Vinyl acetate	2.3	0.64	0.26	0.14	N	86
Vinyl chloride	Vinyl benzoate	1.66	0.16	0.343	0.036	Y	283
Vinyl chloride	Vinyl benzoate	1.7		0.5			450
Vinyl chloride	Vinyl benzoate	0.72		0.28			519
Vinyl chloride	Vinyl butyl ether	2.084	0.016	0.023	0.001	Y	279
Vinyl chloride	Vinyl butylsulfonate	0.325	0.013	0.267	0.046	Y	185
Vinyl chloride	Vinyl butylsulfonate	8.47	0.86	0.083	0.096	Y	185
Vinyl chloride	Vinyl butyrate	2.092	0.074	0.302	0.013	Y	283
Vinyl chloride	Vinyl butyrate	1.75		0.55			400
Vinyl chloride	Vinyl butyrate	1.35		0.65			494
Vinyl chloride	Vinyl caproate	2.26	0.22	0.348	0.05	Y	283
Vinyl chloride	Vinyl chloroacetate	1.64	0.34	0.421	0.055	Y	283
Vinyl chloride	Vinyl dichloroacetate	1.3	0.55	0.91	0.49	Y	283
Vinyl chloride	Vinyl dodecyl ether	1.93		0.15			370
Vinyl chloride	Vinyl fluoride	11		0.05			590
Vinyl chloride	Vinyl fluoride	11.6		0.11			755
Vinyl chloride	Vinyl hendecanoate	1.081	0.016	0.38	0.022	Y	145
Vinyl chloride	Vinyl isobutyl ether	2.19	1.43	0.04	0.37	Y	47
Vinyl chloride	Vinyl laurate	7.4		0.2			450
Vinyl chloride	Vinyl *m*-cresyl ether	1.23	0.04	0.13	0.02	Y	279
Vinyl chloride	Vinyl methyl ketone	0.1		8.3			375
Vinyl chloride	Vinyl *o*-cresyl ether	1.33	0.02	0.14	0.01	Y	279
Vinyl chloride	Vinyl octadecyl ether	2.1		– 0.1			370
Vinyl chloride	Vinyl octyl ether	1.9		0.1			370
Vinyl chloride	Vinyl *p*-chlorophenyl ether	1	0.04	0.63	0.05	Y	279
Vinyl chloride	Vinyl *p*-cresyl ether	1.17	0.02	0.13	0.01	Y	279
Vinyl chloride	Vinyl *p*-*tert*-butylphenyl ether	1.08	0.06	0.14	0.02	Y	279
Vinyl chloride	Vinyl *p*-vinyloxybenzoate	0.58	0.06	0.78	0.07	N	497
Vinyl chloride	Vinyl pelargonate	1.16		0.28			145
Vinyl chloride	Vinyl phenyl ether	1.28	0.14	0.01	0.59	Y	172
Vinyl chloride	Vinyl phenyl ether	1.06		0.16			279
Vinyl chloride	Vinyl phenyl ether	1.21	0.03	0.17	0.03	N	280
Vinyl chloride	Vinyl propionate	1.6		0.6			400
Vinyl chloride	Vinyl propionate	1.35		0.65			450
Vinyl chloride	Vinyl stearate	0.71	0.097	0.24	0.64	Y	145
Vinyl chloride	Vinyl *tert*-butyl sulfide	3		0.15			598
Vinyl chloride	Vinyl *tert*-butyl sulfide	3		0.15			601
Vinyl chloride	Vinyl valerate	2.006	0.071	0.277	0.014	Y	283
Vinyl chloride	Vinylene carbonate	4.82	0.49	0.03	0.12	Y	103
Vinyl chloride	Vinylene carbonate	15.38	1.44	0.069	0.068	Y	319
Vinyl chloride	Vinylene carbonate	17.81	7.84	0	0.22	Y	319
Vinyl chloride	Vinylethyldiethoxysilane	0.94	1.53	– 0.44	2.97	Y	237
Vinyl chloride	Vinylidene chloride	0.071	0.025	2.06	0.32	Y	238
Vinyl chloride	Vinylidene chloride	0.14	0.32	3.39	1.16	N	29
Vinyl chloride	Vinylidene chloride	0.25		8.92		Y	3
Vinyl chloride	Vinylidene chloride	0.3		3.2			470
Vinyl chloride	Vinylidene chloride	0.2		4.5			517
Vinyl chloride	Vinylidene chloride	0.2		1.8			539
Vinyl chloride	Vinylidene chloride	0.16		4.5			585
Vinyl chloride	Vinylidene chloride	0.205	0.003	3.068	0.076	Y	67
Vinyl chloride	Vinylidene cyanide	0.01		0.72			409
Vinyl chloride	Vinylidene cyanide	0.016	0.002	0.6	0.068	Y	82
Vinyl chloride	Vinylisocyanate	0.46		3.7			777
Vinyl chloride	Vinylphenylisocyanate, *p*-	0.01		11.9			777
Vinyl chloride	Vinyltriethoxysilane	0.82	0.16	– 0.04	0.44	Y	237
Vinyl chloride	Vinyltrimethoxysilane	0.93		0.09		Y	237
Vinyl chloroacetate	Acrylonitrile	– 0.007	0.016	4.18	0.33	Y	362
Vinyl chloroacetate	Acrylonitrile	0.09		0.34			542

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl chloroacetate	Phosphate, vinyl diethyl	2.01	0.2	0.374	0.046	Y	779
Vinyl chloroacetate	Phosphate, vinyl diphenyl	1.42	0.15	0.53	0.12	Y	779
Vinyl chloroacetate	Styrene	– 0.04	0.24	14.57	62.41	Y	212
Vinyl chloroacetate	Styrene	0.03		45			542
Vinyl chloroacetate	Vinyl acetate	1.39	0.3	0.83	0.12	N	71
Vinyl chloroacetate	Vinyl acetate	0.88	0.19	0.803	0.089	Y	779
Vinyl chloroacetate	Vinyl acetate	1.18		0.8			861
Vinyl chloroacetate	Vinyl butyl ether	1.49	34.5	0.12	4.39	Y	212
Vinyl chloroacetate	Vinyl chloride	0.421	0.055	1.64	0.34	Y	283
Vinyl chloroacetate	Vinyl ethyl ether	1.92	17.19	0.43	3.9	Y	212
Vinyl chloroacetate	Vinyl phenyl ether	0.84	1.67	0.55	0.61	Y	212
Vinyl chloroacetate	Vinylidene cyanide	0	0.006	0.137	0.037	Y	82
Vinyl chloroethyl ether	Acrylonitrile	– 0.02	0.02	1.04	0.05	N	116
Vinyl chloroethyl ether	Methacrylic anhydride					Y	106
Vinyl chloroformate	Vinyl acetate	0.579	0.076	0.67	0.16	Y	675
Vinyl chloroformate	Vinyl acetate	0.586	0.052	0.66	0.12	Y	706
Vinyl chloromethyl ketone	Acrylonitrile	0.88	0.12	0.064	0.019	Y	356
Vinyl chloromethyl ketone	Methacrylate, methyl	0.593	0.092	0.121	0.021	Y	356
Vinyl chloromethyl ketone	Styrene	0.507	0.039	0.127	0.047	Y	353
Vinyl chloromethyl ketone	Styrene, α-methyl-	0.386	0.034	0.009	0.01	Y	356
Vinyl chloromethyl ketone	Vinyl acetate	49.52	15.79	0.044	0.054	Y	356
Vinyl chloromethyl ketone	Vinylidene chloride	6.8	0.3	0.018	0.009	Y	356
Vinyl cinnamate	Methacrylonitrile	0.15		4.6			200
Vinyl cinnamate	Pyrrolidone, *N*-vinyl-	1.2		0.01			200
Vinyl cinnamate	Vinyl acetate	1.2		0.04			200
Vinyl cyclohexyl ether	Pyrrolidone, *N*-vinyl-	– 0.11	0.59	1.91	9.39	Y	214
Vinyl cyclohexyl ketone	Vinyl 4-chlorocyclohexyl ketone	1.6		0.5			668
Vinyl cyclohexyl ketone	Vinyl acetate	13.76		0.08			846
Vinyl cymantrene	Acrylate, methyl	0.211	0.067	0.46	0.14	Y	354
Vinyl cymantrene	Acrylonitrile	– 0.065	0.093	0.446	0.048	Y	354
Vinyl cymantrene	Pyrrolidone, *N*-vinyl-	0.093	0.053	0.037	0.03	Y	308
Vinyl cymantrene	Styrene	0.096	0.014	2.324	0.06	Y	354
Vinyl cymantrene	Vinyl acetate	7.21	1.01	0.072	0.003	Y	354
Vinyl dichloroacetate	Acrylonitrile	0.044	0.015	7.45	0.32	Y	362
Vinyl dichloroacetate	Acrylonitrile	0.18		0.25			542
Vinyl dichloroacetate	Styrene	0.28		20			542
Vinyl dichloroacetate	Vinyl chloride	0.91	0.49	1.3	0.55	Y	283
Vinyl diethylphosphinate	Ethylene	– 11.99	80.64	0.15	0.16	Y	311
Vinyl diethylphosphinate	Ethylene	– 62.84	34.66	0.05	0.01	Y	311
Vinyl dodecyl ether	Acrylonitrile	0		0.82			373
Vinyl dodecyl ether	Styrene	0		27			374
Vinyl dodecyl ether	Styrene	0		56			374
Vinyl dodecyl ether	Vinyl acetate	0		3.67			372
Vinyl dodecyl ether	Vinyl chloride	0.15		1.93			370
Vinyl dodecyl ether	Vinylidene chloride	0		1.3			371
Vinyl ether	Acrylonitrile	0.02		0.94			386
Vinyl ether	Methacrylate, methyl	– 0.15	0.16	4.9	0.99	Y	45
Vinyl ether	Pyridine, 4-vinyl-	0.03		32			395
Vinyl ether	Styrene	1.2	5.3	152	185	Y	45
Vinyl ethyl ether	Acrylate, methyl	0		3.3			470
Vinyl ethyl ether	Acrylonitrile	0.06	0.12	0.69	0.12	N	194
Vinyl ethyl ether	Ethylene	0		2.7			584
Vinyl ethyl ether	Fumarate, diethyl	– 0.124	0.059	1.63	0.16	Y	194
Vinyl ethyl ether	Methacrylate methyl	0.01		37			106
Vinyl ethyl ether	Styrene	0		90			140
Vinyl ethyl ether	Styrene	– 0.122	0.066	111	15.5	Y	194
Vinyl ethyl ether	Vinyl acetate	0.26		3.42		Y	158
Vinyl ethyl ether	Vinyl chloroacetate	0.43	3.9	1.92	17.19	Y	212
Vinyl ethyl ether	Vinylidene chloride	0		3.2			470
Vinyl ethyl ketone	Methacrylate, methyl	0.65	0.42	0.42	0.17	Y	794
Vinyl ethyl ketone	Styrene	– 0.033	0.023	13.83	1.44	Y	112
Vinyl ethyl ketone	Styrene	0.43	0.06	0.2	0.08	N	344
Vinyl ethyl ketone	Styrene	0.332	0.043	0.29	0.16	Y	353
Vinyl ethyl ketone	Styrene	0.122	0.017	0.665	0.021	Y	550
Vinyl ethyl ketone	Vinyl acetate	10.18	6.62	– 0.13	0.18	Y	794

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl ethyl oxalate	Acrylonitrile	0	0.28	1.34	0.45	Y	124
Vinyl ethyl oxalate	Methacrylate, methyl	−0.05	0.44	4.74	2.95	Y	124
Vinyl ethyl oxalate	Styrene	−0.12	0.19	5.62	1.06	Y	124
Vinyl ethyl oxalate	Vinyl acetate	9.89	8.44	1.35	0.84	Y	124
Vinyl ethyl sulfide	Acrylonitrile	0.06	0.03	0.09	0.01	N	285
Vinyl ethyl sulfide	Acrylonitrile	0.05	0.03	0.06	0.01	N	336
Vinyl ethyl sulfide	Methacrylate, methyl	0.036	0.017	1.03	0.11	Y	303
Vinyl ethyl sulfide	Methacrylate, methyl	0.3		2.7			507
Vinyl ethyl sulfide	Styrene	0.113	0.032	4.76	0.2	Y	303
Vinyl ethyl sulfide	Styrene	0.25		6			507
Vinyl ethyl sulfoxide	Acrylonitrile	−0.08	0.14	1.63	0.16	Y	286
Vinyl ethyl sulfoxide	Methacrylate, methyl	−0.037	0.06	11.17	0.48	Y	286
Vinyl ethyl sulfoxide	Styrene	0.101	0.044	9.64	0.54	Y	286
Vinyl ethyl sulfoxide	Styrene	0.1		6			286
Vinyl ethylene glycol glycidyl ether	Pyrrolidone, *N*-vinyl-	0.06		1.4			369
Vinyl ethylene glycol glycidyl ether	Pyrrolidone, *N*-vinyl-	0.06		1.4			818
Vinyl fluoride	Acrylate, butyl	0.01		19			604
Vinyl fluoride	Acrylate, butyl	0.01		19			606
Vinyl fluoride	Acrylate, methyl	0.01		43			604
Vinyl fluoride	Acrylate, methyl	0.01		43			606
Vinyl fluoride	Acrylonitrile	0.005		44			528
Vinyl fluoride	Acrylonitrile	1		24			590
Vinyl fluoride	Ethylene	0.01	0.15	2.52	0.32	N	42
Vinyl fluoride	Ethylene	0.3		1.7			590
Vinyl fluoride	Ethylene, chlorotrifluoro-	0.8		1.2			406
Vinyl fluoride	Vinyl acetate	0.25		3.5			755
Vinyl fluoride	Vinyl chloride	0.05		11			590
Vinyl fluoride	Vinyl chloride	0.11		11.6			755
Vinyl fluoride	Vinylidene chloride	0.16		6			607
Vinyl formate	Acrylonitrile	−0.004	0.12	2.54	1.79	Y	47
Vinyl formate	Allyl chloride	0.57		0.78			438
Vinyl formate	Butadiene, 2-chloro-	−0.04		15			127
Vinyl formate	Butadiene, 2-chloro-	−0.05	0.01	11.91	3.89	N	247
Vinyl formate	Carbazole, *N*-vinyl-	0.192	0.001	4.142	0.011	Y	246
Vinyl formate	Vinyl acetate	0.98	0.06	0.94	0.14	N	272
Vinyl formate	Vinyl acetate	0.68		1.41			401
Vinyl hendecanoate	Acrylate, methyl	0.033	0.008	3.615	0.012	Y	145
Vinyl hendecanoate	Acrylonitrile	0.09	0.91	1.88	0.44	Y	145
Vinyl hendecanoate	Butadiene	−0.22	1.26	22.56	24.54	Y	145
Vinyl hendecanoate	Styrene	−0.17	0.18	24.89	1.22	Y	145
Vinyl hendecanoate	Vinyl chloride	0.38	0.022	1.081	0.016	Y	145
Vinyl hendecanoate	Vinylidene chloride	0.04	0.16	2.72	0.37	Y	145
Vinyl iodide	Styrene	0.126	0.035	7.401	0.315		806
Vinyl isobutyl ether	Acrylate, 2-chloroethyl	0		2.24			790
Vinyl isobutyl ether	Acrylate, methyl	0	0.002	3.63	0.04	N	347
Vinyl isobutyl ether	Acrylonitrile	0.7	0.09	−0.24	0.26	N	322
Vinyl isobutyl ether	Acrylonitrile	0.99	0.06	−0.05	0.07	N	322
Vinyl isobutyl ether	Acrylonitrile	−0.04	0.01	0.98	0.15	N	347
Vinyl isobutyl ether	Acrylonitrile	−0.04	0.02	1.26	0.19	N	347
Vinyl isobutyl ether	Ethylene, trichloro-	0.05	0.009	0.014	0.003	Y	332
Vinyl isobutyl ether	Fumarate, diethyl	0		0.52			640
Vinyl isobutyl ether	Maleate, diethyl	0		0.17			640
Vinyl isobutyl ether	Styrene	0.65	0.39	11.58	1.91	N	349
Vinyl isobutyl ether	Styrene	0.29	0.33	11.96	2.32	N	349
Vinyl isobutyl ether	Styrene	0.01		50			490
Vinyl isobutyl ether	Vinyl chloride	0.04	0.37	2.19	1.43	Y	47
Vinyl isobutyl ether	Vinylene carbonate	0.18		0.16			322
Vinyl isobutyl sulfide	Acrylate, ethyl	0.05	0.04	0.36	0.02	N	285
Vinyl isobutyl sulfide	Acrylate, ethyl	0.05	0.05	0.32	0.02	N	336
Vinyl isobutyl sulfide	Acrylate, methyl	0.05	0.02	0.3	0.01	N	285
Vinyl isobutyl sulfide	Acrylate, methyl	0.06	0.02	0.29	0.01	N	336
Vinyl isobutyl sulfide	Acrylonitrile	0.03	0.01	0.08	0.005	N	285
Vinyl isobutyl sulfide	Acrylonitrile	0.022	0.038	0.062	0.004	Y	303
Vinyl isobutyl sulfide	Acrylonitrile	0.03	0.01	0.08	0.004	N	336
Vinyl isobutyl sulfide	Methacrylate, methyl	0.05	0.03	0.89	0.01	N	285

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl isobutyl sulfide	Methacrylate, methyl	0.021	0.034	0.985	0.077	Y	303
Vinyl isobutyl sulfide	Methacrylate, methyl	0.03	0.02	0.88	0.02	N	336
Vinyl isobutyl sulfide	Styrene	−0.11	0.2	2.38	0.41	Y	303
Vinyl isopropyl ether	Caprolactam, *N*-vinyl-	0.01	0.96	0.22	1.95	Y	215
Vinyl isopropyl ether	Pyrrolidone, *N*-vinyl-	0.03	2.09	0.87	9.3	Y	215
Vinyl isopropyl ketone	Methacrylate, methyl	1.44		0.81			601
Vinyl isopropyl ketone	Methacrylate, methyl	0.6	0.47	0.54	0.22	Y	794
Vinyl isopropyl ketone	Styrene	0.26	0.07	0.46	0.05	N	344
Vinyl isopropyl ketone	Styrene	0.272	0.046	0.36	0.1	Y	353
Vinyl isopropyl ketone	Styrene	0.3		0.4			599
Vinyl isopropyl ketone	Vinyl acetate	7.87		0.3			601
Vinyl isopropyl ketone	Vinyl acetate	6.47	2.18	−0.154	0.073	Y	794
Vinyl isopropyl sulfide	Methacrylate, methyl	0.046	0.025	0.822	0.064	Y	303
Vinyl isopropyl sulfide	Styrene	0.16	0.068	4.61	0.18	Y	303
Vinyl isothiocyanate	Acrylonitrile	1.4		0.36			542
Vinyl isothiocyanate	Methacrylate, methyl	0.6		0.85			422
Vinyl isothiocyanate	Styrene	0.37		0.65			422
Vinyl isothiocyanate	Styrene	0.5		0.8			542
Vinyl 1-methyl ether	Indene	0.67	2.82	12.64	12.59	Y	750
Vinyl laurate	Acrylonitrile	0.04		4			381
Vinyl laurate	Vinyl acetate	0.7		1.4			503
Vinyl laurate	Vinyl chloride	0.2		7.4			450
Vinyl *m*-cresyl ether	Methacrylate, methyl	0.2		3.3			605
Vinyl *m*-cresyl ether	Vinyl chloride	0.13	0.02	1.23	0.04	Y	279
Vinyl *m*-cresyl ether	Vinylidene chloride	0.04	0.004	1.95	0.07	Y	279
Vinyl methanesulfonate	Vinyl acetate	0.206	0.427	0.639	0.014	Y	942
Vinyl methyl ketone	Acrylamide	0.47	0.44	3.99	0.7	Y	609
Vinyl methyl ketone	Acrylamide	0.75	0.23	1.02	0.13	Y	609
Vinyl methyl ketone	Acrylamide, *N*,*N*-dimethyl	0.1	0.43	0.82	0.36	Y	609
Vinyl methyl ketone	Acrylate, butyl	1.81	0.24	0.8	0.06	N	53
Vinyl methyl ketone	Acrylonitrile	1.75	0.11	0.59	0.13	Y	140
Vinyl methyl ketone	Acrylonitrile	1.39		0.63			504
Vinyl methyl ketone	Indene	2.63		0.2			606
Vinyl methyl ketone	Indene	2.9		0.25			606
Vinyl methyl ketone	Methacrylamide	0.25	0.12	3	0.18	Y	609
Vinyl methyl ketone	Methacrylamide	0.28	0.24	1.72	0.26	Y	609
Vinyl methyl ketone	Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	0.41		0.53			664
Vinyl methyl ketone	Methyleneglutaronitrile, 2-	5.05		1.24			512
Vinyl methyl ketone	Styrene	0.349	0.068	0.288	0.092	Y	140
Vinyl methyl ketone	Styrene	0.348	0.009	0.237	0.023	Y	353
Vinyl methyl ketone	Styrene	0.27		0.35			550
Vinyl methyl ketone	Styrene, 2,5-dichloro-	0.5		2			375
Vinyl methyl ketone	Triazine, 4,6-diamino-2-vinyl-	0.17	0.11	1.35	0.68	Y	243
Vinyl methyl ketone	Vinyl acetate					Y	91
Vinyl methyl ketone	Vinyl chloride	8.3		0.1			375
Vinyl methyl ketone	Vinyl phenyl ether	4.4		0.01			423
Vinyl methyl ketone	Vinyl phenyl ketone	0.74		0.671			946
Vinyl methyl ketone	Vinylidene chloride	1.8		0.55			375
Vinyl methyl sulfide	Acrylate, methyl	0.084	0.086	0.209	0.034	Y	195
Vinyl methyl sulfide	Methacrylate, methyl	0.03		1			106
Vinyl methyl sulfide	Styrene	0.15		4.5			193
Vinyl methyl sulfide	Styrene	0.066	0.056	4.46	0.11	Y	195
Vinyl methyl sulfide	Styrene	0.046	0.084	5	0.24	Y	303
Vinyl methyl sulfide	Vinylene carbonate	7.72	1.68	−0.08	0.17	Y	120
Vinyl methyl sulfone	Styrene	−0.22	0.17	1.146	0.087	Y	195
Vinyl methyl sulfone	Vinyl acetate	0.55	0.21	0	0.02	Y	195
Vinyl methyl sulfoxide	Styrene	0.01		3.57			737
Vinyl methyl sulfoxide	Styrene, *p*-chloro-	0.01		6.46			737
Vinyl methyl sulfoxide	Styrene, *p*-methyl-	0.01		2.73			737
Vinyl mono-diethyleneglycol ether	Methacrylic acid	2.2		0			831
Vinyl mono-ethyleneglycol ether	Methacrylate, glycidyl	0		4.41			780
Vinyl *o*-cresyl ether	Methacrylate, methyl	0.1		1.8			605
Vinyl *o*-cresyl ether	Vinyl chloride	0.14	0.01	1.33	0.02	Y	279
Vinyl *o*-cresyl ether	Vinylidene chloride	0.04	0.01	2.1	0.1	Y	279

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl octadecyl ether	Acrylonitrile	0		0.85			373
Vinyl octadecyl ether	Vinyl acetate	0		4.5			372
Vinyl octadecyl ether	Vinyl chloride	−0.1		2.1			370
Vinyl octadecyl ether	Vinylidene chloride	0		1.5			371
Vinyl octyl ether	Acrylonitrile	0		0.81			373
Vinyl octyl ether	Styrene	0		65			374
Vinyl octyl ether	Vinyl acetate	0		3.47			372
Vinyl octyl ether	Vinyl chloride	0.1		1.9			370
Vinyl *p*-benzylethylcarbinol	Acrylate, butyl	0.4		0.17			591
Vinyl *p*-benzylethylcarbinol	Acrylate, methyl	0.48		0.18			591
Vinyl *p*-benzylethylcarbinol	Acrylonitrile	0.31		0.04			591
Vinyl *p*-benzylmethylcarbinol	Acrylonitrile	0.54	0.2	0.11	0.17	N	48
Vinyl *p*-benzylmethylcarbinol	Methacrylate, methyl	0.98	0.28	0.24	0.26	Y	48
Vinyl *p*-benzylmethylcarbinol	Styrene	0.94	0.15	0.98	0.32	Y	48
Vinyl *p*-benzylmethylcarbinol	Styrene, *p*-chloro-	1		1		Y	48
Vinyl *p*-bromobenzoate	Vinyl benzoate	1.17	0.13	0.716	0.031	Y	110
Vinyl *p*-bromobenzoate	Vinyl *p*-cyanobenzoate	0.83	0.021	0.901	0.034	Y	110
Vinyl *p*-bromobenzoate	Vinyl *p*-methoxybenzoate	1.08	0.29	0.72	0.1	Y	110
Vinyl *p*-bromobenzoate	Vinyl *p*-methylbenzoate	1.05	0.17	0.594	0.045	Y	110
Vinyl *p*-chlorobenzoate	Vinyl benzoate	0.81	0.072	0.832	0.028	Y	110
Vinyl *p*-chlorobenzoate	Vinyl *p*-cyanobenzoate	0.813	0.014	1.031	0.028	Y	110
Vinyl *p*-chlorobenzoate	Vinyl *p*-methoxybenzoate	1	0.14	0.699	0.057	Y	110
Vinyl *p*-chlorobenzoate	Vinyl *p*-methylbenzoate	0.853	0.054	0.682	0.021	Y	110
Vinyl *p*-chlorophenyl ether	Vinyl chloride	0.63	0.05	1	0.04	Y	279
Vinyl *p*-chlorophenyl ether	Vinylidene chloride	0.14	0.01	2.44	0.04	Y	279
Vinyl *p*-cresyl ether	Methacrylate, methyl	0		2.6			605
Vinyl *p*-cresyl ether	Vinyl chloride	0.13	0.01	1.17	0.02	Y	279
Vinyl *p*-cresyl ether	Vinylidene chloride	0.03	0.004	1.97	0.06	Y	279
Vinyl *p*-cyanobenzoate	Vinyl benzoate	0.878	0.094	0.659	0.033	Y	110
Vinyl *p*-cyanobenzoate	Vinyl *p*-bromobenzoate	0.901	0.034	0.83	0.021	Y	110
Vinyl *p*-cyanobenzoate	Vinyl *p*-chlorobenzoate	1.031	0.028	0.813	0.014	Y	110
Vinyl *p*-cyanobenzoate	Vinyl *p*-methoxybenzoate	0.63	0.22	0.685	0.075	Y	110
Vinyl *p*-cyanobenzoate	Vinyl *p*-methylbenzoate	0.81	0.1	0.624	0.04	Y	110
Vinyl *p*-methoxybenzoate	Vinyl *p*-bromobenzoate	0.72	0.1	1.08	0.29	Y	110
Vinyl *p*-methoxybenzoate	Vinyl *p*-chlorobenzoate	0.699	0.057	1	0.14	Y	110
Vinyl *p*-methoxybenzoate	Vinyl *p*-cyanobenzoate	0.685	0.075	0.63	0.22	Y	110
Vinyl *p*-methylbenzoate	Vinyl *p*-bromobenzoate	0.594	0.045	1.05	0.17	Y	110
Vinyl *p*-methylbenzoate	Vinyl *p*-chlorobenzoate	0.682	0.021	0.853	0.054	Y	110
Vinyl *p*-methylbenzoate	Vinyl *p*-cyanobenzoate	0.624	0.04	0.81	0.1	Y	110
Vinyl *p*-*tert*-butylphenyl ether	Vinyl chloride	0.14	0.02	1.08	0.06	Y	279
Vinyl *p*-*tert*-butylphenyl ether	Vinylidene chloride	0.05	0.004	2.04	0.06	Y	279
Vinyl *p*-vinyloxybenzoate	Vinyl chloride	0.78	0.07	0.58	0.06	N	497
Vinyl pelargonate	Butadiene	0.02		26.3			145
Vinyl pelargonate	Styrene	0.01		49.5			145
Vinyl pelargonate	Vinyl chloride	0.28		1.16			145
Vinyl pelargonate	Vinylidene chloride	0		4.08			145
Vinyl phenyl carbonate	Vinyl acetate	0.384	0.083	0.85	0.23	Y	675
Vinyl phenyl carbonate	Vinyl acetate	0.384	0.083	0.85	0.23	Y	705
Vinyl phenyl ether	Acrylonitrile	0.23		2.5			556
Vinyl phenyl ether	Caprolactam, *N*-vinyl-	0.26	0.37	1.3	2.43	Y	214
Vinyl phenyl ether	Methacrylate, methyl	0.01	0.32	11.34	5.76	Y	172
Vinyl phenyl ether	Methacrylate, methyl	0		2.8			605
Vinyl phenyl ether	Pyrrolidone, *N*-vinyl-	0.253	0.007	4.48	0.1	Y	214
Vinyl phenyl ether	Styrene	0.01		1.7			423
Vinyl phenyl ether	Vinyl chloride	0.01	0.59	1.28	0.14	Y	172
Vinyl phenyl ether	Vinyl chloride	0.16		1.06			279
Vinyl phenyl ether	Vinyl chloride	0.17	0.03	1.21	0.03	N	280
Vinyl phenyl ether	Vinyl chloroacetate	0.55	0.61	0.84	1.67	Y	212
Vinyl phenyl ether	Vinyl methyl ketone	0.01		4.4			423
Vinyl phenyl ether	Vinylidene chloride	0.433	0.051	2.45	0.34	Y	240
Vinyl phenyl ether	Vinylidene chloride	0.04	0.03	2.11	0.11	N	280
Vinyl phenyl ketone	Methacrylate, glycidyl	0.697		0.719			946
Vinyl phenyl ketone	Methacrylate, methyl	0.59	1.9	0.71	0.6	Y	794
Vinyl phenyl ketone	Styrene	0.3	0.02	0.24	0.04	N	344
Vinyl phenyl ketone	Styrene	0.465	0.03	0.21	0.042	Y	353

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinyl phenyl ketone	Vinyl acetate	5.81	0.96	−0.06	0.057	Y	794
Vinyl phenyl ketone	Vinyl methyl ketone	0.671		0.74			946
Vinyl phenyl sulfide	Acrylate, methyl	−0.02	0.22	0.57	0.1	Y	193
Vinyl phenyl sulfide	Acrylonitrile	0.03	0.02	0.11	0.01	N	285
Vinyl phenyl sulfide	Acrylonitrile	0.03	0.01	0.11	0.01	N	336
Vinyl phenyl sulfide	Benzothiazole, vinylmercapto-	0.24	0.12	0.95	0.61	Y	763
Vinyl phenyl sulfide	Methacrylate, methyl	0.06	0.09	0.79	0.06	N	239
Vinyl phenyl sulfide	Methacrylate, methyl	0.08		0.85			239
Vinyl phenyl sulfide	Styrene	0.019	0.054	3.63	0.12	Y	193
Vinyl phenyl sulfide	Styrene	0.26	0.18	3.96	0.27	N	239
Vinyl phenyl sulfone	Styrene	−0.31	0.16	1.562	0.091	Y	193
Vinyl phenyl sulfone	Vinyl acetate	−0.35	0.37	0.171	0.064	Y	193
Vinyl propionate	Allyl chloride	0.62		0.68			438
Vinyl propionate	Butadiene, 2-chloro-					N	247
Vinyl propionate	Carbazole, *N*-vinyl-	0.081	0.073	1.69	0.21	Y	246
Vinyl propionate	Ethylene	1.5		0.67			605
Vinyl propionate	Methacrylate, methyl	0.03		24			272
Vinyl propionate	Vinyl acetate	0.98		0.98			272
Vinyl propionate	Vinyl acetate	1		0.9			425
Vinyl propionate	Vinyl chloride	0.6		1.6			400
Vinyl propionate	Vinyl chloride	0.65		1.35			450
Vinyl stearate	Acrylate, methyl	0.03		5.8			537
Vinyl stearate	Acrylonitrile	0.078	0.007	4.639	0.015	Y	145
Vinyl stearate	Butadiene	0.02	0.27	42.5	4.73	Y	145
Vinyl stearate	Styrene	−0.39	0.71	15.96	13.32	Y	145
Vinyl stearate	Vinyl acetate	0.96	0.17	0.953	0.015	Y	1
Vinyl stearate	Vinyl acetate	0.73		0.9			537
Vinyl stearate	Vinyl chloride	0.24	0.64	0.71	0.097	Y	145
Vinyl stearate	Vinylidene chloride	0.08	0.17	3.92	0.14	Y	145
Vinyl sulfone	Methacrylate, methyl	0.1	0.16	4.5	0.49	Y	45
Vinyl sulfone	Styrene	−0.027	0.047	0.731	0.058	Y	45
Vinyl *tert*-butyl ketone	Methacrylate, methyl	0.65	0.15	1.21	0.11	Y	794
Vinyl *tert*-butyl ketone	Styrene	3.2	0.46	0.3	0.31	N	344
Vinyl *tert*-butyl sulfide	Styrene	0.248	0.05	0.36	0.11	Y	353
Vinyl *tert*-butyl sulfide	Acrylonitrile	0	0.013	0.09	0.024	Y	303
Vinyl *tert*-butyl sulfide	Styrene	0.158	0.073	4.36	0.76	Y	303
Vinyl *tert*-butyl sulfide	Vinyl acetate	0.07		13			598
Vinyl *tert*-butyl sulfide	Vinyl acetate	0.07		13			601
Vinyl *tert*-butyl sulfide	Vinyl chloride	0.15		3			598
Vinyl *tert*-butyl sulfide	Vinyl chloride	0.15		3			601
Vinyl thiolacetate	Acrylate, methyl	0.23		0.8			566
Vinyl thiolacetate	Carbazole, *N*-vinyl-	0.45	0.15	0.44	0.28	N	97
Vinyl thiolacetate	Styrene	0.25		4			566
Vinyl thiolacetate	Succinimide, *N*-vinyl-	2.47	0.37	0.17	0.15	N	97
Vinyl thiolacetate	Vinyl acetate	5.5		0.05			566
Vinyl thiolacetate	Vinylene carbonate	13.57	1.04	0.041	0.01	Y	186
Vinyl trichloroacetate	Acrylonitrile	0.047	0.039	7.34	0.9	Y	362
Vinyl trimethylammonioethyl ether iodide	*N*-Vinylpyrrolidone	0	0.02	11.6	0.03		1037
Vinyl valerate	Vinyl chloride	0.277	0.014	2.006	0.071	Y	283
Vinyl, 2-, 2-methyl-4,4,6,6-tetraphenyl-cyclotrisiloxane	Styrene	0.8		0.11			626
Vinyl-tris(trimethoxysiloxy)silane	Acrylonitrile	0.07		3.9			209
Vinyl-tris(trimethoxysiloxy)silane	Acrylonitrile	0.08		3.85			573
Vinyl-tris(trimethoxysiloxy)silane	Methacrylate, methyl	0.02		34			482
Vinyl-tris(trimethoxysiloxy)silane	Styrene	0		26			209
Vinyl-tris(trimethoxysiloxy)silane	Styrene	0.01		24			482
Vinylacetophenone	Methacrylate, methyl	1.65	3.81	0.33	0.36	Y	266
Vinylacetophenone	Styrene	1.12	0.42	0.246	0.072	Y	266
Vinylanthracene, 9-	Acrylate, butyl	0.126	0.054	3.717	0.046	Y	123
Vinylanthracene, 9-	Acrylate, ethyl	0.295	0.056	3.498	0.041	Y	123
Vinylanthracene, 9-	Acrylate, methyl	0.08	0.092	2.998	0.067	Y	123
Vinylanthracene, 9-	Methacrylate, methyl	0.117	0.043	4.068	0.04	Y	123
Vinylanthracene, 9-	Styrene	0.25		2.12			123
Vinylanthracene, 9-	Styrene	0.3		2.12			48
Vinylbenzoate, *p*-, sodium	Acrylonitrile	0.23	0.34	0.174	0.04	Y	175

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinylbenzoic acid, *p*-	Acrylonitrile	1.63	0.42	0.06	0.009	Y	175
Vinylbenzoic acid, *p*-	Methacrylate, methyl	1.16	0.3	0.398	0.097	Y	266
Vinylbenzoic acid, *p*-	Styrene	1.029	0.06	0.282	0.011	Y	266
Vinylbenzyl chloride	Methacrylate, methyl	1.02		0.46			792
Vinylene carbonate	Acrylamide	0.05		13.8			387
Vinylene carbonate	Acrylonitrile	0.08		14.9			579
Vinylene carbonate	Methacrylate, methyl	– 0.04	0.85	126	298	Y	103
Vinylene carbonate	Pyrrolidone, *N*-vinyl-	0.056	0.059	1.08	0.11	Y	103
Vinylene carbonate	Styrene	3.16		411		Y	103
Vinylene carbonate	Styrene	– 0.73	0.98	21.03	23.45	Y	120
Vinylene carbonate	Vinyl acetate	0.3	0.3	3.2	0.62	Y	103
Vinylene carbonate	Vinyl acetate	0.27		3			103
Vinylene carbonate	Vinyl acetate	0.05	0.16	7.16	0.64	Y	120
Vinylene carbonate	Vinyl acetate	0.13		7.3			120
Vinylene carbonate	Vinyl acetate	0.044	0.039	3.83	0.18	Y	144
Vinylene carbonate	Vinyl acetate	0.08	0.11	3.92	0.32	Y	90
Vinylene carbonate	Vinyl chloride	0.03	0.12	4.82	0.49	Y	103
Vinylene carbonate	Vinyl chloride	0.069	0.068	15.38	1.44	Y	319
Vinylene carbonate	Vinyl chloride	0	0.22	17.81	7.84	Y	319
Vinylene carbonate	Vinyl isobutyl ether	0.16		0.18			322
Vinylene carbonate	Vinyl 1-menthyl ether	0.14	1.91	0.25	3.32	Y	750
Vinylene carbonate	Vinyl methyl sulfide	– 0.08	0.17	7.72	1.68	Y	120
Vinylene carbonate	Vinyl thiolacetate	0.041	0.01	13.57	1.04	Y	186
Vinylethyldiethoxysilane	Vinyl chloride	– 0.44	2.97	0.94	1.53	Y	237
Vinylethynyl-4-piperidinol, 1,2,5-trimethyl-4-	Acrylonitrile	0.38		0.08			783
Vinylethynyl-4-piperidinol, 1,2,5-trimethyl-4-	Methacrylic acid	0.05		0.4			734
Vinylferrocene	Acrylonitrile	0.165	0.092	0.186	0.025	Y	294
Vinylferrocene	Acrylonitrile	0.15		0.16			294
Vinylferrocene	Butadiene	0.16	0.15	4.34	0.18	Y	802
Vinylferrocene	Methacrylate, methyl	0.52		1.22			294
Vinylferrocene	Pyrrolidone, *N*-vinyl-	0.71	0.16	0.364	0.068	Y	308
Vinylferrocene	Styrene	0.2	0.1	4.37	1.44	Y	274
Vinylferrocene	Styrene	0.14	0.14	2.76	0.22	Y	294
Vinylhydroquinone	Acrylic acid	0.026	0.092	0.29	0.11	Y	337
Vinylhydroquinone	Acrylonitrile	0.04	0.03	0.56	0.36	N	338
Vinylhydroquinone	Methacrylate, methyl	0.02	0.13	0.49	0.21	Y	337
Vinylhydroquinone	Pyridine, 4-vinyl-	– 0.23	0.36	0.53	0.4	Y	337
Vinylhydroquinone dibenzoate	Acrylate, methyl	0.75		0.46			440
Vinylhydroquinone dibenzoate	Acrylic acid	0.95		0.44			444
Vinylhydroquinone dibenzoate	Methacrylate, methyl	0.41		0.34			440
Vinylhydroquinone dibenzoate	Styrene	0.43		0.22			440
Vinylhydroquinone dibenzoate	Styrene, α-methyl-	0.3		0.11			440
Vinylidene chloride	Aconitate, trimethyl	64.6	23.74	0.15	0.94	N	149
Vinylidene chloride	Acrylamide, *N*-octadecyl-	0.432	0.008	1.4	0.11	Y	119
Vinylidene chloride	Acrylate, butyl	0.934	0.006	0.873	0.022	Y	118
Vinylidene chloride	Acrylate, butyl	0.84		0.46			464
Vinylidene chloride	Acrylate, butyl	0.87		0.58			464
Vinylidene chloride	Acrylate, ethyl	0.58	0.15	0.72	0.39	Y	65
Vinylidene chloride	Acrylate, methyl	0.9	0.11	0.95	0.21	Y	107
Vinylidene chloride	Acrylate, methyl	0.7		0.8			107
Vinylidene chloride	Acrylate, methyl	1		1			377
Vinylidene chloride	Acrylate, octadecyl	0.9	0.037	1	0.14	Y	118
Vinylidene chloride	Acrylate, octyl	0.851	0.018	0.679	0.057	Y	118
Vinylidene chloride	Acrylic acid	0.437	0.065	1.246	0.042	Y	288
Vinylidene chloride	Acrylonitrile	0.32	0.14	0.92	0.11	Y	138
Vinylidene chloride	Acrylonitrile	0.28	0.034	1.04	0.2	Y	238
Vinylidene chloride	Acrylonitrile	0.4		0.44			404
Vinylidene chloride	Acrylonitrile	0.42		0.58			404
Vinylidene chloride	Acrylonitrile	0.49		0.65			404
Vinylidene chloride	Acrylonitrile	0.69		0.57			404
Vinylidene chloride	Acrylonitrile	0.76		0.5			404
Vinylidene chloride	Acrylonitrile	0.95		0.48			404
Vinylidene chloride	Acrylonitrile	0.95		0.65			404

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TABLE 1. cont'd

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinylidene chloride	Acrylonitrile	1.3		0.65			404
Vinylidene chloride	Acrylonitrile	1.74		0.66			404
Vinylidene chloride	Acrylonitrile	1.43		0.63			404
Vinylidene chloride	Acrylonitrile	1.8		0.63			404
Vinylidene chloride	Acrylonitrile	0.39		0.58			468
Vinylidene chloride	Acryloyl chloride	0.5		1.12			288
Vinylidene chloride	Allyl acetate	6.6		0			470
Vinylidene chloride	Allyl chloride	3.49	1.4	0.24	0.24	Y	3
Vinylidene chloride	Allylstearamide, *N*-	5.22	0.15	−0.24	0.19	Y	119
Vinylidene chloride	Butadiene	−0.044	0.038	1.97	0.25	Y	257
Vinylidene chloride	Carbazole, *N*-vinyl-	−0.023	0.068	3.6	0.12	Y	13
Vinylidene chloride	Carbazole, *N*-vinyl-	−0.008	0.018	3.65	0.3	Y	98
Vinylidene chloride	Crotonaldehyde			0			405
Vinylidene chloride	Crotonic acid	18.1	43.7	−0.2	1.03	Y	47
Vinylidene chloride	Cyclopentene, 4-, 1,3-dione	1.88	0.35	0.113	0.027	Y	264
Vinylidene chloride	Diallyl phthalate	5		0.2			376
Vinylidene chloride	Ethylene	15.71	1.96	0.018	0.005	Y	299
Vinylidene chloride	Ethylene chlorotrifluoro-	17.14		0.02			454
Vinylidene chloride	Fumarate, diethyl	12.19	1.58	0.012	0.038	Y	59
Vinylidene chloride	Fumarate, diisopropyl	48		0.095			1038
Vinylidene chloride	Indene	0.49	0.15	0.293	0.095	Y	6
Vinylidene chloride	Indene	−0.02	1.15	0.34	0.85	Y	6
Vinylidene chloride	Isobutylene, 3-chloro-	1.1		0			470
Vinylidene chloride	Isopropenyl methyl ketone	0.134	0.099	4.06	0.66	Y	47
Vinylidene chloride	Isopropenylisocyanate	0.85		0.31			434
Vinylidene chloride	Maleate, diethyl	12.5					3
Vinylidene chloride	Maleimide	0.666	0.056	0.464	0.083	Y	251
Vinylidene chloride	Methacrylate, 2-(sulfonic acid)ethyl	0.22		3.6			564
Vinylidene chloride	Methacrylate, benzyl	0.34		3.3			432
Vinylidene chloride	Methacrylate, butyl	0.35	0.03	2.07	0.18	Y	3
Vinylidene chloride	Methacrylate, ethyl	0.353	0.02	2.18	0.1	Y	3
Vinylidene chloride	Methacrylate, methyl	0.3		2.6		Y	138
Vinylidene chloride	Methacrylate, methyl	0.36	0.03	2.38	0.02	N	324
Vinylidene chloride	Methacrylate, methyl	0.18	0.18	2.16	0.06	N	324
Vinylidene chloride	Methacrylate, methyl	0.5		2.5			426
Vinylidene chloride	Methacrylate, methyl	0.34		2.5			432
Vinylidene chloride	Methacrylate, methyl	0.09		2.1			538
Vinylidene chloride	Methacrylate, methyl	0.094	0.032	1.8	0.95	Y	65
Vinylidene chloride	Methacrylate, methyl	0.19		2.83			762
Vinylidene chloride	Methacrylate, methyl	0.02		1.23			762
Vinylidene chloride	Methacrylate, methyl	0.27	0.01	2.77	0.06	N	786
Vinylidene chloride	Methacrylic acid	0.154	0.047	3.368	0.098	Y	6
Vinylidene chloride	Methacrylonitrile	0.3	0.1	2.43	0.1	N	781
Vinylidene chloride	Methacrylonitrile	0.036	0.05	2.38	0.05	N	781
Vinylidene chloride	Norbornadiene	1.36	0.63	0.09	0.17	N	267
Vinylidene chloride	Oxazolidone, *N*-vinyl-	1.42	0.11	0.091	0.077	Y	102
Vinylidene chloride	Propenyl 2-methyl, acetate	2.4		0			470
Vinylidene chloride	Styrene	0.134	0.048	1.81	0.35	Y	138
Vinylidene chloride	Styrene	0.098	0.01	1.79	0.14	Y	238
Vinylidene chloride	Styrene	1.5		1.8			393
Vinylidene chloride	Styrene	0.087	0.007	1.839	0.024	Y	59
Vinylidene chloride	Styrene	0.15		1.81			812
Vinylidene chloride	Styrene	0.11	0.005	1.7	0.12	N	93
Vinylidene chloride	Succinimide, *N*-vinyl-	1.441	0.061	0.311	0.058	Y	104
Vinylidene chloride	Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	0.13		1.9			583
Vinylidene chloride	Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	0.25		1.8			583
Vinylidene chloride	Tetrazole, 5-phenyl-2-(4′-vinyl)phenyl-	0.11		1.9			583
Vinylidene chloride	Vinyl 12-ketostearate	4.4	4.8	0.26	2.61	Y	146
Vinylidene chloride	Vinyl acetate	4.66	0.26	0.03	0.1	Y	3
Vinylidene chloride	Vinyl acetate	6.7		0.05			432
Vinylidene chloride	Vinyl acetate	5		0.05			436
Vinylidene chloride	Vinyl acetate	3.49	0.17	−0.002	0.026	Y	59
Vinylidene chloride	Vinyl acetate	4.7		0.12			812
Vinylidene chloride	Vinyl benzoate	5.58	1.76	0.065	0.093	Y	47
Vinylidene chloride	Vinyl butyl ether	1.75	0.11	0.004	0.001	Y	279

TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinylidene chloride	Vinyl chloride	2.06	0.32	0.071	0.025	Y	238
Vinylidene chloride	Vinyl chloride	3.39	1.16	0.14	0.32	N	29
Vinylidene chloride	Vinyl chloride	8.92		0.25		Y	3
Vinylidene chloride	Vinyl chloride	3.2		0.3			470
Vinylidene chloride	Vinyl chloride	4.5		0.2			517
Vinylidene chloride	Vinyl chloride	1.8		0.2			539
Vinylidene chloride	Vinyl chloride	4.5		0.16			585
Vinylidene chloride	Vinyl chloride	3.068	0.076	0.205	0.003	Y	67
Vinylidene chloride	Vinyl chloromethyl ketone	0.018	0.009	6.8	0.3	Y	356
Vinylidene chloride	Vinyl dodecyl ether	1.3		0			371
Vinylidene chloride	Vinyl ethyl ether	3.2		0			470
Vinylidene chloride	Vinyl fluoride	6		0.16			607
Vinylidene chloride	Vinyl hendecanoate	2.72	0.37	0.04	0.16	Y	145
Vinylidene chloride	Vinyl *m*-cresyl ether	1.95	0.07	0.04	0.004	Y	279
Vinylidene chloride	Vinyl methyl ketone	0.55		1.8			375
Vinylidene chloride	Vinyl *o*-cresyl ether	2.1	0.1	0.04	0.01	Y	279
Vinylidene chloride	Vinyl octadecyl ether	1.5		0			371
Vinylidene chloride	Vinyl *p*-chlorophenyl ether	2.44	0.04	0.14	0.01	Y	279
Vinylidene chloride	Vinyl *p*-cresyl ether	1.97	0.06	0.03	0.004	Y	279
Vinylidene chloride	Vinyl *p*-*tert*-butyl phenyl ether	2.04	0.06	0.05	0.004	Y	279
Vinylidene chloride	Vinyl pelargonate	4.08		0			145
Vinylidene chloride	Vinyl phenyl ether	2.45	0.34	0.433	0.051	Y	240
Vinylidene chloride	Vinyl phenyl ether	2.11	0.11	0.04	0.03	N	280
Vinylidene chloride	Vinyl stearate	3.92	0.14	0.08	0.17	Y	145
Vinylidene chloride	Vinylidene cyanide	0.009	0.001	0.049	0.02	Y	82
Vinylidene chloride	Vinylisocyanate	1.46		0.33			435
Vinylidene cyanide	Acrylate, α-chloro-, methyl	0.066	0.07	0.313	0.021	Y	82
Vinylidene cyanide	Acrylic acid	0.291	0.042	0.212	0.016	Y	82
Vinylidene cyanide	Butadiene, 2-chloro-					Y	82
Vinylidene cyanide	Ethylene, dichloro-, *cis*-					Y	82
Vinylidene cyanide	Ethylene, dichloro-, *cis*-					Y	82
Vinylidene cyanide	Maleic anhydride					Y	82
Vinylidene cyanide	Methacrylate, methyl	0.028	0.013	0.057	0.012	Y	82
Vinylidene cyanide	Phosphonic acid, 1-phenylvinyl	4.58		0.1			921
Vinylidene cyanide	Propene, 2-chloro-	0.204	0.079	0.001	0.03	Y	82
Vinylidene cyanide	Styrene	0.72	0.16	0.015	0.007	Y	134
Vinylidene cyanide	Styrene	0.001	0.001	0.003	0.001	Y	82
Vinylidene cyanide	Styrene, 2,5-dichloro-	0.005	0.009	0.026	0.006	Y	82
Vinylidene cyanide	Vinyl acetate	0.1	0.11	0.003	0.002	Y	82
Vinylidene cyanide	Vinyl benzoate	0.061	0.047	0	0.017	Y	82
Vinylidene cyanide	Vinyl chloride	0.72		0.01			409
Vinylidene cyanide	Vinyl chloride	0.6	0.068	0.016	0.002	Y	82
Vinylidene cyanide	Vinyl chloroacetate	0.137	0.037	0	0.006	Y	82
Vinylidene cyanide	Vinyl chloride	0.049	0.02	0.009	0.001	Y	82
Vinylidene fluoride	Methacryloyl fluoride, perfluoro-	7.6		0.02			669
Vinylidene fluoride	Vinyl acetate	0.08		6			627
Vinylisocyanate	Acrylate, methyl	0.14		1.38			435
Vinylisocyanate	Acrylonitrile	0.16		0.19			435
Vinylisocyanate	Methacrylate, methyl	0.01		3.3			422
Vinylisocyanate	Styrene	0.08		8.13			435
Vinylisocyanate	Styrene	0.1		6.9			533
Vinylisocyanate	Vinyl chloride	3.7		0.46			777
Vinylisocyanate	Vinylidene chloride	0.33		1.46			435
Vinylmethyldiacetoxysilane	Acrylonitrile	−0.11	0.23	2.246	0.054	Y	754
Vinylmethyldiacetoxysilane	Styrene	0	0.15	4.08	0.14	Y	754
Vinylmethyldiethoxysilane	Styrene	0.08	0.14	5.68	0.1	Y	754
Vinylmethyldiethoxysilane	Styrene	−0.08	0.2	11.29	0.43	Y	754
Vinylmethylphenylsulfonium tetrafluoroborate	Acrylamide	0.1		3.4			793
Vinylmethylphenylsulfonium tetrafluoroborate	Acrylonitrile	0.1		2.2			793
Vinylphenyldimethylsilane	Methacrylate, methyl	−0.009	0.034	29.79	1.89	Y	482
Vinylphenyldimethylsilane	Styrene	0.024	0.016	32.53	0.49	Y	482
Vinylphenylisocyanate, *p*-	Vinyl chloride	11.9		0.1			777
Vinylphenylpropanol, 2-*p*-	Styrene	0.41	0.4	0.48	0.3	Y	72

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	r_1	±95%	r_2	±95%	Conv.	Refs.
Vinylsulfonic acid	Acrylamide	0.3	0.1	3.5	0.15		1066
Vinyltriethoxysilane	Acrylonitrile	0.41	0.38	6.59	0.6	Y	209
Vinyltriethoxysilane	Acrylonitrile	2.69	2.5	26.83	29.59	Y	237
Vinyltriethoxysilane	Styrene	– 0.09	0.14	20.86	1.99	Y	209
Vinyltriethoxysilane	Vinyl chloride	– 0.04	0.44	0.82	0.16	Y	237
Vinyltrimethoxysilane	Acrylonitrile	0.45		9.09		Y	2.37
Vinyltrimethoxysilane	Vinyl chloride	0.09		0.93		Y	237
Vinyltrimethylsilane	Acrylonitrile	0.1	0.27	4.08	0.76	Y	209
Vinyltrimethylsilane	Methacrylate, methyl	0.028	0.016	35.66	0.85	Y	482
Vinyltrimethylsilane	Styrene	– 0.19	0.36	14.66	5.15	Y	209
Vinyltrimethylsilane	Styrene					Y	482
Vinyltrimethylsilane	Styrene	0.049	0.025	5.98	0.18	Y	73
Xanthate, *S*-methacryloyl *O*-ethyl	Methacrylate, methyl	0.6	0.08	0.76	0.04		1086
Xanthate, *S*-methacryloyl *O*-ethyl	Styrene	0.36	0.08	0.44	0.06		1086

TABLE 2. LISTING OF QUICK BASIC (MICROSOFT) PROGRAM FOR CALCULATING REACTIVITY RATIOS*

```
100  OPTION BASE 1
110  DIM eta (20)
120  DIM ksi (20)
130  DIM gee (20)
140  DIM ef (20)
150  DIM t (20)
151  FOR b = 1 TO 20
152  READ t(b)
153  NEXT b
170  DATA 12.71,4.3,3.18,2.78,2.57,2.45,2.37,2.31,2.26,2.23,2.2,2.18,2.16,2.14,2.13,2.12,2.11,2.1,2.09,2.09
180  DEF FNLog10(X) = LOG(X)/LOG(10#)
190  PRINT "Calculation of reactivity ratios by the method of Kelen and Tudos"
210  PRINT "Enter 0 for monomer 1 in the feed to start the calculation"
220  REM initialize all of the summing addresses
230  n = 0
231  m = 0
232  var = 0
233  sumasi = 0
234  sumi = 0
235  suma = 0
236  sumsqi = 0
237  sumnegi = 0
238  sum2i = 0
250  INPUT "Do you wish to stop (Y/N)?";f$
260  IF f$ = "y" THEN GO TO 1510
270  REM enter the names and molecular weights of the monomers
280  INPUT "Monomer 1 is:"; mone$
290  INPUT "Monomer 2 is:"; mtwo$
340  REM enter the feed, polymer and conversion values
350  PRINT "Are the feed and polymer values in mol fractions (mol),
mol ratios (ratio) or weight fractions (wt) ?"
370  INPUT type$
380  IF type$ = "ratio" THEN GOTO 1210
390  IF type$ = "wt" THEN GOTO 1360
400  PRINT "Mol fraction of"; mone$; "in the feed = "
410  INPUT m10
420  IF m10 = 0 THEN GOTO 800
430  n = n + 1
440  m20 = 1-m10
450  PRINT "Mol fraction of"; mone$; "in the polymer = "
460  INPUT p1
470  p2 = 1-p1
480  PRINT "Conversion, weight fraction = ? (If none given enter 0)"
490  INPUT w
500  IF w = 0 THEN GOTO 680
```

* Method of Kelen and Tűdös (803,804).

```
510  REM calculate G and F
520  X = m10/m20
530  y = p1/p2
540  mu = mw2/mw1
550  zeta2 = w*(mu + X)/(mu + y)
560  zeta1 = (y/X)*zeta2
570  z = (FNLog10(1-zeta1))/(FNLog10(1-zeta2))
580  g = (y-1)/z
590  f = y/(z^2)
600  IF n = 1 THEN fmin = f
610  IF n = 1 THEN fmax = f
620  IF fmin>f THEN fmin = f
630  IF fmax<f THEN fmax = f
640  gee(n) = g
650  ef(n) = f
660  GOTO 380
670  REM calculate G and f without conversion data
680  X = m10/m20
690  y = p1/p2
700  g = ((y-1)*X)/y
710  f = (X^2)/Y
720  IF n = 1 THEN fmin = f
730  IF n = 1 THEN fmax = f
740  IF fmin>f THEN fmin = f
750  IF fmax<f THEN fmax = f
760  gee(n) = g
770  ef(n) = f
780  GOTO 380
790  REM calculate eta and ksi
800  alpha = SQR(fmin*fmax)
810  m = m + 1
820  a = gee (m)/(alpha + ef(m))
830  si = ef(m)/(alpha + ef(m))
840  REM sum variables for least squares
850  sumasi = (a*si) + sumasi
860  sumi = si + sumi
870  suma = a + suma
880  sumsqi = (si^2) + sumsqi
890  sumnegi = (1-si) + sumnegi
900  sum2i = si*(1-si) + sum2i
910  eta(m) = a
920  ksi(m) = si
930  IF m = n THEN GOTO 960
940  GOTO 810
950  REM calculate the reactivity ratios
960  r1 = (sumasi*(n-sumi)-suma*(sumi-sumsqi))/((n*sumsqi)-(sumi^2))
970  r2 = (alpha*((sumasi*sumi)-(suma*sumsqi)))/((n*sumsqi)-(sumi^2))
980  REM calculate S squared
990  m = 0
1000 m = m + 1
1010 smin = ((eta(m)-(r1*ksi(m))) + ((r2/alpha)*(1-ksi(m))))^2
1020 var = smin + var
1030 IF m = n THEN GOTO 1050
1040 GOTO 1000
1050 d = sumsqi*(sumnegi^2)-(sum2i^2)
1060 REM calculate the delta r's
1070 deltr1 = t(m-2)*SQR((var/(n-2))*((sumnegi^2)/d))
1080 deltr2 = alpha*t(m-2)*SQR((var/(n-2))*(sumsqi/d))
1090 REM print out the answers
1100 PRINT “Reactivity ratios for”; mone$; “(M1) and”; mtwo$; “(M2)”
1110 PRINT “r1 = ”; r1; “delta r1 = ”; deltr1
1120 PRINT “r2 = ”; r2; “delta r2 = ”; deltr2
1130 PRINT “alpha = ”; alpha
1140 PRINT “ksi”; “eta”
1150 m = 0
1160 m = m + 1
1170 PRINT ksi(m), eta (m)
1180 IF m = n THEN GOTO 220
1190 GOTO 1160
```

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```
1200 REM calculation of M1 and M2 from mol ratios
1210 PRINT "Mol ratio of"; mone$; "in the feed  =";
1220 INPUT qf
1230 IF qf = 0 THEN GOTO 800
1240 n = n + 1
1250 m10 = qf/(qf + 1)
1260 m20 = 1-m10
1270 PRINT "Mole ratio of"; mone$ "in the polymer = "
1280 INPUT qp
1290 p1 = qp/(qp+1)
1300 p2 = 1-p1
1310 PRINT "Weight fraction conversion = "
1320 INPUT w
1330 IF w = 0 THEN GOTO 680
1340 GOTO 510
1350 REM calculation of M1 and M2 from weight fractions
1351 PRINT "The molecular weight of"; mone$; "is"
1352 INPUT mw1
1353 PRINT "The molecular weight of"; mtwo$; "is"
1354 INPUT mw2
1360 PRINT "Weight fraction of"; mone$ "in the feed = "
1370 INPUT rf1
1380 If rf1 = 0 THEN GOTO 800
1390 n = n + 1
1400 rf2 = 1-rf1
1410 m10 = (rf1/mw1)/((rf1/mw1) + (rf2/mw2))
1420 m20 = 1-m10
1430 PRINT "Weight fraction of"; mone$; "in the polymer = "
1440 INPUT rp1
1450 rp2 = 1-rp1
1460 p1 = (rp1/mw1)/((rp1/mw1) + (rp2/mw2))
1470 PRINT "Weight fraction conversion = "
1480 INPUT w
1490 IF w = 0 THEN GOTO 680
1500 GOTO 510
1510 PRINT "FINI"
1520 END
```

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Q and e Values for Free Radical Copolymerizations of Vinyl Monomers and Telogens

Robert Z. Greenley*
Monsanto Co., 544 Oak Valley Drive, St. Louis, MO 63131, USA

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A. INTRODUCTION

The Alfrey and Price Q and e equation (A1) is well known:

$$Q_2 = (Q_1/r_1)\exp\{-e_1(e_1 - e_2)\} \qquad \text{(A1)}$$

Q and e are measures of the reactivity and polarity, respectively, of a vinyl monomer and $r_1 = k_{11}/k_{12}$, a reactivity ratio. This equation may be arranged to a logarithmic form (A2) which provides a more convenient linear solution:

$$\{[\ln(Q_1/r_1)] - e_1^2\} = -e_2e_1 + \ln Q_2. \qquad \text{(A2)}$$

When monomer 2 is the one to be characterized, its Q and e values may be determined from the slope ($-e_2$) and intercept ($\ln Q_2$) of the equation.

The first requirement for the use of Eq. (A2) is the selection of a small group of common monomers for which Q and e could be independently established. Since, by definition the Q and e scheme is based on styrene ($Q = 1.0$ and $e = -0.8$), the average Q and e values of these primary monomers were calculated using Eqs. (A1) and (A3) (Ref. 1).

$$e_2 = e_1 \pm (-\ln r_1r_2)^{1/2} \qquad \text{(A3)}$$

utilizing only their reactivity ratios with styrene. The six primary monomers (Group I) – acrylic acid, acrylonitrile, butadiene, methyl acrylate, methacrylonitrile and methyl methacrylate – were chosen because their reactivity ratios had been narrowly defined by several investigators. These primary reactivity ratios were taken from the compilation in the second edition of this Handbook.

The Q and e values of a secondary group (Group II) of ten common vinyl monomers were determined using Eq. (A2), with the primary monomer group supplying the Q_1 and e_1 values. The Q and e values were then calculated for a tertiary set (Group III) of reactivity ratios for which a set of reactivity ratios with four or more of the primary and secondary monomers was available. For all groups except Group I, recalculated reactivity ratios (see the preceding chapter) were used when available. Otherwise, reported values were included.

The Q and e values developed for the three groups during the first pass through the data were subsequently used to recalculate the Q and e values for Groups II and III. Group I was not redetermined so that the styrene bias of the system could be better maintained. After four iterations, no significant changes were observed. During the iterative process, a number of reactivity ratio citations were dropped due to a lack of fit with the majority of data points.

The final Q and e values for these three groups were then used to determine the Q and e values of other monomers with four or more reactivity ratio citations with at least three comonomers (Group IV), and monomers with three citations with three different comonomers (Group V).

By replacing r_1 in Eq. (A2) with the reciprocal of the chain transfer constant, $1/C_s$ (3), Q and e values of telogens may also be estimated (4) from their coreactivity with vinyl monomers.

The Monomer Table lists the monomer group designation, the Q and e values, and the correlation coefficient (r) for the regression. The Number column (n) represents the number of r_1 values actually used in the regression. If the monomer is in Group V, the number is understood to be 3. The data are listed alphabetically as well as in increasing values of Q and e.

*Retired.

Recent work by Jenkins (5) has uncovered another approach to characterizing the copolymerization character of vinyl monomers. By deriving data from r_1 and r_2 values, he was able to calculate three coefficients which appear to allow a more precise prediction of the actual reactivity ratios.

B. *Q* AND *e* VALUES FOR FREE RADICAL COPOLYMERIZATIONS

TABLE 1. MONOMERS

Monomer	Group	*Q*	*e*	*n*	*r*
Acenaphthalene	IV	0.72	− 1.88	5	0.98
Acetylene, phenyl-	IV	0.45	0.10	6	0.75
Aconitate, trimethyl	III	0.25	2.27	5	0.63
Acrolein	IV	0.80	1.31	16	0.97
Acrolein, methyl-	IV	1.83	0.71	5	0.98
Acrylamide	IV	0.23	0.54	17	0.64
Acrylamide, *N*-methylol-	IV	0.52	1.15	6	0.91
Acrylamide, *N*-octadecyl-	IV	0.66	1.64	4	0.93
Acrylamide, *N,N*-diethyl	IV	0.48	− 0.31	5	0.56
Acrylamide, *N,N*-dimethyl-glucitol	V	0.22	0.61		0.68
Acrylate, α-acetoxy-, ethyl	V	0.52	0.77		0.99
Acrylate, α-chloro-, ethyl	V	1.00	− 1.03		0.87
Acrylate, α-chloro-, methyl	IV	2.43	0.35	4	0.38
Acrylate, α-cyano-, methyl	IV	4.91	0.91	4	0.99
Acrylate, α-phenyl-, methyl	IV	5.19	0.96	8	0.90
Acrylate, benzyl	IV	0.33	1.13	5	0.92
Acrylate, butyl	II	0.38	0.85	20	0.94
Acrylate, ethyl	III	0.41	0.55	12	0.91
Acrylate, ferrocenylmethyl	IV	0.15	0.51	4	0.65
Acrylate, glycidyl	IV	0.48	1.28	4	0.87
Acrylate, heptafluorobutyl	V	0.96	1.34		0.81
Acrylate, methyl	I	0.45	0.64		
Acrylate, octadecyl	IV	0.33	1.26	7	0.97
Acrylate, octyl	V	0.63	2.01		0.99
Acrylate, trifluoro-, methyl	V	0.048	1.20		0.55
Acrylate, 2-chloroethyl	V	0.49	1.03	5	0.95
Acrylate, 2-ethylhexyl	IV	0.37	0.24	4	0.37
Acrylate, 2-nitrobutyl	V	0.69	1.09		0.98
Acrylic acid	I	0.83	0.88		
Acrylic acid, α-bromo-	V	3.07	1.37		0.99
Acrylic anhydride	V	1.46	0.31		0.37
Acrylonitrile	I	0.48	1.23		
Acryloyl chloride	IV	1.82	1.92	6	0.90
Allyl acetate	III	0.24	− 1.07	8	0.85
Allyl acrylate	V	0.32	− 0.99		0.96
Allyl alcohol	IV	0.005	− 1.48	5	0.98
Allyl chloride	III	0.026	− 0.60	12	0.93
Allylbenzene	IV	0.038	0.40	4	0.60
N-Allylstearamide	V	0.024	− 0.41		0.62
Benzothiazole, vinylmercapto-	IV	0.36	− 0.44	4	0.95
Bicyclo[2.2.1]hept-2-ene-5,6-dicarboxamine, *N*-benzyl-	IV	0.01	− 0.36	6	0.47
Butadiene	I	1.70	− 0.50	24	0.82
Butadiene-1-carboxylate, ethyl	V	1.67	1.26		0.99
Butadiene, 1,4-dicarboxylate, diethyl	V	1.94	1.39		0.99
Butadiene, 2,3-dichloro-	V	9.08	0.14		0.93
Butadiene, 2,3-dimethyl-	V	1.42	− 0.43		0.58
Butadiene, hexafluoro-	IV	0.82	0.58	4	0.93
Butadiene, 2-chloro-	II	10.52	1.20	10	0.98
Butadiene, 2-fluoro-	III	1.88	0.63	6	0.77
Butene-1	IV	0.007	− 0.06	5	0.08
Butene-2	IV	0.002	− 0.29	6	0.44
Carbamate, *N*-vinyl-, ethyl	V	0.037	− 1.12		0.91
Carbamate, *N,N*-diethyl-, vinyl	IV	0.028	− 1.11	4	0.95
Carbazole, *N*-vinyl-	III	0.26	− 1.29	12	0.99
Carbon monoxide	V	0.013	1.68		0.70

TABLE 1. *cont'd*

Monomer	Group	Q	e	n	r
Citraconimide, *N*-methyl-	IV	0.87	1.58	4	0.94
Crotonaldehyde	IV	0.023	0.84	5	0.82
Crotonic acid	III	0.017	0.89	6	0.98
4-Cyclopentene-1,3-dione	IV	0.42	2.43	4	0.96
Diallyl melamine	V	0.059	−1.57		0.99
Diallyl phthalate	IV	0.031	−0.26	20	0.50
Diallycyanamide	IV	0.14	2.41	4	0.96
N,N-Divinylaniline	II	0.26	−0.68	5	0.78
Ethylene	III	0.016	0.05	6	0.52
Ethylene, 1,1-diphenyl-	IV	0.17	−1.71	5	0.84
Ethylene, chlorotrifluoro-	III	0.026	1.56	5	0.99
Ethylene, tetrachloro-	III	0.001	1.24	7	0.99
Ethylene, tetrafluoro-	IV	0.032	1.63	4	0.99
Ethylene, trichloro-	III	0.010	1.29	11	0.94
Fumarate, diethyl	IV	0.25	2.26	10	0.91
Fumarate, diisopropyl	IV	0.11	2.58	8	0.84
Fumaronitrile	IV	0.29	2.73	5	0.96
Hexatriene, tetrachloro-	IV	1.83	0.94	6	0.98
Hexene-1	V	0.035	0.92		0.69
Imidazole, 1-vinyl-	V	0.11	−0.68		0.98
Imidazole, 1-vinyl-2-methyl-	IV	0.14	−0.98	6	0.93
Indene	IV	0.13	−0.71	8	0.45
Isobutylene	III	0.023	−1.20	7	0.99
Isobutylene, 3-chloro-	IV	0.17	−0.86	4	0.98
Isoprene	II	1.99	−0.55	11	0.86
Isoprene, 3-acetoxy-	V	1.91	−0.11		0.10
Isopropenyl acetate	IV	0.023	−0.94	4	0.98
Isopropenyl methyl ketone	III	1.03	0.64	6	0.78
Isopropenyl, 3-(1-cyclohexenyl), acetate	V	0.57	−0.66		0.98
Isopropenylisocyanate	III	0.18	−1.05	8	0.94
Itaconate, dibutyl	V	0.82	0.57		0.88
Itaconate, diethyl	V	1.04	0.88		0.98
Itaconate, dimethyl	III	0.73	0.57	8	0.90
Itaconic acid	IV	0.78	1.07	5	0.99
Maleate, diethyl	IV	0.053	1.08	12	0.87
Maleic anhydride	IV	0.86	3.69	25	0.98
Maleimide	V	0.94	2.86		0.99
Maleimide, 2,3-dimethyl-*N*-(2-methacryloxyethyl)-	V	2.54	1.64		0.98
Maleimide, *N*-(2-hydroxyethyl)-	V	1.26	1.07		0.68
Maleimide, *N*-(2-chlorophenyl)-	IV	2.29	2.87	5	0.96
Maleimide, *N*-(4-chlorophenyl)-	V	2.98	2.75		0.99
Maleimide, *N*-butyl-	V	0.88	3.70		0.92
Maleimide, *N*-phenyl-	IV	2.81	3.24	4	0.99
Methacrylamide	IV	0.40	−0.05	8	0.29
Methacrylamide, *N*-phenyl-	V	0.40	0.19		0.70
Methacrylamide, 1-deoxy-D-glucital	V	0.15	−0.16		0.19
Methacrylate, 2-chloro-2,3,3,3-tetrafluoropropyl	V	2.09	0.62		0.56
Methacrylate, 2,2,6,6-tetra-methyl-4-piperidinyl	IV	0.52	−1.09	4	0.68
Methacrylate, 2,3-epithio-propyl	IV	1.04	0.29	4	0.84
Methacrylate, benzyl	IV	0.88	0.35	10	0.97
Methacrylate, butyl	III	0.82	0.28	10	0.68
Methacrylate, ethyl	III	0.76	0.17	7	0.62
Methacrylate, ferrocenylmethyl	IV	0.22	0.65	7	0.85
Methacrylate, glycidyl	III	0.96	0.20	9	0.92
Methacrylate, isobutyl	III	0.82	0.27	5	0.76
Methacrylate, isopropyl	IV	0.97	0.10	4	0.46
Methacrylate, methyl	I	0.78	0.40		
Methacrylate, phenyl	IV	1.25	0.79	7	0.91
Methacrylate, sulfolanyl	V	1.18	0.95		0.95

TABLE 1. *cont'd*

Monomer	Group	Q	e	n	r
Methacrylate, 2-naphthyl	IV	1.04	−0.09	8	0.46
Methacrylate, 2-(*N*,*N*-dimethyl-carbamoyloxy)ethyl	IV	1.14	0.84	5	0.74
Methacrylate, 2-(sulfonic acid)ethyl	IV	1.09	0.25	4	0.52
Methacrylate, 2-acetoxyethyl	V	0.60	0.51		0.80
Methacrylate, 2-bromoethyl	IV	1.18	0.74	4	0.96
Methacrylate, 2-chloroethyl	IV	1.04	0.31	7	0.79
Methacrylate, 2-hydroxyethyl	IV	1.78	−0.39	7	0.67
Methacrylate, 2-hydroxypropyl	IV	4.38	1.86	7	0.81
Methacrylic acid	III	0.98	0.62	23	0.73
Methacrylic anhydride	IV	3.00	0.56	5	0.93
Methacrylonitrile	I	0.86	0.68		
Methacryloyl chloride	V	2.04	1.54		0.94
Methacryloylacetone	V	5.47	−0.76		0.79
Methylenebutyrolactone	V	2.48	0.83		0.90
2-Methyleneglutaronitrile	IV	0.41	1.25	6	0.83
Norbornadiene	III	0.051	−1.48	7	0.90
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2.5)-	V	0.25	0.61		0.82
Oxazolidone, *N*-vinyl-	III	0.087	−1.70	6	0.95
Oxazoline, 2,-2-isopropenyl-4,4-dimethyl-	IV	0.87	0.34	4	0.65
Oxazoline, 2-isopropenyl-2-	IV	0.59	−0.64	7	0.54
Oxazoline, 2-,4-acryloxymethyl-2,4-dimethyl-	IV	0.97	−0.51	4	0.71
Oxazoline, 2-,4-methacryloxymethyl-2,4-dimethyl-	IV	0.44	−0.70	4	0.99
Pentadiene, *trans*-1,3-	IV	1.28	−0.13	8	0.54
Phosphonate, α-carbomethoxyvinyl-, diethyl	V	0.14	−0.04		0.96
Phosphonate, isopropenyl-, dimethyl	V	0.032	0.96		0.98
Phosphonate, vinyl-, bis(2-chloroethyl)	V	0.044	1.64		0.89
Phosphonate, vinyl-, diethyl	V	0.27	−0.40		0.54
Phosphonate, vinyl-, dimethyl	V	0.24	−0.25		0.53
Phosphonic acid, α-phenyl-vinyl-	IV	0.65	0.52	5	0.76
Phthalimide, *N*-(methacryloyloxy)-	V	1.89	0.96		0.74
Propene, 3,3,3-trichloro-	V	0.030	1.00		0.99
Propene, 1-chloro-, *cis*-	V	0.003	−0.46		0.84
Propene, 1-chloro-, *trans*-	V	0.006	−0.16		0.28
Propene, 2-chloro-	V	0.073	−0.16		0.99
Propene, 2-chloro-3-hydroxy-	V	0.091	−0.95		0.99
Propene, 2,3-dichloro-	IV	0.12	−0.40	4	0.67
Propenyl, 2-chloro-, acetate	IV	0.20	−0.85	5	0.61
Propenyl, 2-methyl-, acetate	V	0.040	−2.08		0.97
Propylene	V	0.009	−1.69	7	0.84
Pyridazinone, 3-(2-vinyl)-6-methyl-	V	0.57	0.24		0.58
Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro-	V	0.18	−0.32		0.35
Pyridine, 2-methyl-5-vinyl-	III	1.32	−0.66	9	0.95
Pyridine, 2-vinyl-	II	1.41	−0.42	12	0.97
Pyridine, 2-vinyl-5-ethyl-	IV	1.29	−0.91	4	0.94
Pyridine, 4-vinyl-	III	2.47	0.84	7	0.86
Pyrrolidone, 1-benzyl-3-methylene-5-methyl-	V	1.50	−0.59		0.98
Quinoline, 2-vinyl-	IV	1.04	−0.09	4	0.46
Silane, γ-methacryloxypropyl-trimethoxy	V	1.08	0.07		0.35
Styrene	I	1.00	−0.80		
Styrene, 2,4,6-trimethyl-	IV	0.15	−0.58	4	0.41
Styrene, 2,5-dichloro-	II	1.50	0.94	12	0.96
Styrene, 3-tri-*n*-butylstannyl-	IV	0.014	−0.61	4	0.51
Styrene, α-methoxy-	IV	0.39	−1.02	5	0.77
Styrene, α-methyl-	III	0.97	−0.81	15	0.98
Styrene, *m*-bromo-	IV	1.25	−0.27	4	0.98
Styrene, *m*-chloro-	IV	2.46	−0.90	4	0.87
Styrene, *m*-methyl-	V	1.57	−0.03		0.06
Styrene, *m*-nitro-	IV	2.66	1.57	7	0.85
Styrene, *p*-bromo-	IV	1.30	−0.68	7	0.99
Styrene, *p*-chloro-	III	1.33	−0.64	12	0.92

TABLE 1. *cont'd*

Monomer	Group	*Q*	*e*	*n*	*r*
Styrene, *p*-chloromethyl-	IV	1.39	−0.38	7	0.74
Styrene, *p*-cyano-	IV	2.93	−0.38	5	0.75
Styrene, *p*-methoxy-	III	1.53	−1.40	6	0.99
Styrene, *p*-methyl-	III	1.10	−0.63	5	0.98
Styrene, *p*-1-(2-hydroxybutyl)-	V	0.70	−0.97		0.65
Styrene, *p*-1-(2-hydroxypropyl)-	IV	1.08	−0.35	4	0.51
Styrene, *p*-2-(2-hydroxypropyl)-	IV	1.15	−0.49	4	0.91
Styrene, pentachloro-	V	0.20	0.79		0.87
Succinimide, *N*-vinyl-	III	0.19	−1.42	8	0.96
Tetrazole, 1-vinyl-	V	0.13	−0.14		0.39
Tetrazole, 2-methyl-5-(4′-vinyl)phenyl-	V	0.86	0.51		0.49
Tetrazole, 2-methyl-5-vinyl-	V	0.55	−0.46		0.85
Tetrazole, 2-phenyl-5-(4′-vinyl)phenyl-	V	0.84	−0.52		0.97
Tetrazole, 5-phenyl-2-(4′-vinyl)phenyl-	V	1.11	0.53		0.53
Toluenesulfonamide, *N,N*-methyl-vinyl-	V	0.18	−0.53		0.78
Triallyl citrate	IV	0.054	0.26	4	0.50
Triallyl cyanurate	V	0.14	2.41		0.17
Triallyl isocyanurate	V	0.035	−0.23		0.35
Urea, *N*-vinyl-*N*′-ethyl-	V	0.17	−1.88		0.98
Vinyl acetate	II	0.026	−0.88	49	0.87
Vinyl benzoate	III	0.030	−0.89	9	0.95
Vinyl bromide	IV	0.038	−0.23	10	0.94
Vinyl butyl ether	IV	0.038	−1.50	10	0.87
Vinyl butylsulfonate	IV	0.16	1.06	4	0.97
Vinyl butyrate	IV	0.024	−0.89	8	0.91
Vinyl chloride	II	0.056	0.16	38	0.37
Vinyl chloroacetate	IV	0.039	−1.61	5	0.98
Vinyl chloromethyl ketone	IV	16.00	1.78	4	0.97
Vinyl cinnamate	IV	0.18	0.76	4	0.99
Vinyl cymantrene	IV	0.39	−0.57	4	0.88
Vinyl dichloroacetate	V	0.059	−1.38		0.95
Vinyl dodecyl ether	IV	0.041	−1.69	6	0.83
Vinyl ether	IV	0.029	−1.16	4	0.80
Vinyl ethyl ether	III	0.018	−1.80	8	0.90
Vinyl ethyl oxalate	IV	0.056	−0.65	4	0.53
Vinyl ethyl sulfide	IV	0.27	−1.31	6	0.96
Vinyl ethyl sulfoxide	IV	0.065	0.05	4	0.21
Vinyl fluoride	IV	0.008	0.72	8	0.71
Vinyl formate	III	0.043	−1.19	5	0.99
Vinyl hendecanoate	III	0.056	−0.84	5	0.82
Vinyl isobutyl ether	IV	0.030	−1.27	7	0.98
Vinyl isobutyl sulfide	IV	0.49	−0.95	7	0.99
Vinyl isopropyl ketone	V	0.58	−1.16		0.44
Vinyl isothiocyanate	IV	0.59	0.37	4	0.77
Vinyl laurate	V	0.011	−0.54		0.81
Vinyl-*m*-cresyl ether	V	0.016	−6.33		0.99
Vinyl methyl ketone	II	0.66	1.05	8	0.98
Vinyl methyl sulfide	IV	0.42	−1.66	5	0.99
Vinyl methyl sulfoxide	V	0.60	−1.79		0.46
Vinyl *o*-cresyl ether	V	0.010	−8.53		0.97
Vinyl octadecyl ether	IV	0.024	−1.93	4	0.87
Vinyl octyl ether	IV	0.020	−1.57	4	0.98
Vinyl *p*-cresyl ether	V	0.015	−6.86		0.99
Vinyl pelargonate	IV	0.046	−1.22	4	0.79
Vinyl phenyl ether	IV	0.046	−2.16	9	0.95
Vinyl phenyl ketone	IV	1.16	1.02	5	0.95
Vinyl phenyl sulfide	IV	0.33	−0.99	5	0.96
Vinyl propionate	IV	0.027	−0.68	7	0.82
Vinyl stearate	III	0.043	−0.97	7	0.85
Vinyl *tert*-butyl sulfide	IV	0.046	−2.20	4	0.72
Vinyl thiolacetate	IV	0.27	−0.52	5	0.85

TABLE 1. *cont'd*

Monomer	Group	Q	e	n	r
Vinyl 4-chlorocyclohexyl ketone	IV	0.66	−0.82		0.50
Vinyl 2-chloroethyl ether	IV	0.019	−1.64	9	0.96
Vinyl-tris(trimethoxysiloxy)silane	IV	0.022	−0.12	5	0.75
p-Vinylbenzylethylcarbinol	V	0.69	−0.98		0.67
p-Vinylbenzylmethylcarbinol	V	1.70	−1.27		0.98
9-Vinylanthracene	IV	0.14	0.82	5	0.90
Vinyl *N,N*-diethylcarbamate	IV	0.028	−1.10	4	0.95
p-Vinylbenzoic acid	V	5.17	1.08		0.95
N-Vinylcaprolactam	IV	0.14	−1.18	4	0.72
Vinylene carbonate	III	0.004	−0.49	9	0.73
Vinylferrocene	IV	0.31	−1.34	6	0.91
Vinylhydroquinone	V	4.30	2.26		0.87
Vinylhydroquinone dibenzoate	IV	1.73	0.84	5	0.87
Vinylidene chloride	II	0.31	0.34	40	0.68
Vinylidene cyanide	IV	14.22	1.92	9	0.82
Vinylisocyanate	III	0.14	−0.95	6	0.98
N-Vinylpyrrolidone	II	0.088	−1.62	12	0.95
Vinyltriethoxysilane	V	0.021	0.82		0.61
Vinyltrimethylsilane	V	0.027	0.19		0.58

TABLE 2. TELOGENS

Telogen	Temp. (°C)	Q ($\times 10^4$)	e	No.	r
Acetone	60	0.11	0.35	5	0.80
	80	0.32	0.45	5	0.68
Benzene	60	0.05	−1.21	16	0.94
	80	0.07	−0.61	9	0.72
–, chloro-	60	0.07	0.08	7	0.30
	80	0.13	−0.06	5	0.30
–, ethyl-	60	0.95	−1.02	8	0.84
	80	0.91	−0.61	7	0.86
–, methyl-	60	0.16	−0.95	12	0.93
	80	0.34	−0.87	11	0.94
Benzoyl peroxide	60	36	−1.89	4	0.93
Butanol	60	0.53	−0.57	6	0.63
Butanone	60	0.82	0.53	4	0.60
	80	1.40	1.00	7	0.80
Cyclohexane	60	0.11	−0.64	6	0.86
	80	0.14	−1.41	7	0.77
1,2-Dichloroethane	60	0.62	1.34	3	0.96
	80	1.1	2.07	6	0.96
Ethyl acetate	60	0.07	−0.87	11	0.97
Mercaptan, alkyl-	60	14500	2.44	11	0.99
Mercaptoacetate, alkyl-	60	15100	3.27	4	0.99
Methane, dichloro-	60	0.10	−0.68	4	0.82
–, nitro-	60	3.26	−1.50	4	0.92
–, tetrabromo-	60	7300	2.90	8	0.99
Methane, tetrachloro-	60	3.64	3.21	13	0.99
	80	5.15	3.41	9	0.99
–, trichloro-	60	1.18	0.47	8	0.95
	80	1.24	0.70	10	0.82
Methanol	60	0.18	−0.93	5	0.76
Triethylamine	60	28.8	−2.39	7	0.99

TABLE 3. MONOMERS ARRANGED BY Q VALUES

Monomer	Q	e
Ethylene, tetrachloro-	0.001	1.24
Butene-2	0.002	−0.29
Propene, 1-chloro-, *cis-*	0.003	−0.46
Vinylene carbonate	0.004	−0.49
Allyl alcohol	0.005	−1.48
Propene, 1-chloro-, *trans-*	0.006	−0.16

TABLE 3. *cont'd*

Monomer	Q	e
Butene-1	0.007	– 0.06
Vinyl fluoride	0.008	0.72
Propylene	0.009	– 1.69
Bicyclo[2.2.1]hept-2-ene-5,6 dicarboxamine, *N*-benzyl-	0.010	– 0.36
Ethylene, trichloro-	0.010	1.29
Vinyl *o*-cresyl ether	0.010	– 8.53
Vinyl laurate	0.011	– 0.54
Carbon monoxide	0.013	1.68
Styrene, 3-tri-*n*-butylstannyl-	0.014	– 0.61
Vinyl *p*-cresyl ether	0.015	– 6.86
Ethylene	0.016	0.05
Vinyl *m*-cresyl ether	0.016	– 6.33
Crotonic acid	0.017	0.89
Vinyl ethyl ether	0.018	– 1.80
Vinyl 2-chloroethyl ether	0.019	– 1.64
Vinyl octyl ether	0.020	– 1.57
Vinyltriethoxysilane	0.021	0.82
Vinyl-tris(trimethoxysiloxy)silane	0.022	– 0.12
Crotonaldehyde	0.023	0.84
Isobutylene	0.023	– 1.20
Isopropenyl acetate	0.023	– 0.94
N-Allylstearamide	0.024	– 0.41
Vinyl butyrate	0.024	– 0.89
Vinyl octadecyl ether	0.024	– 1.93
Allyl chloride	0.026	– 0.60
Ethylene, chlorotrifluoro-	0.026	1.56
Vinyl acetate	0.026	– 0.88
Vinyl propionate	0.027	– 0.68
Vinyltrimethylsilane	0.027	0.19
Carbamate, *N*,*N*-diethyl-, vinyl	0.028	– 1.11
Vinyl *N*,*N*-diethylcarbamate	0.028	– 1.10
Vinyl ether	0.029	– 1.16
Propene, 3,3,3-trichloro-	0.030	1.00
Vinyl benzoate	0.030	– 0.89
Vinyl isobutyl ether	0.030	– 1.27
Diallyl phthalate	0.031	– 0.26
Ethylene, tetrafluoro-	0.032	1.63
Phosphonate, isopropenyl-, dimethyl	0.032	0.96
Hexene-1	0.035	0.92
Triallyl isocyanurate	0.035	– 0.23
Carbamate, *N*-vinyl-, ethyl	0.037	– 1.12
Allylbenzene	0.038	0.40
Vinyl bromide	0.038	– 0.23
Vinyl butyl ether	0.038	– 1.50
Vinyl chloroacetate	0.039	– 1.61
Propenyl, 2-methyl-, acetate	0.040	– 2.08
Vinyl dodecyl ether	0.041	– 1.69
Vinyl formate	0.043	– 1.19
Vinyl stearate	0.043	– 0.97
Phosphonate, vinyl-, bis(2-chloroethyl)	0.044	1.64
Vinyl pelargonate	0.046	– 1.22
Vinyl phenyl ether	0.046	– 2.16
Vinyl *tert*-butyl sulfide	0.046	– 2.20
Acrylate, trifluoro-, methyl	0.048	1.20
Norbornadiene	0.051	– 1.48
Maleate, diethyl	0.053	1.08
Triallyl citrate	0.054	– 0.26
Vinyl chloride	0.056	0.16
Vinyl ethyl oxalate	0.056	– 0.65
Vinyl hendecanoate	0.056	– 0.84
Diallyl melamine	0.059	– 1.57
Vinyl dichloroacetate	0.059	– 1.38
Vinyl ethyl sulfoxide	0.065	0.05
Propene, 2-chloro-	0.073	– 0.16
Oxazolidone, *N*-vinyl-	0.087	– 1.70
N-Vinylpyrrolidone	0.088	– 1.62
Propene, 2-chloro-3-hydroxy-	0.091	– 0.95
Fumarate, diisopropyl	0.11	2.58
Imidazole, 1-vinyl-	0.11	– 0.68
Propene, 2,3-dichloro-	0.12	– 0.40
Indene	0.13	– 0.71
Tetrazole, 1-vinyl-	0.13	– 0.14
N-Vinylcaprolactam	0.14	– 1.18
Diallylcyanamide	0.14	2.41
Imidazole, 1-vinyl-2-methyl-	0.14	– 0.98
Phosphonate, α-carbomethoxyvinyl-diethyl	0.14	– 0.04
Triallyl cyanurate	0.14	2.41
9-Vinylanthracene	0.14	0.82
Vinylisocyanate	0.14	– 0.95
Acrylate, ferrocenylmethyl	0.15	0.51
Methacrylamide, 1-deoxy-D-glucitol	0.15	– 0.16
Styrene, 2,4,6-trimethyl-	0.15	– 0.58
Vinyl butylsulfonate	0.16	1.06
Ethylene, 1,1-diphenyl-	0.17	– 1.71
Isobutylene, 3-chloro-	0.17	– 0.86
Urea, *N*-vinyl-*N*′ethyl-	0.17	– 1.88
Isopropenylisocyanate	0.18	– 1.05
Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro-	0.18	– 0.32
Toluenesulfonamide, *N*,*N*-methyl-vinyl-	0.18	– 0.53
Vinyl cinnamate	0.18	0.76
Succinimide, *N*-vinyl-	0.19	– 1.42
Propenyl, 2-chloro-, acetate	0.20	– 0.85
Styrene, pentachloro-	0.20	0.79
1-Acrylamido-1-deoxy-D-glucitol	0.22	0.61
Methacrylate, ferrocenylmethyl	0.22	– 0.65
Acrylamide	0.23	0.54
Allyl acetate	0.24	– 1.07
Phosphonate, vinyl-, dimethyl	0.24	– 0.25
Aconitate, trimethyl	0.25	2.27
Fumarate, diethyl	0.25	2.26
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2,5)-	0.25	0.61
Carbazole, *N*-vinyl-	0.26	– 1.29
N,*N*-Divinylaniline	0.26	– 0.68
Phosphonate, vinyl-, diethyl	0.27	– 0.40
Vinyl ethyl sulfide	0.27	– 1.31
Vinyl thiolacetate	0.27	– 0.52
Fumaronitrile	0.29	2.73
Vinylferrocene	0.31	– 1.34
Vinylidene chloride	0.31	0.34
Allyl acrylate	0.32	– 0.99
Acrylate, benzyl	0.33	1.13
Acrylate, octadecyl	0.33	1.26
Vinyl phenyl sulfide	0.33	– 0.99
Benzothiazole, vinylmercapto-	0.36	– 0.44
Acrylate, 2-ethylhexyl	0.37	0.24
Acrylate, butyl	0.38	0.85
Styrene, α-methoxy-	0.39	– 1.02
Vinyl cymantrene	0.39	– 0.57
Methacrylamide	0.40	– 0.05
Methacrylamide, *N*-phenyl-	0.40	0.19
Acrylamide, *N*,*N*-dimethyl-	0.41	– 0.26
Acrylate, ethyl	0.41	0.55
2-Methyleneglutaronitrile	0.41	1.25
4-Cyclopentene-1,3-dione	0.42	2.43
Vinyl methyl sulfide	0.42	– 1.66
Oxazoline, 2-,4-methacryloxymethyl-2,4-dimethyl-	0.44	– 0.70
Acetylene, phenyl-	0.45	0.10

TABLE 3. *cont'd*

Monomer	Q	e
Acrylate, methyl	0.45	0.64
Acrylamide, *N,N*-diethyl	0.48	−0.31
Acrylate, glycidyl	0.48	1.28
Acrylonitrile	0.48	1.23
Acrylate, 2-chloroethyl	0.49	1.03
Vinyl isobutyl sulfide	0.49	−0.95
Acrylamide, *N*-methylol-	0.52	1.15
Acrylate, α-acetoxy-, ethyl	0.52	0.77
Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl	0.52	−1.09
Tetrazole, 2-methyl-5-vinyl-	0.55	−0.46
Isopropenyl, 3-(1-cyclohexenyl)acetate	0.57	−0.66
Pyridazinone, 3-(2-vinyl)-6-methyl-	0.57	0.24
Vinyl isopropyl ketone	0.58	−1.16
Oxazoline, 2-isopropenyl-2-	0.59	−0.64
Vinyl isothiocyanate	0.59	0.37
Methacrylate, 2-acetoxyethyl	0.60	0.51
Vinyl methyl sulfoxide	0.60	−1.79
Acrylate, octyl	0.63	2.01
Phosphonic acid, α-phenyl-	0.65	0.52
Acrylamide, *N*-octadecyl-	0.66	1.64
Vinyl methyl ketone	0.66	1.05
Vinyl 4-chlorocyclohexyl ketone	0.66	−0.82
Acrylate, 2-nitrobutyl	0.69	1.09
p-Vinylbenzylethylcarbinol	0.69	−0.98
Styrene, *p*-1-(2-hydroxybutyl)-	0.70	−0.97
Acenaphthalene	0.72	−1.88
Itaconate, dimethyl	0.73	0.57
Methacrylate, ethyl	0.76	0.17
Itaconic acid	0.78	1.07
Methacrylate, methyl	0.78	0.40
Acrolein	0.80	1.31
Butadiene, hexafluoro-	0.82	0.58
Itaconate, dibutyl	0.82	0.57
Methacrylate, butyl	0.82	0.28
Methacrylate, isobutyl	0.82	0.27
Acrylic acid	0.83	0.88
Tetrazole, 2-phenyl-5-(4′-vinyl)-phenyl-	0.84	−0.52
Maleic anhydride	0.86	3.69
Methacrylonitrile	0.86	0.68
Tetrazole, 2-methyl-5-(4′-vinyl)-phenyl-	0.86	0.51
Citraconimide, *N*-methyl-	0.87	1.58
Oxazoline, 2-, 2-isopropenyl-4,4-dimethyl-	0.87	0.34
Maleimide, *N*-butyl-	0.88	3.70
Methacrylate, benzyl	0.88	0.35
Maleimide	0.94	2.86
Acrylate, heptafluorobutyl	0.96	0.20
Methacrylate, isopropyl	0.97	0.10
Oxazoline, 2-,4-acryloxymethyl-2,4-dimethyl-	0.97	−0.51
Styrene, α-methyl-	0.97	−0.81
Methacrylic acid	0.98	0.62
Acrylate, α-chloro-, ethyl	1.00	−1.03
Styrene	1.00	−0.80
Isopropenyl methyl ketone	1.03	0.64
Itaconate, diethyl	1.04	0.88
Methacrylate, 2-naphthyl	1.04	−0.09
Methacrylate, 2,3-epithiopropyl	1.04	0.29
Methacrylate, 2-chloroethyl	1.04	0.31
Quinoline, 2-vinyl-	1.04	−0.09
Silane, γ-methacryloxypropyl-trimethoxy	1.08	0.07
Styrene, *p*-1-(2-hydroxypropyl)-	1.08	−0.35
Methacrylate, 2-(sulfonic acid)ethyl	1.09	0.25
Styrene, *p*-methyl-	1.10	−0.63
Tetrazole, 5-phenyl-2-(4′-vinyl)-phenyl-	1.11	0.53
Methacrylate, 2-(*N,N*-dimethylcarbamoyloxy)ethyl	1.14	0.84
Styrene, *p*-2-(2-hydroxypropyl)-	1.15	−0.49
Vinyl phenyl ketone	1.16	1.02
Methacrylate, sulfolanyl	1.18	0.95
Methacrylate, 2-bromoethyl	1.18	0.74
Methacrylate, phenyl	1.25	0.79
Styrene, *m*-bromo-	1.25	−0.27
Maleimide, *N*-(2-hydroxyethyl)-	1.26	1.07
Pentadiene, *trans*-1,3-	1.28	−0.13
Pyridine, 2-vinyl-5-ethyl-	1.29	−0.91
Styrene, *p*-bromo-	1.30	−0.68
Pyridine, 2-methyl-5-vinyl-	1.32	−0.66
Styrene, *p*-chloro-	1.33	−0.64
Styrene, *p*-chloromethyl-	1.39	−0.38
Pyridine, 2-vinyl-	1.41	−0.42
Butadiene, 2,3-dimethyl-	1.42	−0.43
Acrylic anhydride	1.46	0.31
Pyrrolidone, 1-benzyl-3-methylene-5-methyl-	1.50	−0.59
Styrene, 2,5-dichloro-	1.50	0.94
Styrene, *p*-methoxy-	1.53	−1.40
Styrene, *m*-methyl-	1.57	−0.03
Butadiene-1-carboxylate, ethyl	1.67	1.26
Butadiene	1.70	−0.50
p-Vinylbenzylmethylcarbinol	1.70	−1.27
Vinylhydroquinone dibenzoate	1.73	0.84
Methacrylate, 2-hydroxyethyl	1.78	−0.39
Acryloyl chloride	1.82	1.92
Acrolein, methyl-	1.83	0.71
Hexatriene, tetrachloro-	1.83	0.94
Butadiene, 2-fluoro-	1.88	0.63
Phthalimide, *N*-(methacryloyloxy)-	1.89	0.96
Isoprene, 3-acetoxy-	1.91	−0.11
Butadiene, 1,4-dicarboxylate, diethyl	1.94	1.39
Isoprene	1.99	−0.55
Methacryloyl chloride	2.04	1.54
Methacrylate, 2-chloro-2,3,3,3-tetrafluoropropyl	2.09	0.62
Styrene, *m*-nitro-	2.19	0.20
Maleimide, *N*-(2-chlorophenyl)-	2.29	2.87
Acrylate, α-chloro-, methyl	2.43	0.35
Styrene, *m*-chloro-	2.46	−0.90
Pyridine, 4-vinyl-	2.47	0.84
Methylenebutyrolactone	2.48	0.83
Maleimide, 2,3-dimethyl-*N*-(2-methacryloxyethyl)-	2.54	1.64
Styrene, *o*-chloro-	2.66	1.57
Maleimide, *N*-phenyl-	2.81	3.24
Styrene, *p*-cyano-	2.93	−0.38
Maleimide, *N*-(4-chlorophenyl)-	2.98	2.75
Methacrylic anhydride	3.00	0.56
Acrylic acid, α-bromo-	3.07	1.37
Vinylhydroquinone	4.30	2.26
Methacrylate, 2-hydroxypropyl	4.38	1.86
Acrylate, α-cyano-, methyl	4.91	0.91
p-Vinylbenzoic acid	5.17	1.08
Acrylate, α-phenyl-, methyl	5.19	0.96
Methacryloylacetone	5.47	−0.76
Butadiene, 2,3-dichloro-	9.08	0.14
Butadiene, 2-chloro-	10.52	1.20
Vinylidene cyanide	14.22	1.92
Vinyl chloromethyl ketone	16.00	1.78

TABLE 4. MONOMERS ARRANGED BY *e* VALUES

Monomer	*Q*	*e*
Vinyl ethyl sulfoxide	0.065	0.05
Ethylene	0.016	0.05
Silane, γ-methacryloxypropyl-trimethoxy	1.08	0.07
Acetylene, phenyl-	0.45	0.10
Methacrylate, isopropyl	0.97	0.10
Butadiene, 2,3-dichloro-	9.08	0.14
Vinyl chloride	0.056	0.16
Methacrylate, ethyl	0.76	0.17
Vinyltrimethylsilane	0.027	0.19
Methacrylamide, *N*-phenyl-	0.40	0.19
Methacrylate, glycidyl	0.96	0.20
Styrene, *m*-nitro-	2.19	0.20
Acrylate, 2-ethylhexyl	0.37	0.24
Pyridazinone, 3-(2-vinyl)-6-methyl-	0.57	0.24
Methacrylate, 2-(sulfonic acid)ethyl	1.09	0.25
Methacrylate, isobutyl	0.82	0.27
Methacrylate, butyl	0.82	0.28
Methacrylate, 2,3-epithiopropyl	1.04	0.29
Methacrylate, 2-chloroethyl	1.04	0.31
Acrylic anhydride	1.46	0.31
Vinylidene chloride	0.31	0.34
Oxazoline, 2-,2-isopropenyl-4,4-dimethyl-	0.87	0.34
Methacrylate, benzyl	0.88	0.35
Acrylate, α-chloro-, methyl	2.43	0.35
Vinyl isothiocyanate	0.59	0.37
Allylbenzene	0.038	0.40
Methacrylate, methyl	0.78	0.40
Acrylate, ferrocenylmethyl	0.15	0.51
Methacrylate, 2-acetoxyethyl	0.60	0.51
Tetrazole, 2-methyl-5-(4′-vinyl)-phenyl-	0.86	0.51
Phosphonic acid, α-phenylvinyl-	0.65	0.52
Tetrazole, 5-phenyl-2-(4′-vinyl)-phenyl-	1.11	0.53
Acrylamide	0.23	0.54
Acrylate, ethyl	0.41	0.55
Methacrylic anhydride	3.00	0.56
Itaconate, dimethyl	0.73	0.57
Itaconate, dibutyl	0.82	0.57
Butadiene, hexafluoro-	0.82	0.58
1-Acrylamideo-1-deoxy-D-glucitol	0.22	0.61
Oct-1-ene, 6,6-dimethyl-4,8-dioxaspiro(2.5)-	0.25	0.61
Methacrylic acid	0.98	0.62
Butadiene, 2-fluoro-	1.88	0.63
Acrylate, methyl	0.45	0.64
Isopropenyl methyl ketone	1.03	0.64
Methacrylonitrile	0.86	0.68
Acrolein, methyl-	1.83	0.71
Vinyl fluoride	0.008	0.72
Methacrylate, 2-bromoethyl	1.18	0.74
Vinyl cinnamate	0.18	0.76
Acrylate, α-acetoxy-, ethyl	0.52	0.77
Styrene, pentachloro-	0.20	0.79
Methacrylate, phenyl	1.25	0.79
Vinyltriethoxysilane	0.021	0.82
9-Vinylanthracene	0.14	0.82
Methylenebutyrolactone	2.48	0.83
Vinylhydroquinone dibenzoate	1.73	0.84
Crotonaldehyde	0.023	0.84
Methacrylate, 2-(*N*,*N*-dimethylcarbamoyloxy)ethyl	1.14	0.84
Pyridine, 4-vinyl-	2.47	0.84
Acrylate, butyl	0.38	0.85
Acrylic acid	0.83	0.88
Itaconate, diethyl	1.04	0.88
Crotonic acid	0.017	0.89
Acrylate, α-cyano-, methyl	4.91	0.91
Hexene-1	0.035	0.92
Styrene, 2,5-dichloro-	1.50	0.94
Hexatriene, tetrachloro-	1.83	0.94
Methacrylate, sulfolanyl	1.18	0.95
Phosphonate, isopropenyl-, dimethyl	0.032	0.96
Phthalimide, *N*-(methacryloyloxy)-	1.89	0.96
Acrylate, α-phenyl-, methyl	5.19	0.96
Propene, 3,3,3-trichloro-	0.030	1.00
Vinyl phenyl ketone	1.16	1.02
Acrylate, 2-chloroethyl	0.49	1.03
Vinyl methyl ketone	0.66	1.05
Vinyl butylsulfonate	0.16	1.06
Itaconic acid	0.78	1.07
Maleimide, *N*-(2-hydroxyethyl)-	1.26	1.07
p-Vinylbenzoic acid	5.17	1.08
Maleate, diethyl	0.053	1.08
Acrylate, 2-nitrobutyl	0.69	1.09
Acrylate, benzyl	0.33	1.13
Acrylamide, *N*-methylol-	0.52	1.15
Acrylate, trifluoro-, methyl	0.048	1.20
Butadiene, 2-chloro-	10.52	1.20
Acrylonitrile	0.48	1.23
Ethylene, tetrachloro-	0.001	1.24
2-Methyleneglutaronitrile	0.41	1.25
Acrylate, octadecyl	0.33	1.26
Butadiene-1-carboxylate, ethyl	1.67	1.26
Acrylate, glycidyl	0.48	1.28
Ethylene, trichloro-	0.010	1.29
Acrolein	0.80	1.31
Acrylate, heptafluorobutyl	0.96	1.34
Acrylic acid, α-bromo-	3.07	1.37
Butadiene, 1,4-dicarboxylate, diethyl	1.94	1.39
Methacryloyl chloride	2.04	1.54
Ethylene, chlorotrifluoro-	0.026	1.56
Styrene, *o*-chloro-	2.66	1.57
Citraconimide, *N*-methyl-	0.87	1.58
Ethylene, tetrafluoro-	0.032	1.63
Phosphonate, vinyl-, bis(2-chloro-ethyl)	0.044	1.64
Acrylamide, *N*-octadecyl-	0.66	1.64
Maleimide, 2,3-dimethyl-*N*-(2-methacryloxyethyl)-	2.54	1.64
Carbon monoxide	0.013	1.68
Vinyl chloromethyl ketone	16.00	1.78
Methacrylate, 2-hydroxypropyl	4.38	1.86
Vinylidene cyanide	14.22	1.92
Acryloyl chloride	1.82	1.92
Acrylate, octyl	0.63	2.01
Methacrylate, 2-chloro-2,3,3,3-tetrafluoropropyl	0.62	2.09
Vinylhydroquinone	4.30	2.26
Fumarate, diethyl	0.25	2.26
Aconitate, trimethyl	0.25	2.27
Fumarate, diisopropyl	0.11	2.58
Triallyl cyanurate	0.14	2.41
Diallylcyanamide	0.14	2.41
4-Cyclopentene-1,3-dione	0.42	2.43
Fumaronitrile	0.29	2.73
Maleimide, *N*-(4-chlorophenyl)-	2.98	2.75
Maleimide	0.94	2.86
Maleimide, *N*-(2-chlorophenyl)-	2.29	2.87
Maleimide, *N*-phenyl-	2.81	3.24
Maleic anhydride	0.86	3.69
Maleimide, *N*-butyl-	0.88	3.70
Styrene, *m*-methyl-	1.57	−0.03
Phosphonate, α-carbomethoxyvinyl-, diethyl	0.14	−0.04

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TABLE 4. *cont'd*

Monomer	Q	e
Methacrylamide	0.40	−0.05
Butene-1	0.007	−0.06
Methacrylate, 2-naphthyl	1.04	−0.09
Quinoline, 2-vinyl-	1.04	−0.09
Isoprene, 3-acetoxy-	1.91	−0.11
Vinyl-tris(trimethoxysiloxy)silane	0.022	−0.12
Pentadiene, *trans*-1,3-	1.28	−0.13
Tetrazole, 1-vinyl-	0.13	−0.14
Propene, 1-chloro-, *trans*-	0.006	−0.16
Propene, 2-chloro-	0.073	−0.16
Methacrylamide,1-deoxy-D-glucitol	0.15	−0.16
Triallyl isocyanurate	0.035	−0.23
Vinyl bromide	0.038	−0.23
Phosphonate, vinyl-, dimethyl	0.24	−0.25
Triallyl citrate	0.054	−0.26
Diallyl phthalate	0.031	−0.26
Acrylamide, *N*,*N*-dimethyl-	0.41	−0.26
Styrene, *m*-bromo-	1.25	−0.27
Butene-2	0.002	−0.29
Acrylamide, *N*,*N*-diethyl	0.48	−0.31
Pyridazinone, 3-(2-vinyl)-6-methyl-	0.18	−0.32
Styrene, *p*-1-(2-hydroxypropyl)-	1.08	−0.35
Bicyclo[2.2.1]hept-2-ene-5,6 dicarboxamine, *N*-benzyl-	0.01	−0.36
Styrene, *p*-chloromethyl-	1.39	−0.38
Styrene, *p*-cyano-	2.93	−0.38
Methacrylate, 2-hydroxyethyl	1.78	−0.39
Propene, 2,3-dichloro-	0.12	−0.40
Phosphonate, vinyl-, diethyl	0.27	−0.40
N-Allylstearamide	0.024	−0.41
Pyridine, 2-vinyl-	1.41	−0.42
Butadiene, 2,3-dimethyl-	1.42	−0.43
Benzothiazole, vinylmercapto-	0.36	−0.44
Tetrazole, 2-methyl-5-vinyl-	0.55	−0.46
Propene, 1-chloro-, *cis*-	0.003	−0.46
Vinylene carbonate	0.004	−0.49
Styrene, *p*-2-(2-hydroxypropyl)-	1.15	−0.49
Butadiene	1.70	−0.50
Oxazoline, 2,4-acryloxymethyl-2,4-dimethyl-	0.97	−0.51
Vinyl thiolacetate	0.27	−0.52
Tetrazole, 2-phenyl-5-(4′-vinyl)-phenyl-	0.84	−0.52
Toluenesulfonamide, *N*,*N*-methyl-vinyl-	0.18	−0.53
Vinyl laurate	0.011	−0.54
Isoprene	1.99	−0.55
Vinyl cymantrene	0.39	−0.57
Styrene, 2,4,6-trimethyl-	0.15	−0.58
Pyrrolidone, 1-benzyl-3-methylene-5-methyl-	1.50	−0.59
Allyl chloride	0.026	−0.60
Styrene, 3-tri-*n*-butylstannyl-	0.014	−0.61
Styrene, *p*-methyl-	1.10	−0.63
Oxazoline, 2-isopropenyl-2-	0.59	−0.64
Styrene, *p*-chloro-	1.33	−0.64
Vinyl ethyl oxalate	0.056	−0.65
Methacrylate, ferrocenylmethyl	0.22	−0.65
Isopropenyl, 3-(1-cyclohexenyl)-acetate	0.57	−0.66
Pyridine, 2-methyl-5-vinyl-	1.32	−0.66
Vinyl propionate	0.027	−0.68
Imidazole, 1-vinyl-	0.11	−0.68
N,*N*-Divinylaniline	0.26	−0.68
Styrene, *p*-bromo-	1.30	−0.68
Oxazoline, 2-,4-methacryloxymethyl-2,4-dimethyl-	0.44	−0.70
Indene	0.13	−0.71
Methacryloylacetone	5.47	−0.76
Styrene	1.00	−0.80
Styrene, α-methyl-	0.97	−0.81
Vinyl 4-chlorocyclohexyl ketone	0.66	−0.82
Vinyl hendecanoate	0.056	−0.84
Propenyl, 2-chloro-, acetate	0.20	−0.85
Isobutylene, 3-chloro-	0.17	−0.86
Vinyl acetate	0.026	−0.88
Vinyl butyrate	0.024	−0.89
Vinyl benzoate	0.030	−0.89
Styrene, *m*-chloro-	2.46	−0.90
Pyridine, 2-vinyl-5-ethyl-	1.29	−0.91
Isopropenyl acetate	0.023	−0.94
Vinylisocyanate	0.14	−0.95
Vinyl isobutyl sulfide	0.49	−0.95
Propene, 2-chloro-3-hydroxy-	0.091	−0.95
Vinyl stearate	0.043	−0.97
Styrene, *p*-1(2-hydroxybutyl)-	0.70	−0.97
p-Vinylbenzylethylcarbinol	0.69	−0.98
Imidazole, 1-vinyl-2-methyl-	0.14	−0.98
Vinyl phenyl sulfide	0.33	−0.99
Allyl acrylate	0.32	−0.99
Styrene, α-methoxy-	0.39	−1.02
Acrylate, α-chloro-, ethyl	1.00	−1.03
Isopropenylisocyanate	0.18	−1.05
Allyl acetate	0.24	−1.07
Methacrylate, 2,2,6,6-tetramethyl-piperidinyl	0.52	−1.09
Vinyl *N*,*N*-diethylcarbamate	0.028	−1.10
Carbamate, *N*,*N*-diethyl-, vinyl	0.028	−1.11
Carbamate, *N*-vinyl-, ethyl	0.037	−1.12
Vinyl ether	0.029	−1.16
Vinyl isopropyl ketone	0.58	−1.16
N-Vinylcaprolactam	0.14	−1.18
Vinyl formate	0.043	−1.19
Isobutylene	0.023	−1.20
Vinyl pelargonate	0.046	−1.22
Vinyl isobutyl ether	0.030	−1.27
p-Vinylbenzylmethylcarbinol	1.70	−1.27
Carbazole, *N*-vinyl-	0.26	−1.29
Vinyl ethyl sulfide	0.27	−1.31
Vinylferrocene	0.31	−1.34
Vinyl dichloroacetate	0.059	−1.38
Styrene, *p*-methoxy-	1.53	−1.40
Succinimide, *N*-vinyl-	0.19	−1.42
Allyl alcohol	0.005	−1.48
Norbornadiene	0.051	−1.48
Vinyl butyl ether	0.038	−1.50
Vinyl octyl ether	0.020	−1.57
Diallyl melamine	0.059	−1.57
Vinyl chloroacetate	0.039	−1.61
N-Vinylpyrrolidone	0.088	−1.62
Vinyl 2-chloroethyl ether	0.019	−1.64
Vinyl methyl sulfide	0.42	−1.66
Vinyl dodecyl ether	0.041	−1.69
Propylene	0.009	−1.69
Oxazolidone, *N*-vinyl-	0.087	−1.70
Ethylene, 1,1-diphenyl-	0.17	−1.71
Vinyl methyl sulfoxide	0.60	−1.79
Vinyl ethyl ether	0.018	−1.80
Urea, *N*-vinyl-*N*′ethyl-	0.17	−1.88
Acenaphthalene	0.72	−1.88
Vinyl octadecyl ether	0.024	−1.93
Propenyl, 2-methyl-, acetate	0.040	−2.08
Vinyl phenyl ether	0.046	−2.16
Vinyl *tert*-butyl sulfide	0.046	−2.20
Vinyl *m*-cresyl ether	0.016	−6.33
Vinyl *p*-cresyl ether	0.015	−6.86
Vinyl *o*-cresyl ether	0.010	−8.53

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Patterns of Reactivity (U,V) Parameters for the Prediction of Monomer Reactivity Ratios and Transfer Constants in Radical Polymerization

Aubrey D. Jenkins, Jitka Jenkins

School of Chemistry, Physics and Environmental Science,
University of Sussex, Brighton, Sussex, BN1 9QJ, UK

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A. INTRODUCTION

The relation between monomer reactivity ratios and the Alfrey–Price Q–e parameters is explained in the introduction to the tables of monomer reactivity ratios and Q–e values, compiled by Robert Z. Greenley and published in the present volume (1,2). Although very widely used, the Q–e scheme is well known to have serious limitations (3), which have prompted several attempts to improve upon it. One such endeavour was the "Patterns of Reactivity" scheme, first described as long ago as 1959 (4–7), when the Q–e scheme was only about ten years old; despite the indisputably more satisfactory basis of this procedure, it did not achieve popularity but recent revisions have greatly improved both its accessibility and its accuracy (3,8,9).

In the Q–e scheme, four parameters (Q_1, Q_2, e_1, e_2; two for each monomer) are necessary for the prediction of a monomer reactivity ratio (e.g. $r_{12} = k_{11}/k_{12}$, where subscript 1 refers to the radical and subscript 2 to the monomer) but the same four parameters also facilitate the prediction of the partner monomer reactivity ratio ($r_{21} = k_{22}/k_{21}$) because identical Q and e parameters are used to characterise both a given monomer and its derived radical. This device is certainly economical on input data but it introduces an approximation of very doubtful validity.

In the "Patterns" scheme (to use the abbreviated title), different parameters are designated for the monomer and its conjugate radical. Hence, while four input parameters are again necessary for the calculation of a single monomer reactivity ratio, eight are required to calculate both r_{12} and r_{21}. The reward for the greater input of data is a substantial increase in the precision of the result; furthermore, all four parameters for each monomer/radical conjugate pair are experimentally determined from polymerization data, specifically monomer reactivity ratios from Greenley's tabulation, so no arbitrary assignment is involved, as it is with the Q–e scheme.

The fundamental equation for the calculation of a reactivity ratio, r_{12}, is given below.

$$\log r_{12} = \log r_{1S} - u_2\pi_1 - v_2. \qquad \text{(A1)}$$

Here, the symbol S denotes the monomer styrene, and $\log r_{1S}$ is the counterpart of Q_1 in the Q–e scheme. The counterpart of e_1 is the polarity parameter π_1; this is usually almost exactly equal to the Hammett σ parameter for the substituent(s) present on the α-carbon atom of the radical derived from monomer 1 but it is best calculated (8) from monomer reactivity ratio data according to Eq. (A2).

$$\pi_1 = 0.385 \log[(r_{1A})/0.377(r_{1S})] \qquad \text{(A2)}$$

Here, the symbol A denotes the monomer acrylonitrile. It is truly an astonishing fact that the Hammett σ parameter, derived originally from studies of the dissociation of substituted benzoic acids, is equal in value to a simple quantity derived from a knowledge of the monomer reactivity ratios for the reactions of a monomer 1 with (separately) acrylonitrile and styrene.

The values of u_2 and v_2, the respective counterparts of the Q–e scheme's e_2 and Q_2, are determined by reference to data for the (separate) copolymerizations of monomer 2 with the members of a Basic Monomer Set. These are five monomers for which reliable data exist in the literature: styrene (S); methyl methacrylate (MM); methyl acrylate

(MA); methacrylonitrile (MAN); and acrylonitrile (A). Ideally, monomer reactivity ratios should be known for the copolymerization of the monomer of interest (labelled 2 in this case) with each of these five reference monomers. If the reference monomer is monomer 1 in this context, a plot is made of $[\log r_{12} - \log r_{1S}]$ against π_1; the slope of the resulting straight line is $-u_2$ and the intercept on the ordinate axis is $-v_2$, in conformity with Eq. (A1).

If data for reactions with all five members of the Basic Monomer Set are not available, use can be made of such data as exists, always provided that styrene and acrylonitrile are among the monomers included. This condition ensures that the data are spread over a wide range of radical polarity, represented by π_1, because styrene has a very low value (zero), while acrylonitrile has one of the highest values known (0.701).

In Table 1, each monomer is designated either as Basic or assigned to a category according to the number of members of the Basic Monomer Set for which data have been employed in the determination of its u_2 and v_2; for category 5, all five Basic monomers were involved, and so on down to category 2, where data for only styrene and acrylonitrile are available. Clearly, the higher the category number, the more reliable the u_2 and v_2 values. The procedure described thus far is known as the *Patterns U,V Scheme* (3).

For Group 2 monomers, there is no need to make a plot because the use of just two data points permits algebraic solutions to be found. In fact, it can be shown (3) that the following relations hold.

$$u_2 = [\log r_{AS} - \log r_{A2} + \log r_{S2}]/\pi_A \quad \text{and} \quad v_2 = -\log r_{S2} \tag{A3}$$

Substitution in Eq. (A1) leads to the following relationships (A4, A5), giving the two monomer reactivity ratios for the copolymerization of any two monomers, 1 and 2.

$$\log(r_{12}) = \log[(r_{1S})(r_{S2})] - \frac{\{\log[(r_{AS})(r_{S2})/(r_{A2})]\}\{\log[(r_{SA})(r_{1S})/(r_{1A})]\}}{\log[(r_{AS})(r_{SA})]} \tag{A4}$$

$$\log(r_{21}) = \log[(r_{2S})(r_{S1})] - \frac{\{\log[(r_{AS})(r_{S1})/(r_{A1})]\}\{\log[(r_{SA})(r_{2S})/(r_{2A})]\}}{\log[(r_{AS})(r_{SA})]} \tag{A5}$$

Application of Eqs. (A3–A5) corresponds to the *Patterns A,S Scheme* (4), so-called, because data for reaction with only acrylonitrile and styrene are involved. According to the Patterns A,S Scheme, it is possible to calculate the two monomer reactivity ratios for copolymerization of monomers 1 and 2, if each of them has separately been copolymerized with acrylonitrile and styrene. (The two monomer reactivity ratios for copolymerization of acrylonitrile and styrene are also required. These are taken to be: $r_{AS} = 0.04$, $r_{SA} = 0.38$ (3).)

The π, u, and v values listed in the table below have been derived as explained above, with the Patterns U,V Scheme being used for the monomers in categories 3–5 and the Patterns A,S Scheme for those in category 2. The r_{1S} values are mean values from the figures supplied in Greenley's table, making due allowance for the consistency of the data.

B. EXAMPLE

Suppose one wants to evaluate the monomer reactivity ratios for the copolymerization of 2-chlorobutadiene (CB) and 2-vinylpyridine (VP). To use the Patterns U,V Scheme for this purpose, it is first necessary to consult Greenley's table of monomer reactivity ratios for data characterizing the copolymerizations of each of these monomers with as many members of the Basic Monomer Set as possible. In fact, in both cases, values exist for reactions with styrene, methyl methacrylate, methyl acrylate and acrylonitrile, but not methacrylonitrile. The π values for the four useful basic monomers are, respectively, 0.000, 0.339, 0.423 and 0.701. The relevant monomer reactivity ratios are listed in the table below.

MONOMER REACTIVITY RATIOS FOR 2-CHLOROBUTADIENE AND 2-VINYLPYRIDINE AND MEMBERS OF THE BASIC MONOMER SET

Monomer reactivity ratio	2-Chlorobutadiene	2-Vinylpyridine
$r_{X,S}$	6.91	1.26
$r_{X,A}$	5.18	0.44
$r_{S,X}$	0.038	0.53
$r_{A,X}$	0.05	0.10
$r_{MM,X}$	0.08	0.35
$r_{MA,X}$	0.06	0.25

X = 2-chlorobutadiene or 2-vinylpyridine.

Plots of $[\log r_{12} - \log r_{1S}]$ against π_1, where 2 = CB or VP, are linear with slopes and intercepts that provide the following u and v values (9). For CB, $u = -2.18$, $v = 1.44$, and for VP, $u = -0.982$ and $v = 0.323$. All the data are now available for substitution in Eq. (A1), first for CB = monomer 1 and VP = monomer 2, and secondly with the monomers' roles reversed, to obtain values of r_{12} and r_{21}. The results are $r_{12} = 4.26$ and $r_{21} = 0.04$. The Patterns A,S Scheme can be applied by simply substituting the appropriate monomer reactivity ratio data in Eqs. (A4) and (A5), giving $r_{12} = 4.71$ and $r_{21} = 0.05$. The corresponding experimental results are $r_{12} = 5.19$ and $r_{21} = 0.06$, while the $Q = e$ scheme predicts that $r_{12} = 1.07$ and $r_{21} = 0.07$.

C. TRANSFER CONSTANTS

Transfer constants can be predicted by exactly parallel reasoning (3). It is necessary only to realise that whereas the rate constant for the propagation step of a radical with its own parent monomer appears in the *numerator* of a monomer reactivity ratio ($r_{12} = k_{11}/k_{12}$), where both rate

constants refer to propagation reactions, it figures in the *denominator* of a transfer constant because $(C_2)_1 = k_{12}/k_{11}$, where k_{12} represents a transfer reaction between the radical derived from a monomer (species 1) and a transfer agent (species 2); the equations for calculating transfer constants are thus easily obtained from the equations above by replacing $\log r_{12}$ by $-\log(C_2)_1$. The only formal difference between the two cases is that, for transfer, there is no symmetrical counterpart of the equations representing reaction of a radical of type 2 with a transfer agent of type 1. Thus, the equivalent of Eq. (A1), for transfer is Eq. (A6), and this enables the Patterns U,V Scheme to be applied to chain transfer.

$$-\log(C_2)_1 = \log r_{1S} - u_2\pi_1 - v_2 \qquad \text{(A6)}$$

For use of the Patterns A,S Scheme in transfer, a parallel derivation to that used in copolymerization leads to the following equation, where $(C_2)_S$ and $(C_2)_A$ are, respectively, the (known) transfer constants for reaction of the same transfer agent (species 2) with radicals derived from styrene and acrylonitrile (species 1).

$$\log(C_2)_1 = \log[(C_2)_S/r_{1S}] + (\pi_1/\pi_A)\log[r_{AS}(C_2)_A/(C_2)_S] \qquad \text{(A7)}$$

Since $\pi_A = 0.701$ and $r_{AS} = 0.04$, this equation can be reduced to Eq. (A8) for general use.

$$\log(C_2)_1 = \log[(C_2)_S/r_{1S}] + (1.43\pi_1)\log[0.04(C_2)_A/(C_2)_S] \qquad \text{(A8)}$$

The transfer constants used here are taken from two tabulations, one due to Eastmond (10) and one in the *Polymer Handbook* (11).

D. TABLES OF PARAMETERS

As explained above, each monomer or transfer agent is assigned to a category, designated by Basic or the number 2, 3, 4, or 5, according to the number of members of the Basic Monomer Set with which this reagent has been reacted to obtain data for the evaluation of u, v and (in the case of monomers) π. Although it must be true that the higher the category, the more reliable the derived parameters, the difference between Categories 2 and 5 is not so great as might appear at first sight. In *all* cases, two of the basic monomers involved are styrene, S, (the least polar) and acrylonitrile, A, (the most polar), so the role played by other basic monomers is merely to add intermediate points to what should be a straight line joining the data points for S and A; if the data for these two latter monomers are accurate, intermediate points add little or no value beyond confirmation of the slope and intercept. They do contribute valuable weighting when there are some discrepancies in the data, but parameters have not been recorded here in cases where the discrepancies are large.

Where *either* r_{1S} *or* r_{1A} was reported as zero, the value 0.05 has been assigned arbitrarily in order to make it possible to calculate an approximate value for the π parameter but the values of the u and v parameters are not influenced by this device; entries of this type are printed in italics in Table 1. Sometimes both r_{1S} *and* r_{1A} are reported to be zero; when this happens, π cannot usefully be estimated but u and v can still be determined, if positive values of r_{S1} and r_{A1} are available.

Nomenclature In the tables below, compounds are listed in alphabetical sequence in accordance with the following rules:

The primary listing is based on the root name of the compound and the secondary sequence on the name(s) of the substituent(s) or the esterifying moiety. For example, the compounds, *p*-methyl styrene, *N*-vinyl carbazole, and ethyl acrylate, will be found listed under Styrene, *p*-methyl, Carbazole, *N*-vinyl, and Acrylate, ethyl, respectively.

In deciding on the appropriate order of names, *all prefixes (alphanumeric, Greek or whatever) and spaces* are ignored, and reliance is placed solely on the alphabetical priority of the strictly chemical part of the name. In styrene, *p*-methyl, for example, the prefix *p*- plays no part in determining the place of this name in the list; this is governed by the *m* in methyl.

TABLE 1. MONOMERS

Monomer	Category	r_{1S}	r_{1A}	r_{A1}	r_{S1}	$\log(r_{1S})$	π	u	v
Acenaphthalene	4	0.33	2.56	0.02	3.81	−0.4815	0.506	1.33	−0.46
Acetylene, phenyl	5	0.33	0.33	0.27	0.32	−0.4815	0.159	−1.88	0.37
Aconitate, trimethyl	2			4.24	1.026			−2.88	−0.01
Acrolein	5	0.27	1.11	0.78	0.23	−0.5686	0.397	−2.75	0.59
Acrolein, methyl	4	0.60	3.10	0.15	0.26	−0.2219	0.436	−1.73	0.77
Acrylamide	3	0.70	1.10	0.90	1.20	−0.1549	0.237	−1.82	−0.07
Acrylamide, *N*-methylol	4	0.48	2.43	0.60	0.03	−0.3188	0.432	−3.94	1.18
Acrylamide, *N*-octadecyl	3	0.54	1.40	1.03	2.08	−0.2676	0.321	−1.56	−0.35
Acrylate, benzyl	3	0.20	0.72	1.49	0.49	−0.6990	0.376	−2.68	0.28
Acrylate, butyl	3	0.18	0.97	1.11	0.77	−0.7447	0.443	−2.22	0.12
Acrylate, 2-chloroethyl	4	0.12	0.87	1.03	0.53	−0.9208	0.492	−2.38	0.25
Acrylate, α-chloro-, methyl	3	0.30	1.76	0.12	0.25	−0.5229	0.457	−1.55	0.64

TABLE 1. *cont'd*

Monomer	Category	r_{1S}	r_{1A}	r_{A1}	r_{S1}	log (r_{1S})	π	u	v
Acrylate, α-cyano-, methyl	5	0.61	0.68	0.01	0.05	− 0.2147	0.180	− 1.09	1.20
Acrylate, 3,4-epoxyhexahydrobenzyl	2	1.97	0.39	0.25	0.27	0.2945	− 0.110	− 1.95	0.57
Acrylate, β-ethoxy-, ethyl	2			2.42	46.98			− 0.16	− 1.67
Acrylate, ethyl	3	0.17	0.87	0.80	0.81	− 0.7696	0.436	− 1.99	0.08
Acrylate, methyl	B	0.18	0.85	1.42	0.75	− 0.7447	0.421	− 2.34	0.16
Acrylate, octadecyl	3	0.26	1.20	3.15	0.61	− 0.5850	0.417	− 3.01	0.24
Acrylate, octyl	2	0.125	0.84	1.98	0.39	− 2.0000	0.482	− 3.01	0.41
Acrylate, 2-nitrobutyl	3	0.12	1.76	0.67	0.35	− 0.9208	0.610	− 2.39	0.44
Acrylate, α-phenyl-, methyl	5	1.28	6.70	0.08	0.06	0.1072	0.438	− 2.13	1.20
Acrylate, di-zinc	2	0.90	0.24	0.41	1.10	− 0.0458	− 0.060	− 1.39	− 0.04
Acrylonitrile	B	0.04	1.00	1.00	0.38	− 1.3980	0.701	− 2.60	0.42
Acryloyl chloride	4	0.02	1.00	1.20	0.10	− 1.6990	0.815	− 3.50	1.09
Allyl acetate	3			6.57	90			− 0.37	− 1.97
Allyl chloride	3	0.04	0.04	2.80	36	− 1.3980	0.162	− 0.39	− 1.53
Aniline, N,N-divinyl	*2*	*0.033*	*0.05*	*0.246*	*5.38*	*− 1.482*	*0.231*	*− 0.08*	*− 0.73*
Benzothiazole, vinylmercapto-	3	0.42	0.18	0.19	2.6	− 0.3768	0.020	− 0.38	− 0.38
Butadiene	5	1.40	0.29	0.06	0.57	0.1461	− 0.100	− 0.30	0.41
Butadiene-1-carboxylic acid	2	5.55	7.5	0.12	0.115	0.7443	0.213	− 2.00	0.94
Butadiene-1-carboxylate, ethyl	2	0.3	3.2	0.3	0.12	− 0.5229	0.559	− 2.57	0.92
Butadiene-1,4-dicarboxylic acid	2	0.52	4.00	0.20	0.15	− 0.2840	0.502	− 2.18	0.82
Butadiene, 1,4-dicarboxylate-, diethyl	2	0.55	2.79	0.29	0.09	− 0.2596	0.433	− 2.73	1.05
Butadiene, 2-chloro-	4	6.91	5.18	0.05	0.038	0.8395	0.113	− 2.18	1.44
Butadiene, 2-fluoro-	3	1.67	0.60	0.077	0.22	0.2227	− 0.0095	− 1.32	0.51
Butadiene, 2-trimethylsilyloxy-	2	1.20	0.07	0.036	0.64	0.0792	− 0.324	− 0.21	0.19
Carbazole, *N*-vinyl	4			0.39	5.82			− 0.25	− 0.58
Cinnamonitrile	*2*	*0.05*	*0.36*	*8.46*	*2.55*	*− 1.3010*	*0.491*	*− 2.74*	*− 0.41*
Citraconimide, *N*-methyl-	3	0.24	0.60	0.53	0.145	− 0.6198	0.315	− 2.77	0.59
Crotonaldehyde	2	0.07	0.01	25	14.7	− 1.1549	− 0.164	− 2.33	− 1.17
Crotonate, α-acetyl-, methyl	2			8.68	2.7			− 2.72	− 0.43
Crotonate, α-carboethoxy-, ethyl	2			18.7	8.24			− 2.51	− 0.92
Crotonate, α-chloro-, ethyl	2			9.53	5.13			− 2.38	− 0.71
Crotonate, α-cyano-, ethyl	2	0.02	0.06	11.4	0.26	− 1.6990	0.345	− 4.35	0.59
Crotonate, ethyl	2			25.2	27			− 1.96	− 1.43
Crotonate, α-methoxy-, methyl	*2*	*0.04*	*0.05*	*1.00*	*18.4*	*− 1.3980*	*0.199*	*− 0.19*	*− 1.26*
Crotonate, α-methyl-, methyl	*2*	*0.02*	*0.05*	*2.97*	*30.7*	*− 1.699*	*0.315*	*− 0.55*	*− 1.49*
Crotonic acid	2			21	20	− 1.301		− 2.03	− 1.30
Diallyl phthalate	4	0.076	0.0385	3.5	23.5	− 1.12	0.048	− 0.77	− 1.35
Ethylene	*3*	*0.05*	*0.05*	*7*	*14.88*	*− 1.301*	*0.162*	*− 1.57*	*− 1.23*
Ethylene, tetrachloro-	3			463	195			− 2.60	− 2.36
Ethylene, trichloro-	4			64.5	14.6			− 2.87	− 1.20
Ethylene, diphenyl-	5			0.05	0.335			− 0.74	0.23
Fumarate, diethyl	3	0.06	0.05	9	0.33	− 1.222	0.131	− 4.05	0.56
Fumarate, diisopropyl	5	0.055	0.20	16	0.4	− 1.26	0.377	− 4.31	0.17
Hexatriene, tetrachloro-	4	0.85	4.01	0.234	0.123	− 0.0706	0.421	− 2.39	0.86
Imidazole, *N*-vinyl	3	0.68	0.832	3.39	8.38	− 0.1675	0.195	− 1.44	− 0.92
Isoprene	4	1.84	0.45	0.03	0.458	0.2648	− 0.074	− 0.32	0.34
Isopropenyl isocyanate	3	0.096	0.1	0.24	7.48	− 1.0177	0.170	0.14	− 0.87
Isopropenyl methyl ketone	2	0.48	0.95	0.33	0.38	− 0.3188	0.276	− 1.91	0.42
Itaconic acid	3	0.12	0.86	0.59	0.26	− 0.9208	0.491	− 2.50	0.54
Itaconic anhydride	2	0.55	4.83	0.034	0.031	− 0.2596	0.526	− 2.06	1.51
Maleate, diethyl	*3*	*0.04*	*0.05*	*16*	*7.03*	*− 1.398*	*0.199*	*− 2.51*	*− 0.83*
Maleic anhydride	*4*	*0.011*	*0.05*	*6*	*0.36*	*− 1.959*	*0.416*	*− 5.20*	*1.22*
Maleimide, *N*-(2-chlorophenyl)-	3	0.021	1.078	0.956	0.0245	− 1.688	0.826	− 4.23	1.32
Methacrylamide, *N*-phenyl-	3	0.88	0.71	0.381	1.24	− 0.0555	0.126	− 1.26	− 0.08
Methacrylate, benzyl	3	0.47	0.96	0.2	0.52	− 0.3279	0.281	− 1.40	0.26
Methacrylate, 2-bromoethyl	3	0.41	2.38	0.31	0.32	− 0.3872	0.455	− 1.97	0.47
Methacrylate, butyl	4	0.53	0.98	0.291	0.6	− 0.2757	0.267	− 1.49	0.26
Methacrylate, isobutyl	4	0.42	1.05	0.217	0.54	− 0.3768	0.315	− 1.43	0.27

TABLE 1. *cont'd*

Monomer	Category	r_{1S}	r_{1A}	r_{A1}	r_{S1}	$\log(r_{1S})$	π	u	v
Methacrylate, 2-chloroethyl	3	0.3	1.30	0.14	0.37	− 0.5229	0.406	− 1.39	0.42
Methacrylate, ferrocenylmethyl	2	0.01	0.82	0.15	3.6	− 2	0.898	− 0.03	− 0.56
Methacrylate, glycidyl	3	0.5	1.32	0.14	0.415	− 0.301	0.325	− 1.32	0.34
Methacrylate, 2-hydroxyethyl	3	0.64	1	0.2	0.48	− 0.1938	0.238	− 1.45	0.34
Methacrylate, methyl	B	0.46	1.32	0.138	0.5	− 0.3372	0.339	− 1.18	0.23
Methacrylate, 3,5-dimethyladamantyl	3	0.63	1.30	0.19	0.89	− 0.2007	0.283	− 1.04	0.10
Methacrylate, 2,2,6,6-tetramethyl-4-piperidinyl-	2	0.30	14	0.02	0.63	− 0.5229	0.806	0.14	0.20
Methacrylate, phenyl	3	0.51	0.46	0.36	0.25	− 0.2924	0.146	− 2.22	0.62
Methacrylic acid	4	0.524	0.2	0.04	0.24	− 0.2807	0.002	− 0.95	0.39
Methacrylonitrile	B	0.33	1.67	0.43	0.38	− 0.4815	0.432	− 2.08	0.44
Methacryloylacetone	2	1.66	3.74	0.01	0.067	0.2202	0.297	− 0.82	1.17
Methylenebutyrolactone	3	0.7	1.10	0.09	0.09	− 0.1549	0.237	− 1.98	0.88
Naphthalene, 1-vinyl-	2	2.02	0.451	0.107	0.699	0.3054	− 0.089	− 0.83	0.16
Oct-1-ene,6,6-dimethyl-4,8-dioxaspiro(2,5)-	2	0.271	1.484	0.985	1.93	− 0.567	0.446	− 1.58	− 0.29
Oxazoline, 2,2-isopropenyl-	4	0.64	0.52	0.13	0.67	− 0.1938	0.127	− 0.95	0.19
Oxazoline, 2,2-isopropenyl-4,4-dimethyl-	4	0.68	1.83	0.24	0.55	− 0.1675	0.327	− 1.51	0.31
Pentadienoate, *trans*-4-ethoxy-2,4-,ethyl	2	12.2	5.40	0.01	0.04	1.0864	0.025	− 1.14	1.40
Phthalimide, *N*-vinyl-	2	0.07	0.24	0.43	6.27	− 1.155	0.367	− 0.33	− 0.80
Propene, 3,3,3-trichloro-	*2*	*0.05*	*0.10*	*12.2*	*6.9*	*− 1.301*	*0.277*	*− 2.35*	*− 0.84*
Pyridazinone, 3-(2-vinyl)-6-methyl-	3	0.85	0.19	0.32	0.90	− 0.0706	− 0.089	− 1.36	0.09
Pyridazinone, 3-(2-vinyl)-6-methyl-4,5-dihydro-	3	0.13	0.02	0.74	5.92	− 0.8861	− 0.151	− 0.73	− 0.57
Pyridine, 2-methyl-5-vinyl-	4	0.85	0.31	0.16	0.70	− 0.0706	− 0.007	− 1.04	0.28
Pyridine, 2-vinyl-	4	1.26	0.44	0.10	0.53	0.1004	− 0.014	− 0.98	0.32
Pyridine, 2-vinyl-5-ethyl-	4	1.09	0.43	0.04	0.74	0.03743	0.006	− 0.20	0.12
Pyridine, 4-vinyl-	4	0.69	0.375	0.10	0.52	− 0.1612	0.06	− 0.94	0.30
Silane, 3-methacryloxypropyl, trimethoxy-	2	0.868	3.79	0.094	0.425	− 0.0615	0.408	− 1.06	0.37
Styrene	B	1.00	0.38	0.04	1.00	0	0	0.00	0.00
Styrene, *p*-acetoxy-	2	1.26	0.40	0.07	0.86	0.1004	− 0.030	− 0.44	0.07
Styrene, 3-tri-*n*-butylstannyl-	2	0.03	0.001	4.88	18.5	− 1.5229	− 0.407	− 1.17	− 1.27
Styrene, 2,5-dichloro-	4	0.40	0.08	0.24	0.236	− 0.3979	− 0.107	− 1.98	0.67
Styrene, *p*-chloromethyl-	2	1.12	0.56	0.067	0.62	0.0492	0.046	− 0.62	0.21
Styrene, *p*-1-(2-hydroxypropyl)-	3	0.91	0.53	0.10	0.97	− 0.041	0.071	− 0.60	0.16
Styrene, α-methoxy	5	0.07	0.05	0.06	2.51	− 1.1549	0.105	0.41	− 0.49
Styrene, α-methyl	3	0.60	0.143	0.047	1.1	− 0.2219	− 0.077	− 0.04	− 0.03
Styrene, *p*-methyl	4	0.993	0.33	0.05	0.891	− 0.0031	− 0.021	− 0.20	0.08
Succinimide, *N*-vinyl	4	0.033	0.516	0.116	7.71	− 1.4815	0.623	0.75	− 1.02
Tetrazole, 1-vinyl-	2	0.184	0.314	0.54	3.85	− 0.7352	0.251	− 0.78	− 0.59
Tetrazole, 5-phenyl-2-(4′-vinyl)-phenyl-	2	2.2	1.4	0.32	0.48	0.3424	0.088	− 1.75	0.32
Toluenesulfonamide, N,N-methyl-vinyl-	*3*	*0.05*	*0.04*	*0.42*	*5.6*	*− 1.301*	*0.126*	*− 0.40*	*− 0.66*
Triallyl citrate	*2*	*0.076*	*0.05*	*1.76*	*20*	*− 1.12*	*0.092*	*− 0.49*	*− 1.30*
Vinyl acetate	5	0.02	0.05	4.78	48	− 1.699	0.315	− 0.44	− 1.56
Vinyl benzoate	3	0.06	0.019	5.03	31.56	− 1.222	− 0.031	− 0.86	− 1.45
Vinylbenzoic acid, *p*-	3	1.03	1.63	0.06	0.282	0.0124	0.238	− 1.03	0.50
Vinyl benzyl methyl carbinol	3	0.94	0.54	0.11	0.98	− 0.027	0.069	− 0.66	0.18
Vinyl bromide	3	0.054	0.06	2.52	16.6	− 1.268	0.179	− 0.82	− 1.27
Vinyl isobutyl ether	*3*	*0.32*	*0.40*	*0.49*	*24.5*	*− 0.495*	*0.200*	*0.41*	*− 1.41*
Vinyl butyl sulfide	2	0.05	0.041	0.086	2.69	− 1.301	0.128	0.14	− 0.43
Vinyl isobutyl sulfide	*4*	*0.05*	*0.027*	*0.074*	*2.38*	*− 1.301*	*0.059*	*0.18*	*− 0.36*
Vinyl tert-butyl sulfide	*2*	*0.158*	*0.05*	*0.09*	*4.36*	*− 0.8013*	*− 0.029*	*0.41*	*− 0.64*
Vinyl chloride	4	0.055	0.045	3.29	18.7	− 1.26	0.128	− 0.90	− 1.16
Vinyl chloroacetate	2	0.03	0.09	0.34	45	− 1.523	0.345	1.04	− 1.65
Vinyl dichloroacetate	2	0.28	0.04	3.85	20	− 0.553	− 0.162	− 0.98	− 1.30

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TABLE 1. *cont'd*

Monomer	Category	r_{1S}	r_{1A}	r_{A1}	r_{S1}	$\log(r_{1S})$	π	u	v
Vinyl 2-chloroethyl ether	4	0.07	0.05	1.09	160	−1.155	0.105	1.18	−2.06
Vinyl chloromethyl ketone	3	0.507	0.88	0.064	0.127	−0.295	0.255	−1.58	0.97
Vinyl cymantrene	*2*	*0.096*	*0.05*	*0.446*	*2.32*	*−1.018*	*0.053*	*−0.97*	*−0.37*
Vinyl dodecyl ether	2			0.82	41.5			0.44	−1.62
Vinylene carbonate	3	0.05	0.08	14.9	70	0.29	0.252	−1.03	−1.95
Vinyl ethyl ether	4	0.05	0.06	0.69	100	−1.301	0.192	1.11	−2.00
Vinyl ethyl oxalate	3			1.34	5.62			−1.11	−0.71
Vinyl ethyl sulfide	3	0.182	0.055	0.075	5.38	−0.740	−0.038	0.66	−0.77
Vinyl ethyl sulfoxide	*3*	*0.10*	*0.05*	*1.63*	*7.82*	*−1.000*	*0.046*	*−1.02*	*−0.94*
Vinylferrocene	3	0.17	0.158	0.173	3.57	−0.7696	0.149	−0.12	−0.50
Vinyl hendecanoate	*3*	*0.05*	*0.09*	*1.88*	*24.89*	*−1.301*	*0.260*	*−0.34*	*−1.33*
Vinylidene chloride	5	0.1075	0.32	0.64	1.79	−0.9686	0.346	−1.34	−0.24
Vinyl isocyanate	3	0.08	0.16	0.19	8.13	−1.097	0.277	0.29	−0.90
Vinyl isothiocyanate	3	0.435	1.40	0.36	0.725	−0.3615	0.357	−1.56	0.18
Vinyl methyl ketone	2	0.32	1.57	0.61	0.29	−0.495	0.427	−2.46	0.54
Vinyl phenyl ether	3	0.01	0.23	2.50	1.70	−2.000	0.685	−2.23	−0.30
Vinyl phenyl sulfide	3	0.14	0.03	0.11	3.8	−0.854	−0.090	0.20	−0.58
Vinyl stearate	*3*	*0.05*	*0.078*	*4.64*	*15.96*	*−1.301*	*0.236*	*−1.19*	*−1.15*
Vinyltriethoxysilane	*2*	*0.05*	*0.41*	*6.59*	*20.86*	*−1.301*	*0.513*	*−1.28*	*−1.32*
Vinyl-tris(trimethoxysiloxy) silane	3	0.005	0.075	3.90	25	−2.301	0.616	−0.84	−1.46
Vinyltrimethylsilane	3	0.05	0.10	4.08	10.32	−1.301	0.277	−1.41	−1.15

TABLE 2. TRANSFER AGENT

Transfer agent	Category	C_S	C_A	u	v
Acetaldehyde	3	0.00085	0.0047	−0.93	−3.12
Acetamide, *N,N*-dimethyl-	2	0.00046	0.0005	−1.94	−3.34
Acetic acid	3	0.000222	0.000081	−2.61	−3.80
Acetone	4	0.000032	0.000113	−1.28	−4.59
Acetonitrile	2	0.000044	0.0002	−1.06	−4.36
Allyl chloride	2	0.00151	0.000595	−2.57	−2.82
Aluminium, hydrodiisobutyl	3	27.5	0.394	−4.60	1.21
Aluminium, triethyl	4	12.5	0.059	−5.46	0.79
Aluminium, triisobutyl	2	28.5	28	−2.01	1.45
Aniline	4	0.0020	0.0050	−1.43	−2.70
Aniline, *N,N*-dimethyl-	4	0.0053	0.0547	−0.55	−2.20
Anthracene	3	2	1.8	−2.29	−0.01
Benzene	4	0.000003	0.000246	0.80	−5.65
Benzene, bromo-	3	0.000178	0.000136	−2.07	−4.73
Benzene, *tert*-butyl-	3	0.000005	0.000193	0.26	−5.20
Benzene, chloro-	4	0.000041	0.000079	−1.49	−4.51
Benzene, ethyl-	4	0.00007	0.003573	0.49	−4.28
p-Benzoquinone	3	227	1.3	−5.19	2.29
Borane, tributyl	3	0.00348	0.647	1.29	−2.95
Butanone	3	0.0005	0.000643	−1.82	−3.55
Butyl alcohol	3	0.00016	0.001542	−0.57	−4.05
sec-Butyl alcohol	3	0.000056	0.009755	1.23	−4.62
tert-Butyl alcohol	3	0.00003	0.000044	−1.75	−4.62
Butyl mercaptan	4	21.99	0.409	−4.42	1.23
Butyric acid, 4-hydroxy-γ-lactone	2	0.00004	0.00007	−1.66	−4.39
Cadmium, dibutyl	2	0.117	5.5	0.39	−0.93
Carbonic acid, cyclic ethylene ester	2	0.000024	0.000013	−2.36	−4.63
Carbon tetrabromide,		See methane, tetrabromo-			
Carbon tetrachloride,		See methane, tetrachloro-			
Chloroform	3	0.00005	0.000577	−0.49	−4.17
Copper(II) chloride	5	10300	67.19	−4.61	4.33
Cumene	3	0.00009	0.004141	0.38	−4.07
Cyclohexane	3	0.000005	0.000206	0.25	−4.63

TABLE 2. *cont'd*

Transfer agent	Category	C_S	C_A	u	v
Dimethyl sulfoxide	3	0.00005	0.000029	−2.32	−4.44
Diphenylamine-T	3	0.00009	0.07	2.18	−4.57
Ethane, 1,2-dichloro-	3	0.0002	0.000147	−2.17	−3.82
Ethane, 1,1,2,2-tetrachloro-	3	0.00108	0.000311	−2.73	−3.39
Ether, dodecyl vinyl	2	0.000372	0.000495	−1.82	−3.43
Ethyl acetate	3	0.00155	0.000254	−3.07	−3.28
Formamide, *N,N*-dimethyl-	2	0.0001	0.000278	−1.36	−4.00
α-D-Glucoside, methyl, 6-deoxy-6-mercapto-	2	5.5	0.13	−4.31	0.74
α-D-Glucoside, methyl-, di-*O*-benzyl-	2	0.0062	0.009	−1.76	−2.21
α-D-Glucoside, methyl-, 2,3,4,6-tetra-*O*-acetyl-	2	0.0002	0.003	−0.32	−3.70
α-D-Glucoside, methyl-, 6-(*p*-toluene sulfonyl)-	2	0.0002	0.001	−1.00	−3.70
α-D-Glucoside, methyl-, 6-*O*-triphenylmethyl-	2	0.0021	0.008	−1.17	−2.68
β-D-Glucoside, methyl-, 6-deoxy-6-dipropylamino-	2	0.0022	0.11	0.43	−2.66
Glycerol	2	0.002864	0.00235	−2.12	−2.54
Heptanol, dodecafluoro-	3	0.001333	0.00019	−3.20	−2.85
Indium, triethyl	3	1.76	0.222	−3.25	−0.08
Iron(III) chloride	3	536	3.33	−5.44	2.43
Isobutyl alcohol	3	0.00005	0.002406	0.41	−4.54
Isobutyronitrile	2	0.00027	0.00029	−1.95	−3.57
Lead, tetraethyl	2	0.000124	0.0243	1.28	−3.91
Mercury, diethyl	3	0.000034	0.00722	1.35	−4.60
Methane, dichloro-	2	0.000015	0.000306	−0.13	−4.82
Methane, tetrabromo-	4	2.2	0.085	−4.04	0.37
Methane, tetrachloro-	3	0.01	0.000099	−4.85	−2.09
Methane, nitro-	3	0.001	0.0006	−2.30	−3.09
Methanol	3	0.000074	0.00005	−2.23	−4.18
Octadiene, 2,6-dimethyl-	3	0.0002	0.045	1.37	−3.79
Oxime, acrolein-	3	1.08	62.6	0.53	−0.02
Oxime, crotonaldehyde-	3	0.15	2.05	−0.35	−1.06
Oxime, ethyl isopropenyl ketone-	3	0.43	1.03	−1.45	−0.37
Oxime, methacrolein-	3	1.3	9.41	−0.77	0.13
Oxime, methylacrolein-	3	0.04	5.35	1.03	−1.25
Oxime, methyl isopropenyl ketone-	3	0.11	1.71	−0.30	−0.90
Oxime, methyl vinyl ketone-	3	0.27	1.20	−1.06	−0.67
Pentanol, octafluoro-	3	0.001136	0.00019	−3.10	−2.93
Silane, tetraethyl	4	0.000812	0.0021	−1.30	−3.02
Stibine, tributyl	3	0.0058	11.1	2.78	−3.27
Tin, tetrabutyl	3	0.000371	0.00808	−0.06	−3.69
Toluene	5	0.000012	0.00032	0.26	−4.84
Triethylamine	4	0.00071	0.304	1.85	−3.04
Tripropylamine	4	0.00242	0.428	1.32	−2.89
Zinc, diethyl	2	0.366	1.6	−1.08	−0.44

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Copolymerization Parameters of Metallocene-Catalyzed Copolymerizations

Gerhard Fink, Wolf Jürgen Richter
Max-Planck-Institut für Kohlenforschung, Kaiser–Wilhelm-Platz 1, D-45466 Mülheim an der Ruhr, FR Germany

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A. INTRODUCTION

In contrast to radical and ionic polymerization reactions in which the incoming monomer always adds to the *end* of the growing chain

$$\text{R–M}_n\text{–M}_{n+1}\text{–M}_{n+2}\text{–M}_{n+3}\text{–M}_{n+4}^{\bullet}$$

the most distinct feature of Ziegler–Natta-catalysis is the attachment of a monomer molecule to a highly structured catalyst complex (which may be homogeneously solvated or heterogeneously fixed to a surface) and its insertion *between* the catalyst complex and the growing chain:

$$\text{R–M}_{n+4}\text{–M}_{n+3}\text{–M}_{n+2}\text{–M}_{n+1}\text{–M}_n$$

Since the structural features of the catalyst – in particular the steric bulk of ligands, the bite angle of metallocenes, the configuration and conformation on the one hand, and the increasing space-filling demand of the growing chain and of the various monomers on the other – do influence the addition of the monomers, elucidation of the copolymerization behavior, and, in particular, determination of copolymerization parameters requires correct modeling, i.e. adequate Markov-statistics.

B. A BRIEF THEORETICAL OUTLINE OF COPOLYMERIZATION REACTIONS

Various mathematical models have been applied to copolymerization reactions induced by Ziegler–catalysts. Wall (1) assumed the velocity of the monomer addition M_1 and M_2 to be independent of the previously integrated monomeric unit (zero-order Markov model):

$$\text{R–Kat} + \text{M}_1 \xrightarrow{k_1} \text{R–M}_1\text{–Kat}$$

$$\text{R–Kat} + \text{M}_2 \xrightarrow{k_2} \text{R–M}_2\text{–Kat}$$

$$\text{R} = \text{Polymer chain}$$

This scheme gives rise to the following equation for a copolymerization reaction:

$$\frac{d[\text{M}_1]}{d[\text{M}_2]} = r\frac{[\text{M}_1]}{[\text{M}_2]} \qquad r = \frac{k_1}{k_2}$$

Mayo and Lewis (2) extended this model by including the influence of the last built-in monomer into the chain during the subsequent step (first-order Markov model):

$$\text{R–M}_1\text{–Kat} + \text{M}_1 \xrightarrow{k_{11}} \text{R–M}_1\text{–M}_1\text{–Kat}$$

$$\text{R–M}_1\text{–Kat} + \text{M}_2 \xrightarrow{k_{12}} \text{R–M}_1\text{–M}_2\text{–Kat}$$

$$\text{R–M}_2\text{–Kat} + \text{M}_1 \xrightarrow{k_{21}} \text{R–M}_2\text{–M}_1\text{–Kat}$$

$$\text{R–M}_2\text{–Kat} + \text{M}_2 \xrightarrow{k_{22}} \text{R–M}_2\text{–M}_2\text{–Kat}$$

This results in the so-called Mayo–Lewis equation,

$$\frac{d[\text{M}_2]}{d[\text{M}_1]} = \frac{[\text{M}_2]\, r_2([\text{M}_2]/[\text{M}_1]) + 1}{[\text{M}_1]\,([\text{M}_2]/[\text{M}_1]) + r_1}$$

with $r_1 = k_{11}/k_{12}$ and $r_2 = k_{22}/k_{21}$. Taking the effect of

the last *two* built-in monomers into account, Merz, *et al.* (3) developed a second-order Markov model. This 'penultimate model' necessarily results in a more complex kinetic scheme:

$$\text{R-M}_1\text{-M}_1\text{-Kat} + \text{M}_1 \xrightarrow{k_{111}} \text{R-M}_1\text{-M}_1\text{-M}_1\text{-Kat}$$
$$\text{R-M}_1\text{-M}_1\text{-Kat} + \text{M}_2 \xrightarrow{k_{112}} \text{R-M}_1\text{-M}_1\text{-M}_2\text{-Kat}$$
$$\text{R-M}_2\text{-M}_1\text{-Kat} + \text{M}_1 \xrightarrow{k_{211}} \text{R-M}_2\text{-M}_1\text{-M}_1\text{-Kat}$$
$$\text{R-M}_2\text{-M}_1\text{-Kat} + \text{M}_2 \xrightarrow{k_{212}} \text{R-M}_2\text{-M}_1\text{-M}_2\text{-Kat}$$
$$\text{R-M}_1\text{-M}_2\text{-Kat} + \text{M}_1 \xrightarrow{k_{121}} \text{R-M}_1\text{-M}_2\text{-M}_1\text{-Kat}$$
$$\text{R-M}_1\text{-M}_2\text{-Kat} + \text{M}_2 \xrightarrow{k_{122}} \text{R-M}_1\text{-M}_2\text{-M}_2\text{-Kat}$$
$$\text{R-M}_2\text{-M}_2\text{-Kat} + \text{M}_1 \xrightarrow{k_{221}} \text{R-M}_2\text{-M}_2\text{-M}_1\text{-Kat}$$
$$\text{R-M}_2\text{-M}_2\text{-Kat} + \text{M}_2 \xrightarrow{k_{222}} \text{R-M}_2\text{-M}_2\text{-M}_2\text{-Kat}$$

With $r_{11} = k_{111}/k_{112}$, $r_{21} = k_{211}/k_{212}$, $r_{22} = k_{222}/k_{221}$ and $r_{12} = k_{122}/k_{121}$, the following copolymerization equation is obtained:

$$\frac{d[\text{M}_1]}{d[M_2]} = \frac{1 + r_{21}x(1 + r_{11}x)/(1 + r_{21}x)}{1 + (r_{12}/x)(1 + r_{22}/x)/(1 + r_{12}/x)}$$

with $x = [\text{M}_1]/[\text{M}_2]$.

Expanding this model even further to the influence of the last *three* monomeric units, Ham (4) proposed a third-order Markov model. However, due to the many parameters involved, it has been of little practical use.

Thus, most authors restrict themselves to first- or second-order Markov models when dealing with Ziegler–Natta-catalysis for copolymerization, and this is elaborated below.

1. First-Order Markov Model

The Mayo–Lewis equation describes the composition of a copolymer as a function of the composition of the monomer mixture and their respective copolymerization parameters. These parameters not only determine the composition of the resulting copolymer, but also its microstructure, e.g. the distribution of the sequence length.

A knowledge of the ratio of the starting monomers and their copolymerization parameters enables the sequence length distribution to be calculated. The reactivity probabilities P_{ij} are defined (5,6) that give the probability of the monomer j adding to the polymer chain with the terminating monomer i:

$$P_{11} = \frac{k_{11}[\text{R-M}_1\text{-Kat}][\text{M}_1]}{k_{11}[\text{R-M}_1\text{-Kat}][\text{M}_1] + k_{12}[\text{R-M}_1\text{-Kat}][M_2]} = \frac{r_1}{r_1 + [\text{M}_2]/[\text{M}_1]}$$

$$P_{12} = \frac{k_{12}[\text{R-M}_1\text{-Kat}][\text{M}_2]}{k_{11}[\text{R-M}_1\text{-Kat}][\text{M}_1] + k_{12}[\text{R-M}_1\text{-Kat}][M_2]} = \frac{1}{r_1[\text{M}_1]/[\text{M}_2] + 1}$$

$$P_{21} = \frac{k_{21}[\text{R-M}_2\text{-Kat}][\text{M}_1]}{k_{21}[\text{R-M}_2\text{-Kat}][\text{M}_1] + k_{22}[\text{R-M}_2\text{-Kat}][M_2]} = \frac{1}{1 + r_2[\text{M}_2]/[\text{M}_1]}$$

$$P_{22} = \frac{k_{22}[\text{R-M}_2\text{-Kat}][\text{M}_2]}{k_{21}[\text{R-M}_2\text{-Kat}][\text{M}_1] + k_{22}[\text{R-M}_2\text{-Kat}][M_2]} = \frac{r_2}{[\text{M}_1]/[\text{M}_2] + r_2}$$

with $P_{11} + P_{12} = 1$ and $P_{21} + P_{22} = 1$

The proportion of the M_1 and M_2 units (${}^1P_1$ or ${}^1P_2$) in the copolymer is also determined by reactivity probabilities:

$${}^1P_1 = {}^1P_1P_{11} + {}^1P_2P_{21}$$
$${}^1P_2 = {}^1P_1P_{12} + {}^1P_2P_{22}$$

giving ${}^1P_1 = P_{21}/(P_{12} + P_{21})$ and ${}^1P_2 = P_{12}/(P_{12} + P_{21})$.

All the potential sequence distributions can thus be calculated. Consider, for example, the triad distributions:

$$\text{M}_1\text{M}_1\text{M}_1 = {}^1P_1P_{11}P_{11} = [P_{21}(1 - P_{12})^2]/[P_{12} + P_{21}]$$
$$\text{M}_1\text{M}_1\text{M}_2 + \text{M}_2\text{M}_1\text{M}_1 = 2\,{}^1P_1P_{11}P_{12} = 2[P_{21}(1 - P_{12})P_{12}]/[P_{12} + P_{21}]$$
$$\text{M}_2\text{M}_1\text{M}_2 = {}^1P_2P_{21}P_{12} = [P_{12}^2P_{21}]/[P_{12} + P_{21}]$$
$$\text{M}_2\text{M}_2\text{M}_2 = {}^1P_2P_{22}P_{22} = [P_{12}(1 - P_{21})^2]/[P_{12} + P_{21}]$$
$$\text{M}_2\text{M}_2\text{M}_1 + \text{M}_1\text{M}_2\text{M}_2 = 2\,{}^1P_1P_{12}P_{22} = 2[P_{21}P_{12}(1 - P_{21})]/[P_{12} + P_{21}]$$
$$\text{M}_1\text{M}_2\text{M}_1 = {}^1P_1P_{12}P_{21} = [P_{21}^2P_{12}]/[P_{12} + P_{21}]$$

The triad distribution allows the calculation of the true copolymerization parameters. For a given polymer, the triad distribution is deduced from experimental ^{13}C-NMR spectra (7) (see below).

2. Second-Order Markov Model

The kinetic scheme for this model gives rise to eight reaction probabilities P_{ijk} that result from the probability of the monomer k adding to the polymer chain with the terminating monomers ij. The reactivity probability P_{121} is

given for instance as

$$P_{121} = \frac{k_{121}[\text{R-M}_1\text{-M}_2\text{-Kat}][\text{M}_1]}{k_{121}[\text{R-M}_1\text{-M}_2\text{-Kat}][\text{M}_1] + k_{122}[\text{R-M}_1\text{-M}_2\text{-Kat}][\text{M}_2]}$$
$$= \frac{1}{1 + r_{12}([\text{M}_2]/[\text{M}_1])}$$

with $P_{111} + P_{112} = 1$, $P_{222} + P_{221} = 1$, $P_{122} + P_{121} = 1$, $P_{211} + P_{212} = 1$.

The triad distribution is calculated in a manner analogous to the first-order Markov model:

$$\text{M}_1\text{M}_1\text{M}_1 = {}^1P_{11}P_{111}$$
$$\text{M}_1\text{M}_1\text{M}_2 + \text{M}_2\text{M}_1\text{M}_1 = 2\,{}^1P_{11}P_{112}$$
$$\text{M}_2\text{M}_1\text{M}_2 = {}^1P_{21}P_{212}$$
$$\text{M}_2\text{M}_2\text{M}_2 = {}^1P_{22}P_{222}$$
$$\text{M}_2\text{M}_2\text{M}_1 + \text{M}_1\text{M}_2\text{M}_2 = 2\,{}^1P_{22}P_{221}$$
$$\text{M}_1\text{M}_2\text{M}_1 = {}^1P_{12}P_{121}$$

${}^1P_{ij}$ is the frequency of the diad ij, and is calculated as follows:

$${}^1P_{11} = {}^1P_{11}P_{111} + {}^1P_{21}P_{211}$$
$${}^1P_{22} = {}^1P_{22}P_{222} + {}^1P_{12}P_{122}$$
$${}^1P_{12} = {}^1P_{11}P_{112} + {}^1P_{21}P_{212}$$
$${}^1P_{21} = {}^1P_{22}P_{221} + {}^1P_{12}P_{121}$$

It results in

$${}^1P_{21} = \frac{(1 - P_{111})(1 - P_{222})}{2(1 - P_{111})(1 - P_{222}) + P_{211}(1 - P_{222}) + P_{122}(1 - P_{111})}$$

$${}^1P_{11} = \frac{(1 - P_{222})P_{211}}{2(1 - P_{111})(1 - P_{222}) + P_{211}(1 - P_{222}) + P_{122}(1 - P_{111})}$$

$${}^1P_{22} = \frac{(1 - P_{111})P_{122}}{2(1 - P_{111})(1 - P_{222}) + P_{211}(1 - P_{222}) + P_{122}(1 - P_{111})}$$

The diad frequency ${}^1P_{ij}$ is ${}^1P_{12} = {}^1P_{21}$ and ${}^1P_{11} + 2\,{}^1P_{12} + {}^1P_{22} = 1$

C. CALCULATION OF THE COPOLYMERIZATION PARAMETERS

Once the copolymerization parameters of a catalyst system with a given ratio of monomers are known, the composition of the copolymer and all its sequence distributions result, e.g., the complete microstructure of the copolymer is revealed. These parameters characterize any catalyst system and enable different systems to be compared. The major practical problem is the choice of the adequate statistical model.

1. First-Order Markov Model

1.1. Copolymerization Parameters Deduced from the Mayo–Lewis Equation The Mayo–Lewis equation calculates the composition of the copolymer formed as a function of the ratio of the monomer concentration at a given time. At arbitrary intervals these values are generally inaccessible; thus a sufficiently small interval (a small percent of the total conversion) is taken and the relative change of the monomer concentration $d[M_2]/d[M_1]$ is assumed to be the composition of the copolymer ($[m_1], [m_2]$) itself according to

$$\lim_{dU \to 0}(d[M_2]/d[M_1]) = [m_2]/[m_1]$$

It is advisable to keep the monomer ratio $[M_2]/[M_1]$ constant during polymerization by constantly feeding both monomers, or at least the most reactive monomer. To determine the copolymerization parameters the experiments are run with varying ratios of the starting monomers, and their compositions are subsequently measured. The data obtained can be analyzed by linear or nonlinear methods.

Linear Methods: Mayo and Lewis (2), Fineman and Ross (8), Kelen and Tüdös (9)
Nonlinear Methods: Behnken (10), Tidwell and Mortimer (11), Braun et al. (12)

Independent of the analytical methods the copolymerization parameters derived from the Mayo–Lewis equation have some major drawbacks, but do enable a part of the information contained in each copolymerization experiment to be extracted, namely the integral composition of the copolymer. A series of experiments is necessary to obtain the copolymerization parameters. Furthermore, using this approach it cannot be decided whether the application of the first-order Markov model is valid or not. One may even obtain a nearly perfect Fineman–Ross plot, where other methods show that a first-order Markov model cannot be applied.

1.2. Determination of Copolymerization Parameters from the Sequence Distribution (Triad Distribution) As mentioned above, a knowledge of the copolymerization parameters enables all the sequence distributions to be calculated. Or inversely, experimentally determined sequence distributions yield the copolymerization parameters. In the simplest case, intensities of appropriate single sequences can be compared. The results are even more reliable, if the determination of the copolymerization parameters is based on the maximal accessible information on the microstructure of the copolymer. To derive the r-parameters from the overall triad distribution is the safest way (13). This may be done by calculating a triad distribution based on a first-order Markov model and optimizing by variation of the reaction probabilities P_{ij} until the best fit between calculated and experimental data

is reached. Based on the optimized reaction probabilities the copolymerization parameters r_1 and r_2 are calculated according to the following equations:

$$r_1 = ([1/P_{12}] - 1)([M_2]/[M_1])$$
$$r_2 = ([1/P_{21}] - 1)([M_1]/[M_2])$$

This, procedure for determining the copolymerization parameters is superior to the Mayo–Lewis approach. While the latter requires several experiments, using the above approach, all the information can be obtained from one experiment.

To determine the copolymerization parameters from the triad distribution, six variables are available, five of which are independent. The system is over-determined and thus allows critical evaluation.

2. Second-Order Markov Model

The second-order Markov model gives four copolymerization parameters, which are gained from the sequence distribution (full triad distribution) with a high degree of reliability. The calculated triad distribution from the second-order Markov model is optimized by varying the reaction probabilities P_{ijk} until the best fit is reached. The four copolymerization parameters are calculated from reaction probabilities P_{ijk} as follows (13–15):

$$r_{11} = ([1/P_{112}] - 1)([M_2]/[M_1])$$
$$r_{21} = ([1/P_{212}] - 1)([M_2]/[M_1])$$
$$r_{22} = ([1/P_{221}] - 1)([M_1]/[M_2])$$
$$r_{12} = ([1/P_{121}] - 1)([M_1]/[M_2])$$

The second-order Markov model results in four copolymerization parameters from six variables based on triad distribution. A higher degree of determination clearly is desirable to justify this copolymerization model. However, the complete distribution is not obtained from ^{13}C-NMR spectra of ethene/α-olefin copolymers. The full triad distribution does not exhaust the full information of the spectra, since some peaks exhibit tetrad or even pentad sensitivity. Cheng (16,17) suggested that all recorded peaks of a ^{13}C-NMR spectrum should be included to calculate the copolymerization parameters. Arbitrarily chosen reaction probabilities give rise to a polymer chain built at random, and its ^{13}C-NMR spectrum is calculated. This spectrum is superimposed on the experimental one and optimized by varying the starting values, until the minimal difference is reached. Since the ^{13}C-NMR spectra of ethene/α-olefin copolymers display many overlapping peaks, the quality of the spectra simulation very much influences the success of this method.

Randall (7) found a way to avoid this problem by creating a "collective assignment method". Here the complete triad distribution results from combining the experimental spectral information with the relation between different n-ades. In the first step the ^{13}C-NMR spectrum of an ethene/α-olefin copolymer is split into several spectral areas given by signal overlap. The ^{13}C-NMR spectra of ethene/propene copolymers, for example, are divided into eight appropriate spectral areas A to H, as shown in Fig. 1. The integrals T_x of different spectral areas are expressed by the number of contributing triads ending up in the complete triad distribution by appropriately combining several T_x-data. Randall exemplified this method in detail for ethene/propene-, ethene/1-butene-, and ethene/1-hexene-copolymerizations (7).

The resulting triad distribution allows the composition of the copolymer

$$[m_1] = M_1M_1M_1 + M_2M_1M_2 + M_2M_1M_1 + M_1M_1M_2$$
$$[m_2] = M_2M_2M_2 + M_1M_2M_1 + M_2M_2M_1 + M_1M_2M_2$$

and the average sequence length:

$$n(M_1) = [m_1]/[M_2M_1M_2 + 0.5\,(M_2M_1M_1 + M_1M_1M_2)]$$
$$n(M_2) = [m_2]/[M_1M_2M_1 + 0.5\,(M_2M_2M_2 + M_2M_2M_1)]$$

to be calculated.

3. Example

To demonstrate which model describes the experimental results best, the following table from a recent publication by Fink is reproduced (15). It is based on ethene/1-octene copolymerization experiments using a homogeneous metallocene/MAO catalyst.

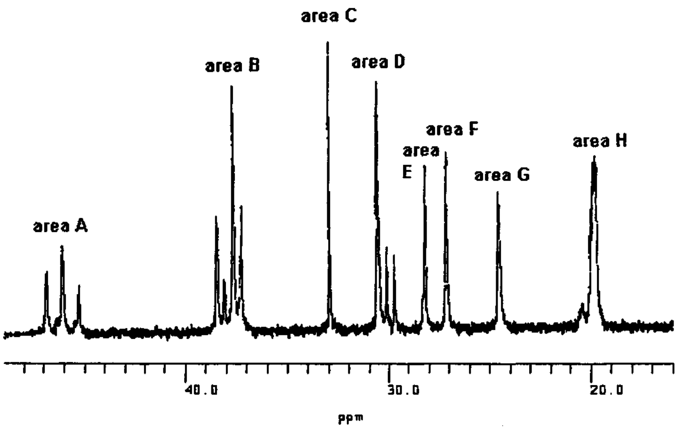

Figure 1. ^{13}C-NMR spectrum of an ethene/propene copolymer.

COMPARISON BETWEEN THE EXPERIMENTAL MEASURED TRIAD DISTRIBUTION AND THE CALCULATED TRIAD DISTRIBUTION ACCORDING TO THE FIRST- (M1) AND THE SECOND-ORDER (M2) MARKOVIAN-STATISTIC OF THE ETHYLENE (E)/1-OCTADECENE (O) COPOLYMERIZATION[a]

[O]/[E] in solution	Model	EEE	EEO + OEE	OEO	OOO	EOO + OOE	EOE	R^b ($\times 10^6$)
0.28	Exp.	0.976	0.014	0.000	0.000	0.001	0.008	–
	M1	0.980	0.004	0.000	0.011	0.004	0.000	50
	M2	0.976	0.014	0.001	0.000	0.001	0.008	0.22
1.39	Exp.	0.878	0.077	0.004	0.000	0.004	0.038	–
	M1	0.878	0.078	0.002	0.000	0.004	0.038	0
	M2	0.878	0.078	0.003	0.000	0.004	0.039	0.3
1.41	Exp.	0.883	0.074	0.005	0.000	0.005	0.033	–
	M1	0.883	0.074	0.002	0.000	0.006	0.035	0
	M2	0.882	0.072	0.003	0.000	0.006	0.036	6.27
2.84	Exp.	0.795	0.118	0.011	0.006	0.008	0.063	–
	M1	0.798	0.124	0.005	0.000	0.010	0.062	20
	M2	0.795	0.117	0.010	0.006	0.008	0.064	0.64
7.14	Exp.	0.878	0.143	0.020	0.011	0.011	0.084	–
	M1	0.738	0.158	0.008	0.001	0.014	0.080	90
	M2	0.731	0.143	0.019	0.011	0.011	0.085	0.27
14.18	Exp.	0.718	0.112	0.046	0.010	0.030	0.084	–
	M1	0.733	0.153	0.008	0.005	0.035	0.066	610
	M2	0.718	0.111	0.045	0.010	0.031	0.085	0.60

[a] $T_p = 60\,°C$, Kat: iPr(CpFlu)$ZrCl_2$ and MAO, [Zr] = 7.56×10^{-6} mol/l, Al/Zr = 9800.
[b] R is the sum of the least squares divided by the number of measured values.

If the experimentally determined triad distribution is compared with the calculated values based on a first-order or alternatively on a second-order Markov model (M_1 or M_2 of the table), both models give a reasonable good fit up to a monomer/comonomer ratio in solution of 1.5. Beyond a ratio of 3, however, the second-order Markov model proves to be the better approximation as indicated by the sum of the error squares divided by the number of experimental values (R of the table).

Second-order Markov statistics is only applicable when there is a sufficiently high comonomer concentration in solution, and enables the formation of α-olefin/α-olefin dual-blocks. Now the insertion of another α-olefin unit into this dual-block sequence is preferred to that into in a single-block. The complete triad distribution is gained by this procedure and it has to be performed over a wide range of the monomer/comonomer ratio in solution.

D. TABLE OF COPOLYMERIZATION PARAMETERS

Monomer/ comonomer	r_1	r_2	r_{11}	r_{21}	r_{22}	r_{12}	Cat./ cocat.	Remarks	T_{Poly} (°C)	Model tested	Analytical method*	Refs.
Ethene/propene			3.4	2.2	0.270	0.153	19		25	M1; M2	C.T.A.	13
			4.1	3.9	0.153	0.065	28		25	M1; M2	C.T.A.	13
	6.26	0.11					24		25	M1	F.-R.	18
	6.61	0.06					24		50	M1	F.-R.	18
	18.6	0.032					2		36	M1	F.-R.	19
	2.57	0.39					24		50	–	See Ref. 20	20
	2.90	0.28					25		50	–	See Ref. 20	20
	15.7	0.009					1		50	–	See Ref. 20	20
	16.1	0.025					7		50	–	See Ref. 20	20
	20.6	0.074					35		50	–	See Ref. 20	20
	12.43	0.08					29	A[a]	120–220	M1	F.-R.	21
	5.1	0.14					24		0	M1	F.-R.	22
	1.3	0.2					19		25	M1	F.-R.	22
	5.60	0.13					24	B[b]	40	M1	See Ref. 24	23
	4.23	0.12					28	B	40	M1	See Ref. 24	23
	25.42	–					13	B	40	M1	See Ref. 24	23
	13.75	0.18					12	B	40	M1	See Ref. 24	23
	16.53	–					7	B	40	M1	See Ref. 24	23
	19.61	–					11	B	40	M1	See Ref. 24	23
	24	0.0085					4		50	M1	F.-R.	25

*C.T.A. – Complete Triad Analysis (7); D.A. – Diad Analysis (28); F.-R. – Fineman–Ross (8); K.-T. – Kelen–Tüdös (9); M.-L. – Mayo–Lewis (2).

Monomer/ comonomer	r_1	r_2	r_{11}	r_{21}	r_{22}	r_{12}	Cat./ cocat.	Remarks	T_{Poly} (°C)	Model tested	Analytical method	Refs.
	19.5	0.015					3		50	M1	F.-R.	25
	50	0.007					8		50	M1	F.-R.	25
	48	0.015					6		50	M1	F.-R.	25
	24	0.029					27		50	M1	F.-R.	25
	250	0.002					10		50	M1	F.-R.	25
	60	–					9		50	M1	F.-R.	25
	3.9	0.12					37	B	40	M1	see ref. 24	26
	4.4	0.12					37	B	60	M1	see ref. 24	26
	5.5	0.11					24	B	40	M1	see ref. 24	26
Ethene/ 1-butene			3.6	2.9	0.21	0.041	19		25	M1; M2	C.T.A.	13
			7.9	6.8	0.085	0.017	28		25	M1; M2	C.T.A.	13
	19.4	0.05					24		30	M1	F.-R.	27
	23.6	0.03					24		50	M1	F.-R.	27
	29.2	0.04					24		70	M1	F.-R.	27
	5.4	0.17					37		30	M1	F.-R.	27
	6.6	0.10					37		50	M1	F.-R.	27
	6.8	0.21					37		70	M1	F.-R.	27
Ethene/ 1-hexene			3.2	2.6	0.150	0.065	19		25	M1; M2	C.T.A.	13
			10.3	6.4	0.111	0.022	28		25	M1; M2	C.T.A.	13
	32.67	0.027					26		60	M1	F.-R.	29
	44.75	0					26		60	M1	D.A.	29
	62.31	0.003					6		60	M1	F.-R.	29
	74.60	0					6		60	M1	D.A.	29
	31.00	0.013					24		60	M1	F.-R.	29
	36.00	0					24		60	M1	D.A.	29
	88.00	0.005					12		60	M1	F.-R.	29
	86.70	0					12		60	M1	D.A.	29
	55	0.004					6		20	M1	F.-R.	30
	54	0.005					6		40	M1	F.-R.	30
	52	0.005					6		60	M1	F.-R.	30
	79	0.005					6		70	M1	F.-R.	30
			5.93	4.58	0.130	0.034	19		25	M1; M2	C.T.A.	15
			7.95	6.60	0.109	0.024	19		40	M1; M2	C.T.A.	15
			10.08	8.85	0.098	0.022	19		60	M1; M2	C.T.A.	15
Ethene/ 1-octene	20.2	–					6	B	85	M1	D.A.	31
	2.5	0.55					5	B	85	M1	D.A.	31
	42.28	0.035					26		60	M1	F.-R.	29
	43.35	0					26		60	M1	D.A.	29
	61.56	0.03					6		60	M1	F.-R.	29
	99.43	0					6		60	M1	D.A.	29
	4.71	0.23					32		0	M1	C.T.A.	32
	6.36	0.18					32		20	M1	C.T.A.	32
	8.16	0.14					32		40	M1	C.T.A.	32
	10.6	0.11					32		60	M1	C.T.A.	32
	10.1	0.03					24		40	M1	see ref. 24	26
	7.5	0.07					24		60	M1	see ref. 24	26
	10.1	0.118					32		40	M1	C.T.A.	33
	18.9	0.014					28		40	M1	C.T.A.	33
	19.5	0.013					30		40	M1	C.T.A.	33
	10.7	0.076					31		40	M1	C.T.A.	33
Ethene/ 1-dodecene			7.2	5.0	2.9	0.057	19		28	M1; M2	C.T.A.	34
			12.0	5.7	0.3	0.036	28		28	M1; M2	C.T.A.	34
Ethene/ 1-octadecene			11.2	6.3	1.6	0.044	19		28	M1; M2	C.T.A.	34
			14.7	8.4	0.4	0.035	28		28	M1; M2	C.T.A.	34
			38.45	18.58	0.085	0.041	19		60	M1; M2	C.T.A.	15
Ethene/styrene	23.4	0.015					5		40	M1	F.-R.	35,46
Ethene/2-allyl-norbornane	43.7	0.038					6		35	M1	F.-R.	36
	42.6	0.027					6		35	M1	K.-T.	36

Monomer/ comonomer	r_1	r_2	r_{11}	r_{21}	r_{22}	r_{12}	Cat./ cocat.	Remarks	T_{Poly} (°C)	Model tested	Analytical method	Refs.
Ethene/												
cyclopentene	80	<0.05					24		−10	M1	F.-R.	39
	120	<0.02					24		0	M1	F.-R.	39
	250	<0.02					24		10	M1	F.-R.	39
	300	<0.07					24		20	M1	F.-R.	39
	1.9	<1					25		0	M1	F.-R.	40
	2.2	<1					25		25	M1	F.-R.	40
Ethene/												
norbornene	2.66	n.d.[c]					28		30	M1	F.-R.	37
	3.44	n.d.					34		30	M1	F.-R.	37
	2.93	n.d.					19		30	M1	F.-R.	37
	2.61	n.d.					23		30	M1	F.-R.	37
	1.85	n.d.					23		0	M1	F.-R.	37
	1.5	n.d.					25		−25	M1	F.-R.	38
	1.9	n.d.					25		0	M1	F.-R.	38
	2.2	n.d.					25		25	M1	F.-R.	38
	3.2	n.d.					25		50	M1	F.-R.	38
	20	n.d.					6		25	M1	F.-R.	38
	6.6	n.d.					24		25	M1	F.-R.	38
	2.6	<2					28		30	M1	F.-R.	40
	3.4	0.06					19		30	M1	F.-R.	40
	2.0	0.05					23		0	M1	F.-R.	40
	3.0	0.05					23		30	M1	F.-R.	40
	3.1	0					22		30	M1	F.-R.	40
Ethene/norbornene												
	0.88	0.05					15		70	M1	K.-T.	41
	1.14	0.1					16		70	M1	K.-T.	41
	1.1	0.026					17		70	M1	K.-T.	41
	0.83	0.29					14		70	M1	K.-T.	41
	1.3	0.03					19		70	M1	K.-T.	41
			1.2	3.6	0	0	20	C[d]	70	M2	C.T.A.	41
			2.2	2.7	0	0	21	C	70	M2	C.T.A.	41
			2.2	8.9	0	0	22	C	70	M2	C.T.A.	41
			5.2	18.2	0	0	33	C	70	M2	C.T.A.	41
			2.2	54	0	0	5	C	70	M2	C.T.A.	41
Ethene/5-phenyl-2-norbornene												
	7.8	0.1					28		30	M1	M.-L.	43
	7.0	0.05					19		30	M1	M.-L.	43
Ethene/dimethanooctahydronaphthalene												
	7.8	0.1					23		50	M1	F.-R.	40,42
	7.0	0.05					18		50	M1	F.-R.	40,42
	7.1	0.04					38		50	M1	F.-R.	40,42
Ethene/phenyldimethanooctahydronaphthalene												
	11.5	0.05					28		30	M1	M.-L.	43
	7.1	0.03					19		30	M1	M.-L.	43
Ethene/trimethanododecahydroanthracene												
	15.6	0.06					23		50	M1	F.-R.	40
Propene/1-octene	3.3	0.39					28		40	M1	D.A.	44
	3.6	0.32					30		40	M1	D.A.	44
	2.6	0.37					31		40	M1	D.A.	44
	2.4	0.48					32		40	M1	D.A.	44
Propene/cyclopentene												
	40	0.001					28		60	M1	K.-T.	45

[a]High pressure copolymerization (100–150 MPa).
[b][Monomer]/[Comonomer] ratio varied. The cited r-values hold only for a selected ratio of [Ethene]/[Propene].
[c]Not determined.
[d]Alternating copolymerization, hence, $r_{12} = r_{22} = 0$.

E. LIST OF CATALYSTS/COCATALYSTS USED

1	$[Cp]_2TiCl_2$	MAO	
2	$[Cp]_2TiMe_2$	$AlMe_3$	
3	$[Cp]2TiPh_2$	MAO : $AlMe_3$	(1 : 1 mixture)
4	$[Cp]_2Ti=CH_2$	$AlMe_2Cl$	(Tebbe reagent)
5	$Me_2Si[Me_4CpNt\text{-}Bu]TiCl_2$	MAO	
6	$[Cp]_2ZrCl_2$	MAO	
7	$[Cp]_2ZrCl_2$	MAO : $AlMe_3$	(1 : 1 mixture)
8	$([Cp]_2ZrCl_2)O$	MAO : $AlMe_3$	(1 : 1 mixture)
9	$[MeCp]_2ZrCl_2$	MAO : $AlMe_3$	(1 : 1 mixture)
10	$[C_5Me_4]_2ZrCl_2$	MAO : $AlMe_3$	(1 : 1 mixture)
11	$[n\text{-}Bu\text{-}Cp]_2ZrCl_2$	MAO	
12	$[Ind]_2ZrCl_2$	MAO	
13	$[Ind]_2ZrBenzyl_2$	MAO	
14	$MeCH[Cp]_2ZrCl_2$	MAO	
15	$Me_2C[CpInd]ZrCl_2$	MAO	
16	$Me_2C[MeCpInd]ZrCl_2$	MAO	
17	$Me_2C[3\text{-}t\text{-}BuCpInd]ZrCl_2$	MAO	
18	$Ph_2C[CpInd]ZrCl_2$	MAO	
19	$Me_2C[CpFlu]ZrCl_2$	MAO	
20	$Me_2C[3\text{-}MeCpFlu]ZrCl_2$	MAO	
21	$Me_2C[3\text{-}PropCpFlu]ZrCl_2$	MAO	
22	$Me_2C[3\text{-}t\text{-}BuCpFlu]ZrCl_2$	MAO	
23	$Ph_2C[CpFlu]ZrCl_2$	MAO	
24	$C_2H_4[Ind]_2ZrCl_2$	MAO	
25	$C_2H_4[IndH4]_2ZrCl_2$	MAO	
26	$Me_2Si[Cp]_2ZrCl_2$	MAO	
27	$Me_2Si[Cp]_2ZrCl_2$	MAO : $AlMe_3$	(1 : 1 mixture)
28	$Me_2Si[Ind]_2ZrCl_2$	MAO	
29	Modified silylbridged $[IndH4]_2ZrCl_2$	MAO	
30	$Me_2Si[2\text{-}MeInd]_2ZrCl_2$	MAO	
31	$Me_2Si[Benz(e)Ind]_2ZrCl_2$	MAO	
32	$Me_2Si[2\text{-}MeBenz(e)Ind]_2ZrCl_2$	MAO	
33	$Me_2Si[3\text{-}t\text{-}BuCpFlu]ZrCl_2$	MAO	
34	$Ph_2Si[Ind]_2ZrCl_2$	MAO	
35	$[Cp]_2HfCl_2$	MAO	
36	$Me_2C[CpFlu]HfCl_2$	MAO	
37	$C_2H_4[Ind]_2HfCl_2$	MAO	
38	$Ph_2C[CpFlu]HfCl_2$	MAO	

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Rates of Polymerization and Depolymerization, Average Molecular Weights, and Molecular Weight Distributions of Polymers

L. H. Peebles, Jr.
Chemistry Division, Naval Research Laboratory, Washington, DC, USA

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A. INTRODUCTION

An attempt is made to present a systematic guide to the literature dealing with rates of polymerization, average molecular weights, and molecular weight distributions of polymers for various types of polymerization. This chapter is based on a review of molecular weight distributions (1) in which many of the equations are given in detail along with graphs showing the interrelationship among various distributions; here, we present only references to the literature. In addition, sections have been added on the effects of degradation and reactor design on the reaction rates and the molecular weight distributions. Literature references beyond (312) are those that have been added since the third edition of Polymer Handbook.

The theoretical description of the molecular weight distribution of a polymer and its rate of polymerization is dependent on the assumed mechanism of polymerization and on the mathematical simplifications used to obtain analytical expressions. As the number of distinct reactions is increased, such as the various transfer reactions, the mathematical expressions can become quite complex and unwieldy. In general, the equations for the rate of polymerization are the most difficult to describe, the distribution equations are somewhat easier, and the average molecular weights the simplest. In condensation polymerization, many of the distribution formulas are derived by considering the statistics or the probability of a given reaction instead of the kinetics of the reactions. Depending on which assumptions are made, quite different average molecular weights are derived, despite the rigor of the derivation. The emphasis in this section is, therefore, on the distribution functions and their averages; the rates of polymerization are given only if they have been explicitly derived.

This chapter is divided into several tables and sections, each treating various types of polymerization. The Stockmayer distribution function for condensation polymers is given in detail because of its general applicability and usefulness. Some general distribution functions are given in Section C. For all the other expressions, the reader must refer to the original literature. Many of the simpler functions are adequately described in textbooks of polymer chemistry. Flory (2), Bamford et al. (3), Odian (4), Billmeyer (5), and Kuechler (6) give extended descriptions of many systems. Bagdasarian (7) gives an extended discussion of methods of determining absolute values of propagation and termination constants, the influence of cage effects on the rate of initiation, and the influence

of retardation, inhibition, and diffusion-controlled termination on the rate of polymerization. A review of the various ways of deriving molecular weight distributions and the moments of a distribution is given by Chappelear and Simon (8).

Section B presents a series of tables describing the main assumption or conditions imposed on the theoretical models and references to the articles where the corresponding equations may be found. Tables 1 and 2 present rate equations and the distribution formulas for addition polymerization by a variety of mechanisms. No distinction is made among free radical, cationic, anionic, or coordination-type polymerization. While Table 1 treats those cases where termination reactions predominate and where steady-state assumptions are usually made, Table 2 treats those cases where termination reactions either do not exist, or may be considered as side reactions, having a minor to major control over the molecular weight distribution. The sequence length distributions for addition-type copolymers are omitted. However, see Kuechler (6) for an extended discussion of copolymerization distributions. Table 3 contains distribution formulas for linear condensation polymers in which the polymer is assumed to be perfectly linear and to contain no rings. Table 4 treats equilibrium polymerization. Table 5 describes nonlinear systems. Table 6 treats those cases where polymers are degraded (or altered) by the application of heat, light, or ionizing radiation. In the latter case, the polymer may undergo scission, crosslinking, or both reactions simultaneously. Several references on crosslinking are included here but not in Table 5. Finally, Table 7 is concerned with the influence of reactor design on molecular weight distribution; the kinetic equations for addition polymerization (with and without termination) and condensation polymerization are considered.

Section C lists a number of distribution functions and their properties. Among them is the generalized exponential function which is a good approximation to many real systems (Eq. C29).

Section D presents the Stockmayer distribution function for condensation polymerization wherein molecules of various types of kind A react with molecules of various types of kind B.

B. REFERENCE TABLES FOR THE CALCULATION OF RATES OF POLYMERIZATION, AVERAGE MOLECULAR WEIGHTS, AND MOLECULAR WEIGHT DISTRIBUTIONS OF POLYMERS FOR VARIOUS TYPES OF POLYMERIZATION

The following symbols are used in this chapter. R_p: rate of polymerization; R_d: rate of depolymerization; R_1^*: active, growing polymer containing one monomer unit; R_n^* and Q_n^*: active, growing polymer chains containing n monomer units; P_r: molecular weight distribution; k_i: rate constant for initiation; k_p: rate constant for propagation; I: initiator concentration; M: monomer concentration; M_n and M_w: number-average and weight-average molecular weights, respectively; 1° and 2° represent first and second order, respectively. No distinction is made among free radical, cationic, anionic, or coordination-type polymerizations.

The rate of initiation may be held constant (const) throughout the polymerization, or it may depend on some function of the catalyst and monomer concentrations, or it may be instantaneous (instant), in which case only the total number of initiating species need be known.

The rate of propagation is normally only the consumption of monomer; in some cases, the rate of propagation through terminal or pendant double bonds is also considered.

Transfer reactions may occur to initiator, momomer, solvent, or polymer.

Termination of active species may occur by a first-order deactivation, by second-order combination (comb) or disproportionation (disprop), or not at all ("living" polymers).

Confusion exists over the meaning of the transfer-to-catalyst reaction. In free radical systems, it means transfer of the active species to the initiator by a second-order mechanism. In ionic polymerization, it means the expulsion of an active fragment from a growing chain by a first-order mechanism to form dead polymer and an active initiator fragment. The first-order mechanism is called here the "catalyst expulsion reaction" (cat ex).

The nomenclature of distribution functions can be quite confusing. In this work, the Flory distribution (Eq. C41) is also known as the Schulz–Flory distribution, the "most probable" distribution, and the exponential distribution. The Schulz distribution (Eq. C36) is also known as the Schulz–Zimm distribution or the generalized Poisson distribution; at large values of k it approximates the Poisson distribution (Eq. C48). The Pearson Type III distribution is a variation of the Schulz distribution. If an addition polymer is made at constant monomer concentration, no transfer reactions occur, termination is only by second-order combination, and the distribution of the polymer is described by the Schulz distribution with $k = 2$. This distribution is sometimes called the self-convolution distribution or the convoluted exponential distribution. In a uniform distribution, all molcules have the same size – it is monodisperse. A rectangular or box distribution has no molecules below r_a, an equal number (or weight) of molecules between r_a and r_b, and no molecules whose size is above r_b.

In Table 5, systems are treated where branching reactions, ring formation, or gel formation may occur. See also Table 6 for crosslinking reactions during degradation. The symbol RA_f means a monomer containing f reactive A units. The problem of calculating the species distribution of polyfunctional condensation polymers where branched, cyclic, and crosslinked species can be formed is exceedingly complex. Most treatments apply the restriction that ring formation does not occur prior to the gel point, which obviously is incorrect. The restriction is invoked because of the transition from the pre-gel condition, where all unreacted functional groups can react without steric limitations to a condition containing rings in which some of the unreacted groups are sterically unable to react with all of the remaining unreacted groups. The problem is

further compounded because each different reacting monomer will have various degrees of steric hindrance. Therefore, a general treatment must ignore this aspect. An examination of the Stockmayer distribution function in Section D shows that in-depth calculations are required even for simple oligomer species. A number of attempts have been made to provide simpler expressions for the number or weight of individual species and the average molecular weights before and after the gel point. These include the theory of stochastic processes (271), stochastic graph theory (272), the theory of cascade processes which is based on probability generating functions (151), the use of link distribution functions (273), the recursive nature of branching processes and elementary probability laws (274), Monte Carlo methods (275), graph theory (276), and a kinetic approach (277).

TABLE 1. ADDITION POLYMERIZATION WITH TERMINATION

					References		
Set	**Initiation**	**Monomer**	**Transfer**	**Termination**	R_p	P_r	M_n, M_w
1.1. INVARIANT MONOMER CONCENTRATION							
1.1.1	Const	Const	None	2° Disprop or comb	2–4	1–4	1–4
1.1.2	Const	Const	Monomer, solvent	2° Disprop	2,3,10–12	1–3	1–3
1.1.3	Const	Const	Monomer, solvent	2° Disprop and comb	3	1,3	1,3
1.1.4	Const, redox	Const	Activator	2° Comb	13	13	13
1.1.5	Const, initiation by activator	Const	None	2° With catalyst; redox system	14	–	14
1.1.6	k_iM^2	Const	Dimer, Monomer Initiator	2° Term	15	–	15
1.1.7	Instant	Const	None	2° Term; 1° or 2° reactivation	16	–	16
1.2. VARYING MONOMER CONCENTRATION, NO TRANSFER-TO-MONOMER REACTION							
1.2.1	Const	Varies	None	2° Comb or disprop	3	1,3	1,3
1.2.2	Const	Varies	Solvent	2° Comb and disprop	3	1,3	1,3
1.2.3	Photosensitized	Varies	None	2° Disprop	39	39	–
1.2.4	Const	Varies	None	2° Disprop and comb pseudo 1° with scavenger	17 (rate of scavenger disappearance)	–	–
1.3. VARYING MONOMER CONCENTRATION, TRANSFER-TO-MONOMER REACTION OCCURS							
1.3.1	Const	Varies	Monomer, solvent	2° Disprop or comb	3,18	1,3,18	1
1.3.2	Const	Varies	Monomer, solvent	2° Disprop and comb	–	–	19
1.3.3	k_iM^2	Varies	Monomer	2° Comb and disprop	3,4	1,3,4	1,3,4
1.3.4	k_iMI	Varies	Monomer, initiator	2° Disprop; degradative chain transfer	20	–	20
.3.5	Instant	Varies	Monomer	Non-steady state conditions, term by comb or disprop	313	313	313
1.4. 1° TERMINATION OR DEACTIVATION, STEADY-STATE KINETICS							
1.4.1	Const	Const	Monomer	1° Deactivation	4	1,4	1,4
1.4.2	k_iMI	Const	Monomer, solvent	1° Deactivation	4	1.4,21,22	1,4,21,22
1.4.3	k_iM^2	Const	Monomer	1° Deactivation	4	1,4	1,4
1.4.4	k_iMI	Varies	Solvent	1° Plus solvent term	4,23	1,4	1,4
1.4.5	k_iM^2	Varies	None	1° Deactivation	4,23	1,4	1,4
1.4.6	k_iMI	Const	None	Deactivation by init. expulsion	21	1,21	1,21
1.5. TERMINATION BY 2° REACTION WITH MONOMER, STEADY-STATE KINETICS							
1.5.1	Const	Varies	None	2° With monomer	4,23	1,4	1,4
1.5.2	k_iMI	Varies	Monomer	2° With monomer	23	1	1
1.5.3	Const	Const	Monomer	2° With monomer	4	1,4	1,4
1.6. TWO ACTIVE ENDS PER CHAIN							
1.6.1	Const	Const	None	2° Disprop	3	1,3	1,3
1.6.2	Const	Const	Monomer	2° Disprop	–	18	18
1.6.3	Const	Const	Monomer	2° Comb; two active chains couple to form a chain with two active ends	3	1,3	1,3
1.7. SLOW EXHAUSTION OF INITIATOR, NONSTEADY-STATE KINETICS							
1.7.1	k_iI	Const	None	2° Disprop* or comb	25*,26	–	1,25*,26
1.7.2	k_iI	Varies	None	2° Comb	27	–	27

*Data belong together.

TABLE 1. *cont'd*

Set	Initiation	Monomer	Transfer	Termination	References R_p	P_r	M_n, M_w
1.8. DEAD-END POLYMERIZATION, RAPID DECAY OF INITIATOR, MONOMER CONCENTRATION INVARIANT							
1.8.1	k_iI	Const	Monomer, solvent	2° Disprop or comb	28	1,28	1,28
1.8.2	k_iI^2	Const	None	2° Disprop or comb	28	1,28	1,28
1.9. DEAD-END POLYMERIZATION, SLOW DECAY OF INITIATOR, MONOMER CONCENTRATION VARIES							
1.9.1	k_iI	Varies	Monomer, solvent	2° Disprop* or comb	30	–	1,19*
1.9.2	k_iI	Varies	Monomer, solvent	2° Comb	30	–	1
1.9.3	k_iIM	Varies	None	1° Term, bimolecular monomer addition. I^* and R_I^* do not terminate	31	–	–
1.9.4	Instant	Varies	Monomer	1° Term, or 2° with monomer	40	–	–
1.9.5	Redox	Varies	None	2° Term	41	–	–
1.10. COPOLYMERIZATION: TWO DIFFERENT MONOMERS PRESENT							
1.10.1	Const	Const	Monomer	2° Disprop or comb	1,2,3,4,10 32,33	34	1,35
1.10.2	Const	Varies	None	Diffusion controlled and inversely proportional to viscosity	239	239	239
1.10.3	Const	Const	None	Rate const for term is known as fn(conc). Comparison of cross term parameter Φ	314	–	–
1.10.4	Const	Const	None	Alternating copolymerization	315	–	–
1.10.5	Varies	Varies	Agent	Various; Monte Carlo calculations; initiation and term influences composition	–	316	316
1.11. DIFFUSION-CONTROLLED TERMINATION (see also 1.10.2 and 5.1.4)							
1.11.1	Const	Varies	None or solvent*	2° Disprop or comb* and diffusion controlled	37*	1,36	–
1.11.2	k_iI	Varies	None	2° Comb, $R_t = k_tM_n, n > 1$	27	–	27
1.11.3	Const	Varies	None	2° Process	42	–	–
1.11.4	k_iI	Varies	Monomer	2° Disprop and diffusion controlled	240	240	–
1.11.5	k_iI	Varies	None	2° Disprop and comb, diffusion controlled	241	241	–
1.11.6	k_i	Varies	None	2° Disprop, term rate for long chains depends on entanglement density	242	242	242
1.11.7	k_i	Varies	Monomer, solvent	2° Disprop, term rate for long chains depends on entanglement density	243	243	243
1.11.8	k_iI or none	Varies	Monomer, solvent	2° Comb. and disprop term depends on free volume or free volume plus entanglement, Calc. of gel point	317	–	317
1.11.9	Const	Const	Solvent	$k_{t(n,m)} = k_o(nm)^{-a}$. Term by comb and disprop.	318	–	–
1.12. PRIMARY RADICAL TERMINATION							
1.12.1	Const	Varies	Monomer	2° Comb and disprop and primary radicals	38	–	1,38
1.12.2	Const	Const	None or init. and monomer*	2° Term and primary radicals	33,43–45	–	44,45,15*
1.13. MIXED SPECIES PROPAGATION							
1.13.1	Const	Varies	Monomer	Propagation, transfer and termination rates depend on species type, i.e. free radical and cationic occurring simultaneously	46 244	46 244	– 244
1.13.2	Const	Const	None	Zwitter-ion polymerization; distance between ions varies as $r^{3/2}$, equilibrium between free and solvated ions; 1° term	47	–	47
1.13.3	Const	Varies	None	Bifunctional initiator, term by comb	319	–	319

*Data belong together.

TABLE 1. *cont'd*

Set	Initiation	Monomer	Transfer	Termination	References		
					R_p	P_r	M_n, M_w
1.14. EMULSION POLYMERIZATION (see also Tables 2 and 7)							
1.14.1	Const	Const within particles	None	General theory; particles act as independent units; 2° term within particles; number of particles remain constant; number of radicals per particle	48–54	–	53
1.14.2	Const	Const within particles	None	General theory; Slow-term rate within particles	55	–	55
1.14.3	Const	Const within particles	None	Inst. term within particles; number of particles varies	56	–	–
1.14.4	Const	Const within particles	Monomer	Normal 2° term within particles; rapid interchange between phases of small-sized radicals; number of radicals per particle	57	–	–
1.14.5	Const	Const within particles varies outside	Monomer	Rapid exchange between phases of small-sized radicals; term in aq phase and in particles	58		
1.14.6	Slow and const	Const	None	Slow 2° comb; calcn. of number of radicals per particle	–	59	59
1.14.7	Const	Const within particles	None	Const number of particles; term by 2° comb	60	–	60
1.14.8	Const	Const	None	Inst term on entering a particle; const number of particles	–	–	61
1.14.9	Varies	Varies	Minimize	Adjust initiation and term rates while minimizing transfer to obtain "monodisperse" polymer	72	72	72
1.14.10	Const	Const within particles	Monomer, agent	Instant 2° term when a free radical enters a particle containing two growing chains and reacts with one of them. No term by disprop or comb within particles	245	245	245
1.14.11	Const	Const within particles	Monomer, agent	Same as case 1.14.10 but plus term by disprop or particle by comb	245	245	245
1.14.12	Varies	Varies	Monomer	Varying rate of entry, desorption of oligometic radicals, term by comb and disprop, Monte Carlo simulation model	–	320	–
1.14.13	Const	Const	None	Any number of chains per particle, 1° term, 2° term by disprop or by comb. Use of Markov chains	–	321	–
1.14.14	Const	Const	None	See 1.14.13. Copolymerization, chain composition distribution	–	322	–
1.15. HETEROGENEOUS POLYMERIZATION							
1.15.1	$k_i MI$, I varies	Varies	Monomer	Polymerization in monomer rich and monomer poor phases; 2° disprop	62	62	62
1.15.2	Instant	Varies	None	Term by precipitation onto growing solid particle	63	–	63
1.15.3	Const	Const	None	2° Comb, 1° occlusion onto particle surfaces, and primary radical term	64	–	–
1.15.4	Const	Const	None	2° Term in liquid phase, 1° radical precipitation, propagation and 2° term at solid–liquid interface	65	–	–
1.16. INHIBITION AND RETARDATION							
1.16.1	Const	Varies	None	2° Term, 2° addition to inhibitor	3,66,67,73	–	–
1.16.2	Const	Const	Inhibitor	2° Term, inhibitor term, inhibitor coupling	68	–	68
1.16.3	Const	Const	Retarder	2° Term, retarder reinitiation and term	69	–	69

TABLE 1. *cont'd*

Set	Initiation	Monomer	Transfer	Termination	References R_p	References P_r	References M_n, M_w
1.16.4	Const	Const	Retarder	2° Term, retarder reinitiation, term and coupling	3,12,70 71,74	–	–
1.16.5	Const	Const	Retarder	2° Term, rate of transfer equals rate of reinitiation	10	–	–
1.16.6	Const	Const	Retarder	2° Term, copolymerization of retarder	11	–	11
1.16.7	Const	Varies	None	Pseudo 1° with scavenger	17	–	–
1.16.8	Const	Const	Inhibitor	2° Disprop, 2° reaction with inhibitor	75	–	75
1.16.9	k_iI	Const	Inhibitor	2° with inhibitor or with monomer to assess the efficiency of initiation	246	–	–
1.17. POLYFUNCTIONAL INITIATOR WITH VARIOUS THERMAL STABILITIES							
1.17.1	k_iMI On raising the temp., other peroxide groups can initiate	Const	None	2° disproportionation	–	–	247
1.18. PERIODIC MODULATION OF TERMINATION OR INITIATION							
1.18.1	Const	Varies	None	Periodic modulation of term by disprop by addition of an inhibitor or by magnetic or electric fields	–	323	–
1.18.2	Varies	Varies	None	Periodic modulation of initiation, term by comb and/or disprop, computer calculation	324	324	324
1.18.3	Varies	Varies	None	Periodic modulation of initiation, term by comb. Calcn. of MWD by generating functions	–	325	–

TABLE 2. ADDITION POLYMERIZATION – "LIVING" POLYMERS WITH PARTIAL DEACTIVATION

Set	Initiation	Monomer	Transfer	Termination	References R_p	References P_r	References M_n, M_w
2.1. THE POISSON DISTRIBUTION: $k_i = k_p$							
2.1.1	k_pMI	Varies	None	None	2,101,102	1,2,101, 102	1,2,101, 102
2.1.2	k_pMIt	Varies	None	None; initiator added at a constant rate	103	–	103
2.2. THE GOLD DISTRIBUTION: $k_i \neq k_p$							
2.2.1	k_iMI	Varies	None	None	102, 104	1,102	1,102
2.3. PARTIAL DEACTIVATION BY A 1° PROCESS OR A 2° PROCESS WITH AN IMPURITY							
2.3.1	Instant	Varies	None	1° or 2°	105	1,106	1,106
2.3.2	Instant	Varies	None	Rate of term/R_p = const.	–	1,106,107	1,106,107
2.3.3	Instant initiator has two active sites	Varies	None	Rate of term/R_p = const.	–	1,107	1,107
2.3.4	Instant	Varies	None	Rate of term independent of R_p	1,106	–	1,106
2.3.5	Instant	Varies	None	1° at infinite time	108,109	–	108,109
2.3.6	Instant	Const	None	Probability that a chain will terminate rather than propagate is k_t/k_pM	–	–	248
2.4. MULTIPLE PROPAGATING SPECIES: R_n^* CAN TRANSFORM INTO Q_n^*, ETC.							
2.4.1	Instant	Const	None	None, two propagating species	–	76	76
2.4.2	k_iMI	Varies	None	None, two propagating species	1, 77–79	1,77,78 80	1,77–80

TABLE 2. *cont'd*

					References		
Set	**Initiation**	**Monomer**	**Transfer**	**Termination**	R_p	P_r	M_n, M_w
2.4.3	Instant	Varies	None	None, multiple propagating species	249	249	249
2.4.4	Activated monomer addition	Varies; volume also varies	None	None; two prop constants	–	326	326
				k_p can increase	–	327	327
2.5.	**SIMULTANEOUS POLYMERIZATION AND DEPOLYMERIZATION**						
2.5.1	k_iMI	Const	None	None	–	1,81	1,81
2.5.2	k_iMI	Varies	None	None	82,83	81	83
2.5.3	k_pM^2	Varies	None	None	84	–	–
2.6.	**THE k_p VARIES WITH CHAIN LENGTH** (see also 2.4.4, 3.3, and 3.4)						
2.6.1	k_iMI	Varies	None	None			
	(a) all propagation constants (k_r) are different				–	1,85,86	–
	(b) $k_i : k_1 : k_2 : k_3 : \cdots k_n = m : (m-1) : (m-2) : (m-3) : \cdots$				–	1,85	–
	(c) $k_1 \neq k_2 \cdots \neq k_m = k_{m+1} = \cdots = k_n$			–	1,85	1,85	
	(d) $k_i \neq k_1 \neq k_2 = k_m$				–	1,85	–
2.6.2	Instant, $k_1 = k_2 \cdots = k_m, k_{m+1}$, etc.= 0			86	86	86	–
2.6.3	Instant, k_p is a linear decreasing function of r				86	86	86
2.6.4	Const	Varies	None	None; k_p for monomer, dimer, and trimer different from remaining molecules	–	328	328
2.6.5	Rate constants can vary with extent of conversion; determination of rate constants from P_r and the use of generating functions; termination by monomolecular decay, disprop and/or comb.				–	329	–
2.7.	**DEACTIVATION BY TRANSFER TO MONOMER**						
2.7.1	k_iMI	Varies	Monomer	None	1,87	1,87	1,74,87,88
2.7.2	Instant	Varies	Monomer	None	1,74,90	1,89,90	1,74,90
2.7.3	Instant	Varies	Monomer	None, two active ends per initiator	1,91	1,91,92	1,91
2.8.	**DEACTIVATION BY SLOW 1° TERMINATION**						
2.8.1	Instant	Varies	None	Slow 1°	1,74	–	1,74
2.8.2	Instant	Varies	Monomer	Slow 1°, at infinite time	1,74	–	1,74
2.9.	**DEACTIVATION BY INITIATOR EXPULSION REACTION**						
2.9.1	Instant	Varies	None	None	–	–	1,93
2.9.2	k_iMI	Varies	Monomer	1° term	67	–	67
2.9.3	Instant	Varies	Monomer	None	250	250	250
2.10.	**DEACTIVATION BY DEGRADATIVE CHAIN TRANSFER**						
2.10.1	k_iMI	Varies	Degradative transfer to polymer	None	94	–	95
2.11.	**COPOLYMERIZATION**						
2.11.1	Instant	Varies	None	None	–	96	
2.12.	**HETEROGENEOUS POLYMERIZATION**						
2.12.1	Instant	Varies	None	None; diffusion of monomer through solid polymer	97	–	97
2.12.2	Instant	Varies	None	2° Term with monomer; diffusion of monomer through solid polymer	98	–	98
2.12.3	Const	Const	None	Sorption and desorption of chains from the surface; slow 1° term which depends on chain length	–	99	99
2.13.	**SPONTANEOUS POLYMERIZATION**						
2.13.1	Const	Const	None	Vinyl compound and activator form monomer; monomer both initiates and propagates; no term	100	–	100

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TABLE 2. *cont'd*

Set	Initiation	Monomer	Transfer	Termination	References		
					R_p	P_r	M_n, M_w
2.14. REVERSIBLE INITIATION AND REACTIVATION							
2.14.1	Rev 2° with monomer	Const	Monomer	No termination; dead species in equilibrium with living species, irreversible propagation	251	251	251
2.15. DEACTIVATION BY TRANSFER TO AGENT							
2.15.1	k_iMI	Const or varies	Agent const varies	No termination. Transfer creates dead polymer and active initiator	–	–	252
2.15.2	k_iMI	Varies	Agent	Numerical method for calc. of MWD with mono- or polyfunctional transfer agent. Latter leads to branching.	–	330	–
2.16. SLOW EQUILIBRIA							
2.16.1	Varies	Varies	None	3-State mechanism consisting of two successive equilibria	–	–	331
2.16.2	Varies	Varies	None	Equilibrium between dormant aggregated polymer and "living" polymer	332	–	–
2.17. POLYMER MICROSTRUCTURE							
2.17.1	Varies	Varies	None	None; concentration of head-to-head and tail-to-tail, sequence length distributions, various dyad and triad fractions	–	–	334
2.17.2	NA	NA	NA	Block copolymers	–	–	335

TABLE 3. LINEAR CONDENSATION POLYMERIZATION WITHOUT RING FORMATION

Set	Conditions	References
3.1	Condensation of bifunctional monomer AB; the Flory distribution. See Eq. (C41)	1,2,110
3.2	Bifunctional monomer AA reacting with bifunctional monomer BB; the nylon case of hexamethylene diamine and adipic acid	1,24,111
3.3	Deviations from the principle of equal reactivity; the "substitution effect"	1,112,253,254
3.4	Rate of condensation varies	
	3.4.1 Rate of condensation proportional to chain size	1,113,114,134
	3.4.2 Condensation requires rotation into colinear orientation prior to reaction	255
	3.4.3 The order of reaction varies with conversion, or a catalytic influence of unreacted A or B groups, or both effects occurring simultaneously	256
3.5	Other simple linear condensation cases	
	3.5.1 AA reacting with BC. BC is an anhydride; within a given molecule, B must react before C	1,111
	3.5.2 AA reacting with BC. BC is an unsymmetrical acid or glycol; B reacts only with A at a different rate from that of C reacting with A	1,111
	3.5.3 AB reacting with C and itself. B and C react only with A; C is a terminator or capping material	1,111
	3.5.4 AA reacting with BB and C; the nylon case again with acetic acid as terminator	1,111
	3.5.5 AA reacting with BC; A and B react with C	1,111
	3.5.6 AB reacts with CC or DD kinetics	115
	3.5.7 AA and A reacting with BB and B	336
3.6	Further polymerization of polymers with an initial geometric distribution	
	3.6.1 Further polymerization of AB when the initial distribution is geometric	1,116
	3.6.2 Further polymerization of AB when the initial distribution is a superposition of two geometric distributions	1,116
	3.6.3 Further polymerization of AA with BB when the initial distribution of both is geometric	1,116
3.7	Copolymerization of condensation polymers	
	3.7.1 AB reacting with CD; AB and CD can be hydroxy acids or similar materials	1,111
	3.7.2 AA reacting with BB and CC. A reacts with B and C only and vice versa; BB and CC can be adipic and sebacic acids	111,257
	3.7.3 AA and BB reacting with CC and DD; A and B react only with C and D and vice versa	111
	3.7.4 AA reacting with BC and DD; A reacts only with B, C, and D	111
	3.7.5 AA and DD reacting with BC; A and B react only with C and D and vice versa	111
	3.7.6 AA reacting with BC–BC, the latter can be a dianhydride; B must react before C	258,259

TABLE 3. *cont'd*

Set	Conditions	References
3.8	Coupled polymers	
	3.8.1 AB polymerized to extent of conversion α, then coupled with CC	1,117,118
	3.8.2 AB polymerized to extent of conversion α, then coupled with CD. A and B can react with C or D	1,117
	3.8.3 AA and BB polymerized to extent of conversion α, then coupled with an excess of CC. A and B to react completely on coupling	1,117
	3.8.4 Poisson-distribution polymer of AA coupled with BC	1,117
	3.8.5 Monomer AB polymerized to extent of conversion α, then coupled with excess CC to extent of conversion γ, then recoupled with excess DD	1,117
	3.8.6 Particularly narrow distributions via coupling reaction	
	I. AA and BB (great excess)→BBAABB, then remove excess BB. CC and BBAABB (great excess)→ BBAABBCCBBAABB, then remove excess BBAABB, and continue in like manner	119
	II. AA and 2BC→CBAABC then CBAABC and 2DE→EDCBAABCDE, etc	119
	III. AB and CD→ABCD then ABCD and EF→ABCDEF, etc	119
	3.8.7 Blocks of polymers of known distribution are coupled together	
	I. A series of Poisson-type-polymers coupled together	
	II. Poisson-type-polymers coupled to "most probable"-type polymers	
	III. A series of "most probable"-type polymers coupled together	120,118
3.9	AB reacts with CC or CD; rate of reaction of A dependent upon whether or not B has reacted	115
3.10	Segmented block copolymers; distribution of block sizes	260–262
3.11	Reacted sequences in homopolymers	263, 264

TABLE 4. EQUILIBRIUM POLYMERIZATION

Set	Conditions	References
4.1	The "most probable" distribution of Flory has been derived for condensation polymerization when all reactions are assumed to have the same probability, regardless of chain length, and whether or not exchange reactions occur:	Eq. C41
	$P_r + P_s = P_{r+s-i} + P_i, \quad i < r+s$	
	Here, P_i can be a byproduct such as water, or a polymer molecule whose size is smaller than $r+s$. The same distribution results when random scission occurs to infinitely long chains. See also (265) for multifunctional monomers.	2,121
4.2	The theoretical equilibrium molecular weight distribution for the system	122
	$rM = P_r$	
	depends upon the thermodynamic definition of the final product. If the change in Gibbs free energy of formation and polymerization is a linear function of molecular size *r*, then two cases can be considered:	
	4.2.1 The monomer is polymerized to a pure perfectly ordered state (solid); this gives the "most probable" distribution	Eq. C41
	4.2.2 The monomer is polymerized to a pure randomly ordered state (liquid); a completely different distribution results	123
	If the free-energy change upon disordering of the pure polymer is independent of the molecular weight distribution, a new distribution arises	124
4.3	Thermodynamics of living equilibrium polymers	125
4.4	Given an initial distribution, find the distribution as a function of time when chain ends react at random with all monomer units	126
4.5	Initiation, propagation, and termination reactions are all equilibrium reactions; an initiator is required	127
4.6	Initiation, propagation, and termination reactions are all equilibrium reactions; the system is self-initiating	127
4.7	Equilibrium initiation and equilibrium propagation with a multifunctional initiator	128,266
4.8	Equilibrium initiation and equilibrium propagation; no termination; nonequilibrium solution.	129
4.9	The catalyst can form an active species with any polymer molecule, and the total number of *moles* of the system is kept constant (constant pressure and volume if all polymer molecules are ideal gases)	130
4.10	Addition polymerization, instantaneous initiation, no transfer, no termination, monomer concentration held constant, active species in equilibrium with inactive species	77
4.11	Addition polymerization, rate of initiation equals k_iMC, no transfer, no termination, two active species in equilibrium, monomer concentration varies	78
4.12	Addition polymerization, instantaneous initiation, no transfer, no termination, active species in equilibrium with inactive species, monomer concentration varies	77
4.13	Poly(phosphate) equilibria	131
4.14	Instantaneous initiation, polymerization and depolymerization, 1° termination	132
4.15	Instantaneous initiation, polymerization and depolymerization, degradative transfer to monomer	133
4.16	Copolymerization: bimolecular addition of one monomer, equilibrium addition of other monomer	230
4.17	Copolymerization: equilibrium growth with monomer A or B adding to a chain with a terminal group of either A or B. Three cases: 2° reaction with initiator; 1° formation of active radical; 2° reaction with another monomer	267

TABLE 4. *cont'd*

Set	Conditions	References
4.18	Equilibrium copolymerization of two or more comonomers	268
4.19	Polycondensation where groups have different equilibrium constants	269,270
4.20	Equilibrium copolymerization initiated by polymer chains with active sites: average mol. wts, grafting ratio, grafting efficiency, grafting success, branching distribution, frequency of grafts	337

TABLE 5. NONLINEAR POLYMERIZATION SYSTEMS

Set	Conditions	References
5.1	Vinyl polymerization; self-grafting	
5.1.1	General case; molecular weight averages for grafted and ungrafted polymer	278
5.1.2	Constant rate of initiation, monomer concentration invariant, transfer to monomer and to polymer, termination by 2° disproportionation	1,3,18
5.1.3	Constant rate of initiation, monomer concentration varies, transfer to polymer, termination by 2° combination	135
5.1.4	Constant rate of initiation, monomer concentration can vary, transfer to monomer and to polymer, termination by 2° disproportionation and/or combination	279
5.1.5	Instantaneous initiation, monomer varies, either no transfer occurs or transfer to monomer, solvent, or polymer is allowed; termination by coupling and varies with chain length	280
5.2	Vinyl polymerization; grafting onto a performed polymer whose initial distribution is either (i) of constant length or (ii) a geometric distribution	18
5.3	Vinyl polymerization; all segments of the backbone chains have equal probability to be grafted	136
5.4	Vinyl polymerization; terminal double-bond polymerization, monomer concentration varies, transfer to monomer and to polymer, terminal double bond polymerization	
5.4.1	Termination predominantly by transfer, constant rate of initiation; batch or continuous polymerization	1,137–139
5.4.2	Termination by disproportionation, constant rate of initiation, includes transfer to solvent	338
5.4.3	Termination by combination, constant rate of initiation, amount of short and long chain branching, transfer to a tertiary site	338,339
5.4.4	Termination by combination, initiator and monomer concentration vary, transfer to monomer and to polymer	340
5.4.5	Termination by combination, initiator and monomer concentration vary, transfer to monomer and to polymer, characterization following saponification and reacetylation	341
5.5	Vinyl polymerization; long-chain branching.	
5.5.1	constant rate of initiation, monomer concentration invariant, transfer to monomer and to polymer, termination by 2° disproportionation	1,140
5.5.2	"Living polymer". Instantaneous initiation, β-hydride or β-methyl elimination to form a terminal double bond, transfer with agent to form a saturated end	355
5.6	Vinyl polymerizaton; "living" branched polymer; polyfunctional initiator RA_f; rate of initiation equals rate of propagation, no transfer, no termination	141
5.7	Vinyl polymerization; R_p, in a diffusion controlled gelling system; termination by disproportionation or combination, no transfer	142
5.8	Vinyl polymerization; branching density as a function of conversion; branches formed by polymerization through a vinyl group (diene polymers) or by transfer-to-polymer reaction	
5.8.1	Batch polymerization	1,2
5.8.2	Continuous polymerization	1,138
5.9	Vinyl polymerization	
5.9.1	Branching density as a function of conversion of (1) long-chain branching, (2) short-chain branching (backbiting), (3) very short chain branching (radical migration)	143
5.9.2	Copolymerization with divinyl, no ring formation prior to gelation	274,281
5.9.3	Copolymerization with divinyl; ring formation permitted; Monte Carlo calculations for crosslinking density, weight fraction of gel; chain-length distribution between crosslinks	342,343
5.9.4	Circuits in a network, elastically active chains	282,283
5.10a	Emulsion polymerization; branch density	144,344
5.10b	Emulsion polymerization; Monte Carlo calculations; can account for desorption of oligomers, chain-length dependence of kinetic parameters, chain transfer to monomer and solvent, polymerization through terminal double bonds and long-chain branching	345
5.11	Cyclopolymerization: the concentration of pendent double bonds per molecule	145–149
5.12	Gelation condition in a system when cyclopolymerization also occurs; transfer to monomer reaction occurs. Molecular weight given	150
5.13	General theory of gelation for polyaddition- and polycondensation-type polymers	151
5.14	The general distribution function for various molecules of type A reacting with various molecules of type B; A can only react with B	
5.14.1	All functional groups have equal reactivity, independent of position within the molecule or the size of the molecule. Ring formation excluded	Section D 276

TABLE 5. *cont'd*

Set	Conditions	References
	5.14.2 Monomers of type RA_f (f can vary) can only react with monomers of type RB_g (g can vary) where the various B's can have different reactivities. No ring formation	284
	5.14.3 Monomers of type RA_f and RB_g where f and g can vary, the reactivity of a given B can depend on whether or not an adjacent B on the same molecule has reacted. No ring formation	285
	5.14.4 Monomers of type RA_f and RB_g where f and g can vary; no ring formation; calculation of higher distribution moments	346
5.15	Crosslinking or coupling of a polymer with a known primary distribution (see also Table 6)	
	5.15.1 General case. No ring formation prior to gelation	1,152–155, 286
	5.15.2 All primary chains have the same size; no ring formation prior to gelation	1,2,152, 155–157
	5.15.3 Primary chains of the Poisson type, (Eq. C48); no ring formation prior to gelation	155,157
	5.15.4 Primary chains of the Schulz type, (Eq. C36); no ring formation prior to gelation	286
	5.15.5 Primary chains of the "most probable" type; ring formation allowed prior to gelation	287
	5.15.6 Formation of star-type polymers	288
5.16	Homopolymer of ARB_{r-1}. A can react only with B; the B's may have different reactivities. Formation of rings excluded prior to gelation	
	5.16.1 All B groups have the same reactivity	1,2,158,265, 289
	5.16.2 Let B groups have different reactivities	1,159,160
	5.16.3 A controversy over the statistical approach	161,162,163, 164
5.17	Copolymer of ARB_{f-1} and AB; A can react only with B; formation of rings excluded prior to gelation	1,2,158
5.18	Homopolymer of RA_f; formation of rings excluded prior to gelation	
	5.18.1 All A's equally reactive	1,2,121,158, 165,166, 265,274, 277,281, 290–292
	5.18.2 Reactivity of A depends on number of A's previously reacted	167,273,293
5.19	Various copolymers	
	5.19.1 Copolymer of RA_f and AA; formation of rings excluded prior to gelation	1,2,165
	5.19.2 Copolymer of RA_f, AA, and BB; A can react only with B; formation of rings excluded prior to gelation; all branch points completely reacted. See set 5.16.3 for a controversy	1,168,169
	5.19.3 A mixture of self-condensing monomers R_1A_g, R_2A_h, etc., no ring formation	277,294,295
	5.19.4 A stoichiometric mixture of RA_f and RB_f of the same functionality f, indistinguishable reactivity, no ring formation. Note that different authors get different equations for M_n and M_w	277
	5.19.5 A stoichiometric mixture of RA_f, RA_g, ... and RB_h, RB_i ..., f, g, h, i being different functionalities, indistinguishable reactivities, no ring formation	277,294
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TABLE 6. DEGRADATION OF POLYMERS – MAY BE ACCOMPANIED BY CROSSLINKING

Set	Initiation	Mass	Initial distribution	Transfer	Termination	References R_d	P_r	M_n, M_w
6.1. RANDOM SCISSION ONLY								
6.1.1	Proportional to time	Const	Arbitrary	None	None	–	183–186	182–184
6.1.2	Proportional to time	Const	Infinite or uniform	None	None	–	183–187	183,184,188
6.1.3	Random at all bonds	Const	Uniform	None	None	–	189	189
6.1.4	Random at chain ends	Const	Uniform	None	None	–	190	–
6.1.5	Random at all chains	Const	Uniform	None	None	–	191	191
6.1.6	Random	Const	Rectangular	None	None	–	184,187	184
6.1.7	Random	Const	Flory	None	None	–	184,187	184,188
6.1.8	Random	Const	Schulz	None	None	–	184,187, 301	187,301
6.1.9	Random	Const	Poisson	None	None	–	187	–
6.1.10	Random at normal and weak bonds	Const	Uniform	None	None	–	–	192
6.1.11	Gaussian about the midpoint	Const	Schulz	None	None	301	301	–
6.1.12	Central	Const	Schulz	None	None	301	301	–
6.2. UNZIPPING-TYPE REACTION								
6.2.1	1° end	Varies	Uniform	None	1°	193	–	193
6.2.2	1° end	Varies	Uniform	Polymer	2° Disprop	194	–	194
6.2.3	1° end	Varies	Schulz	None	1°	193	–	193
6.2.4	1° end	Varies	Schulz	None	2° Disprop	195	–	195
6.2.5	1° end	Varies	Schulz ($k = 2$)	None	1°	196	–	196
6.2.6	1° end	Varies	Schulz ($k = 2$)	None	2° Comb	196	–	196
6.2.7	1° end; various rates of initiation	Varies; monomer radicals may evaporate	Flory	None	1° or 2° Disprop	197	–	–
6.2.8	Random scission only	Varies	Uniform	Polymer	2° Disprop	194	–	194
6.2.9	Random scission only	Varies	Schulz	None	2° Disprop	198	–	198
6.2.10	1° end and random scission	Varies	Unspecified	None	1° and 2° Process	199 (all molecules must terminate) 200 (some molecules can completely disappear)		
6.2.11	1° end and random scission	Varies	Flory	Polymer	1° and 2° Disprop	201	–	201
6.2.12	1° end and random scission	Varies	Flory	Polymer	2° Comb	201	–	201

TABLE 6. *cont'd*

Set	Initiation	Mass	Initial Distribution	Transfer	Termination	References R_d	References P_r	References M_n, M_w
6.2.13	1° end and random scission	Varies	Flory	Polymer	1° and 2° Process; comparison of random scission, weak link, and transfer theories.	202 203	– –	– 203
6.2.14	1° end and random scission	Varies	Uniform	Polymer	Comparison of various term mechanisms	204	–	–
6.2.15	1° end and random scission	Varies; units other than monomer may evaporate	Uniform	Polymer	2° Disprop	205	–	205
6.2.16	1° end and random scission	Varies; units other than monomer may evaporate	Flory	polymer	1° and 2° Disprop or 2° comb	206	206	206
6.2.17	Unzipping reactions	Varies	Various	Various	Various, a review	207	–	–
6.3.	**RANDOM SCISSION AND CROSSLINKING**							
6.3.1	Proportional to time	Const	Arbitrary	None	Unspecified term, with and without ring formation	153 208 – 302 303	153 208 282 302 303	153 208 – 302 –
6.3.2	Varies with depth of penetration	Const	Flory	None	1° and 2° Disprop without ring formation	209	210 209	210
6.3.3	Proportional to time	Const	Arbitrary	None	End-linking (grafting) rather than crosslinking; without ring formation	211 208	211 208	211 28
6.3.4	Proportional to time	Const	Arbitrary	None	End-linking; with ring formation	211	211	211
6.3.5	Proportional to time	Const	Schulz	None	Unspecified term, without ring formation	29	–	29
6.3.6	Proportional to time	Const	Various	Unspecified	Various initial distributions	–	–	350
6.4.	**CROSS LINKING ONLY**							
6.4.1	Proportional to time	Const	Arbitrary	None	Ring formation prohibited	153	153	153
6.4.2	Proportional to time	Const	Uniform	None	Ring formation prohibited	182	182	182
6.4.3	Proportional to time	Const	Schulz	None	Ring formation prohibited	182,212, 213	182	182
6.4.4	Proportional to time	Const	Beasley (140)	None	Ring formation prohibited	–	182	–
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TABLE 7. INFLUENCE OF REACTOR CONDITIONS AND DESIGN ON THE MOLECULAR WEIGHT DISTRIBUTION

Set	Conditions	References
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[a]CFSTR: Continuous-flow, stirred tank reactor; BR: batch reactor; TR: tube reactor; MWD: molecular weight distribution.

C. SOME DISTRIBUTION FUNCTIONS AND THEIR PROPERTIES

The frequency function, $F(r)$, is the fraction of molecules of size r. Furthermore, $F(r)$ is normalized

$$\sum_1^\infty F(r) = \int_0^\infty F(r)\,dr = 1 \qquad \text{(C1)}$$

The weight fraction of molecules of size r is

$$W(r) = rF(r)\Big/\sum_1^\infty rF(r) = rF(r)\Big/\int_0^\infty rF(r)\,dr \qquad \text{(C2)}$$

Averages of any distribution are defined by

$$\sum_1^\infty r^iF(r)\Big/\sum_1^\infty r^{i-1}F(r) = \int_0^\infty r^iF(r)\,dr\Big/\int_0^\infty r^{i-1}F(r)\,dr \qquad \text{(C3)}$$

The number-average degree of polymerization is defined by

$$\bar{r}_n = \sum_1^\infty rF(r)\Big/\sum_1^\infty F(r) = \sum_1^\infty W(r)\Big/\sum_1^\infty [W(r)/r] \qquad \text{(C4)}$$

Thus, by the definitions of $F(r)$ and $W(r)$

$$W(r) = rF(r)/\bar{r}_n \qquad \text{(C5)}$$

The weight-average degree of polymerization is

$$\bar{r}_w = \sum_1^\infty r^2F(r)\Big/\sum_1^\infty rF(r) = \sum_1^\infty rW(r)\Big/\sum_1^\infty W(r) \qquad \text{(C6)}$$

The z and $z + 1$ averages are defined by Eq. (C3) with i set equal to 3 and 4. There is no need to restrict averages of a distribution to positive integers – any useful average can be defined; such as the $(-5/2)$ average. If the intrinsic viscosity of a polymer is related to the degree of polymerization through the equation

$$[\eta] = k\bar{r}_v^a, \qquad \text{(C7)}$$

where $\bar{r}_v$ is the viscosity-average degree of polymerization, it is related to the frequency function by

$$\bar{r}_v = \left[\sum_1^\infty r^{1+a}F(r)\Big/\sum_1^\infty rF(r)\right]^{1/a} \qquad \text{(C8)}$$

As a approaches unity, $\bar{r}_v$ approaches $\bar{r}_w$. In principle, a distribution function can be determined if sufficient averages of the distribution can be determined. In practice, only the number, weight, and perhaps z averages can be found, which are insufficient to define any distribution without making further assumptions.

The degree of polymerization is a useful concept as long as one is describing polymers made with a single monomer or with monomers of equal molecular weight. When considering copolymers, one must work with the actual molecular weight of the reacted unit. This is done in condensation polymerization. The molecular weight distribution of addition copolymers is not included here because of the extreme complexity of these systems.

When performing the summation of a distribution equation to find an average of the distribution, use is frequently made of the following sums:

$$\sum_{x=1}^{\infty} p^{x-1} = 1/(1-p) \quad p<1 \tag{C9}$$

$$\sum_{x=1}^{\infty} xp^{x-1} = 1/(1-p)^2 \quad p<1$$

$$\sum_{x=1}^{\infty} x^2p^{x-1} = (1+p)/(1-p)^3 \quad p<1$$

$$\sum_{x=1}^{\infty} x^np^{x-1} = \frac{\mathrm{d}}{\mathrm{d}p}\left[p\sum_{x=1}^{\infty} x^{n-1}p^{x-1}\right] \quad p<1$$

$$\sum_{i=0}^{\infty} a^{n-i}b^i n!/(n-i)!\,i! = (a+b)^n \quad n \text{ is an integer}$$

$$\sum_{i=0}^{\infty} a^i in!/(n-i)!\,i! = na(1+a)^{n-1}$$

$$\sum_{i=0}^{\infty} a^i i^2 n!/(n-i)!\,i! = na(1+na)(1+a)^{n-2}$$

$$\sum_{n=1}^{\infty} A^{n-1}/(n-1)! = \exp A$$

$$\sum_{n=1}^{\infty} nA^{n-1}/(n-1)! = (1+A)\exp A$$

$$\sum_{n=1}^{\infty} n^2A^{n-1}/(n-1)! = (1+3A+A^2)\exp A$$

$$\sum_{n=1}^{\infty} n^pA^{n-1}/(n-1)! = \frac{\mathrm{d}}{\mathrm{d}A}\left[A\sum_{n=1}^{\infty} n^{p-1}A^{n-1}/(n-1)!\right]$$

1. Normal Distribution Function (Gaussian Distribution)

$$F(r) = \frac{\exp\{-(r-\bar{r})^2/2\sigma^2\}}{(2\pi)^{1/2}\sigma} \tag{C10}$$

$$W(r) = (r/\bar{r})F(r) \tag{C11}$$

$$\bar{r} = \int_{-\infty}^{+\infty} \frac{r\exp\{-(r-\bar{r})^2/2\sigma^2\}}{(2\pi)^{1/2}\sigma} = \bar{r}_n \tag{C12}$$

$$\sigma^2 = \int_{-\infty}^{+\infty} \frac{(r-\bar{r})^2\exp\{-(r-\bar{r})^2/2\sigma^2\}}{(2\pi)^{1/2}\sigma} \tag{C13}$$

$$\bar{r}_w = \frac{\sigma^2}{\bar{r}} + \bar{r} \tag{C14}$$

Values of $F(r)$ and $\int_0^t F(r)\,\mathrm{d}r$ are found in many statistical tables (223).

2. Logarithmic Normal Distribution Function

Under the assumption that the weight distribution of the logarithm of molecular size is normally distributed, we can replace r in the normal distribution function by $\ln r$ and $\bar{r}$ by $\ln \bar{r}_m$

$$W(\ln r) = \frac{\exp\{-(\ln r - \ln \bar{r}_m)^2/2\sigma^2\}}{(2\pi)^{1/2}\sigma} \tag{C15}$$

where

$$\int_1^{\infty} W(\ln r)\,\mathrm{d}(\ln r) = 1 \tag{C16}$$

or in the alternate form

$$W(r) = \frac{\exp\{-(\ln r - \ln \bar{r}_m)^2/2\sigma^2\}}{r(2\pi)^{1/2}\sigma} \tag{C17}$$

where

$$\int_0^{\infty} W(r)\,\mathrm{d}r = 1 \tag{C18}$$

and

$$\ln \bar{r}_m = \int_0^{\infty} (\ln r)W(r)\,\mathrm{d}r \tag{C19}$$

Here $\bar{r}_m$ is the median value of the distribution, that is, one-half of the values of r are less than $\bar{r}_m$.

$$\sigma^2 = \int_0^{\infty} (\ln r - \ln \bar{r}_m)^2 W(r)\,\mathrm{d}r \tag{C20}$$

$$\bar{r}_n = \bar{r}_m \exp(-\sigma^2/2) \tag{C21}$$

$$\bar{r}_w = \bar{r}_m \exp(+\sigma^2/2) \tag{C22}$$

$$\bar{r}_z = \bar{r}_m \exp(+3\sigma^2/2) \tag{C23}$$

$$\bar{r}_i = \bar{r}_m \exp\{(2i-3)\sigma^2/2\} \tag{C24}$$

Note that

$$\bar{r}_m = (\bar{r}_n\bar{r}_w)^{1/2} \tag{C25}$$

$$\bar{r}_w/\bar{r}_n = \bar{r}_z/\bar{r}_w = \bar{r}_{z+1}/\bar{r}_z = \exp\sigma^2 \tag{C26}$$

The logarithmic normal distribution sometimes is given in a "generalized" form (224)

$$W_s(r) = \frac{r^s\exp[-(\ln r/\bar{r}_s)^2/2\sigma^2]}{(2\pi)^{1/2}\sigma\bar{r}_s^{s+1}\exp\{(s+1)^2\sigma^2/2\}} \tag{C27}$$

but Honig (225) has shown that

$$\ln \bar{r}_{\mathrm{m}} = \ln \bar{r}_{\mathrm{s}} + (s+1)\sigma^2 \qquad \text{(C28)}$$

Thus, the normalized Lansing–Kramer function ($s = 0$) (226) is identical to the normalized Wesslau function ($s = -1$) (227).

The generalized logarithmic normal distribution is skewed to large values of r, but Kotliar (237, 238) shows that this distribution is not a good representation of a polymer after either low- or high-molecular weight material is removed or degradation has occurred.

3. Generalized Exponential Distribution (1,228)

$$F_{m,k,y}(r) = my^{k/m} r^{k-1}[\exp(-yr^m)]/\Gamma(k/m) \qquad \text{(C29)}$$

$$W_{m,k,y}(r) = my^{(k+1)/m} r^{k}[\exp(-yr^m)]/\Gamma[(k+1)/m] \qquad \text{(C30)}$$

$$\bar{r}_n = \Gamma[(k+1)/m]/y^{1/m}\Gamma(k/m) \qquad \text{(C31)}$$

$$\bar{r}_w = \Gamma[(k+2)/m]/y^{1/m}\Gamma[(k+1)/m] \qquad \text{(C32)}$$

$$\bar{r}_z = \Gamma[(k+3)/m]/y^{1/m}\Gamma[(k+2)/m] \qquad \text{(C33)}$$

$$\bar{r}_i = \Gamma[(k+i)/m]/y^{1/m}\Gamma[(k+i-1)/m] \qquad \text{(C34)}$$

and

$$r_{\mathrm{v}} = \{\Gamma[(k+a+1)/m]/y^{a/m}\Gamma[(k+1)/m]\}^{1/a} \qquad \text{(C35)}$$

where a is defined by equation (C7).

The variance of a distribution σ^2, the usual measure of distribution breadth for small populations, depends strongly on the average molecular weight of the distribution:

$$\sigma^2 = \bar{r}_{\mathrm{n}}(\bar{r}_{\mathrm{w}} - \bar{r}_{\mathrm{n}})$$

Hence, the preferred measure of the molecular weight distribution breadth is $\bar{r}_{\mathrm{w}}/\bar{r}_{\mathrm{n}}$.

(a) The distribution function of Schulz (9) and Zimm (229) is obtained by setting $m = 1$ and requiring that $k > 0$. This distribution is equivalent to the Pearson Type III distribution

$$F(r) = y^k r^{k-1}[\exp(-yr)]/\Gamma(k) \qquad \text{(C36)}$$

$$W(r) = y^{(k+1)} r^{k}[\exp(-yr)]/\Gamma(k+1) \qquad \text{(C37)}$$

The distribution reduces to the "most probable" distribution where $k = 1$.

The cumulative number or weight fraction of the Schulz distribution may be computed from

$$\int_0^r F_{1,k,y}(r) = \frac{ky^k}{\Gamma(1+k)} \sum_{i=0}^{\infty} \frac{(-1)^i y^i r^{k+i}}{i!\,(k+i)} \qquad \text{(C38)}$$

$$\int_0^r W_{1,k,y}(r) = \frac{y^{k+1}}{\Gamma(1+k)} \sum_{i=0}^{\infty} \frac{(-1)^i y^i r^{k+i+1}}{i!\,(a+i+1)}. \qquad \text{(C39)}$$

(b) The Weibull (231) or Tung (232) distribution is obtained by setting $m = 1 + k$ and $k > 0$. This distribution is usually seen in the form

$$\int_0^r W(r)\,\mathrm{d}r = 1 - \exp[-yr^{(1+k)}] \qquad \text{(C40)}$$

Kotliar (233) shows that evaluation of y and k by the Tung method can lead to erroneous values of $\bar{r}_{\mathrm{w}}/\bar{r}_{\mathrm{n}}$.

(c) The Flory distribution, as noted above, occurs when $k = m = 1$, provided that $\ln p$ can be replaced by $-(1-p)$, i.e. $p \approx 1$. The Flory distribution is also written as:

$$F(r) = p^{r-1}(1-p) \qquad \text{(C41)}$$

$$W(r) = rp^{r-1}(1-p)^2 \qquad \text{(C42)}$$

$$\bar{r}_{\mathrm{n}} = 1/(1-p) \qquad \text{(C43)}$$

$$\bar{r}_{\mathrm{w}} = (1+p)/(1-p) \qquad \text{(C44)}$$

$$\bar{r}_{\mathrm{v}} = \bar{r}_{\mathrm{n}}([\Gamma(2+a)]^{1/a} \qquad \text{(C45)}$$

and with the approximation $\ln p = p - 1$

$$\int_0^r W(r)\,\mathrm{d}r \cong (1/p) - [1 + (1-p)r]p^{r-1} \qquad \text{(C46)}$$

For high molecular weights $p \approx 1$, hence

$$r_{\mathrm{n}} : r_{\mathrm{w}} : r_{\mathrm{z}} = 1:2:3. \qquad \text{(C47)}$$

4. Poisson Distribution

$$F(r) = \exp(-\nu)\,\nu^{r-1}/(r-1)! \qquad \text{(C48)}$$

$$W(r) = [\nu/(\nu+1)]r\exp(-\nu)\,\nu^{r-2}/(r-1)! \qquad \text{(C49)}$$

$$\bar{r}_{\mathrm{n}} = 1 + \nu \qquad \text{(C50)}$$

$$\bar{r}_{\mathrm{w}} = 1 + \nu + \nu/(1+\nu) \qquad \text{(C51)}$$

D. MOLECULAR WEIGHT DISTRIBUTION IN CONDENSATION POLYMERS: THE STOCKMAYER DISTRIBUTION FUNCTION

Stockmayer (234) has presented a generalized distribution formula for a variety of monomers containing end groups of type A which can only react with a variety of monomers containing end groups of type B. In the original mixture there are $A_1, A_2, A_3, \ldots, A_i, \ldots$ moles of reactants bearing respectively, $f_1, f_2, f_3, \ldots, f_i, \ldots$ functional groups of type A each, together with $B_1, B_2, \ldots, B_j, \ldots$ moles of reactants of functionalities $g_1, g_2, \ldots g_j, \ldots$ in groups of type B. all functional groups of a given type are equally reactive and ring formation does not occur appreciably; which obviously is not true near the gel point. The system reacts until a fraction α of the A groups and a fraction β of the B groups

have reacted. Further

$$\alpha \sum_i f_i A_i = \beta \sum_j g_j B_j$$

Now $N\{m_n, n_j\}$ represents the number of moles of that species which consists of $m_1, m_2, \ldots, m_i, \ldots$ monomer units of the A type combined with $n_1, n_2, \ldots, n_j$ units of the B type.

$$N\{m_i, n_j\} = \frac{K(\sum_i f_i m_i - \sum_i m_i)!\,(\sum_j g_j n_j - \sum_j n_j)!\,\Pi_i(x_i^{m_i}/m_i!)\Pi_j(y_j^{n_j}/n_j!)}{(\sum_i f_i m_i - \sum_i m_i - \sum_j n_j + 1)!\,(\sum_j g_j n_j - \sum_j n_j - \sum_i m_i + 1)!} \tag{D1}$$

where

$$\begin{aligned} x_i &= \left[\frac{f_i A_i}{(\sum_i f_i A_i)}\right]\left[\frac{\beta(1-\alpha)^{f_i-1}}{(1-\beta)}\right] \\ y_j &= \left[\frac{g_j B_j}{(\sum_j g_j B_j)}\right]\left[\frac{\alpha(1-\beta)^{g_j-1}}{(1-\alpha)}\right] \\ K &= \left(\sum_i f_i A_i\right)(1-\alpha)(1-\beta)/\beta \\ &= \left(\sum_j g_j B_j\right)(1-\alpha)(1-\beta)/\alpha \end{aligned} \tag{D2}$$

An example will illustrate the use of Eq. (D1).

Suppose we have the monomers acetic acid (CH_3COOH, $A_1, f_1 = 1$) and adipic acid ($HOOC(CH_2)_4COOH$, $A_2, f_2 = 2$) reacting with ethylene glycol ($HOCH_2CH_2OH$, $B_1, g_1 = 2$) and glycerol ($HOCH_2CHOHCH_2OH$, $B_2, g_2 = 3$) (all hydroxyl groups of the glycerol are considered equally reactive). What is the number of molecules which contain exactly 1 acetic acid unit, 4 adipic acid units, 3 glycol units, and 2 glycerol units? It is $N\{1,4,3,2\}$ and

$$\begin{aligned} N\{1,4,3,2\} &= K(1+8-1-4)!\,(6+6-3-2)! \\ &\div (1+8-1-4-3-2+1)! \\ &\div (6+6-3-2-1-4+1)! \\ &\times \left(\frac{x_1^1}{1!}\right)\left(\frac{x_2^4}{4!}\right)\left(\frac{y_1^3}{3!}\right)\left(\frac{y_2^2}{2!}\right) \end{aligned} \tag{D3}$$

where

$$\begin{aligned} x_1 &= \left[\frac{A_1}{A_1+2A_2}\right]\left[\frac{\beta}{1-\beta}\right], \\ x_2 &= \left[\frac{2A_2}{A_1+2A_2}\right]\left[\frac{\beta(1-\alpha)}{(1-\beta)}\right] \\ y_1 &= \left[\frac{2B_1}{2B_1+3B_2}\right]\left[\frac{\alpha(1-\beta)}{(1-\alpha)}\right], \\ y_2 &= \left[\frac{3B_2}{2B_1+3B_2}\right]\left[\frac{\alpha(1-\beta)^2}{(1-\alpha)}\right] \\ K &= (A_1+2A_2)(1-\alpha)(1-\beta)/\beta \end{aligned} \tag{D4}$$

If each species i has an effective molecular weight M_i, which is lower than the original molecular weight by the term $W_0 f_i/2$, where W_0 is the molecular weight of the by-product, then

$$W = \sum_i M_i A_i + \sum_j B_j M_j \tag{D5}$$

The number of molecules of the end of the reaction is, neglecting byproduct,

$$N = \sum_i A_i + \sum_j B_j - \alpha \sum_i f_i A_i \tag{D6}$$

The number-average molecular weight is

$$\bar{M}_n = W/N \tag{D7}$$

The weight-average molecular weight is

$$\begin{aligned} \bar{M}_w = &\left[\beta\frac{\sum_i M_i^2 A_i}{\sum_i f_i A_i} + \alpha\frac{\sum_j M_j^2 B_j}{\sum_j g_j B_j}\right. \\ &\left. + \frac{\alpha\beta\left[\alpha(f_c-1)M_b^2 + \beta(g_c-1)M_a^2 + 2M_a M_b\right]}{1-\alpha\beta(f_c-1)(g_c-1)}\right] \\ &\times \left[\beta\frac{\sum_i M_i A_i}{\sum_i f_i A_i} + \alpha\frac{\sum_j M_j B_j}{\sum_j g_j B_j}\right]^{-1} \end{aligned} \tag{D8}$$

where

$$\begin{aligned} f_c &= \left(\sum_i f_i^2 A_i\right) \Big/ \left(\sum_i f_i A_i\right) \\ g_c &= \left(\sum_j g_j^2 B_j\right) \Big/ \left(\sum_j g_j B_j\right) \\ M_a &= \left(\sum_i M_i f_i A_i\right) \Big/ \left(\sum_i f_i A_i\right) \\ M_b &= \left(\sum_j M_j g_j B_j\right) \Big/ \left(\sum_j g_j B_j\right) \end{aligned} \tag{D9}$$

Simpler expressions for M_n and M_w are given by Ziegel et al. (235) for the case when only bifunctional B monomers are present.

The gel point is

$$(\alpha\beta)_c = 1/(f_c-1)(g_c-1) \tag{D10}$$

Extensive computations of $N\{m_i, n_j\}$ for the case $f_1 = 1, f_2 = 2, f_4$, and $g_2 = 2$ have appeared (236).

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Heats and Entropies of Polymerization, Ceiling Temperatures, Equilibrium Monomer Concentrations, and Polymerizability of Heterocyclic Compounds*

J. Leonard
Département de Chimie and CERSIM, Université Laval, Québec, Canada

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A. HEATS OF POLYMERIZATION

Symbols: The subscripts xx to ΔH denote the state of the monomer (first letter) and the state of the polymer (second letter), as follows:

- g Gaseous state (hypothetical in case of polymer)
- c Condensed amorphous state
- c′ Crystalline or partially crystalline state
- l Liquid state
- s In solution; solvent specified in the sixth column (ls denotes polymer dissolved in monomer).

For emulsion polymerization the subscript lc is used and a note added in the sixth column. In all cases where monomer or polymer is present in solution etc., the value of ΔH will depend on the composition to some extent. Where the polymer is crystalline, ΔH will depend on the degree of crystallinity. ΔH values are in kJ per mol of monomer and are generally the limiting values for high degree of polymerization n [1 kcal = 4.187 kJ]. Where more than one value is available in the literature for given states of monomer and polymer and a given method, only one value is shown in the tables. This corresponds to one of the references indicated N_i refers to the ith note given at the end of the table.

Example: $C_2H_4(g) \rightarrow (1/n)(C_2H_4)_n(g), \quad \Delta H_{gg} = -93.5\,kJ$

Precision: generally 0.5–4.0 kJ/mol (for details see Ref. 1).

Methods of determination: These are summarized below, using the numbering system in Ref. 1.

- 2 Combustion of monomer or polymer or both.
- 3 Reaction calorimetry.
- 4a Thermodynamic (van't Hoff Equation).
- 4b Semiempirical rules applied to evaluate heat of formation of polymer or monomer or both. Such rules may be found in Refs. 25,143,223,224,335.
- 5 Heat capacity and heat of transition (Kirchhoff's equation).

TABLE 1. MONOMERS GIVING POLYMERS CONTAINING CARBON ATOMS ONLY IN THE MAIN CHAIN

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
1.1. WITH ACYCLIC CARBONS ONLY IN THE MAIN CHAIN						
1.1.1. DIENES						
1,3-Butadiene	gg	73	25	4b	1 : 2 Polymerization	10
	gg	78	25	4b	1 : 4 Polymerization	10
	lc	73	25	2	N_1	45
Chloroprene	lc	68	61.3	3		41
Cyclopentadiene	ss	59	− 70	3	Methylene chloride	190
Isoprene	gg	70.5	25	4b		10
	lc	75	25	2		46
	ls	71	74.5	3		15
	ls	65.5	34.6	3	N_2	47
1.1.2 MONOMERS GIVING POLYMERS WITH OR WITHOUT ALIPHATIC SIDE CHAINS THAT CONTAIN ONLY C, H						
1.1.2.1. Olefins (listed by increasing carbon number)						
Ethylene	gg	93.5	25	4b		2
	gc′	108.5	25	2		2,3
	gc′	107.5	25	3		183
	gc	101.5	25	2	ΔH_{fus} (Polymer) taken as 5.0	2,4
	c′c′	173	− 173	5	Polymer is poly(1-butene), iso	385
	c′c	169	− 173	5	Polymer is poly(1-butene), iso	385
	gc′	212	173	5	Polymer is poly(1-butene), iso	385
	gc	209	173	5	Polymer is poly(1-butene), iso	385
	gc′	212	25	4b	Polymer is poly(1-butene), iso	385
	gc	209	25	4b	Polymer is poly(1-butene), iso	385
	gc′	211	127	5	Polymer is poly(1-butene), iso	385
	gc	204	127	5	Polymer is poly(1-butene), iso	385
	gl	198	227	5	Polymer is poly(1-butene), iso	385
Propene	gg	86.5	25	4b		5
	gc′	104	25	2		3
	lc	84	25	4b		5
	sc	69	− 78	3	n-Butane	6

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TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
1-Butene	gg	86.5	25	4b		5
	lc	83.5	25	4b		5
	lc′	78	−173	5	Isotactic polymer	385
	lc	74	−173	5	Isotactic polymer	385
	lc′	83	−73	5	Isotactic polymer	385
	lc	79	−73	5	Isotactic polymer	385
	gc′	108	25	4b	Isotactic polymer	385
	gc	103	25	4b	Isotactic polymer	385
	gc′	107	127	5	Isotactic polymer	385
	gc	99	127	5	Isotactic polymer	385
	gl	94	227	5	Isotactic polymer	385
2-Butene, *cis*	gg	80	25	4b		5
	lc	75	25	4b		5
	c′c′	63	−173	5	Isotactic polymer	385
	c′c	59	−173	5	Isotactic polymer	385
	lc′	75	−73	5	Isotactic polymer	385
	lc	71	−73	5	Isotactic polymer	385
	gc′	101	25	4b	Isotactic polymer	385
	gc	96	25	4b	Isotactic polymer	385
	gc′	99	127	5	Isotactic polymer	385
	gc	92	127	5	Isotactic polymer	385
	gl	86	227	5	Isotactic polymer	385
2-Butene, *trans*	gg	75.5	25	4b		5
	lc	71	25	4b		5
	c′c′	57	−173	5	Isotactic polymer	385
	c′c	54	−173	5	Isotactic polymer	385
	lc′	71	−73	5	Isotactic polymer	385
	lc	67	−73	5	Isotactic polymer	385
	gc′	96	25	4b	Isotactic polymer	385
	gc	91	25	4b	Isotactic polymer	385
	gc′	96	127	5	Isotactic polymer	385
	gc	89	127	5	Isotactic polymer	385
	gl	83	227	5	Isotactic polymer	385
Isobutene	gc	72	25	2		7
	lc	48	25	2	Low polymer	3,8
	ss	53.5	25	?	Solvent? low polymer	8
	ss	54	−35	3	CH_2Cl_2, polymer swollen, N_3	9
1-Pentene	c′c′	84	−173	5		386
	c′c	81	−173	5		386
	lc′	95	−73	5		386
	lc	93	−73	5		386
	lc′	99	25	2,4b		386
	lc	95	25	2,4b		386
	gl	117	127	5		386
	gl	113	227	5		386
–, 4-methyl	c′c′	82	−173	5		387
	c′c	79	−173	5		387
	lc′	93	−73	5		387
	lc	90	−73	5		387
	lc′	97	25	4b		387
	lc	95	25	4b		387
	gc′	124	127	5		387
	gc	117	127	5		387
	gc′	122	227	5		387
	gc	112	227	5		387
	gl	105	327	5		387
2-Pentene, *cis*	gg	80.5	25	4b		10
	c′c′	75	−173	5		386
	c′c	72	−173	5		386
	lc′	87	−73	5		386
	lc	85	−73	5		386
	lc′	91	25	2,4b		386
	lc	87	25	2,4b		386

TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	gl	109	127	5		386
	gl	105	227	5		386
–, 4-methyl	lc′	90	25	4b		387
	lc	88	25	4b		387
	gc′	118	127	5		387
	gc	111	127	5		387
	gc′	116	227	5		387
	gc	114	227	5		387
	gl	100	327	5		387
2-Pentene, *trans*	gg	75.5	25	4b		10
	c′c′	70	– 173	5		386
	c′c	68	– 173	5		386
	lc′	83	– 73	5		386
	lc	81	– 73	5		386
	lc′	87	25	2,4b		386
	lc	83	25	2,4b		386
	gl	106	127	5		386
	gl	103	227	5		386
–, 4–methyl	lc′	86	25	4b		387
	lc	83	25	4b		387
	gc′	115	127	5		387
	gc	107	127	5		387
	gc′	113	227	5		387
	gc	103	227	5		387
	gl	97	327	5		387
1-Hexene	lc	83	25	4b		5
1-Heptene	gg	86	25	4b		5
1.1.2.2. *Cycloalkanes* (listed by increasing ring size)						
Cyclopropane	lc	113	25	2		11
–, methyl-	lc	105	25	4b		11
–, 1,1-dimethyl-	lc	97.5	25	4b		11
Cyclobutane	lc	105	25	2		12
–, methyl-	lc	100	25	4b		11
–, 1,1-dimethyl-	lc	93.5	25	4b		11
Cyclopentane	lc	22	25	2		12
–, methyl-	lc	17	25	4b		11
– 1,1-dimethyl-	lc	13.5	25	4b		11
Cyclohexane	lc	– 3	25	2		12
–, methyl-	lc	– 9	25	4b		11
–, 1,1-dimethyl-	lc	– 7.5	25	4b		11
Cycloheptane	lc	21.5	25	2		12
Cyclooctane	lc	34.5	25	2		12
Cyclononane	lc	47	25	2		13
Cyclodecane	lc	48	25	2		13
Cycloundecane	lc	45	25	2		13
Cyclododecane	lc	14	25	2		13
Cyclotridecane	lc	22	25	2		13
Cyclotetradecane	lc	7	25	2		13
Cyclopentadecane	lc	12	25	2		13
Cyclohexadecane	lc	8	25	2		13
Cycloheptadecane	lc	8.5	25	2		13
1.1.2.3. *Cycloalkenes*						
Cyclobutene	ll	121	25	2,4b	*cis*-Polybutadiene	388
	gl	145	25	2,4b	*cis*-Polybutadiene	388
Cyclopentene	lc	17.5	25	2	N_{66}	361
	c′(I)c	11	– 173	5	*cis*-Polymer	388
	lc	16	– 73	5	*cis*-Polymer	388
	lc	15	25	2,4b	*cis*-Polymer	388
	c′(I)c	23	– 173	5	*trans*-Polymer	388
	lc	19	– 73	5	*trans*-Polymer	388
	lc	18	25	2,4b	*trans*-Polymer	388
	lc	18	77	5	*trans*-Polymer	388

TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Cyclopentadiene	ss	59	− 173	3	Butyl chloride, N_{70}	371
Cyclohexene	ss	1	− 65	4a	Toluene, N_{78}	389
Cycloheptene	c′(III)c	12	− 173	5	70% *trans*, 30% *cis*-Polymer, N_{54}	388
	c′(III)c′	18	− 173	5	70% *trans*, 30% *cis*-Polymer, N_{54}	388
	c′(II)c	18	− 73	5	70% *trans*, 30% *cis*-Polymer, N_{54}	388
	c′(II)c′	26	− 73	5	70% *trans*, 30% *cis*-Polymer, N_{54}	388
	lc	18	25	2,4b	70% *trans*, 30% *cis*-Polymer	388
	lc′	29	25	2,4b	70% *trans*, 30% *cis*-Polymer	388
	ll	17	51	5	70% *trans*, 30% *cis*-Polymer	388
Cyclooctene	c′(II)c′	18	− 173	5	48% *trans*, 52% *cis*-Polymer, N_{54}	388
	c′(II)c	6	− 173	5	48% *trans*, 52% *cis*-Polymer, N_{54}	388
	c′(I)c′	27	− 73	5	48% *trans*, 52% *cis*-Polymer, N_{54}	388
	c′(I)c	19	− 73	5	48% *trans*, 52% *cis*-Polymer, N_{54}	388
	lc′	30	25	2,4b	48% *trans*, 52% *cis*-Polymer	388
	lc	13	25	2,4b	48% *trans*, 52% *cis*-Polymer	388
	ll	13	57	5	48% *trans*, 52% *cis*-Polymer	388
1.1.3. MONOMERS GIVING POLYMERS WITH ALIPHATIC SIDE CHAINS THAT CONTAIN HETEROATOMS						
1.1.3.1. Acrylic Derivatives (listed alphabetically)						
Acrolein	lc	80	74.5	3		15
	ss	57.5	74.5	3	Hexane	17
	ss	81.5	74.5	3	Water	17
Acrylamide	ss	81.5	74.5	3	Water	17,14
	lc	79.4	90	3		332
	ss?	70.5	74.5	3	Acetone	17
	sc	60	74.5	3	Benzene	17
	sc	57.5	74.5	3	Hexane	17
−, *N*-methylol-	lc	74.5	190	3		332
−, *N,N*′-methylene bis-	lc	82.7	190	3		332
Acrylic acid	lc	67	74.5	3		15
	ss	77.5	20	3	Water	36,37
	sc	73.5	74.5	3	Benzene	15
	sc	72	74.5	3	Carbon tetrachloride	15
	sc	74.5	74.5	3	Hexane	15
−, *n*-butyl ester	lc	78	74.5	3		17,37
	ss	77	74.5	3	Acetone	17
	ss	79	74.5	3	Butanone	17
	ss	76	74.5	3	Benzene	17
	ss	75.5	74.5	3	Carbon tetrachloride	17
	ss	78	74.5	3	Hexane	17
−, ethyl ester	lc	78	74.5	3		34,37
	lc	80.7	90	3		318
−, ethylhexyl ester	lc	78.2	90	3		318
−, lauryl ester	lc	80.5	30	3		352
−, methyl ester	lc	78	76.8	3		21,34,37
	lc	81.8	80	3		319
	ss	84.5	20	3	Ethyl alcohol	36
	ss	81	74.5	3	Hexane	34
Acrylonitrile	lc′	76.5	74.5	3		17,21,38,201
	sc′	77.5	74.5	3	Benzene	17
1.1.3.2. α-Substituted Acrylic Derivatives (listed alphabetically)						
α-Chloroacrylic acid, methyl ester	lc	52.7	80	3		319
α-Cyanoacrilic acid, methyl ether	lc	42	60	3		354
−, ethyl ester	c′c	28	− 173	5		390
	c′c	29	− 73	5		390
	lc	47	25	2		390
	lc	53	127	5		390
	lc	54	177	5		390
−, allyl ester	c′c	41	− 173	5		391
	c′c	42	− 73	5		391
	c′c	43	− 8	5		391
	lc	62	− 8	5		391

TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	lc	64	25	2,4b		391
	lc	68	127	5		391
–, *n*-decyl ester	c′c	29	– 173	5		392
	c′c	29	– 73	5		392
	lc	69	25	2,4b		392
	lc	74	127	5		392
–, allyloxyethyl	cc	41	– 173	5		393
	lc	43	– 73	5		393
	lc	49	25	2,4b		393
	lc	51	57	5		393
Ethacrylic acid, methyl ester	ls	31	87	4a		395
Methacrolein	lc	65.5	74.5	3		15
Methacrylamide	ss	56	74.5	3	Water	17
	ss	42.5	74.5	3	Chloroform	17
	ss	39.5	74.5	3	Acetone	17
	ss	35	74.5	3	Benzene	17
Methacrylic acid	lc	42.5	74.5	3		15
	lc	64.5	25	2		206
	ss	66	20	3	Water	36
	ss	56.5	25	3	Water	37
	ss	54	25	3	Dimethylformamide, N_7	203,316
	sc	57	74.5	3	Methanol, N_5	15
–, benzoic acid ester	c′c	55	– 173	5		394
	c′c	56	– 73	5		394
	c′c	59	25	5		394
	ss	57	77	2,3	1,4 Dioxane	394
	ll	90	227	5		394
–, benzyl ester	lc	56	76.8	3	N_6	39
–, *n*-butyl ester	lc	57.5	74.5	3		34,37,39
	ls	60	26.9	3		14
–, *tert*-butyl ester	ls	54.5	26.9	3		14
–, cyclohexyl ester	lc	51	76.8	3		39
	ls	53	26.9	3		14
–, 2-ethoxyethyl ester	lc	57.5	74.5	3		34
	ls	62	26.9	3		14
–, ethyl ester	lc	60	120	4a		40
	lc	59.5	74.5	3		34,37
	ls	57.5	26.9	3		14
–, β(*N*-piperidyl)ethyl ester	lc	57	40	3		188
–, *n*-hexyl ester	lc	58.5	25	3	Emulsion (aq.)	37
	ls	60	26.9	3		14
–, 2-hydroxyethyl ester	lc	50	25	3	Emulsion (aq.)	37
–, 2-hydroxypropyl ester	lc	50.5	25	3	Emulsion (aq.)	37
–, isobutyl ester	lc	60		3		34
–, isopropyl ester	lc	60	74.5	3		34
–, methyl ester	lc	56	130	4a		42,43,29
	lc	55.5	74.5	3		17,34,36,37, 41,201,235
	lc	55	25	2		206
	ls	57.5	26.9	3		14
	c′c	34	– 173	5		414
	c′c	36	– 73	5		414
	lc	55	25	5		414
	lc	56	77	3		414
	ss	54	130	4a	*o*-Dichlorobenzene	42,29
	ss	58.5	74.5	3	Acetonitrile	34
	ss	57.5	74.5	3	Tetrahydrofuran	34
	ss	58.5	74.5	3	Hexane	34
–, methyl ester deuterated	c′c	33	– 173	5		414
	c′c	35	– 73	5		414
	lc	55	25	5		414
	lc	57	77	3		414
–, *n*-octyl ester	lc	57	65	3		188

TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
–, phenyl ester	lc	51.5	76.8	3	N_6	39
–, *n*-propyl ester	lc	57.5	74.5	3		34
Methacrylonitrile	lc	56.5	74.5	3		15
	ss	64	130	4a	Benzonitrile	44,29
1.1.3.3. Vinyl Ethers						
Vinyl *n*-butyl ether	lc?	60	50	3	N_6	216
1.1.3.4. Vinyl Alcohol, Ketones, Halogens						
Vinyl alcohol					see Acetaldehyde	195
Methyl vinyl ketone	ls	74	74.5	3		17
Vinyl chloride	gc	132	25	2		18.19,20
	lc	71	25	4b		10
	lc	111.5	25	2	ΔH_{fus} (Monomer) taken as 20	18
	lc	96	74.5	3		215
1.1.3.5. Vinyl Esters						
Vinyl acetate	lc	88	74.5	3		17,34,21
	ls	89.5	25	3		35
	ss	90	74.5	3	Acetone	17
	ss	86.5	74.5	3	Hexane	17
	ss	86	74.5	3	Benzene	17
Vinyl propionate	lc	86	74.5	3		17,34
Vinyl 2-ethylhexoate	lc	88	74.5	3		34
1.1.3.6. Others (listed alphabetically)						
Allyl chloride	ls	77.5	74.5	3		15
	lc	88	20	2		214
	ss	91	20	3	Dimethylformamide, tetrahydrofuran	214
Ethylene, nitro						
–, tetrafluoro-	gg	155	25	2		22
	gc′	172	25	2		22,23
	lc′	163 ± 17	25	2		1
Fumaric acid, diethyl ester	lc	65	100	3		235
Itaconic acid, dimethyl ester	ss	60.5	26.9	3	*o*-Dichlorobenzene	14
Maleic anhydride	ls	59	74.5	3		15
Maleimide	ss	67.5	74.5	3	Chlorobenzene	24
	ss	89.5	74.5	3	Dioxane	24
	ss	88.5	74.5	3	Acetonitrile	24
	ss	87.5	74.5	3	Dimethylformamide	24
–, phenyl	ss	37	55	4a	DMF, N_{78}, N_{75}	440
α-Methylene pentanolactone	ss	38.8	83	4a	DMF	315
Vinyl cyclohexane	c′c′	88	−173	5		396
	c′c	68	−173	5		396
	lc′	100	−73	5		396
	lc	79	−73	5		396
	lc′	105	25	2,4b		396
	lc	85	25	2,4b		396
	lc′	111	127	5		396
	lc	86	127	5		396
Vinylidene chloride	lc′	60	76.8	3		21
	lc′	75.5	25	2		18
	lc′	73	74.5	3		15
	c′c′	67	−173	5		397
	c′c	56	−173	5		397
	lc′	77	−73	5		397
	lc	66	−73	5		397
	lc′	81	25	2		397
	lc	70	25	2		397
	gc′	108	25	2		397
	gc	97	25	5		397
	gc′	107	127	5		397
	gc	95	127	5		397
N-Vinyl succinimide	ls	54.7	97	3		384

TABLE 1. *cont'd*

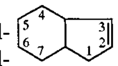
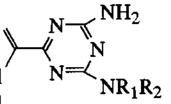
Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
1.1.4. MONOMERS GIVING POLYMERS WITH AROMATIC SIDE CHAINS THAT CONTAIN ONLY C, H (listed alphabetically)						
Acenaphthalene	ss	87.8	0	3	Dichloromethane	320
	ss	84.8	18	3	Dichloromethane	320
	ss	98.5	26.9	3	*o*-Dichlorobenzene	14
	ss	67	74.5	3	*o*-Dichlorobenzene	15
	ss	67	74.5	3	Benzene	15
	c′c	82	26.9	3		14
Acenaphthylene	ss	43	60	4a	Toluene, N_{78}, N_{75}	399
Biphenyl, *p*-isopropenyl-	ss	34	− 15	4a	Tetrahydrofuran	16
Indene	ss	58	− 30	3	Methylene chloride indep. of *T* [− 70° to 10°]	190
–, 5-methyl-	ss	58	− 50	3	Methylene chloride	175
–, 6-methyl-	ss	57.5	− 60	3	Methylene chloride	175,169
–, 7-methyl-	ss	58.5	− 70	3	Methylene chloride	175,169
–, 4,6-dimethyl- 	ss	77.5	− 40	3	Methylene chloride	175
–, 4,7-dimethyl-	ss	65	− 40	3	Methylene chloride	175
–, 5,6-dimethyl-	ss	79	− 40	3	Methylene chloride	175
–, 4,5,6,7-tetramethyl-	ss	75	− 40	3	Methylene chloride	175
Naphthalene, 2-isopropenyl-	ss	36.5	− 5	4a	Tetrahydrofuran	16
	ss	38	10	4a	Toluene, N_{78}	400
Styrene	gg	74.5	25	4b		25
	lc	70	25	2		26
	lc	68.5	26.9	3		14,17,27,201,235
	lc	73	127	4a		28,29
	ls	73	25	2		26
	ls	73	26.9	3		14
	ss	66.5	− 60	3	Methylene chloride	30,190
– α-acetoxy	ss	26	64	4a	Toluene, N_{78}, N_{75}	401
–, *o*-chloro-	lc	68.5	76.8	3		27
–, *p*-chloro-	lc	67	76.8	3		27
–, 2,5-dichloro-	lc	69	76.8	3		27
–, ar-ethyl-	lc	68	76.8	3		27
–, α-methyl-	lc	35	25	2		31
	lc	34.5	− 20	4a		32,29
	lc	39	25		N_9	123
	ss	33.5	− 20	4a	Tetrahydrofuran	32,29,33,16
	ss	47.7	22	4a	Cyclohexane	341
	ss	15	− 10	4a	*n*-Heptane, N_{78}	402
	ss	14	− 10	4a	Toluene, N_{78}	402
–, α-methyl, *p*-*tert*-butyl-	ss	29.7		4a	Solvent and temp. not stated	381
–, 2,4,6-trimethyl-	lc	70	26.9	3		14
1.1.5. MONOMERS GIVING POLYMERS WITH AROMATIC SIDE CHAINS AND THAT CONTAIN HETEROATOMS						
2-Amino-4-alkyl/aryl-amino-6-isopropenyl-1,3,5-triazine,						
R_1 = H, R_2 = ethyl	ls	64.8	170	3	N_{65}	370
R_1 = H, R_2 = propyl	ls	63.5	160	3	N_{65}	370
R_1 = ethyl, R_2 = ethyl 	ls	53.9	161	3	N_{65}	370
R_1 = propyl, R_2 = propyl	ls	47.7	153	3	N_{65}	370
R_1 = methyl, R_2 = phenyl	ls	50.2	140	3		379
R_1 = methyl, R_2 = phenyl	ls	53.1	150	4a		379
R_1 = H, R_2 = *p*-methoxyphenyl	ls	50.2	160	3		378
R_1 = H, R_2 = *p*-methoxyphenyl	ls	46.8	160	4a		378
2-Amino-4-(*N*-R. anilino)-6-isopropenyl-1,3,5-triazine						
R = *n*-alkyl = *n*-propyl	lc	46	60	3		403
= *n*-hexyl	lc	43	60	3		403
= *n*-octyl	lc	42	60	3		403
= *n*-decyl	lc	41	60	3		403
= *n*-dodecyl	lc	41	60	3		403
= *n*-tetradecyl	lc	40	60	3		403
= *n*-hexadecyl	lc	39	60	3		403
R = alkyl = isopropyl	lc	44	60	3		404
= isobutyl	lc	44	60	3		40
= *sec*-butyl	lc	43	60	3		404

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TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
= *n*-pentyl	lc	44	60	3		404
= isopentyl	lc	43	60	3		404
= 1-methylbutyl	lc	42	60	3		404
R = benzyl	lc	44	60	3		404
R = chloro	ls	11	170	3		405
R = – 4-methoxy-	ls	14	183	3		406
R = – 4-ethoxy-	ls	14	182	3		406
2-Anilo-4-R-6-isopropenyl-1,3,5-triazine						
R = methoxy	ls	12	174	3		406
R = ethoxy	ls	12	174	3		406
Atropic acid, methyl ester	ss	28	– 40	4b	Toluene, N_{10}	149
Atroponitrile	ss	39	50	4b	Toluene, N_{10}	149
Benzoic acid, *n*-methacryloyloxy-	lc	59	25	2		363
–, vinyl ester	lc	84.5	74.5	3		34
Carbazole, *N*-vinyl-	sc′	63.5	74.5	3	Hexane	15
	ss	94.9	0	3	Dichloromethane	321
2,4-Hexadiyne-1,6-di(R group)						
R = $-SO_3C_6H_4CH_3$(p)	c′c′	152.6	187	3		372
R = $-NHC_6H_3(NO_2)_2$(2,4 posn.)	c′c′	77.5	135	3		373
R = $-SO_3C_6H_4NNC_6H_5$(p)	c′c′	138	140	3		374
R = $-OCONHCH_2COOH$	c′c′	130	137	3		375
Oxazole, 2-isopropenyl-	ss	39.5	20	4a	Tetrahydrofuran	284
Pyridine						
–, 2-isopropenyl-	ss	26	20	4a	Tetrahydrofuran	284
	ss	40	– 15	4a	Toluene, N_{78}	407
–, 2-vinyl-	lc	71.5	74.5	3		15
	ls	75.5	74.5	3		15
	sc	73.5	74.5	3	Benzene	15
–, 4-vinyl-	lc	78	74.5	3		17
	ss	78	74.5	3	Benzene, hexane	17
Silane, benzyl dimethyl vinyl-	c′c′	48.2	– 73	2		355
	lc	66.7	25	3	N_{62}	366
	lc	67.1	77	3	N_{62}	366
–, dimethyl phenyl vinyl-	lc	56.5	25	3	N_{62}	362
–, trimethyl vinyl-	lc	65.8	25	3	N_{62}	367
N,N,N′,N′-Tetraethyl-4-isopropenyl-phenylphosphonous diamide	ss	27	– 55	4a	Tetrahydrofuran	408
Thiazole, 2-isopropenyl-	ss	28.5	20	4a	Tetrahydrofuran	284
p-[bis(Trimethylsilyl)methyl]isopropenylbenzene	ss	30	– 30	4a	Tetrahydrofuran	409
1.2. WITH AROMATIC OR CYCLIC CARBONS IN THE MAIN CHAIN						
– 11,12-Dicyano-2,6-naphtoquinodimethane						
11,12-bis (alkylthio)						
alkyl = butyl	ss	67	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= s-butyl	ss	59	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= isopropyl	ss	65	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= ethyl	ss	69	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= methyl	ss	70	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
– , 7,8-Dicyanoquinodimethane						
7,8-bis(butoxycarbonyl)-	ss	26	60	4a	Chloroform, N_{78}, N_{81}	411
7,8-diacetyl-	ss	25	55	4a	Chloroform, N_{78}, N_{81}	412
7,8-dibenzoyl-	ss	22	55	4a	Chloroform, N_{78}, N_{81}	412
7,8-dibutoxycarbonyl-	ss	26	55	4a	Chloroform, N_{78}, N_{81}	412
7,8-diisobutyryl-	ss	23	55	4a	Chloroform, N_{78}, N_{81}	413
7,8-dipropionyl-	ss	24	55	4a	Chloroform, N_{78}, N_{81}	413
7,8-bis(ethylthio)-	ss	23	60	4a	Chloroform, N_{78}, N_{81}	411
7,8-bis(phenylacetyl)-	ss	25	55	4a	Chloroform, N_{78}, N_{81}	413
7,8-bis(phenylthio)-	ss	23	50	4a	Chloroform, N_{78}, N_{81}	411
Norbornylene	c′(II)c	56	– 173	5	55% *cis*/45% *trans* Polymer, N_{54}	415
	c′(I)c	62	– 73	5	55% *cis*/45% *trans* Polymer, N_{54}	415
	c′(I)c	62	25	4b	55% *cis*/45% *trans* Polymer, N_{54}	415
	lc	65	57	5	55% *cis*/45% *trans* Polymer, N_{54}	415
5-Trimethylsilyl-2-	c′c	38	– 173	5		416
	cc	40	– 173	5	Overcooled monomer	416

TABLE 1. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	c′c	39	−73	5		416
	cc	46	−73	5	Overcooled monomer	416
	lc	52	25	4b		416
	lc	55	107	5		416
N-7,7-Triacyanobenzoquinonemethideimine	ss	22	55	4a	Toluene N_{78}, N_{82}	438

TABLE 2. MONOMERS GIVING POLYMERS CONTAINING HETEROATOMS IN THE MAIN CHAIN

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
2.1. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO CARBON ONLY						
2.1.1. ETHERS AND ACETALS (listed by increasing ring size of monomer)						
2-RINGS (aldehydes and ketones)						
Acetaldehyde	lc	0	25	4b	N_{11}	48
	lc′	64.5	25	2	To poly(vinyl alcohol)	195
	lc	62.5	25	2	To poly(vinyl alcohol)	195
	c′c	31	−173	5		417
	lc	34	−73	5		417
	lc	36	25	2,4b		417
–, bromochlorofluoro-	sc′	36.0		4a	Toluene, N_{74}	233
–, bromodichloro-	sc′	31.2		4a	Toluene, N_{74}	344
–, bromodifluoro-	sc′	43.4		4a	Toluene, N_{74}	344
–, dibromochloro-	sc′	26.0		4a	Toluene, N_{74}	344
–, dibromofluoro-	sc′	29.0		4a	Toluene, N_{74}	344
–, dichlorofluoro-	sc′	56.2		4a	Toluene, N_{74}	344
–, difluorochloro-	sc′	51.0		4a	Toluene, N_{74}	344
–, tribromo-	sc′	19.6		4a	Toluene, N_{74}	344
–, trichloro-	gc′	71±8	50	4a		50
	gc′	65.5	−50	4a		166
	gc	51	−50	4a		166
	lc′	17	57	5		418
	lc′	38±8	50	4a		50
	lc′	34	25	3		418
	lc′	34.5	−50	4a		166
	lc	20	−50	4a		166
	lc′	30	−73	5		418
	cc′	25	−173	5		418
	ss	14.5	−50	4a	Tetrahydrofuran	167
	sc′	33.5	13	4a	Pyridine	50
	sc′	39	10	4a	*n*-Heptane	166
	sc′	37.8		4a	Toluene, N_{74}	344
–, trifluoro-	gc	64.5	45	4a		129
	lc	47	25	4a	Dichloromethane	322
	sc	50.8	25	4a	Dichloromethane	322
	sc′	54.9		4a	Toluene, N_{74}	344
Acetone	gg	−12	25	4b		234
	gc	10	25	4b		144,148
	lc	−25	25	4b		48,234
Butanal	lc	20.5	20	3		161
	sc	35.5	18	4a	*n*-Hexane (9 kbar), N_{12}	161
	sc	21.5	20	3	*n*-Hexane (1 bar, 1M), N_{12}	161
4,7-Dioxaoctanal	lc	15.9	−80	4a	N_{69}	330
	ss	16.7	−80	4a	THF	330
Formaldehyde	gc′	66	25	4a	N_{13}	49,164, 165,132
	gc′	55	25	2		7,49
Heptanal	c′c′	20	−173	5		419
	c′c	10	−173	5		419

TABLE 2. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	c′c′	22	−73	5		419
	c′c	8	−73	5		419
	lc(I)	39	25	3	N_{77}	419
	lc	33	25	3		419
	ll	36	97	5		419
Hexanal	c′c′	8	−173	5		420
	c′c	7	−173	5		420
	c′c′	12	−73	5		420
	c′c	10	−73	5		420
	ll	27	25	3		420
	ll	28	67	5		420
Octanal	lc	14.7	−75	4a	N_{69}	330
	sc	14.2	−75	4a	THF	330
4-Oxapentanal	lc	19.7	−80	4a	N_{69}	329
	ls	20.1	−80	4a		329
Pentanal	lc	22.7	−75	4a	N_{69}	328
	sc	22.2	−75	4a	THF	328
o-Phthalaldehyde	ss	22	−70	4a	Dichloromethane, cyclopolymer	154
Propanal	c′c′	5	−173	5		421
	c′c	2	−173	5		421
	lc′	15	−73	5		421
	lc	12	−73	5		421
	lc′	19	25	3		421
	lc	14	25	3		421
	lc′	21	57	5		421
	lc	15	57	5		421
–, 2,2-dichloro-	gc	50	−65	4a		172
	lc	20.5	−65	4a		172
	ss	17	−65	4a	Tetrahydrofuran	172
–, 2-chloro, 2-methyl-	gc	47	−65	4a		172
	lc	19.5	−65	4a		172
	ss	19.5	−65	4a	Tetrahydrofuran	172
–, 2-methyl-	gc	46	−65	4a		166
	lc	16	−65	4a		166
	ss	15.5	−65	4a	Tetrahydrofuran	167,172
	ss	16.5	−65	4a	Diethyl ether	166
	ss	22	−65	4a	*n*-Pentane	166
3-RINGS						
Cyclohexene oxide	lc	97	25	2		422
Ethylene oxide	gg	104	25	4b		14
	gc′	140	25	3		168
	gc	127.3	25	2		306
	lc′	102.4	25	2		306
	lc	94.5	25	2		51
Propylene oxide	gg	75.5	25	4b		14,52
Styrene oxide	lc	101.5	26.9	3		14
–, 3-nitro-	lc	101	26.9	3		14
4-RINGS						
Oxetane	gc	81.8	25	4a		325
	lc	51.4	25	4a	N_{17}	325
	ss	81	−9	3	Chloromethane + chloroethane	53
–, 3,3-di(chloromethyl)-	lc	84.5	26.9	3		14
–, 3,3-dimethyl-	ss	67.5	−9	3	Chloromethane + chloroethane	53
– 3,3-di(phenoxymethyl)-	ss	83.5	26.9	3	*o*-Dichlorobenzene	14
5-RINGS						
1,3-Dioxolane	gg	26	20	4b		54
	gc	50	25	4a		292
	gc	52.0	57	4a	N_{60}	353
	lc	24	100	4b	N_{14}	198
	lc	17	90	4a	N_{69}, N_{78}	437
	lc	15	25	4a	N_{17}	292

TABLE 2. *cont'd*

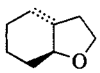
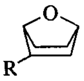
Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	lc	23	40	4a	N_{15}	159
	ls	6.5	55	4a		219
	ss	22	0	4a/3	Dichloromethane	133,159,220
	ss	27	20	4a	Chloroethane	293
	ss	15	30	4a	Benzene	134
	ss	17.5	70	3	Dichloromethane	220
	ss	8	75	4a	Toluene, N_{78}	423
–, 4-ethyl-	lc	13.0	– 24	4a		333
–, 4,4-dimethyl-	lc	9.6	80	4b		335
–, *cis*-4,5-dimethyl-	lc	12.1	80	4b		335
–, *trans*-4,5-dimethyl-	lc	7.5	80	4b		335
–, 4-isopropyl-	lc	12.1	80	4b		335
–, 4-methyl-	lc	13.4	– 8	4a		334
trans-7-Oxabicyclo[4.3.0]nonane 	lc	14.0				357
7-Oxa-bicyclo[2.2.1]heptane, 2-alkyl-						
R = H 	lc	44.3	25	2		308
R = exo-CH_3	lc	49.7	25	2		308
R = endo-CH_3	lc	45.4	25	2		308
Tetrahydrofuran	gg	21	20	4b		55
	gg	12	25	4b		56
	gc	39.5	25	4a		292
	gc	47.1	50	4a	N_{61}	353
	lc′	29.6	25	2		358
	lc′	38	25	2		56,57
	lc	18.6	25	2		358
	lc	7.5	25	4a	N_{17}	292
	lc	12.5	50	4a		130
	lc	15	30	4a	N_{16}	231
	lc	25.5	25	2		140,208
	ls	23	40	4a		57,58,211
	ss	23	40	4a	Diethyl ether	211
–, 3-methyl-	ls	22.6	– 6	4a		342
6-RINGS						
m-Dioxane	gg	0	20	4b		54,59,60
p-Dioxane	ls	– 4	20	4a	N_{78}	436
Tetrahydropyran	gg	1.5	20	4b		55,56,59
Trioxane	sc′	17.5	40	4a	1,2-Dichloroethane	178
	sc′	26.5	58	3	1,2-Dichloroethane	212
	sc′	19.5	30	3	Dichloromethane	182,202
	sc′	12.5	30	4a	Nitrobenzene	182
	sc′	21.5	30	3	Nitrobenzene	202
	c′c′	6	30	3	N_{18}	202
	c′c′	11.5	58	3	N_{19}	212
	c′c′	4.5	25	4a		164
	c′c′	5.5	25	2		see 202
7-RINGS						
1,3-Dioxepane	gg	19.5	20	4b		54
	gc	53.9	25	4a		323
	lc	13.0	25	4a	N_{17}	323
	ss	12	75	4a	Toluene, N_{78}	423
	ss	13.5	60	4a	Benzene	134,87
	ss	14	0	4a	1,2-Dichloroethane, N_{78}	424
	ss	15	– 30	4a/3	Dichloromethane	136
– 2-butyl	ss	7	– 5	4a	1,2-Dichloroethane, N_{78}	424
–, 4-methyl-	ss	9.3	– 15	4a	1,2-Dichloroethane	339
–, 2-methyl-	ss	8.8	– 15	4a	1,2-Dichloroethane	340
	ss	9	– 10	4a	1,2-Dichloroethane, N_{78}	424
1-Oxa-4,5-dithiepane $-O(CH_2)_2S_2(CH_2)_2-$	lc	7.5	26.9	3		61
	ss	9	26.9	3	Dioxane	61
	ss	8	26.9	3	Benzene	61

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TABLE 2. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Oxepane	gc	38.6	25	4a		323
	lc	− 1.7	25	4a	N_{17}	323
8- AND LARGER RINGS						
2-Butyl-1,3,6-trioxocane	ss	8	10	4a	Toluene, N_{78}	425
1,3-Dioxocane	gg	53.5	20	4b		54
	gc	62.1	25	4a		324
	lc	18.3	25	4a	N_{17}	324
Tetraoxane	sc′	26	30	3	Nitrobenzene	202
	c′c′	3.5	30	3		131,202
	c′c′	4	25	2		see 202
1,3,6-Trioxocane	gc	62.2	5	4a		324
	lc	12.0	25	4a	N_{17}	324
	ss	13	20	4a	Toluene, N_{78}	425
	ss	22	60	4a	Benzene	134
(1,3,6-Trioxocane)$_n$						
$n=1$	ss	16.7	0	4a	Dichloromethane	343
$n=2$	ss	4.6	0	4a	Dichloromethane	343
$n=3$–8	ss	0	0	4a	Dichloromethane	343
(1,3,6,9-Tetraoxacycloundecane)$_n$						
$n=1$	ss	13.4	0	4a	Dichloromethane	343
$n=2$	ss	3.8	0	4a	Dichloromethane	343
$n=3$	ss	3.8	0	4a	Dichloromethane	343
$n=4$–8	ss	0	0	4a	Dichloromethane	343
1,3,6,9,12-Pentaoxacyclotetradecane)$_n$						
$n=1$	ss	11.3	5	4a	Dichloromethane	343
$n=2$	ss	7.5	5	4a	Dichloromethane	343
$n=3$–7	ss	0	5	4a	Dichloromethane	343
1,3,6,9,12,15-Hexaoxacycloheptadecane)$_n$						
$n=1$	ss	10.5	− 2	4a	Dichloromethane	343
$n=2$	ss	2.9	− 2	4a	Dichloromethane	343
$n=3$–5	ss	0	− 2	4a	Dichloromethane	343
2.1.2. CYCLIC ESTERS						
4-RINGS						
β-Propiolactone	lc	75	25	3		368
	lc′	82	25	3		368
	lc′	80.5	25	2/4b		137
	lc	74	127	3		368
5-RINGS						
γ-Butyrolactone	lc	− 5	25	3		368
	lc′	7	25	3		368
	lc	− 6	77	3		368
6-RINGS						
2,2-Dimethyltrimethylene carbonate	c′(II)c′(II)	7	− 173	5	N_{54}, N_{63}, N_{77}	426
	c′(II)c	− 9	− 173	5	N_{54}, N_{63}	426
	c′(II)c′(II)	7	25	4b		426
	c′(II)c	− 8	25	4b		426
	lc′(I)	18	117	5	N_{63}, N_{77}	426
	ll	12	147	5	N_{63}	426
p-Dioxanone	c′c′	21	− 173	5		427
	c′c	6	− 173	5		427
	c′c′	21	− 73	5		427
	c′c	6	− 73	5		427
	c′c′	21	25	2		427
	c′c	4	25	2		427
	ll	17	127	5		427
Ethylene oxalate	c′c	8.6	− 173	5		312
	c′c	9.0	− 73	5		312
	c′c	10.1	25	2		312
	c′c	8.3	87	5		312

TABLE 2. *cont'd*

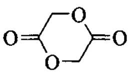
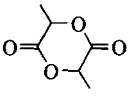
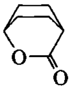
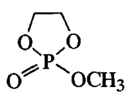
Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Glycollide 	lc	20.0	142	2		312
	c′c′	34.0	25	2		364
	cc	10.8	25	2		364
DL-Lactide 	lc	31.4	277	2		364
	c′c	8.7	25	2		311
	lc	27.0	127	2		311
L-Lactide	ss	25	40	4a	Nitrobenzene, N_{78}	428
	ss	23	105	4a	1,4-Dioxane, N_{78}	429
8-Oxo-7-oxabicyclo[2,2,2]octane 	c′c′	20.9	25	2	N_{53}	307
	gc′	90.5	25	2	N_{53}	307
	lc′	34.5	25	2	N_{53}	307
Pentanolactone	lc′	27.5	25	2		314
	lc	10.5	25	2		314
	lc	9.9	77	3		314
7-RINGS						
ε-Caprolactone	lc	17	25	3		368
	lc′	31	25	3		368
	lc	13.7	77	3		368
	ss	15	40	4a	Nitrobenzene, N_{78}	428
Spiroorthoester 2-R-1,4,6-trioxaspiro[4.6] undecane						
R = H	ss	11	− 30 to 5	4b	Dichloromethane	430
R = CH_3	ss	8	− 50 to 5	4b	Dichloromethane	430
R = CH_3Br	ss	5	− 35 to − 5	4b	Dichloromethane	430
R = Ph	ss	7	− 50 to − 10	4b	Dichloromethane	430
8-AND LARGER RINGS						
Heptanolactone	lc	16	127	4b		368
Octanolactone	lc	19	127	4b		368
Nonanolactone	lc	22	127	4b		368
Decanolactone	lc	24	127	4b		368
Undecanolactone	lc	28	25	3		368
	lc′	62	25	3		368
	lc	27	127	3		368
Dodecanolactone	lc	17	127	4b		368
Tridecanolactone	c′c	− 2	25	3		368
	c′c′	38	25	3		368
	lc	6	127	3		368
Tetradecanolactone	lc	2	127	4b		368
Pentadecanolactone	c′c	− 10	25	1		313
	c′c′	39	25	1		313
	lc	− 3	97	1		313
	c′(II)c	− 37	− 73	1	N_{54}	313
Hexadecanolactone	lc	0	127	4b		368
2.2. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO OTHER HETEROATOMS (S, Si, P)						
Cyclotrisiloxane, 1,1,3,3,5,5-hexaethyl	c′(III)c′(II)	4.6	− 173	3	N_{54}, N_{63}, N_{77}	431
	c′(II)c′(II)	5	− 73	3	N_{54}, N_{63}, N_{77}	431
	c′(II)c	− 10	− 23	3	N_{54}, N_{63}	431
	c′(I)c′(I)	10	− 23	3	N_{54}, N_{63}, N_{77}	431
	c′(I)c	1	25	3	N_{54}, N_{63}	431
	ll	14	25	3	N_{63}	431
	ls	15	170	3	95% Conversion	431
–, hexamethyl	lc	14.5	25	3		84
	lc	23.4	77	3	N_{62}	365
	c′c	2.79	25	3	N_{63}	365
Cyclotetrasiloxane, octamethyl-	lc	− 13.4	77	3	N_{62}	365
	lc	− 6.4	25	3	N_{63}	365
N,N-Diethylamino-1,3,2-dioxaphosphorinane	ls	− 6.3	− 20	4a	N_{58}	346
1,3,2-Dioxaphospholan, 2-methoxy- 	ss	15		3	Dichloromethane	309
	ss	14		4a	1,1,2,2-Tetrachloroethane	309

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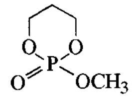
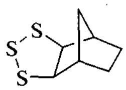
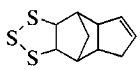
TABLE 2. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
2-Oxo-1,3,2-dioxaphosphorinane	lc	− 6.28	90	4a	N_{59}	347
−, 2-alkoxy-						
R = methyl 	ls	2.9	140	4a	Diglyme or DMSO	348
R = methyl	ss	0.8	100	4a	Dichloromethane	356
R = ethyl	ss	− 1.0	100	4a	Dichloromethane	356
R = propyl	ss	− 2.4	100	4a	Dichloromethane	356
R = trimethyl silyl	ss	− 2.7	100	4a	Dichloromethane	356
Sulfur trioxide	gc′	56	13	4a		86
	lc′	12.5	25	4a		86

2.3. MONOMERS GIVING POLYMERS CONTAINING S IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY (listed by increasing ring size) (polysulfones listed under Table 3. Copolymers)

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Carbon disulfide	lc′	23	25	2		179
Thiirane	gg	81	25	4b	N_{20}	69,70,71
	lc	73 ± 4	20	3		173
	sc′	80 ± 4	20	3	Various solvents	173
−, 2,2-dimethyl-	gg	70.5	25	4b	N_{20}	69,70,71
−, *cis*-2,3-dimethyl-	gg	63	25	4b	N_{20}	69,70,71
−, *trans*-2,3-dimethyl-	gg	5.5	25	4b	N_{20}	69,70,71
−, 2-methyl-	gg	71	25	4b	N_{20}	69,70,71
Thietane	gg	80	25	4b	N_{20}	69,70,71
Thioacetone	ls	10.8	50–90	4a	Monomer	327
Thiolane	gg	7.5	25	4b	N_{20}	69,70,71
1,2-Dithiolane $SSCH_2CH_2CH_2$	ss	26.5	30	4a	Ethyl alcohol	72
Thiane	gg	− 2.5	25	4b	N_{20}	69,70,71
o-Dithiane $SS(CH_2)_3CH_2$	lc	2	26.9	3		14
exo-3,4,5-Trithiatricyclo-[5.2.2.0^{2,6}]decane 	ss	5.8	40	4a	Toluene, N_{78}	377
exo-3,4,5-Trithiatetracyclo-[5.5.1.0^{2,6}.0^{8,12}]tridec-10-ene 	ss	6.6	50	4a	Toluene, N_{78}	376
Thiepane	gg	14.5	25	4b	N_{20}	69,70,71
1,2-Dithiepane $SS(CH_2)_4CH_2$	lc	10.5	26.9	3		14
	sc	11.5	26.9	3	Dioxane	14
1,2-Dithiocane $SS(CH_2)_5CH_2$	lc	16	26.9	3		14

2.4. MONOMERS GIVING POLYMERS CONTAINING N IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY (listed by increasing ring size)

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
2-RINGS						
Butylisocyanate	ss	24	− 55	4a	Dimethylformamide, N_{78}	432
3-RINGS						
Ethyleneimine	lc	96.2	27	2		360
−, *N*-(β-trimethylsilylethyl)(TEI)	lc	119	27	2		360
−, − $ZnCl_2 \cdot (TEI)_2$ (complex)	c′c	264	27	2		360
4-RINGS						
Trimethyleneimine,						
−, *N*-(β-trimethylsilylethyl)(TMI)	lc	115	27	2		360
−, −, $ZnCl_2 \cdot (TMI)_2$(complex)	c′c	258	27	2		360
5-RINGS						
8-Oxa-6-azabicyclo[3.2.1]octan-7-one	ss	24	38	4a	Dimethylsulfoxide, N_{78}	433
2-Pyrollidinone	lc	4.5	75	2/4b		62
	lc	3.5	43	3		135
	lc′	12	43	3		135
	c′c′	− 5.5	25	2/4b		63
−, 1-methyl-	lc	3.5	25	4b		64
Pyrrole	ss	145	15	3	Acetonitrile	434
	ss	104	30	3	Acetonitrile	434
	ss	60	50	3	Acetonitrile	434

TABLE 2. *cont'd*

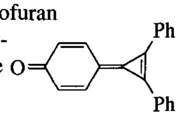
Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
6-RINGS						
2-Piperidone	lc	9	75	2/4b		62
	c′c′	4.5	25	2/4b		63
–, 1-methyl-	lc	– 2	25	4b		64
7-RINGS						
ε-Caprolactam	lc	16.3	186	3		310
	lc	16	75	2		62
	lc	15.5	200	3		65,135,138
	ls	16.5	250	4a		68,67,66
	c′c′	12.5	25	2		63
–, 1-methyl	lc	9.5	25	4b		64
–, 3-methyl	ls	12.5	260	4a		194
–, 3-ethyl	ls	16	240	3		191
–, 3-propyl	ls	16.5	240	3		191
–, 4-ethyl	ls	14.5	240	3		171
–, 5-methyl	lc	16	75	4b		62
	ls	11	200	4a		225
–, 7-methyl	lc	16	75	4b		62
	ls	16.5	225	4a		226
–, 7-ethyl	ls	14.5	240	3		191
–, 7-propyl	ls	14.5	240	3		191
8-RINGS						
2-Oxo-hexamethyleneimine	lc	22	75	4b		62
	lc	22	230	3		138,207
	c′c′	24	25	2		63
–, 1-methyl-	lc	16.5	25	4b		64
–, 4-ethyl-	ls	22	240	3		171
–, 7-ethyl-	ls	21.5	240	3		171
9–13-RINGS						
Ω-Dodecalactam	lc	10.6	186	3		310
2-Oxo-heptamethyleneimine	lc	32.5	230	3		138,189
2-Oxo-octamethyleneimine	c′c′	23.5	25	2/4b		138
2-Oxo-nonamethyleneimine	c′c′	11.5	25	2/4b		138
2-Oxo-decamethyleneimine	c′c′	– 2	25	2/4b		138
2-Oxo-undecamethyleneimine	lc	~0	230	3		138,139
	ls	13	290	4a		139
2.5. MONOMERS GIVING POLYMERS CONTAINING N IN THE MAIN CHAIN, BONDED TO OTHER HETEROATOMS (P)						
Phosphonitrile chloride						
–, cyclic trimer	gc	61	230	3		125
	lc	6	230	3		125
–, cyclic tetramer	gc	68	230	3		125
	lc	4	230	3		125
–, cyclic pentamer	gc	79.5	230	3		125
	lc	3.5	230	3		125
–, cyclic hexamer	gc	88	230	3		125
	lc	1.5	230	3		125
–, cyclic heptamer	gc	96.5	230	3		125
	lc	0	230	3		125
2.6. OTHER MONOMERS GIVING POLYMERS NOT LISTED ABOVE						
Carbon C (graphite)	c′c′	– 39.5	25	2	Linear polymer (carbyne)	187
4,7-bis[Cyano(ethoxycarbonyl) methylene]-4,7-dihydrobenzofuran	ss	21.6	60		Chloroform, N_{78}, N_{79}	435
4-(2,3-Diphenyl cyclopropenyl-idene)cyclohexa-2,5-dienone 	ss	21.2	– 15	4a	Dichloromethane, N_{67}	317
1,3-Disilacyclobutane, 1,1,3,3-tetramethyl-	lc	73.9	25	2		359
Selenium Se_8	ls	– 9.5	400	4a		85

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TABLE 2. *cont'd*

Monomer	State of monomer and polymer (xx)	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
1-Silacyclobutane, 1,1-dimethyl-	lc′	92.7	25	2		359
	lc	85.4	25	2		359
–, 1-phenyl, 1-methyl-	lc	91.5	25	2		359
Sulfur, S_6	ls	10	138	2	N_{72}	380
–, S_7	ls	4	138	2	N_{72}	380
–, S_8	ls	– 19	160	4a	N_{71}	380
–, S_8	ls	– 13.5	200	4a		73,74

TABLE 3. COPOLYMERS (listed alphabetically under Monomer A) N_{21}

Monomer A	Monomer B	State of monomer and polymer xx	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Acrylonitrile	Methacrylic acid,	sc		25	3	Emulsion (aq.)	38
	Methyl ester	ss		30.5	3		76
	Styrene	ss		20	3		76,201
	Vinyl acetate	ss		20	3		76
	Vinylidene chloride	sc		25	3	Emulsion(aq.), N_{22}	75
Allyl chloride	Maleic anhydride	ss	74	74.5	3		34
bis-(*o*-Aminophenyl)-2,2′ dibenzymidazoleoxide	Terephthalic acid	c′c	24	– 173	5	Polymer + H_2O (c′)	445
		c′c	18	– 73	5	Polymer + H_2O (c′)	445
		c′c	6.5	25	2	Polymer + H_2O (l)	445
	–, dichloride	c′c	136	– 173	5	Polymer + HCl (c′)	445
		c′c	96	– 73	5	Polymer + HCl (g)	445
		c′c	83.5	25	2	Polymer + HCl (g)	445
	–, dimethylether	c′c	31.5	– 173	5	Polymer + CH_3OH (c′)	445
		c′c	16.5	– 73	5	Polymer + CH_3OH (l)	445
		c′c	5.5	25	2	Polymer + CH_3OH (l)	445
1,3-Butadiene	Styrene	lc		25	2		45
	Sulfur dioxide						197
1-Butene	Sulfur dioxide	ss	44.5	26.9	3	Excess B	5
		ss	43.5	55	4a	Excess B	77
–, 3-methyl-	Sulfur dioxide	lc′	46	35	4a	From B-rich mixture	199,200
		lc	22	25	4a	From A-rich mixture	199,200
2-Butene, *cis*	Sulfur dioxide	ss	42.5	26.9	3	Excess B	5
		ss	43.5	25	4a	Excess B	5
–, *trans*	Sulfur dioxide	ss	39.5	26.9	3	Excess B	5
		ss	40.5	25	4a	Excess B	5
Cyclohexene	Sulfur dioxide	ss	38	25	4a	Excess B	78
Cyclopentene	Sulfur dioxide	ss	45	26.9	3	Excess B	5
1,3-Dioxane	1,3-Dioxolane	ss	16	20	4a	Methylene dichloride, N_{78} $\Delta H_{BA} = -11$	446
Fumaric acid, diethyl ester	Vinyl acetate	ss?	78	76.8	3	Excess B, N_{22}	79
Fumaroyl chloride	Styrene	ss	80	74.5	3	Hexane	34
	Styrene, α-methyl-	ss	71.5	74.5	3	Excess B	34
Isobutene	Sulfur dioxide	lc	31	25	2		82
		lc	39.5	0	4a	N_{23}	83
1-Hexadecene	Sulfur dioxide	ss	42	26.9	3	Chloroform	5
		ss	40	30	4a	Chloroform	80
1-Hexene	Sulfur dioxide	ss	43.5	26.9	3	Excess B	5
Isopropenyl acetate	Maleic anhydride	sc	74.5	76.8	3		79
Maleic acid, diethyl ester	Vinyl acetate	ss?	83.5	76.8	3	Excess B, N_{22}	79
Maleic anhydride	Allyl chloride	ss	74	74.5	3		34
	Isopropenyl acetate	sc	74.5	76.8	3		79
	Styrene	ss	81	74.5	s	Benzene	34
		ss	82.5	74.5	3	Acetonitrile	34

TABLE 3. *cont'd*

Monomer A	Monomer B	State of monomer and polymer xx	$-\Delta H_{xx}$ (kJ/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	Styrene, α-methyl-	ss	72.5	74.5	3	Excess B	34
	Vinyl acetate	sc	84.5	76.8	3	Excess B	79
	Vinyl *n*-butyl ether	ss	90	74.5	3	Benzene	34
Maleimide	Styrene	ss	87.5	74.5	3	Acetonitrile	34
	Styrene, α-methyl-	ss	72	74.5	3	Acetonitrile	34
Methacrylic acid	Methacrylic acid, methyl ester	lc		25	2		206
–, methyl ester	Acrylonitrile	sc		25	3	Emulsion (aq.)	38
		ss		30.5	3		76
	Methacrylic acid	lc		25	2		206
	Styrene	ss		24	3		81
	Vinyl acetate	ss		24	3		81
Propene	Sulfur dioxide	sc	42.5	26.9	3	Excess B	5
Styrene	Acrylonitrile	ss		20	3		76,201
	1,3-Butadiene	lc		25	2		45,
	Fumaroyl chloride	ss	80	74.5	3	Hexane	34
	Maleic anhydride	ss	81	74.5	3	Benzene	34
		ss	82.5	74.5	3	Acetonitrile	34
	Maleimide	ss	87.5	74.5	3	Acetonitrile	34
	Methacrylic, acid, methyl ester	ss		24	3		81
	Vinyl acetate	ss		35	3		81
–, α-methyl-	Fumaroyl chloride	ss	71.5	74.5	3	Excess A	34
	Maleic anhydride	ss	72.5	74.5	3	Excess A	34
	Maleimide	ss	72	74.5	3	Acetonitrile	34
Sulfur dioxide	Butadiene						197
	1-Butene	ss	44.5	26.9	3	Excess A	5
		ss	43.5	55	4a	Excess A	77
	–, 3-methyl-	lc′	92	35	4a	From A-rich mixture	199
		lc	44.5	25	4a	From B-rich mixture	199
	2-Butene, *cis*	ss	42.5	26.9	3	Excess A	5
		ss	43.5	25	4a	Excess A	5
	–, *trans*	ss	39.5	26.9	3	Excess A	5
		ss	40.5	25	4a	Excess A	5
	Cyclohexene	ss	38	25	4a	Excess A	78
	Cyclopentene	ss	45	26.9	3	Excess A	5
	1-Hexadecene	ss	42	26.9	3	Chloroform	5
		ss	40	30	4a	Chloroform	80
	1-Hexene	ss	43.5	26.9	3	Excess A	5
	Isobutene	lc	31	25	2		82
		lc	39.5	0	4a	N_{24}	83
	Propene	sc	42.5	26.9	3	Excess A	5
Vinyl acetate	Acrylonitrile	ss		20	3		76
	Fumaric acid, diethyl ester	ss?	78	76.8	3	Excess A, N_{22}	79
	Maleic acid, diethyl ester	ss?	83.5	76.8	3	Excess A, N_{22}	79
	Maleic anhydride	sc	84.5	76.8	3	Excess A	79
	Methacrylic acid, methyl ester	ss		24	3		81
	Styrene	ss		35	3		81
Vinyl *n*-butyl ether	Maleic anhydride	ss	90	74.5	3	Benzene	34
Vinylidene chloride	Acrylonitrile	sc		25	3	Emulsion (aq.), N_{22}	75

B. ENTROPIES OF POLYMERIZATION

Symbols: The subscripts to $\Delta S°$ denote the state of the monomer (first letter) and the state of the polymer (second letter) as in Section A. The standard state of the monomer is 1 atm for the gaseous state and 1*M* in solution, unless otherwise stated. In all cases where monomer or polymer is present in solution, the value of $\Delta S°$ will depend to some extent on the composition. Where the polymer is crystalline, $\Delta S°$ will depend on the degree of crystallinity. ΔS values are in (J/K) per mol of monomer and are generally the limiting values for high degree of polymerization (1 kcal = 4.187 kJ).

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Precision: generally 0.5–8.0 (J/K/mol)

Methods of determination: (numbering conforms with that in Section A)
1 Third law or statistical.
4a Thermodynamic (van't Hoff Equation).
4b Semiempirical rules applied to evaluate entropy of monomer or polymer or both.

TABLE 4. MONOMERS GIVING POLYMERS CONTAINING MAIN CHAIN CARBON ONLY

Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
4.1. MAIN CHAIN ACYCLIC CARBON ONLY						
4.1.1. DIENES						
1,3-Butadiene	lc	89	25	1		95,96
	lc	84	25	1	*cis*-1,4-Polymer	97
Isoprene	lc	101	25	1		100,101
4.1.2. MONOMERS GIVING POLYMERS WITHOUT OR WITH ALIPHATIC SIDE CHAINS WHICH CONTAIN ONLY C, H						
4.1.2.1. Olefins (listed by increasing carbon number)						
Ethylene	c′c′	66	−173	1	Isotactic poly(-1-butene)	385
	c′c	59	−173	1	Isotactic poly(-1-butene)	385
	gc′	338	−73	1	Isotactic poly(-1-butene)	385
	gc	331	−73	1	Isotactic poly(-1-butene)	385
	gg	142	25	4b		2,87
	gc	155	25	4b		11
	gc	158	25	1		88–91
	gc′	172	25	4b		11
	gc′	174	25	1	100% Cryst. polymer	88–91
	gc′	336	25	1	Isotactic poly(-1-butene)	385
	gc	325	25	1	Isotactic poly(-1-butene)	385
	gc′	334	127	1	Isotactic poly(-1-butene)	385
	gc	317	127	1	Isotactic poly(-1-butene)	385
	gl	311	227	1	Isotactic poly(-1-butene)	385
Propene	gg	167	25	4b		5
	gc′	191	25	1	Syndiotactic polymer	186
	gc′	205	25	1	Isotactic polymer	207
	lc	113	25	4b		5
	lc	116	25	1	Isotactic polymer	88
	lc	116	25	1	Atactic polymer	88,92
	lc′	136	25	1	100% Cryst. isotactic	88,92
1-Butene	lc′	75	−173	1	Isotactic polymer	385
	lc	69	−173	1	Isotactic polymer	385
	lc′	114	−73	1	Isotactic polymer	385
	lc	107	−73	1	Isotactic polymer	385
	gg	166	25	4b		5
	gc′	213	25	1	Isotactic polymer	88,385
	gc	193	25	1	Isotactic polymer	88,385
	lc	113	25	4b		5
	lc	112	25	1	Isotactic polymer	88
	lc′	141	25	1	100% Cryst. isotactic	88
	gc′	204	127	1	Isotactic polymer	385
	gc	187	127	1	Isotactic polymer	385
	gl	182	227	1	Isotactic polymer	385
2-Butene, *cis*	c′c′	21	−173	1	Isotactic polymer	385
	c′c	14	−173	1	Isotactic polymer	385
	lc′	106	−73	1	Isotactic polymer	385
	lc	99	−73	1	Isotactic polymer	385
	gg	163	25	4b		5
	lc	104	25	4b		5
	gc′	201	25	1	Isotactic polymer	385
	gc	190	25	1	Isotactic polymer	385
	gc′	196	127	1	Isotactic polymer	385
	gc	179	127	1	Isotactic polymer	385
	gl	172	227	1	Isotactic polymer	385

TABLE 4. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
–, *trans*	c′c′	17	– 173	1	Isotactic polymer	385
	c′c	10	– 173	1	Isotactic polymer	385
	lc′	100	– 73	1	Isotactic polymer	385
	lc	93	– 73	1	Isotactic polymer	385
	gg	159	25	4b		5
	lc	100	25	4b		5
	gc′	195	25	1	Isotactic polymer	385
	gc	194	25	1	Isotactic polymer	385
	gc′	193	127	1	Isotactic polymer	385
	gc	175	127	1	Isotactic polymer	385
	gl	170	227	1	Isotactic polymer	385
Isobutene	gg	172	25	4b		5
	lc	112	25	4b		5
	lc	121	25	1		11,93
1-Pentene	c′c′	24	– 173	1		386
	c′c	20	– 173	1		386
	lc′	117	– 73	1		386
	lc	113	– 73	1		386
	lc′	133	25	1		386
	lc	124	25	1		386
	gl	198	127	1		386
	gl	190	227	1		386
–, 4-methyl	c′c′	28	– 173	1		387
	c′c	28	– 173	1		387
	lc′	111	– 73	1		387
	lc	111	– 73	1		387
	gc′	216	25	1	Isotactic polymer	196
	lc′	131	25	1		387
	lc	131	25	1		387
	gc′	214	127	1		387
	gc	200	127	1		387
	gc′	209	227	1		387
	gc	188	227	1		387
	gl	176	327	1		387
2-Pentene, *cis*	c′c′	20	– 173	1		386
	c′c	16	– 173	1		386
	lc′	114	– 73	1		386
	lc	111	– 73	1		386
	lc′	129	25	1		386
	lc	120	25	1		386
	gl	195	127	1		386
	gl	185	227	1		386
–, 4-methyl	lc′	134	25	1		387
	lc	134	25	1		387
	gc′	220	127	1		387
	gc	205	127	1		387
	gc′	215	227	1		387
	gc	215	227	1		387
	gl	183	327	1		387
2-Pentene, *trans*	c′c′	18	– 173	1		386
	c′c	14	– 173	1		386
	lc′	111	– 73	1		386
	lc	102	– 73	1		386
	lc′	127	25	1		386
	lc	118	25	1		386
	gl	194	127	1		386
	gl	186	227	1		386
–, 4-methyl	lc′	130	25	1		387
	lc	130	25	1		387
	gc′	216	127	1		387
	gc	202	127	1		387
	gc′	214	227	1		387

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TABLE 4. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	gc	194	227	1		387
	gl	182	327	1		387
1-Hexene	lc	113	25	4b		5
1-Heptene	gg	168	25	4b		5
4.1.2.2. Cycloalkanes (listed by increasing ring size)						
Cyclopropane	lc	69	25	4b		11
–, methyl-	lc	85	25	4b		87
–, 1,1-dimethyl-	lc	93	25	4b		87
Cyclobutane	lc	55	25	4b		11
–, methyl-	lc	72	25	4b		87
–, 1,1-dimethyl-	lc	75	25	4b		87
Cyclopentane	lc	43	25	4b		11
–, methyl-	lc	64	25	4b		87
–, 1,1-dimethyl-	lc	66	25	4b		87
Cyclohexane	lc	11	25	4b		11,87
–, methyl-	lc	32	25	4b		87
–, 1,1-dimethyl-	lc	36	25	4b		87
Cycloheptane	lc	16	25	4b	N_{25}	11,94
Cyclooctane	lc	3	25	4b	N_{25}	11,94
Cycloalkenes						
Cyclobutene	ll	52	25	1,4b	*cis*-Polybutadiene	388
	gl	131	25	1,4b	*cis*-Polybutadiene	388
Cyclopentene	c′(I)c	17	–173	1	*cis*-Polymer	388
	lc	54	–73	1	*cis*-Polymer	388
	lc	52	25	1,4b	*cis*-Polymer	388
	lc	47.2	25	1	N_{66}	361
	c′(I)c	18	–173	1	*trans*-Polymer	388
	lc	56	–73	1	*trans*-Polymer	388
	lc	52	25	1,4b	*trans*-Polymer	388
	lc	51	77	1	*trans*-Polymer	388
Cyclohexene	ss	17	–65	4b	Toluene, N_{78}	389
Cycloheptene	c′(III)c	–7	–173	1	70% *trans*, 30% *cis* Polymer, N_{54}	388
	c′(III)c′	6	–173	1	70% *trans*, 30% *cis* Polymer, N_{54}	388
	c′(II)c	37	–73	1	70% *trans*, 30% *cis* Polymer, N_{54}	388
	c′(II)c′	56	–73	1	70% *trans*, 30% *cis* Polymer, N_{54}	388
	lc	37	25	4b	70% *trans*, 30% *cis* Polymer	388
	lc′	70	25	4b	70% *trans*, 30% *cis* Polymer	388
	ll	36	51	1	70% *trans*, 30% *cis* Polymer	388
Cyclooctene	c′(II)c′	10	–173	1	48% *trans*, 52% *cis* Polymer, N_{54}	388
	c′(II)c	–25	–173	1	48% *trans*, 52% *cis* Polymer, N_{54}	388
	c′(I)c′	49	–73	1	48% *trans*, 52% *cis* Polymer, N_{54}	388
	c′(I)c	8	–73	1	48% *trans*, 52% *cis* Polymer, N_{54}	388
	lc′	63	25	1,4b	48% *trans*, 52% *cis* Polymer	388
	lc	9	25	1,4b	48% *trans*, 52% *cis* Polymer	388
	ll	9	57	1	48% *trans*, 52% *cis* Polymer	388
4.1.3. MONOMERS GIVING POLYMERS WITH ALIPHATIC SIDE CHAINS THAT CONTAIN HETEROATOMS						
Acrylonitrile	lc′	109	25	1		193
–, allylester	c′c	–6	–173	1		391
	c′c	1	–73	1		391
	c′c	24	–8	1		391
	lc	97	–8	1		391
	lc	85	25	1		391
	lc	96	127	1		391
–, allylloxyethyl	cc	16	–173	1		393
	lc	29	–73	1		393
	lc	56	25	1		393
	lc	60	57	1		393
–, *n*-decylester	c′c	4	–173	1		392
	c′c	8	–73	1		392

TABLE 4. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	lc	141	25	1		392
	lc	155	127	1		392
–, ethylester	c′c	3	– 173	1		390
	c′c	16	– 73	1		390
	lc	88	25	1		390
	lc	104	127	1		390
	lc	107	177	1		390
Ethacrylic acid						
-methyl ester	ls	105	87	4b		395
Ethylene, tetrafluoro-	gc′	197	– 75.7	1		98,99
	lc′	112	– 75.7	1		98,99
Methacrylic acid	ss	146	80	4b		316
–, ethyl ester	lc	126	120	4a		40
–, methyl ester	lc	117	127	4a		42,43,102
	c′c	9	– 173	1		414
	c′c	24.1	– 73	1		414
	c′c′	40	– 63	1		102,103
	lc	105	25	1		414
	lc	115	77	1		414
	ss	130	127	4a	*o*-Dichlorobenzene	42,49
–, methyl ester deuterated	c′c	10	– 173	1		414
	c′c	26	– 73	1		414
	lc	110	25	1		414
	lc	118	77	1		414
Methacrylonitrile	ss	151	127	4a	Benzonitrile	44,29
α-Methylene pentanolactone	ss	108.8	83	4a	DMF	315
Vinylidene chloride	c′c′	31	– 173	1		397
	c′c	25	– 173	1		397
	lc′	97	– 73	1		213,397
	lc	91	– 73	1		397
	lc′	112	25	1		397
	lc	106	25	1		397
	gc′	201	25	1		397
	gc	195	25	1		397
	gc′	198	127	1		397
	gc	191	127	1		397
4.1.4. MONOMERS GIVING POLYMERS WITH AROMATIC SIDE CHAINS THAT CONTAIN ONLY C, H						
Acenaphtylene	ss	98	60	4a	Toluene, N_{78}	399
Biphenyl, *p*-isopropenyl-	ss	118	– 20	4a	Tetrahydrofuran	16
Naphthalene, 2-isopropenyl-	ss	122	– 5	4a	Tetrahydrofuran	16
	ss	125	10	4a	Toluene, N_{78}	400
Styrene	gg	149	25	4b		25
	lc	90	– 23	1		104
	lc	104	25	1		104
	lc	116	127	1		104
	lc	104	127	4a	N_{26}	28
	lc	105	25	1	Isotactic polymer	88
	lc	112	25	1		105
	lc′	111	25	1	100% Cryst. isotactic	88
–, α-methyl-	lc	110	– 20	4a		32
	ss	130	– 20	4a	Tetrahydrofuran	32,29,16
	ss	51	– 10	4a	*n*-Heptane, N_{78}	402
	ss	47	– 10	4a	Toluene, N_{78}	402
	ss	163.3	22	4a	Cyclohexane	341
–, α-methyl, *p*-*tert*-butyl-	ss	106.6		4a	Solvent and temp. not stated	381
4.1.5. MONOMERS GIVING POLYMERS WITH AROMATIC SIDE CHAINS AND THAT CONTAIN HETEROATOMS						
α-Acetoxystyrene	ss	83	64	4a	Toluene, N_{78}	401
2-Amino-4-(*N*-alkalino)-6-isopropenyl-1,3,5-triazine						
alkyl = *n*-propyl	ls	117	157	4a		402
isopropyl	ls	114	151	4a		403
isobutyl	ls	114	154	4a		403

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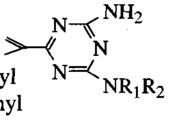
TABLE 4. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
sec-butyl	ls	112	148	4a		403
1-methylbutyl	ls	111	146	4a		403
n-pentyl	ls	114	150	4a		403
isopentyl	ls	113	151	4a		403
n-hexyl	ls	112	149	4a		402
n-octyl	ls	110	143	4a		402
n-decyl	ls	109	140	4a		402
n-dodecyl	ls	109	134	4a		402
n-tetradecyl	ls	105	132	4a		402
n-hexadecyl	ls	102	130	4a		402
benzyl	ls	113	157	4a		403
2-Amino-4-alkyl/aryl-amino-6-isopropenyl-1,3,5-triazine 						
R_1 = H, R_2 = ethyl	ls	160.5	150	4a		370
R_1 = H, R_2 = propyl	ls	153.8	145	4a		370
R_1 = ethyl, R_2 = ethyl	ls	137.5	130	4a		370
R_1 = propyl, R_2 = propyl	ls	124.6	125	4a		370
R_1 = methyl, R_2 = phenyl	ls	131.7	150	4a		379
R_1 = H, R_2 = *p*-methoxyphenyl	ls	117	160	4a		378
Benzoic acid, *n*-methacryloyloxy-	c′c	−2	−173	4a		394
	c′c	5	−73	4a		394
	c′c	8	25	1,4a		363,394
	ll	85	227	4a		394
Oxazole, 2-isopropenyl, 4,5-dimethyl-	ss	96	20	4a	Tetrahydrofuran	284
Pyridine, 2-isopropenyl-	ss	70	20	4a	Tetrahydrofuran	284
Silane, benzyl dimethyl vinyl-	c′c	0.7	−73	1		355
	lc	83.5	25	1		366
	lc	107.3	77	3		366
–, dimethyl phenyl vinyl-	lc	127.5	25	1		362
–, trimethyl vinyl-	lc	109.5	25	1		367
Thiazole, 2-isopropenyl-	ss	69	20	4a	Tetrahydrofuran	284
p-[bis(Trimethylsilyl)methyl] isopropenylbenzene	ss	110	−30	4a	Tetrahydrofuran	409
N,N,N′,N′-Tetraethyl-4-isopropenylphenyl-phosphonous diamide	ss	10	−55	4a	Tetrahydrofuran	408

4.1.6. OTHER MONOMERS GIVING POLYMERS NOT LISTED ABOVE

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Vinylcyclohexane	c′c	28	−173	1		396
	c′c	3	−173	1		396
	lc′	95	−73	1		396
	lc	75	−73	1		396
	lc′	120	25	1		396
	lc	85	25	1		396
	lc′	136	127	1		396
	lc	102	127	1		396

4.2. WITH AROMATIC OR CYCLIC CARBONS IN THE MAIN CHAIN

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
–11,12-Dicyano-2,6-naphtoquinodimethane						
11,12-bis(alkylthio)						
alkyl = butyl	ss	109	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= *sec*-butyl	ss	109	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= isopropyl	ss	116	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= ethyl	ss	115	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
= methyl	ss	114	30	4a	Oligomer, benzene, N_{78}, N_{80}	410
–7,8-Dicyanoquinodimethane						
7,8-bis(butoxycarbonyl)-	ss	37	60	4a	Chloroform, N_{78}, N_{81}	411
7,8-diacetyl-	ss	37	55	4a	Chloroform, N_{78}, N_{81}	412
7,8-dibenzoyl-	ss	38	55	4a	Chloroform, N_{78}, N_{81}	412
7,8-dibutoxycarbonyl-	ss	37	55	4a	Chloroform, N_{78}, N_{81}	412
7,8-diisobutyryl-	ss	39	55	4a	Chloroform, N_{78}, N_{81}	413
7,8-dipropionyl-	ss	37	55	4a	Chloroform, N_{78}, N_{81}	413
7,8-bis(ethylthio)-	ss	37	60	4a	Chloroform, N_{78}, N_{81}	411

TABLE 4. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
7,8-bis(phenylacetyl)-	ss	37	55	4a	Chloroform, N_{78}, N_{81}	413
7,8-bis(phenylthio)-	ss	34	50	4a	Chloroform, N_{78}, N_{81}	411
–4,7-Dihydrobenzofuran						
4,7-bis-[cyano(ethoxycarbonyl)methylene]	ss	41	60	4a	Chloroform, N_{78}	435
Norbornylene	c′(II)c	5	– 173	3	55% *cis*/45% *trans* Polymer N_{54}	415
	c′(I)c	50	– 73	3	55% *cis*/45% *trans* Polymer N_{54}	415
	c′(I)c	50	25	4b	55% *cis*/45% *trans* Polymer N_{54}	415
	lc	58	57	3	55% *cis*/45% *trans* Polymer N_{54}	415
5-trimethylsilyl–2-	c′c	4	– 173	1		416
	cc	13	– 173	1	Overcooled monomer	416
	c′c	14	– 73	1		416
	cc	48	– 73	1	Overcooled monomer	416
	lc	70	25	1		416
	lc	81	107	1		416
N,7,7-Tricyanobenzoquinonemethideimine	ss	38	55	4a	Toluene, N_{78}, N_{81}	438

TABLE 5. MONOMERS GIVING POLYMERS CONTAINING HETEROATOMS IN THE MAIN CHAIN

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
5.1. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO CARBON ONLY						
5.1.1. ETHERS AND ACETALS (listed by increasing ring size of monomer)						
2-RINGS (aldehydes and ketones)						
Acetaldehyde	c′c	– 6	– 173	1		417
	lc	14	– 73	1		417
	lc	21	25	1		417
–, bromochlorofluoro-	sc′	122		4a	Toluene, N_{74}	233
–, bromodichloro-	sc′	122		4a	Toluene, N_{74}	344
–, bromodifluoro-	sc′	135		4a	Toluene, N_{74}	344
–, dibromochloro-	sc′	116		4a	Toluene, N_{74}	344
–, dibromofluoro-	sc′	114		4a	Toluene, N_{74}	344
–, dichlorofluoro-	sc′	179		4a	Toluene, N_{74}	344
–, difluorochloro-	sc′	152		4a	Toluene, N_{74}	344
–, tribromo-	sc′	100		4a	Toluene, N_{74}	344
–, trichloro-	gc′	190 ± 30	50	4a		50
	lc′	95 ± 30	50	4a		50
	sc′	134		4a	Toluene, N_{74}	344
	sc′	117	13	4a	Pyridine, N_{27}	50
	ss	52	– 50	4a	Tetrahydrofuran	167
	sc′	142	10	4a	*n*-Heptane	166
–, trichloro	cc′	37	– 173	1		418
	lc′	69	– 73	1		418
	lc′	80	25	1		418
	lc′	30	57	1		418
–, trifluoro-	gc	187	45	4a		129
	lc	97	25	4a	Dichloromethane	322
	sc′	155		4a	Toluene, N_{74}	344
	sc	142.7	25	4a	Dichloromethane	322
Acetone	gc	188	25	4b		144,148
Butanal	sc	122	10	4a	*n*-Hexane [9 kbar], N_{12}	161
4,7-Dioxaoctanal	lc	67.4	– 80	4a	N_{69}	330
	ss	77.0	– 80	4a	THF	330
Formaldehyde	gg	124	25	1		141,142
	gc′	174	25	1		106
	gc′	169	25	4a	N_{28}	164,165
Heptanal	c′c′	25	– 173	1		419
	c′c	1	– 173	1		419
	c′c′	32	– 73	1		419

TABLE 5. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	c′c	4	−73	1		419
	lc′(I)	111	25	1	N_{77}	419
	lc	101	25	1		419
	ll	110	97	1		419
Hexanal	c′c′	19	−173	1		420
	c′c	16	−173	1		420
	c′c′	43	−73	1		420
	c′c	41	−73	1		420
	ll	117	25	1		420
	ll	121	67	1		420
Octanal	lc	57.8	−75	4a	N_{69}	330
	sc	65.7	−75	4a	THF	330
4-Oxapentanal	lc	81.6	−80	4a	N_{69}	329
	ls	93.6	−80	4a		329
Pentanal	lc	97.1	−75	4a	N_{69}	328
	sc	107.6	−75	4a	THF	328
o-Phthalaldehyde	ss	96	−70	4a	Dichloromethane	154
Propanal	c′c′	8	−173	1		421
	c′c	6	−173	1		421
	lc′	69	−73	1		421
	lc	67	−73	1		421
	lc′	85	25	1		421
	lc	76	25	1		421
	lc′	90	57	1		421
	lc	77	57	1		421
–, 2-chloro 2-methyl-	ss	90	−65	4a	Tetrahydrofuran	172
–, 2,2-dichloro-	ss	69	−65	4a	Tetrahydrofuran	172
–, 2-methyl-	ss	74	−65	4a	Tetrahydrofuran	172
	ss	78	−65	4a	Diethyl ether	166
	ss	94	−65	4a	*n*-Pentane	166
3-RINGS						
Ethylene oxide	gc′	174	25		100% Cryst. polymer	210
Propylene oxide	gc′	189	25		Estimated for 100% cryst. polymer	210
4-RINGS						
Oxetane	gc	162.7	25	4a		325
	lc	68.4	25	4a	N_{17}	325
–, 3,3-dichloromethyl	lc	83	25	1		107
5-RINGS						
1,3-Dioxolane	gc′	205	25	1		177
	gc	167	25	1		177
	gc	139	25	4a		292
	gc	147	57	4a	N_{60}	353
	lc′	100	25	1		177
	lc	37	25	4a	N_{17}	292
	lc	67	25	1		177
	lc	63	40	4a	N_{15}	159
	lc	76	100	4a	N_{14}	198
	lc	18	90	4a	N_{69}, N_{78}	398
	ss	78	0	4a	Dichloromethane	133,154
	ss	94	20	4a	Chloromethane	213
	ss	22	75	4a	Toluene, N_{78}	423
	ss	59	30	4a	Benzene	134
–, 4,4-dimethyl-	lc	54.8	80	b4		335
–, *cis* 4,5-dimethyl-	lc	55.3	80	4b		335
–, *trans* 4,5-dimethyl-	lc	55.3	80	4b		335
–, 4-ethyl-	lc	59.4	−24	4a		333
–, 4-isopropyl	lc	60.7	80	4b		335
–, 4-methyl-	lc	53.2	−8	4a		334
7-Oxa-bicyclo[2,2,1]heptane	lc	75.3	25	4b		308
–, 2-exo-methyl-	lc	96.2	25	4b		308
–, 2-endo-methyl-	lc	96.2	25	4b		308

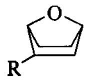
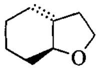


TABLE 5. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
trans-7-Oxabicyclo[4.3.0]nonane 	lc	55.7				357
Tetrahydrofuran	gc′	177	25	1		140
	gc	112	25	4a		292
	gc	139	25	1		140
	gc	143	50	4a	N_{61}	353
	lc′	100	25	1		140
	lc′	81.9	25	1		358
	lc	47.6	25	1		358
	lc	16	25	4a	N_{17}	292
	lc	62	25	1		140
	lc	41	50	4a		130
	lc	49	30	4a	N_{16}	231
	ls	67	40	4a		57,58
	ss	87	40	4a	Diethyl ether	211
–, 3-methyl-	ls	100.9	– 6	4a		342
6-RINGS						
1,3-Dioxane	ls	– 23	20	4a	N_{78}, Cyclic oligomer	436
Paraldehyde	gc′	201	25	1	Isotactic polymer	184
	gc′	159	25	1	Syndiotactic polymer	184
Trioxane	gg	64	25	1		141
	gc′	156	25	1		141
	ss	41	40	4a	1,2-Dichloroethane	178
	sc′	42	25	4a	Nitrobenzene	182
	c′c′	18 ± 16	25	4a		164
7-RINGS						
1,3-Dioxepane	gc′	181	25	1		170
	gc′	144	25	1		170
	gc	131.4	25	4a		323
	lc	25.1	25	4a	N_{17}	323
	lc′	77	25	1		170
	lc	39	25	1		170
	ss	48	– 30	4a	Dichloromethane	136
	ss	39	60	4a	Benzene	134
	ss	26	75	4a	Toluene, N_{78}	423
	ss	43	0	4a	1,2-Dichloroethane, N_{78}	424
–, 2-butyl	ss	33	– 5	4a	1,2-Dichloroethane, N_{78}	424
–, 2-methyl-	ss	37.2	– 15	4a	1,2-Dichloroethane	340
	ss	39	– 10	4a	1,1-Dichloromethene, N_{78}	424
–, 4-methyl-	ss	38.8	– 15	4a	1,2-Dichloroethane	339
Oxepane	gc	91.8	25	4a		323
	lc	– 12.4	25	4a	N_{17}	323
1-Oxa-4,5-dithiepane	ss	> 12	25	4a	Benzene	61
8-AND LARGER RINGS						
2-Butyl-1,3,6-trioxocane	ss	16	10	4a	Toluene, N_{78}	425
1,3-Dioxocane	gc	121.7	25	4a		324
	lc	10.2	25	4a	N_{17}	324
Tetraoxane	gg	51	25	1		142
	c′c′	– 3	27	1		131
1,3,6-Trioxocane	gc	129.1	25	4a		324
	lc	8.0	25	4a	N_{17}	324
	ss	39	60	4a	Benzene	134
	ss	13	20	4a	Toluene, N_{78}	425
(1,3,6-Trioxocane)$_n$						
$n=1$	ss	34.3	0	4a	Dichloromethane	343
$n=2$	ss	12.6	0	4a	Dichloromethane	343
$n=3$	ss	36.4	0	4a	Dichloromethane	343
$n=4$	ss	43.1	0	4a	Dichloromethane	343
$n=5$	ss	47.7	0	4a	Dichloromethane	343
$n=6$	ss	51.5	0	4a	Dichloromethane	343
$n=7$	ss	54.8	0	4a	Dichloromethane	343
$n=8$	ss	57.8	0	4a	Dichloromethane	343

Notes page II-406; References page II - 407

TABLE 5. *cont'd*

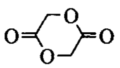
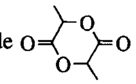
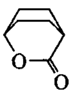
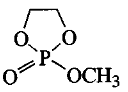
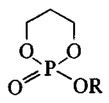
Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
(1,3,6,9-Tetraoxacycloundecane)$_n$						
$n=1$	ss	13.0	0	4a	Dichloromethane	343
$n=2$	ss	20.1	0	4a	Dichloromethane	343
$n=3$	ss	28.9	0	4a	Dichloromethane	343
$n=4$	ss	48.2	0	4a	Dichloromethane	343
$n=5$	ss	52.3	0	4a	Dichloromethane	343
$n=6$	ss	56.9	0	4a	Dichloromethane	343
$n=7$	ss	59.9	0	4a	Dichloromethane	343
$n=8$	ss	62.8	0	4a	Dichloromethane	343
(1,3,6,9,12-Pentaoxacyclotetradecane)$_n$						
$n=1$	ss	8.4	5	4a	Dichloromethane	343
$n=2$	ss	10.0	5	4a	Dichloromethane	343
$n=3$	ss	43.1	5	4a	Dichloromethane	343
$n=4$	ss	49.8	5	4a	Dichloromethane	343
$n=5$	ss	54.4	5	4a	Dichloromethane	343
$n=6$	ss	58.2	5	4a	Dichloromethane	343
$n=7$	ss	61.1	5	4a	Dichloromethane	343
(1,3,6,9,12,15-Hexaoxacycloheptadecane)$_n$						
$n=1$	ss	8.4	−2	4a	Dichloromethane	343
$n=2$	ss	28.1	−2	4a	Dichloromethane	343
$n=3$	ss	44.8	−2	4a	Dichloromethane	343
$n=4$	ss	50.7	−2	4a	Dichloromethane	343
$n=5$	ss	54.8	−2	4a	Dichloromethane	343
5.1.2. CYCLIC ESTERS						
4-RINGS						
β-Propiolactone	lc	54	25	1		368
	lc′	74	25	1		368
	lc	51	127	1		368
5-RINGS						
γ-Butyrolactone	lc	30	25	1		368
	lc′	65	25	1		368
	lc	29	77	1		368
6-RINGS						
2,2-Dimetyltrimethylene carbonate	c′(II)c′(II)	7.7	−173	1	N_{63}	426
	c′(II)c	−35.3	−173	1	N_{63}	426
	c′(II)c′(II)	5.8	25	1	N_{63}	426
	c′(II)c	−35.2	25	1	N_{63}	426
	lc′(I)	38.7	117	1	N_{63}	426
	ll	24.0	147	1	N_{63}	426
p-Dioxanone	c′c′	6	−173	1		427
	c′c	−28	−173	1		427
	c′c′	9	−73	1		427
	c′c	−25	−73	1		427
	c′c′	10	25	1		427
	c′c	−32	25	1		427
	ll	13	127	1		427
Ethylene oxalate	c′c	−12	−173	1		312
	c′c	−9	−73	1		312
	c′c	−5	25	1		312
	lc	15	142	1		312
Glycollide 	c′c′	0.3	25	1		364
	cc	−10.5	25	1		364
	lc	17.5	277	1		364
DL-Lactide 	c′c	−31.3	25	1		311
	lc	13.0	127	1		311
L-Lactide	ss	41	105	4a	1,4-Dioxane, N_{78}	429
	ss	25	40	4a	Nitrobenzene, N_{78}	428
8-Oxo-7-oxabicyclo[2,2,2]octane 	gg	127.7	25	4b	N_{53}	307
	lc′	76.2	25	4b	N_{53}	307

TABLE 5. *cont'd*

Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Pentanolactone	lc′	65	25	1		314
	lc	15	25	1		314
	lc	13	77	1		314
7-RINGS						
ε-Caprolactone	lc	4	25	1		368
	lc′	54	25	1		368
	lc	8	77	1		368
Spiroorthoester 2-R-1,4,6-trioxaspiro[4.6] undecane						
R = H	ss	− 39.6	− 10	4a	Dichloromethane, N_{78}	430
= CH_3	ss	− 30.7	− 25	4a	Dichloromethane, N_{78}	430
= CH_2Br	ss	− 20.8	− 20	4a	Dichloromethane, N_{78}	430
= Ph	ss	− 25.7	− 30	4a	Dichloromethane, N_{78}	430
8-AND LARGER RINGS						
Heptanolactone	lc	1	127	4b		368
Octanolactone	lc	− 5	127	4b		368
Nonanolactone	lc	− 12	127	4b		368
Decanolactone	lc	− 18	127	4b		368
Undecanolactone	lc	− 24	25	1		368
	lc′	69	25	1		368
	lc	− 25	127	1		368
Dodecanolactone	lc	− 25	127	4b		368
Tridecanolactone	c′c	− 57	25	1		368
	c′c′	50	25	1		368
	lc	− 26	127	1		368
Tetradecanolactone	lc	− 25	127	4b		368
Pentadecanolactone	c′c	− 41	25	1		313
	c′c′	86	25	1		313
	lc	− 23	97	1		313
	c′(II)c	− 109	− 73	1	N_{54}	313
Hexadecanolactone	lc	− 21	127	4b		368

5.2. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO OTHER HETEROATOMS (S, Si, P)

Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Cyclotrisiloxane, 1,1,3,3,5,5-hexaethyl	c′(III)c′(II)	7	− 173	1	N_{54}, N_{63}, N_{77}	431
	c′(II)c′(II)	0	− 73	1	N_{54}, N_{63}, N_{77}	431
	c′(II)c	− 62	− 23	1	N_{54}, N_{63}	431
	c′(I)c′(I)	9	− 23	1	N_{54}, N_{63}, N_{77}	431
	c′(I)c	− 22	25	1	N_{54}, N_{63}	431
	ll	25	25	1	N_{63}	431
hexamethyl-	lc	3.03	77	1		365
	c′c	− 51.0	25	1		365
Cyclotetrasiloxane, octamethyl-	lc	− 190	77	1		365
	lc	− 194.4	25	1		365
N,N-Diethylamino-1,3,2-dioxaphosphorinane	ls	− 20.9	− 20	4a	N_{58}	346
1,3,2-Dioxaphospholan, 2-methoxy- 	ss	13.5		4a	1,1,2,2-Tetrachloroethane	309
2-Oxo-1,3,2-dioxaphosphorinane	lc	− 19.3	90	4a	N_{59}	347
−, 2-alkoxy- 						
R = methyl	ls	11.7	140	4a	Diglyme or DMSO	348
R = methyl	ss	2.5	100	4a	Dichloromethane	356
R = ethyl	ss	− 1.5	100	4a	Dichloromethane	356
R = propyl	ss	− 4.5	100	4a	Dichloromethane	356
R = trimethyl silyl	ss	− 6.0	100	4a	Dichloromethane	356
Sulfur trioxide	gc′	178	41	4a		86

5.3. MONOMERS GIVING POLYMERS CONTAINING N IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY (listed by increasing ring size)

Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
3-RINGS						
Ethyleneimine	lc	51.9	27	1		360
−, *N*(β-trimethylsilyl ethyl)-(TEI)	lc	113	27	1		360

TABLE 5. *cont'd*

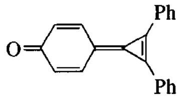
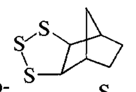
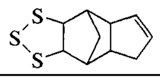
Monomer	State of monomer and polymer xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
–,–, $ZnCl_2(TEI)_2$(complex)	c′c	114	27	1		360
4-RINGS						
Trimethyleneimine,						
N-(β-trimethylsilyl ethyl)-(TMI)	lc	83.0	27	1		360
–, $ZnCl_2(TEI)_2$(complex)	c′c	37.2	27	1		360
5-RINGS						
Bicyclic oxalactam	ss	72	38	4a	Dimethylsulfoxide	433
2-Pyrrolidinone	c′c′	31	25	1/4b		63
6-RINGS						
2-Piperidone	c′c′	25	25	1/4b		63
7-RINGS						
ε-Caprolactam	ls	29	250	4a		68
	c′c′	– 5	25	1		63
–, 3-methyl-	ls	11	260	4a		194
–, 5-methyl-	ls	16	200	4a		225
–, 7-methyl-	ls	21	225	4a		226
8-RINGS						
2-Oxo-hexamethyleneimine	c′c′	– 17	25	1		63
N. B. Values for 9–13 rings by probably unreliable extrapolation of $\Delta S_{c'c'}$ for 5–8 rings are given in Ref. 138						
13-RINGS						
2-Oxo-undecamethyleneimine	ls	16	290	4a		139
5.4. OTHER MONOMERS GIVING POLYMERS NOT LISTED ABOVE						
4-(2,3-Diphenyl cyclopropenylidene)cyclohexa-2,5-dienone 	ss	69.4	– 15	4a	Dichloromethane, N_{67}	317
1,3-Disilacyclobutane, 1,1,3,3-tetramethyl-	lc	18.1	25	1		359
N-Phenylmaleimide	ss	86	55	4a	DMF, N_{78}	440
Selenium Se_g	ls	– 27	200	4a	From estimated T_e	88,111
1-Silacyclobutane, 1,1-dimethyl-	lc′	85.4	25	1		359
	lc	71.2	25	1		359
–, 1-phenyl 1-methyl-	lc	57.4	25	1		359
Sulfur, S_6	ls	2	80	1	N_{73}	380
–, S_7	ls	– 11	80	1	N_{73}	380
–, S_8	ls	– 44.7	160	4a	N_{71}	380
	ls	– 31	159	4a		73,74,111
Thioacetone	ls	48.9	50–90	4a	Monomer	327
exo-3,4,5-Trithiatricyclo-[5.2.1.0^{2,6}]decane 	ss	31.4	40	4a	Toluene, N_{76}	377
exo-3,4,5-Trithiatetracyclo-[5.5.1.0^{2,6}.0^{8,12}]tridec-10-ene 	ss	29.3	50	4a	Toluene, N_{76}	376

TABLE 6. COPOLYMERS (listed alphabetically under Monomer A)

Monomer A	Monomer B	State of monomer and polymer, xx	$-\Delta S^{\circ}_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
Bis-(*o*-aminophenyl)-2,2′ dibenzimidazoleoxide	Terephthalic acid	c′c	19	– 173	1	Polymer + H_2O (c′)	445
		c′c	– 17	– 73	1	Polymer + H_2O (c′)	445
		c′c	– 112	25	1	Polymer + H_2O (l)	445

TABLE 6. *cont'd*

Monomer A	Monomer B	State of monomer and polymer, xx	$-\Delta S^\circ_{xx}$ (J/K/mol)	Temp. (°C)	Method	Solvent/Notes	Refs.
	–, dichloride	c′c	– 33	– 173	1	Polymer + Hcl (c′)	445
		c′c	– 295	– 73	1	Polymer + Hcl (g)	445
		c′c	– 320	25	1	Polymer + HCl (g)	445
	–, dimethylester	c′c	– 13	– 173	1	Polymer + CH_3OH (c′)	445
		c′c	– 108	– 73	1	Polymer + CH_3OH (l)	445
		c′c	– 160	25	1	Polymer + CH_3OH (l)	445
1,3-Butadiene	Styrene	lc		30	1		108
1-Butene	Sulfur dioxide	lc	116	25	1		109
		ss	145	64	4a	Excess B	110
–, 3-methyl-	Sulfur dioxide	lc	162	35	4a	Excess B	199,200
		lc	81	25	4a	Excess A	199,200
2-Butene, *cis*	Sulfur dioxide	ss	146	25	4a	Excess B	5
–, *trans*	Sulfur dioxide	ss	140	25	4a	Excess B	5
Cyclopentene	Sulfur dioxide	ss	134	102	4a	Excess B	110
1,3 Dioxane	1,3 Dioxolane	ss	57	20	4a	Methylene dichloride, N_{78}, $\Delta S_{BA} = -34$	446
1-Hexadecene	Sulfur dioxide	ss	139	30	4a	Chloroform	110
1-Hexene	Sulfur dioxide	lc	116	25	1		109
		ss	145	60	4a	Excess B	110
Isobutene	Sulfur dioxide	lc	134	0	4a	N_{23}	83
Methacrylic acid	Methacrylic acid, methyl ester						206
Propene	Sulfur dioxide	lc	117	25	1		109
		sc	130	90	4a	Excess B	110
	Ethylene	gc	172	25	1	31 mol% A in copolymer, N_{30}	222

C. CEILING TEMPERATURES AND EQUILIBRIUM MONOMER CONCENTRATIONS

Most addition polymerization reactions are exothermic and exentropic. The free energy of polymerization per monomer unit therefore becomes less negative as the temperature is raised. At the *ceiling temperature* T_c, the free energy of polymerization under the prevailing conditions is zero, and above this temperature, polymerization to long-chain polymer is impossible (just as in physical aggregation a liquid cannot form a solid when the temperature is above the melting point). The reverse phenomenon of a *floor* temperature is also known, e.g., for sulfur.

In general a pure liquid monomer which gives an *insoluble polymer* will have a single well-defined ceiling temperature, given by $T_c = \Delta H_{lc}/\Delta S_{lc}$. A pure liquid monomer which gives a *soluble* polymer will have a series of ceiling temperatures corresponding to different percentage conversions of monomer to polymer. The condition for equilibrium is then

$$-\Delta\bar{G}_1 + \Delta G_{lc} + \Delta\bar{G}_2 = 0$$

The partial molar free energy per mol of monomer, $\Delta\bar{G}_1$ and per base mol of polymer, $\Delta\bar{G}_2$ are then functions of composition and may be evaluated from an appropriate equation for mixing of monomer and polymer, e.g., the Flory–Huggins equation. For a monomer dissolved in a solvent the situation is more complex and the ceiling temperature at a given monomer concentration (or the equilibrium concentration of monomer at a given temperature) is dependent on the nature of the solvent and the composition of the medium (Refs. 28,29,112,113,114,160). For the case where both monomer and polymer are in solution the variation of T_c with concentration is given to a first approximation by

$$T_c = \Delta H^\circ_{ss}/(\Delta S_{ss} + R\ln[M])$$

where $[M]$ is the concentration of monomer and ΔH°_{ss} and ΔS°_{ss} refer to the heat and entropy changes in an appropriate standard state. A more general expression may be derived from the free energy condition by insertion of suitable expressions for $\Delta\bar{G}_1$ and $\Delta\bar{G}_2$. These will contain the various interaction parameters appropriate to the polymer–monomer–solvent system.

The values of T_c quoted in the table are mostly obtained from experimental values by interpolation or short extrapolation. Some unpolymerizable monomers are included where these are structurally closely related to monomers which do polymerize and where the cause of nonpolymerization appears to be thermodynamic. This is amplified for cyclic monomers in Section D.

Section C is divided into three sections

1 Equilibria involving pure liquid monomers (lc, lc′, ls)
2 Equilibria involving gaseous monomers (gc, gc′)
3 Equilibria involving monomers in solution (sc, sc′, ss) and copolymerizations

For meaning of symbols, see Section A.

1. Equilibria Involving Pure Liquid Monomers

TABLE 7. MONOMERS GIVING POLYMERS CONTAINING MAIN CHAIN ACYCLIC CARBON ONLY

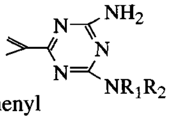
Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
2-Amino-4-(*N*-alkylanilino)-6-isopropenyl-1,3,5-triazine					
alkyl = *n*-propanyl	lc	157	1		402
= *n*-hexanyl	lc	149	1		402
= *n*-octanyl	lc	143	1		402
= *n*-decanyl	lc	140	1		402
= *n*-dodecanyl	lc	134	1		402
= *n*-tetradecanyl	lc	132	1		402
= *n*-hexadecanyl	lc	130	1		402
= isopropyl	lc	151	1		403
= isobutyl	lc	154	1		403
= *sec*-butyl	lc	148	1		403
= *n*-pentyl	lc	150	1		403
= isopentyl	lc	151	1		403
= 1-methylbutyl	lc	146	1		403
= benzyl	lc	157	1		403
2-Amino-4-alkyl/aryl-amino-6-isopropenyl-1,3,5-triazine 					
R_1 = H, R_2 = ethyl	ls	181	1		370
R_1 = H, R_2 = propyl	ls	177	1		370
R_1 = ethyl, R_2 = ethyl	ls	163	1		370
R_1 = propyl, R_2 = propyl	ls	161	1		370
R_1 = methyl, R_2 = phenyl	ls	169	1		379
R_1 = H, R_2 = *p*-methoxyphenyl	ls	169	1		378
2-Amino-4-(*p*-chloroanilino)-6-isopropenyl-1,3-5-triazine					
	lc	170	1		404
2-Amino-4-methoxy	ls	183	1		405
-4-ethoxy	ls	182	1		405
6-isopropenyl-1-3,5-triazine					
2-Anilo-4-methoxy	ls	174	1		405
-4-ethoxy	ls	174	1		405
6-isopropenyl-1,3,5-triazine					
Atropic acid, methyl ester	ls	− 8	1		149
1-Butene	lc	247	1	Isotactic polymer, N_{57}	385
2-Butene, *cis*	lc	227	1	Isotactic polymer, N_{57}	385
, *trans*	lc	217	1	Isotactic polymer, N_{57}	385
–, 2-methyl-	ll	− 29	1	Calculated, N_{31}	143
–, 2,3-dimethyl-	ll	− 223	1	Calculated, N_{31}	143
α-Cyanoacrilic acid					
–, allyl ester	lc	307	1	N_{57}	391
–, *n*-decyl ester	lc	217	1	N_{57}	392
–, allyloxyethyl	lc	607	1	N_{57}	393
Cyclopentene	lc	97	1	N_{66}	361
Ethacrylic acid					
–, methyl ester	ls	87	1	N_{75}	395
Ethylene	lc	367	1	Polymer is polybutene-1-iso	385
Methacrylic acid					
–, benzoil acid ester	lc	787	1	N_{57}	394
–, methyl ester	lc	102	1		414
–, methyl ester deuterated	lc	93	1		414
Naphtalene, 2-isopropenyl	ls	69	1	N_{43}	400
Pentene-1	lc	317	1	N_{57}	386
Pentene-2, *cis*	lc	287	1	N_{57}	386
Pentene-2, *trans*	lc	277	1	N_{57}	386
–, 4-methyl, *cis*	lc	317	1	N_{57}	387
–, 4-methyl, *trans*	lc	267	1	N_{57}	387
Silane, benzyl dimethyl vinyl-	lc	397	1		366
–, dimethyl phenyl vinyl-	lc	197	1		362
Styrene, α-methyl-	ls	61	1	1 bar	119
	ls	54	1		341
	ls	170	1	6.57 kbar	119

TABLE 7. *cont'd*

Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
Vinylcyclohexane	lc	567	1	N_{57}	396
Vinylidenechloride	lc	387	1	N_{57}	397
Vinyldimethylbenzylsilane	lc	397	1	N_{57}	367
Vinyldimethylphenylsilane	lc	117	1	N_{57}	367
Vinyltrimethylsilane	lc	327	1	N_{57}	367

N.B. The following compounds are not polymerizable for thermodynamic reasons but can sometimes be copolymerized with other monomers (see Ref. 205): α-trifluoromethyl vinyl acetate, α-methoxystyrene, 1,1-diphenylethylene, *trans*-crotonitrile, *trans*-stilbene, *trans*-1,2-di(2-pyridyl)-ethylene, *trans*-1,2-dibenzoylethylene, *trans*-1,2-diacetylethylene, α-stillbazole, methyl 2-*tert*-butylacrylate, 1-isopropenylnaphthalene, 2,4-dimethyl-α-methyl-styrene.

TABLE 8. MONOMERS GIVING POLYMERS CONTAINING HETEROATOMS IN THE MAIN CHAIN

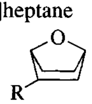
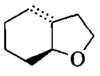
Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
8.1. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO CARBON ONLY					
Acetaldehyde	gg	−31	1	Atactic polymer (1 bar)	115
	ls	−39	1	Isotactic polymer (1 bar)	115
	ls	20	1	< 10 kbar	158
–, trichloro-	lc′	58	1		233
	lc	177	1	N_{57}	418
–, trifluoro-	lc	212	1	N_{68}	322
2,2-Dimethyltrimethylene carbonate	lc	227	1	N_{57}	426
4,7-Dioxaoctanal	lc	−38	1	N_{69}	330
1,3-Dioxepane	ls	100	0.1	N_{22}	116
	ls	192	1	N_{43}	423
	ls	144	1		398
–, 2-phenyl-	ls	20	0.36	N_{22}	116
(1,3-Dioxolane)$_n$ $n = 1$	ls	100	0.3		116,219
	ls	165	1		198
	ls	100	1	N_{43}	423
	lc	98	1		353
$n = 1$–8	ls	60		K_n determined for cyclic monomers	232
1,3-Dioxolane, 4,4-dimethyl-	lc	−98	1	N_{57}	335
–, *cis* 4,5-dimethyl-	lc	−54	1	N_{57}	335
–, *trans* 4,5-dimethyl-	lc	−137	1	N_{57}	335
–, 4-ethyl-	ls	−48	4.74 Md/l	N_{56}	333
	lc	−54	1	N_{57}	333
–, 4-isopropyl-	lc	−74	1	N_{57}	335
–, 4-methyl-	ls	−20	4.47 Md/l	N_{56}	334
	lc	−21	1	N_{57}	334
–, 4-phenyl-	ls	20	1		285
Heptanal	lc	74	1	N_{57}	419
Hexanal	lc′	−43	1	N_{57}	420
	lc	−25	1	N_{57}	420
L-Lactide	lc	640	1	N_{57}, calculated	429
Octanal	lc	−19	1	N_{69}	330
7-Oxabicyclo[2,2,1]heptane	lc	320	1	N_{57}	308
–, 2-exo-methyl- 	lc	240	1	N_{57}	308
–, 2-endo-methyl-	lc	200	1	N_{57}	308
trans-7-Oxabicyclo[4,3,0]nonane 	lc	12	1		357
4-Oxapentanal	lc	−35	1	N_{69}	329
	ls	−59	1		329
1,2-Oxathiolane-2,2-dioxide	ls	95	0.74	N_{22}	152
Oxepane	ls	41.5	1		147
	lc	−136	1	N_{32}, N_{57}	323
Oxetane	lc	478	1	N_{31}	325
8-Oxo-7-oxabicyclo[2,2,2]octane	lc′	180	1	N_{53}	307

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TABLE 8. *cont'd*

Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
Pentanal	lc	−42	1	N_{69}	328
Propanal	ls	−31	1	Atactic polymer	115
	ls	−39	1	Isotactic polymer	115
	lc′	−48	1	N_{57}	421
	lc	−83	1	N_{57}	421
Spiroorthoester 2-R-1,4,6-trioxaspiro[4,6]undecane					
R = H	lc	172	1	N_{68}	430
= CH_3	lc	254	1	N_{68}	430
= CH_2Br	lc	498	1	N_{68}	430
= Ph	lc	258	1	N_{68}	430
Tetrahydrofuran	ls	80	1	1 bar	58,130
	ls	129	1	12.5 kbar	146
–, 3-methyl	ls	4	1		342
Tri(ethylene terephthalate)	ls	297	0.014		see 174

N.B. The following compounds are not polymerizable for thermodynamic reasons but can sometimes be copolymerized with other monomers (see Ref. 205); benzaldehyde (Refs. 297–299), hexafluoroacetone, 1,1-dimethylpropanal; also numerous cyclic ethers – see Section D.

8.2. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO OTHER HETEROATOMS (S, Si, P)

Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
Sulfur trioxide	lc′	30.4	1		86
Sodium metaphosphate $Na_n(OPO_2)_n$					
$n=3$	ls	800	0.043	K_n determined for cyclic monomers, $n=3$–7	300,301
$n=4$	ls	800	0.026		300,301
$n=5$	ls	800	0.008		300,301
Siloxanes $(R_1R_2SiO)_n$					
R_1, R_2					
Me, H $n=3$–5	ls	0	0.045	K_n determined for cyclic monomers, $n=4$–15	176
$n=6$–18	ls	0	0.034		176
$n=19$–∞	ls	0	0.046		176
$n=3$–∞	ls	0	0.125		176
Me, Me $n=3$–5	ls	110	0.100	K_n determined for cyclic monomers, $n=4$–40	176
$n=6$–18	ls	110	0.036		176
$n=19$–∞	ls	110	0.047		176
$n=3$–∞	ls	110	0.183		176
$n=4$–40	ls	110		K_n determined for values of n indicated	180
$n=4$–30	ls	145		K_n determined for values of n indicated	180
Me, Et $n=3$–5	ls	110	0.170	K_n determined for cyclic monomers, $n=4$–20	176
$n=6$–18	ls	110	0.049		176
$n=19$–∞	ls	110	0.039		176
$n=3$–∞	ls	110	0.258		176
Me, Pr $n=3$–5	ls	110	0.270	K_n determined for cyclic monomers, $n=4$–8	176
$n=3$–8	ls	110	0.310		176
Me, $CF_3(CH_2)_2$ $n=3$–5	ls	110	0.711	K_n determined for cyclic monomers, $n=4$–20	176
$n=6$–18	ls	110	0.089		176
$n=19$–∞	ls	110	0.027		176
$n=3$–∞	ls	110	0.827		176
Et, Et $n=3$	lc	247	1	Calculated	431

8.3. MONOMERS GIVING POLYMERS CONTAINING S IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY

Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
Thiacetone	lc	95	1		148
	ls	−52	1	N_{55}	327
Thioacetophenone	ls	approx. 40	1		288

N.B. Isothiocyanates (Ref. 295) are not polymerizable for thermodynamic reasons, but can be copolymerized with thiiranes; carbon disulfide (Ref. 296) can also be copolymerized with thianes

TABLE 8. *cont'd*

Monomer	State of monomer and polymer	T_c [°C]	Wt. fraction monomer at equilibrium	Notes	Refs.
8.4. MONOMERS GIVING POLYMERS CONTAINING N IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY					
(ε-Caprolactam)$_n$ $n=1$	ls	220	0.055		68
	ls	225	0.067		192
	ls	277	0.084		See 181
$n=2$	ls	277	0.0078	Cyclic monomer	See 181
$n=3$	ls	277	0.0052	Cyclic monomer	See 181
$n=4$	ls	277	0.0056	Cyclic monomer	See 181
$n=5$	ls	277	0.0048	Cyclic monomer	See 181
$n=\geq 6$	ls	277	0.0076	Cyclic monomer	See 181
–, 3-methyl-	ls	225	0.086		192,194
–, 3-ethyl-	ls	240	0.1		191
–, 3-propyl-	ls	240	0.1		191
–, 4-ethyl-	ls	240	0.35		171
–, 5-methyl-	ls	172	0.18		225,302
–, 7-methyl-	ls	225	0.107		226,302
–, 7-ethyl-	ls	240	0.1		191,302
–, 7-propyl-	ls	240	0.1		191,302
2,5-Dioxopiperazine	ls	171	1	From calorimetric data	437
2-Oxo-hexamethylenimine	ls	240			302
–, 4-ethyl-	ls	240	0.03		171
–, 7-ethyl-	ls	240	0.06		171
–, 8-propyl-	ls	240			302
2-Oxo-undecamethylenimine	ls	290	0.02		139
2-Piperidone	ls	60	0.32		118
2-Pyrrolidone	lc	76	1	N_{75}	383
	ls	70	1	T_c varies with the accelerator, N_{75}	439
8.5. OTHER MONOMERS GIVING POLYMERS NOT LISTED ABOVE					
Norbornene	lc	777	1	55% *cis*/45% *trans* polymer, N_{57}	415
5-trimethylsilyl-2-	lc	417	1		416
Selenium Se_8	ls	83	1	N_{32}	85
Sulfur S_8	ls	159	1	N_{33}	73,,111
				Effect of pressure	145
	ls	157	1	N_{33}	380

2. Equilibria Involving Gaseous Monomers (listed alphabetically)

Monomer	State of monomer and polymer xx	T_c (°C)	Equilibrium pressure (mbar)	Notes	Refs.
Acetaldehyde, trichloro-	gc′	98	1013		50
–, trifluoro-	gc	73	1013		129
Acetone	gc	– 220		Estimated, N_{36}	144
1,3-Dioxepane	gc	149	1013		323
1,3-Dioxocane	gc	288	1013		324
1,3-Dioxolane	gc	87	1013		292
Ethylene, tetrafluoro-	gc	560	128	N_{34}	23,120
Formaldehyde	gc′	119	1013	N_{28}	49,164,165
Methacrylic acid					
–, ethyl ester	gs	173	1013	N_{35}	40
–, methyl ester	gs	164	1013	N_{35}	43
Oxepane	gc	135	1013		323
Oxetane	gc	319	1013		325
Sulfur trioxide	gc′	27.0	372		86
		0.0	40.8		86
Tetrahydrofuran	gc	83	1013		292
1,3,6-Trioxocane	gc	243	1013		324

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3. Equilibria Involving Monomers in Solution

TABLE 9. MONOMERS GIVING POLYMERS CONTAINING MAIN CHAIN CARBON ONLY

Monomer	State of monomer and polymer xx	T_c (°C)	M (mol/l)	Solvent/Notes	Refs.
9.1. MONOMERS GIVING POLYMERS CONTAINING MAIN CHAIN ACYCLIC CARBON ONLY					
Acrylonitrile		25	3×1^{-8}	Estimated from $\Delta G_{lc'}$	193
Atropic acid					
–, methyl ester	ss	– 40	1.0	Toluene	149
–, ethyl ester	ss	– 67	1.0	Toluene	150
–, *n*-propyl ester	ss	– 72	1.0	Toluene	150
–, *n*-butyl ester	ss	– 80	1.0	Toluene	150
–, *p*-methyl-, methyl ester	ss	– 37	1.0	Toluene	150
Atroponitrile	ss	50	1.0	Toluene	149
Biphenyl, *p*-isopropenyl-	ss	0	0.515	Tetrahydrofuran	16
Cyclohexene	ss	– 23	5	Toluene	389
Cyclooctene	ss	20		Benzene, N_{38}	229,230
Isobutylene	ss	88	1.2	Supercritical CO_2	441
Methacrylamide, *N*-butyl-	ss	122	0.651	Ethyl benzoate	326
–, *N*-phenyl-	ss	125	0.611	Ethyl benzoate	326
Methacrylic acid, methyl ester	ss	155.5	0.82	*o*-Dichlorobenzene	42
	ss	135	0.611	Ethyl benzoate	326
–, *o*-methyl phenyl ester	ss	140	0.64	*p*-Xylene	345
–, phenyl ester	ss	146	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-*tert*-butyl phenyl ester	ss	81	0.64	*p*-Xylene	345
–, *o*-*sec*-butylphenyl ester	ss	100	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-chlorophenyl ester	ss	139	0.64	Benzene or *p*-xylene, N_{75}	442
–, 2,6-diisopropylphenyl ester	ss	33	0.64	Benzene or *p*-xylene, N_{75}	442
–, 2,6-dimethyl phenyl ester	ss	77	0.64	*p*-Xylene	345
–, *o*-ethylphenyl ester	ss	118	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-isopropylphenyl ester	ss	112	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-methoxyphenyl ester	ss	145	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-methoxycarbonylphenyl ester	ss	112	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-nitrophenyl ester	ss	108	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-phenylphenyl ester	ss	100	0.64	Benzene or *p*-xylene, N_{75}	442
–, *o*-propylphenyl ester	ss	118	0.64	Benzene or *p*-xylene, N_{75}	442
2,4,6-tribromophenyl ester	ss	92	0.64	Benzene or *p*-xylene, N_{75}	442
2,4,6-trichlorophenyl ester	ss	104	0.64	Benzene or *p*-xylene, N_{75}	442
2,4,6-trimethylphenyl ester	ss	69	0.64	Benzene or *p*-xylene, N_{75}	442
Methacrylonitrile	ss	145	0.27	Benzonitrile	44
Methyl-α-*p*-chlorobenzylacrylate	ss	85	5	Toluene	443
α-Methylene pentanolactone	ss	83	1	DMF	315
	ss	55	0.324	DMF	315
Methyl-α-*p*-methoxybenzylacrylate	ss	95	5	Toluene	443
Methylphenylitaconate	ss	120	2,22	Dichlorobenzene	444
Naphthalene, 2-isopropenyl-	ss	0	0.284	Tetrahydrofuran	16
Oxazole,					
–, 2-isopropenyl-4,5-dimethyl-	ss	0	0.0025	Tetrahydrofuran	284
Pyridine, 2-isopropenyl-	ss	0	0.043	Tetrahydrofuran	284
Styrene	ss	150	9.1×10^{-4}	Benzene	28
	ss	150	6.5×10^{-4}	Cyclohexane	28
–, α, acetoxy	ss	47	1.0	Toluene	401
–, α-methyl-	ss	0	0.76	Tetrahydrofuran, N_{37}	16,32,33
	ss	53	1.8	*n*-Heptane	402
	ss	58	1.8	Toluene	402
–,–, *o*-methoxy-	ss	– 25	~2	Methylene chloride	155
N,N,N',N'-Tetraethyl-4-isopropenylphenylphosphorous diamide	ss	10	1.0	Tetrahydrofuran	408
Thiazole, 2-isopropenyl-	ss	0	0.010	Tetrahydrofuran	284
p-[Bis(Trimethylsilyl)methyl] isopropenylbenzene	ss	1.2	1.0	Tetrahydrofuran	409

TABLE 9. *cont'd*

Monomer	State of monomer and polymer xx	T_c (°C)	M (mol/l)	Solvent/Notes	Refs.
9.2. MONOMERS GIVING POLYMERS CONTAINING MAIN CHAIN CYCLIC CARBON					
–, 7,8-Dycyanoquinodimethane					
7,8-bis(butoxycarbonyl)	ss	93	0.014	Chloroform, N_{75}	411
	ss	442	1.0	Chloroform, N_{43}	411
7,8-Diacetyl-	ss	87	0.018	Chloroform, N_{75}	412
	ss	415	1.0	Chloroform, N_{43}	412
7,8-Dibenzoyl-	ss	88	0.069	Chloroform, N_{75}	412
	ss	301	1.0	Chloroform, N_{43}	412
7,8-Dibutoxycarbonyl	ss	93	0.014	Chloroform, N_{75}	412
	ss	442	1.0	Chloroform, N_{43}	411
	ss	79	0.014	Chloroform, N_{75}	411
	ss	422	1.0	Chloroform, N_{43}	411
	ss	67	0.014	Chloroform, N_{75}	411
	ss	481	1.1	Chloroform, N_{43}	411

TABLE 10. MONOMERS GIVING POLYMERS CONTAINING HETEROATOMS IN THE MAIN CHAIN

Monomer	State of monomer and polymer xx	T_c (°C)	M (mol/l)	Solvent/Notes	Refs.
10.1. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO CARBON ONLY					
Acetaldehyde	sc	~ – 80	6	Toluene, N_{22}	228
–, bromochlorofluoro-	sc′	23	1	Toluene	233
–, bromodichloro-	sc′	– 17	1	Toluene	344
–, bromodifluoro-	sc′	48	1	Toluene	344
–, dibromochloro-	sc	– 40	1	Toluene	337
–, dibromofluoro-	sc′	– 19	1	Toluene	344
–, dichlorofluoro-	sc	52	1	Methyl cyclohexane	336
	sc′	41	1	Toluene	344
–, chlorodifluoro-	sc	70	1	Methyl cyclohexane	336
	sc′	63	1	Toluene	344
–, tribromo-	sc′	– 75	1	Toluene	338
–, trichloro-	ss	11	1.0	Tetrahydrofuran	167
	sc′	12.5	(0.1)	Pyridine, N_{39}, N_{40}	50
	sc′	35	1.0	*n*-Heptane	166
	sc′	18	1	Methyl cyclohexane	336
	sc′	9	1	Toluene	344
–, trifluoro-	sc′	81	1	Toluene	344
	sc	9	1	Dichloromethane	322
Butanal	sc	– 18	~2	Toluene, isotactic polymer	227
	sc	12	1.0	*n*-Hexane [8 kbar], N_{12}	161
	sc	27	1.0	*n*-Hexane [10 kbar], N_{12}	161
4,7-Dioxaoctanal	ss	– 56	1	THF	330
1,3-Dioxepane	ss	78	1.0	Benzene	116,134
	ss	27	1.0	Dichloromethane	136
	ss	32	1.0	1,2-Dichloroethane, N_{57}	424
–, 2-butyl	ss	– 51	1.0	1,2-Dichloroethane, N_{57}	424
–, 2-methyl-	ss	– 37	1	1,2-Dichloroethane	340
	ss	– 40	1.0	1,2-Dichloroethane, N_{57}	424
–, 4-methyl-	ss	– 33	1	1,2-Dichloroethane	339
(1,3-Dioxolane)$_n$ $n=1$	ss	1	1.0	Dichloromethane	133,159
	ss	– 8	1.0	Benzene, N_{41}	134,159
	ss	20	2.0	1,3-Dioxane, N_{41}	159
	ss	20	1.0	Chloroethane	293
	ls	60	2.0	A few percent dichloromethane present	198
	ls	145	10.0	A few percent dichloromethane present	198
$n=1$–8	ss	60		Dichloroethane, N_{42}	232

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TABLE 10. *cont'd*

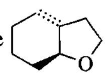
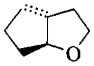
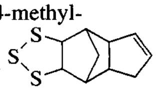
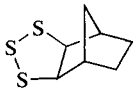
Monomer	State of monomer and polymer xx	T_c (°C)	M (mol/l)	Solvent/Notes	Refs.
Formaldehyde	sc′	30	0.06	Dichloromethane	122
	sc′	25	0.004	Nitrobenzene	182
L-Lactide	ss	284	1.0	1,4-Dioxane	429
Octanal	sc	− 59	1	THF	330
trans-8-Oxabicyclo[4,3,0]nonane 	ss	− 51	1	Dichloromethane	357
trans-2-Oxabicyclo[3,3,0]octane 	ss	0	0.63	Dichloromethane	357
Oxa-4,5-dithiepane	ss	25	< 0.005	Benzene	61
Oxepane	ss	30	0.08	Dichloromethane	236
Pentanal	sc	− 68	1	THF	328
o-Phthalaldehyde	ss	− 43	1.0	Dichloromethane, cyclopolymer	154
Propanal, 2-chloro-, 2-methyl-	ss	− 54	1.0	Tetrahydrofuran	172
−, 2,2-dichloro-	ss	− 24	1.0	Tetrahydrofuran	172
	ss	approx. 5	(0.25)	Dichloromethane, N_{22}, N_{40}	153
−, 2-methyl-	ss	− 36.6	1.0	*n*-Pentane	166
	ss	− 63	1.0	Tetrahydrofuran	172
	ss	− 61.6	1.0	Diethyl ether	166
Tetrahydrofuran	ss	25	4.45	Benzene, N_{37}, N_{44}	231
	ss	20	2.8	Diethyl ether	211
Tetraoxane	sc′	50	< 0.008	1,2-Dichloroethane	178
	sc′	25	0.12	Dichloromethane	182
	sc′	25	0.10	Nitrobenzene	182
Trioxane	sc′	50	0.20	1,2-Dichloroethane	178
	sc′	30	0.13	1,2-Dichloroethane	178
	sc′	30	0.05	Benzene	178
	sc′	30	0.19	Nitrobenzene, N_{45}	178
	sc′	25	1.5	Nitrobenzene, N_{45}	182
	sc′	25	2.5	Dichloromethane	182
1,3,6-Trioxocane	ss	297	1.0	Benzene, N_{45}	134
	ss	330	1.0	Toluene, N_{57}	425
−, 2-Butyl-	ss	220	1.0	Toluene, N_{57}	425
10.2. MONOMERS GIVING POLYMERS CONTAINING O IN THE MAIN CHAIN, BONDED TO OTHER HETEROATOMS (Si, P)					
1,3,2-Dioxaphospholan, 2-methoxy-	ss	157	0.1	1,1,2,2-Tetrachloroethane	309
1,3-Dioxepane, 4-methyl-	ss	− 33	1	1,2-Dichloroethane	339
−, 2-methyl-	ss	− 37	1	1,2-Dichloroethane	340
Siloxanes $(R_1R_2SiO)_n$					
R_1, R_2					
H, Me	ss	0	(0.2)	Toluene, N_{46}	176
Me, Me	ss	110	0.3	Toluene, N_{47}	217,218
Me, Et	ss	110	(0.4)	Toluene, N_{46}	176
Me, $CF_3(CH_2)_2$	ss	110	(0.9)	Cyclohexanone, N_{46}	176
10.3. MONOMERS GIVING POLYMERS CONTAINING S IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY					
1,3-Dithiolane, 2-phenylimino-4-methyl-	ss	65	2.7	Benzene	290
exo-3,4,5-Trithiatetracyclo-[5,5,1,0^{2,6}.0^{8,12}]tridec-10-ene 	ss	25	2.37	Toluene, N_{76}	376
	ss	90	3.72	Toluene, N_{76}	376
exo-3,4,5-Trithiatricyclo-5.2.1.0^{2,6}]decane 	ss	10	3.8	Toluene, N_{76}	377
	ss	70	6.0	Toluene, N_{76}	377
10.4. MONOMERS GIVING POLYMERS CONTAINING N IN THE MAIN CHAIN, BONDED IN THE CHAIN TO CARBON ONLY					
Bicyclic oxalactam	ss	60	1.0	Dimethylsulfoxide	433
n-Hexyl isocyanate	sc	− 22	2	Dimethylformamide	127
Pyrrole	ss	77	0.017	Acetonitrile	434
N,7,7-Tricyanobenzoquinone methide imine	ss	74	0.14	Toluene, N_{75}, N_{81}	438

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TABLE 11. COPOLYMERS

Monomer A	Monomer B	State of monomer and polymer	T^a (°C)	[A][B] (mol²/l²)	Solvent/Notes	Refs.
11.1. 1:1 COPOLYMERS						
Allyl acetate	Sulfur dioxide	ss	45	27	Excess B	110
Allyl alcohol	Sulfur dioxide	sc	76	27	Excess B	110
Allyl ethyl ether	Sulfur dioxide	ss	68	27	Excess B	110
Allyl formate	Sulfur dioxide	sc	45	27	Excess B	110
1-Butene	Sulfur dioxide	ss	64	27	Excess B	110
–, 2-ethyl-	Sulfur dioxide		<– 80		All compositions	110
–, 3-methyl-	Sulfur dioxide	sc	36	27	Excess B	110,199
2-Butene, *cis*	Sulfur dioxide	ss	46	27	Excess B, N_{48}	110
–, *trans*	Sulfur dioxide	ss	38	27	Excess B, N_{48}	110
2-Butene, (50% *cis*)	Sulfur dioxide	ss	34.6	27	Excess B, N_{49}	110
–, 2-methyl-	Sulfur dioxide		<– 80		All compositions	110
Cycloheptene	Sulfur dioxide	ss	11	27	Excess B	124
Cyclohexene	Sulfur dioxide	ss	24	27	Excess B	110
1,3-Cyclooctadiene	Sulfur dioxide	ss	37	10	Excess B (1,2 addition)	156
Cyclopentene	Sulfur dioxide	ss	103	27	Excess B	110
Ethene	Carbon monoxide	gg	150 (– 35)		N_{64}	369
	Carbon dioxide	gg	– (50)		N_{64}	369
	Sulfur dioxide	sc′	>135	27	Excess B	110
Ethene oxide	Carbon monoxide	gg	350 (– 127)		N_{64}	369
	Carbon dioxide	gg	220 (– 58)		N_{64}	369
Formaldehyde	Carbon monoxide	gg	190 (– 47)		N_{64}	369
	Carbon dioxide	gg	– 150 (46)		N_{64}	369
2-Heptene (88% *cis*)	Sulfur dioxide	ss	– 38	33	Excess B, N_{49}	110
1-Hexadecene	Sulfur dioxide	sc	69	27	Excess B	110
		ss	30	1.15	Chloroform	80
1-Hexene	Sulfur dioxide	ss	60	27	Excess B	110
–, 2-ethyl-	Sulfur dioxide		<– 80		All compositions	110
Isobutene	Sulfur dioxide	sc	5	27	Excess B	110
1-Pentene	Sulfur dioxide	ss	63	27	Excess B	110
–, 2-methyl-	Sulfur dioxide	ss	– 34	27	Excess B	110
–, 4,4-dimethyl-	Sulfur dioxide	sc	14	27	Excess B	110
–, 2,4,4-trimethyl-	Sulfur dioxide		<– 80		All compositions	110
2-Pentene (50% *cis*)	Sulfur dioxide	ss	8.5	32	N_{49}	110
–, 4-methyl-			<– 80		All compositions	110
4-Pentenoic acid	Sulfur dioxide	sc	66	27	Excess B	110
Propene	Sulfur dioxide	sc	90	27	Excess B	110
	Carbon monoxide	gg	140 (– 39)		N_{64}	369
	Carbon dioxide	gg	– 120 (39)		N_{64}	369
Propene oxide	Carbon monoxide	gg	490 (– 129)		N_{64}	369
	Carbon dioxide	gg	180 (– 49)		N_{64}	369
3-Propenyl phenyl ether	Carbon monoxide	gg	590 (– 136)		N_{64}	369
	Carbon dioixde	gg	190 (– 36)		N_{64}	369
Styrene	Carbon monoxide	gg	– 190 (53)		N_{64}	369
Tetrafluoroethene	Carbon monoxide	gg	280 (– 74)		N_{64}	369
	Carbon dioxide	gg	30 (– 2)		N_{64}	369
Vinyl chloride	Carbon monoxide	gg	230 (– 55)		N_{64}	369
	Carbon dioxide	gg	– 45 (18)		N_{64}	369
11.2. GENERAL COPOLYMERS						
ε-Caprolactam	ε-Caprolactam, 3-methyl-	ls	225		N_{50}	192,194

[a] Values in parentheses are for ΔG°_{298} in (kJ/mol).

D. POLYMERIZABILITY OF 5-, 6- AND 7-MEMBERED HETEROCYCLIC RING COMPOUNDS

The free energy of polymerization is generally negative for 3-, 4-, 8-, and higher-membered ring compounds. With heterocyclic rings there is generally an ionic mechanism available which allows these compounds to polymerize. With 5-, 6- and 7-membered ring compounds the sign of ΔG, and hence the polymerizability, is critically dependent on the nature of the ring and on the extent and position of substitution. Substitution generally makes ΔG less negative (more positive) and reduces polymerizability in the thermodynamic sense.

Tables 12–14 summarize the polymerizability of 5-, 6- and 7-membered rings, respectively, as a function of the nature of the ring and extent of substitution. Table 15 provides a comparison of polymerizability of unsubstituted 5-, 6-, and 7-membered rings.

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TABLE 11. COPOLYMERS

Monomer A	Monomer B	State of monomer and polymer	T^a (°C)	[A][B] (mol^2/l^2)	Solvent/Notes	Refs.
11.1. 1 : 1 COPOLYMERS						
Allyl acetate	Sulfur dioxide	ss	45	27	Excess B	110
Allyl alcohol	Sulfur dioxide	sc	76	27	Excess B	110
Allyl ethyl ether	Sulfur dioxide	ss	68	27	Excess B	110
Allyl formate	Sulfur dioxide	sc	45	27	Excess B	110
1-Butene	Sulfur dioxide	ss	64	27	Excess B	110
–, 2-ethyl-	Sulfur dioxide		<– 80		All compositions	110
–, 3-methyl-	Sulfur dioxide	sc	36	27	Excess B	110,199
2-Butene, *cis*	Sulfur dioxide	ss	46	27	Excess B, N_{48}	110
–, *trans*	Sulfur dioxide	ss	38	27	Excess B, N_{48}	110
2-Butene, (50% *cis*)	Sulfur dioxide	ss	34.6	27	Excess B, N_{49}	110
–, 2-methyl-	Sulfur dioxide		<– 80		All compositions	110
Cycloheptene	Sulfur dioxide	ss	11	27	Excess B	124
Cyclohexene	Sulfur dioxide	ss	24	27	Excess B	110
1,3-Cyclooctadiene	Sulfur dioxide	ss	37	10	Excess B (1,2 addition)	156
Cyclopentene	Sulfur dioxide	ss	103	27	Excess B	110
Ethene	Carbon monoxide	gg	150 (– 35)		N_{64}	369
	Carbon dioxide	gg	– (50)		N_{64}	369
	Sulfur dioxide	sc′	>135	27	Excess B	110
Ethene oxide	Carbon monoxide	gg	350 (– 127)		N_{64}	369
	Carbon dioxide	gg	220 (– 58)		N_{64}	369
Formaldehyde	Carbon monoxide	gg	190 (– 47)		N_{64}	369
	Carbon dioxide	gg	– 150 (46)		N_{64}	369
2-Heptene (88% *cis*)	Sulfur dioxide	ss	– 38	33	Excess B, N_{49}	110
1-Hexadecene	Sulfur dioxide	sc	69	27	Excess B	110
		ss	30	1.15	Chloroform	80
1-Hexene	Sulfur dioxide	ss	60	27	Excess B	110
–, 2-ethyl-	Sulfur dioxide		<– 80		All compositions	110
Isobutene	Sulfur dioxide	sc	5	27	Excess B	110
1-Pentene	Sulfur dioxide	ss	63	27	Excess B	110
–, 2-methyl-	Sulfur dioxide	ss	– 34	27	Excess B	110
–, 4,4-dimethyl-	Sulfur dioxide	sc	14	27	Excess B	110
–, 2,4,4-trimethyl-	Sulfur dioxide		<– 80		All compositions	110
2-Pentene (50% *cis*)	Sulfur dioxide	ss	8.5	32	N_{49}	110
–, 4-methyl-			<– 80		All compositions	110
4-Pentenoic acid	Sulfur dioxide	sc	66	27	Excess B	110
Propene	Sulfur dioxide	sc	90	27	Excess B	110
	Carbon monoxide	gg	140 (– 39)		N_{64}	369
	Carbon dioxide	gg	– 120 (39)		N_{64}	369
Propene oxide	Carbon monoxide	gg	490 (– 129)		N_{64}	369
	Carbon dioxide	gg	180 (– 49)		N_{64}	369
3-Propenyl phenyl ether	Carbon monoxide	gg	590 (– 136)		N_{64}	369
	Carbon dioixde	gg	190 (– 36)		N_{64}	369
Styrene	Carbon monoxide	gg	– 190 (53)		N_{64}	369
Tetrafluoroethene	Carbon monoxide	gg	280 (– 74)		N_{64}	369
	Carbon dioxide	gg	30 (– 2)		N_{64}	369
Vinyl chloride	Carbon monoxide	gg	230 (– 55)		N_{64}	369
	Carbon dioxide	gg	– 45 (18)		N_{64}	369
11.2. GENERAL COPOLYMERS						
ε-Caprolactam	ε-Caprolactam, 3-methyl-	ls	225		N_{50}	192,194

[a] Values in parentheses are for ΔG°_{298} in (kJ/mol).

D. POLYMERIZABILITY OF 5-, 6- AND 7-MEMBERED HETEROCYCLIC RING COMPOUNDS

The free energy of polymerization is generally negative for 3-, 4-, 8-, and higher-membered ring compounds. With heterocyclic rings there is generally an ionic mechanism available which allows these compounds to polymerize. With 5-, 6- and 7-membered ring compounds the sign of ΔG, and hence the polymerizability, is critically dependent on the nature of the ring and on the extent and position of substitution. Substitution generally makes ΔG less negative (more positive) and reduces polymerizability in the thermodynamic sense.

Tables 12–14 summarize the polymerizability of 5-, 6- and 7-membered rings, respectively, as a function of the nature of the ring and extent of substitution. Table 15 provides a comparison of polymerizability of unsubstituted 5-, 6-, and 7-membered rings.

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TABLE 12. 5-MEMBERED RING COMPOUNDS

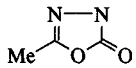
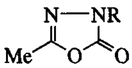
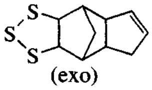
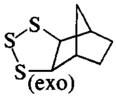
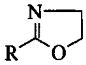
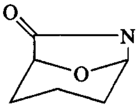
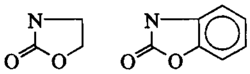
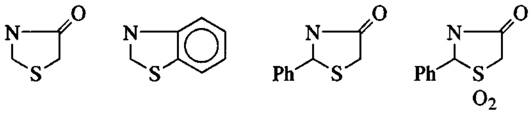
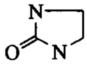
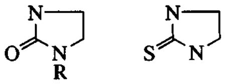
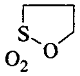
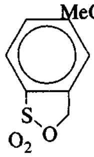
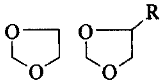
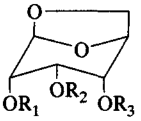
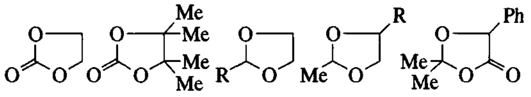
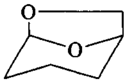
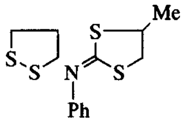
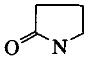
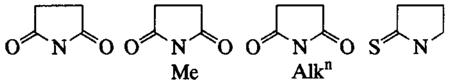
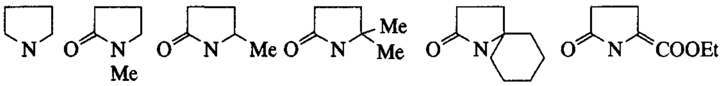
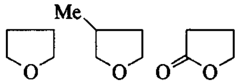
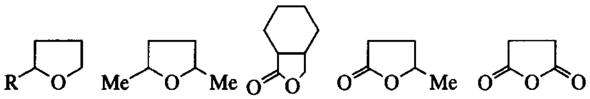
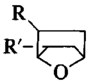
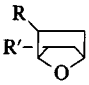
Ring	Polymerized	Not polymerized	Refs.
C_2N_2O	 N_{51}	 R = Me, Ph	237
C_2S_3			376
			377
C_3NO	 R = Me, Ph etc. N_{52} 		238,239,433
C_3NS			239,240
C_3N_2		 R = Me, MeCO	239
C_3OS			152
C_3O_2	 R = Me, CH_2Cl, Ph  $R_1 = R_2 = R_3 = H$; $R_1 = R_2 = R_3 = Me$; $R_1 = R_2 = R_3 = CH_2Ph$; $R_1 = R_3 = CH_2Ph, R_2 = H$; $R_1 = R_2 = CH_2Ph, R_3 = H$	 R = Me, Ph; R = Me, CH_2Cl	116,133,134, 159,177. 239,241–244, 285–287, 350,351,349, 398,423
			331
C_3S_2			245,246,290
C_4N			239,240,243
			240,247–249
C_4O			51,58,117, 130,140,146, 239,243,250–256, 291,303,304
	 R′ = H, R = H; R′ = H, R = endo – Me; R′ = H, R = exo – Me; R′ = endo – Me, R = exo – Me	 R′ = exo-Me; R = exo-Me	

TABLE 12. *cont'd*

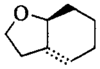
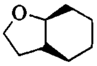
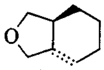
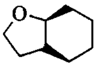
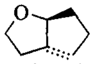
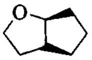
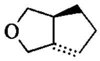
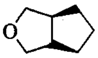
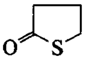
Ring	Polymerized	Not polymerized	Refs.
	 (*trans*)	 (*cis*)	357
	 (*trans*)	 (*cis*)	357
	 (*trans*)	 (*cis*)	357
	 (*trans*)	 (*cis*)	357
C_4S			185,256

TABLE 13. 6-MEMBERED RING COMPOUNDS

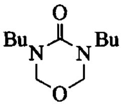
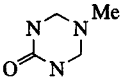
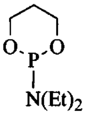
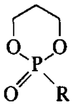
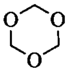
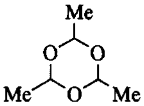
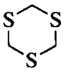
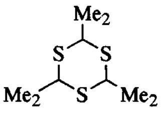
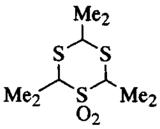
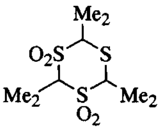
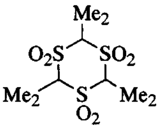
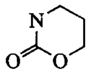
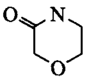
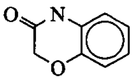
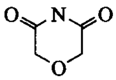
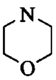
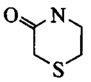
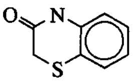
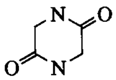
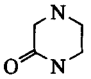
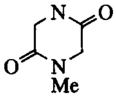
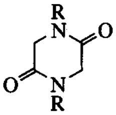
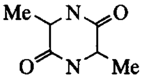
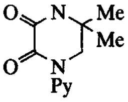
Ring	Polymerized	Not polymerized	Refs.
C_3N_2O			239
C_3N_3			239
C_3O_2P			346
	 R = H R = OCH_3		347 348
C_3O_3			141,178,184,257
C_3S_3		   	148,258,259,260
C_4NO		   	185,239,240
C_4NS		 	240
C_4N_2		   R = Me, Ph  	239,240,261

TABLE 13. *cont'd*

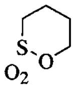
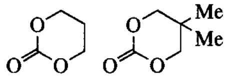
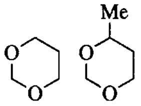
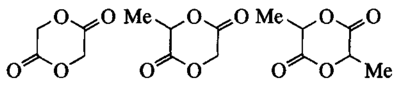
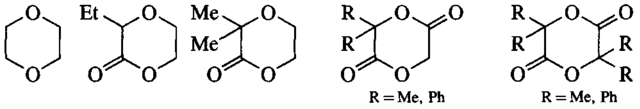
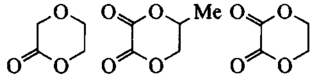
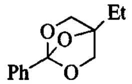
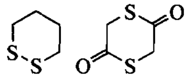
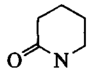
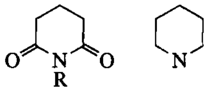
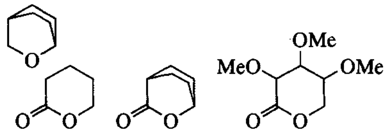
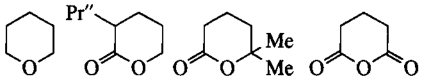
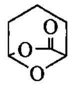
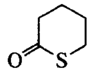
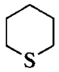
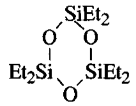
Ring	Polymerized	Not polymerized	Refs.
C_4OS			152
C_4O_2			116,136,239,243,262,426,436
			239,243,262,263,428,429
			427
			382
C_4S_2			246,265
C_5N		 R = H, Et, Ph	118,209,239,240,243,266
C_5O			153,239,243,264,226–270,283
			331
C_5S			185,256
Si_3O_3			431

TABLE 14. 7-MEMBERED RING COMPOUNDS

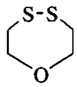
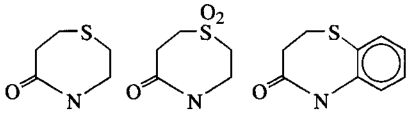
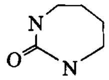
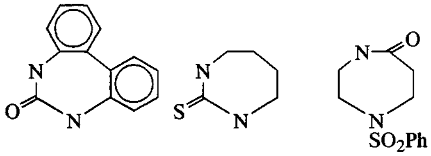
Ring	Polymerized	Not polymerized	Refs.
C_4OS_2			61
C_5NS			240
C_5N_2			239,240

TABLE 14. *cont'd*

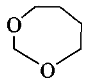
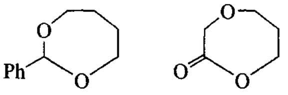
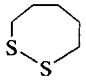
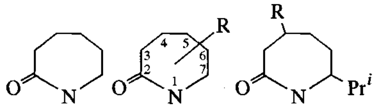
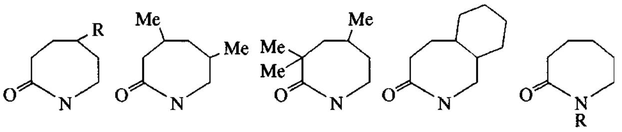
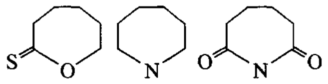
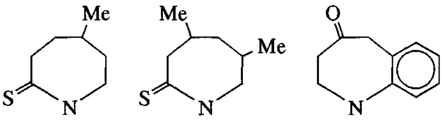
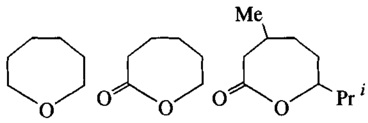
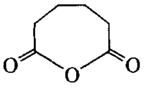
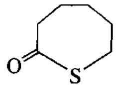
Ring	Polymerized	Not polymerized	Refs.
C_5O_2			116,136,170,241, 262,271,423,424
C_5S_2			246
C_6N	 R = 3 – Me, 4 – Me, R = H, Me; 5 – Me, 5 – Et, 5 – n – propyl, 5–*i*–propyl; 5 – Cyclohexyl; 6 – Me, 7 – Me	 R = Ph, $PhCH_2$, *n* – Heptyl; R = Me, Ph, CH_2OH, $EtSCH_2$	63,68,240, 249,272–279
			240,243,276, 277,280,305
C_6O			153,239,243, 281,282
C_6S			256

TABLE 15. COMPARISON OF POLYMERIZABILITY (+ OR –) OF UNSUBSTITUTED 5-, 6- AND 7-MEMBERED RING COMPOUNDS[a]

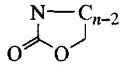
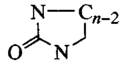
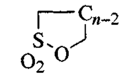
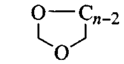
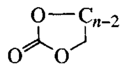
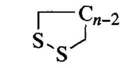
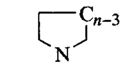
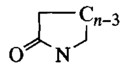
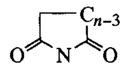
Type of ring		Name of 5-ring	5-Ring	6-Ring	7-Ring
1,3-C_nNO		2-Oxazolidinone	–	+	
1,3-C_nN_2		2-Imidazolidinone	+	–	+
1,2-C_nOS		1,2-Oxathiolane-2,2-dioxide	+	–	
1,3-C_nO_2		1,3-Dioxolane	+	–	+
		Ethylene carbonate	–	+	
1,2-C_nS_2		1,2-Dithiolane	+	+	+
C_nN		Pyrrolidine	–	–	+
		2-Pyrrolidinone	+	+	+
		Succinimide	–	–	+

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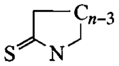
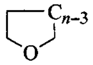
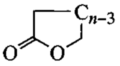
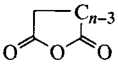
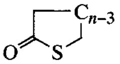
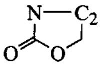
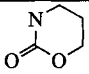
TABLE 15. *cont'd*

Type of ring		Name of 5-ring	5-Ring	6-Ring	7-Ring
		2-Pyrrolidinethione	−		+
C_nO		Tetrahydrofuran (oxolane)	+	−	+
		Oxolane-2-one (γ-butyrolactone)	+	+	+
		Oxolane-2,5-dione(succinic anhydride)	−	−	+
C_nS		Thiolan-2-one (γ−thiobutyrolactone)	−	+	+

[a] The formulae denote rings of any size. Thus in the first line 1,3C4NO is drawn as  and represents 

E. NOTES

N_1 Corrected for end-group effects.

N_2 Is assumed.

N_3 Partial allowance for unreacted monomer.

N_4 Semi-empirical values for a number of other olefins are given in Ref. 143.

N_5 Value given is for dilute solution. Values determined for complete range of composition; maximum (14.4) at 50 mol% monomer.

N_6 No allowance for unreacted monomer.

N_7 Strongly dependent on both monomer concentration and temperature.

N_9 Corrected for enthalpy of glassy state.

N_{10} $-\Delta S_{ss}$ assumed to be 120.3 J/K mol.

N_{11} Zero heat not necessarily in conflict with observed polymerizability below −40°C. Additional loss of free energy may be provided by the crystallization of the polymer.

N_{12} Polymer largely insoluble and remains in suspension.

N_{13} After correction for species in vapour other than formaldehyde.

N_{14} In the presence of a few per cent methylene chloride.

N_{15} From measurements in methylene chloride, benzene and 1,4-dioxane.

N_{16} From measurements in benzene.

N_{17} From measurements on vapor−solid equilibrium.

N_{18} From measurements in both methylene chloride and nitrobenzene.

N_{19} From measurements in 1,2-dichloroethane.

N_{20} Value calculated by the compiler of this table from data in Ref. cited.

N_{21} Numerical values for heats of copolymerization are listed only for those systems yielding 1 : 1 copolymers. The values refer to the copolymerization of 0.5 mol of each monomer. In all other cases listed the copolymers have a range of composition; details of the corresponding heats of copolymerization are given in the Ref. cited.

Where no solvent is specified in the seventh column, the symbol ΔH_{ss} denotes that the measured heat is for a liquid mixture of monomers going to a solution of copolymers. ΔH_{lc} denotes the heat change for pure liquid monomers going to condensed amorphous polymer. (This symbolism differs from that in Ref. 1.)

N_{22} The states of monomer and/or polymer are not stated in Ref. but are likely to be the ones given.

N_{23} Value calculated from measurements on mixtures containing excess B.

N_{24} Value calculated from measurements on mixtures containing excess A.

N_{25} Value in Ref. 11 corrected using entropy of monomer in Ref. 94.

N_{26} From measurements in both benzene and cyclohexane.

N_{27} Standard state: mol fraction of monomer = 0.1.

N_{28} After correction for species in vapor other than formaldehyde.

N_{29} Numerical values for entropies of polymerizaiton listed are for systems yielding 1:1 copolymers. The values refer to the copolymerization of 0.5 mol of each monomer. The symbolism and standard states are the same as used for the heats of copolymerization (see N_{21}).

N_{30} Value of $\Delta S°$ for the composition of polymer indicated.

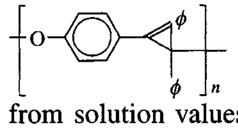
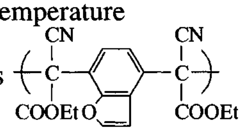
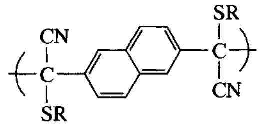
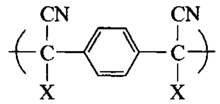
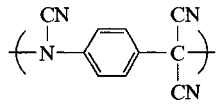
N_{31} No allowance for free energy of mixing of polymer and monomer.

N_{32} Floor temperature (hypothetical for supercooled liquid).

N_{33} Floor temperature.

N_{34} Calculated value. Not measurable experimentally because of side reactions.

N_{35} Small amount of vapor dissolved in the polymer: approximately gc.

N_{36} Hypothetical value for acetone as a gas at 1013 mbar pressure.
N_{37} Decreases with increasing polymer concentration (Ref. 112,160,289).
N_{38} Recognised that polymerization over $WCl_6/EtAlCl_2/EtOH$ yields an equilibrium mixture of unsaturated cyclic rings $(C_8H_{14})_n$. Species up to $n = 15$ have been identified and higher cyclic polymers are also likely to be present. No firm equilibrium data exist as yet.
N_{39} $dT_c/dP = 19$ deg/kbar.
N_{40} Value in [*M*] column is the mol fraction of monomer.
N_{41} Decreases with increasing polymer concentration in methylene chloride, in benzene and in 1,4-dioxane (Ref. 159).
N_{42} K_n values determined for cyclic monomers, $n = 1-8$.
N_{43} Extrapolated value.
N_{44} For equilibrium concentrations of linear oligomeric species see Ref. 294.
N_{45} Note the substantial discrepancy between the two sets of results with nitrobenzene as solvent.
N_{46} Value in [*M*] column is the volume fraction of cyclic monomer (rings of all sizes).
N_{47} Concentration of rings, $n = 13-\infty$, taking mol. wt. = 74 (value for $n = 1$); K_n determined for cyclic monomers, $n = 3-400$.
N_{48} Corrected for isomerization effect.
N_{49} Uncorrected for isomerization effect.
N_{50} Equilibrium concentrations of A and B lower than expected from values for homopolymerizations.
N_{51} Polymer is $\text{-}[CONHN(COMe)]\text{-}$.
N_{52} Polymer is $\text{-}[CH_2CH_2N(COR)]\text{-}$.
N_{53} *cis* and *trans* forms of polymer.
N_{54} c′(I),c′(II),c(III) refer to crystal forms I, II, III of monomer.
N_{55} Standard state is 1M, calculated from data in Ref. 148.
N_{56} Polymer dissolved in monomer; equilibrium concentration in mol/L.
N_{57} T_c calculated from $\Delta H^\circ_{lc}/\Delta S^\circ_{lc}$ or $\Delta H^\circ_{ss}/\Delta S^\circ_{ss}$.
N_{58} Valid in concentration range 2.3 to 4.6 M.
N_{59} Corrected for monomer–polymer interactions; required temperature variable interaction parameter.
N_{60} Data from Ref. 292, with corrections for monomer adsorbed in polymer.
N_{61} lc data from Ref. 231 combined with vaporization data.
N_{62} Calorimetry in solution with adjustments for solution enthalpies.
N_{63} With heat capacity adjustment for *T* change: may apply to N_{62}.
N_{64} From group method calculations; ΔG° (298 K) value given in brackets in kJ/mol; T_c refers to standard state conditions, $p_A = p_B = 1$ atm.
N_{65} ΔH_p by method 4a in close agreement.
N_{66} Ring opening polymerization giving 78% *trans* polymer.
N_{67} Polymer is 
N_{68} Calculated from solution values with experimentally determined data.
N_{69} Calculated from solution data utilizing monomer-polymer interaction parameters, see Ref. 130.
N_{70} Mixture of 1,2 and 1,4 polymerization.
N_{71} Includes adjustment for the presence of small concentrations of other cyclics; $S_n \neq S_8$.
N_{72} Calculations based on standard enthalpies of formation of S_n and ΔH_p (S_8).
N_{73} Calculation based on standard entropies of S_n and ΔS_p (S_8).
N_{74} Values apply in temperature range below the appropriate ceiling temperature, see Section C, Table 10, under "Monomers Giving Polymers Containing O in the Main Chain, Bonded to C Only."
N_{75} Obtained by extrapolation of kinetic data.
N_{76} Ring opening at S–C bond.
N_{77} c′(I), c′(II) refer to crystal forms I, II of polymer.
N_{78} Average Temperature
N_{79} Polymer is 
N_{80} Polymer is 
N_{81} Polymer is 
N_{82} Polymer is 

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Activation Energies of Propagation and Termination in Free Radical Polymerization

T. F. Mckenna
Laboratoire de Chimie et Procedes de Polymerization, Villeurbanne, Cedex, France

A. M. Santos
Faculdade de Engenharia Química de Lorena–Faenquil, Lorena, São Paulo, Brazil

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A. INTRODUCTION

The conversion of a free radical homopolymerization as a function of time is usually expressed by the following equation:

$$\frac{1}{1-x}\frac{\partial x}{\partial t} = k_{\mathrm{p}}\left(\frac{2fk_{\mathrm{d}}I}{k_{\mathrm{t}}}\right)^{0.5}$$

where x is the conversion, t the time, k_{p}, k_{t}, and k_{d} the propagation, termination and initiator decomposition rate constants, respectively, f the initiator efficiency and I the initiator concentration.

It is generally assumed that the temperature dependence of free radical polymerization rate constants can be expressed using the well-known Arrhenius equation:

$$k = A_0 \exp\left(\frac{-E}{RT}\right)$$

where A_0 is the frequency factor, R the universal gas constant, T the absolute temperature, and E the activation of the reaction in question. Measurement of k_{p} and k_{t} at different temperatures allows one to determine values of the activation energies of the same two reactions, E_{p} and E_{t}, respectively.

If we accept this representation, then the overall activation energy of a homopolymerization can be written as

$$E_{\mathrm{OV}} = E_{\mathrm{p}} - \frac{1}{2}E_{\mathrm{t}} + \frac{1}{2}E_{\mathrm{d}}$$

The value of the activation energy for the initiator decomposition reaction, E_{d}, can often be estimated separately. When data are not available for E_{p} and E_{t} as separate quantities, the term $\left(E_{\mathrm{p}} - \frac{1}{2}E_{\mathrm{t}}\right)$ can be used to model the polymerization reaction.

In the following tables, all energies are reported in terms of kJ/mol, and any appropriate remark(s) associated with the data are presented.

B. TABLES

TABLE 1. DIENES

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Butadiene	10.9			In gas phase	13
	38.9			In emulsion	14
	24.3 & 20.9			In gas phase	16
	20.5			In gas phase	21
	35.7	5.9		Solution polymerization in CCl_4; temperature range: 303–333 K	90
	38.9			For emulsion polymerization, supposing $\bar{n} = 0.5$	91
1,3-Hexadiene	8.42			Thermal and photoinitiation; temperature range: 278–333 K; k_p measured by ESR	92
Chloroprene	40.6			In emulsion	35
Dimethyl butadiene	37.7			In emulsion	45
Isoprene	46.0			In emulsion	15

TABLE 2. OLEFINS

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Acetylene	21.4			In gas phase	21
Ethylene	34.3			In gas phase	21
	18.4	1.3	17.8	Calculated using results of Ref. 24	35
	23.9			In gas phase	44
	46.4	33.5	29.7	High pressure in gas phase (up to 300 NPa); initiated by oxygen; temperature range: 60–250 °C; conversion found by gravimetry	73
			31.0	High pressure polymerization (up to 300 MPa); initiated by DTBPO; temperature range: 130–165 °C	82
	36.8	6.22			93
	29.7	10.0			94
	40.0	15.2		Activation volumes (cal/mol/atm): propagation: − 19.7, termination: 13.0	95
	25.1	− 1.59			96
	20.8	3.13			97
	29.7	10.0			98
	32.5	4.19			99
	36.9	1.05			100
	31.4			Estimation for simulation of emulsion copolymerization with vinyl acetate	101
		14.2			102
			31.6	Activation volume $= -26.2E \times 10^{-6}$ m^3/gmol	103
	30.3	4.2		Activation volume for propagation = − 0.5 cal/mol/atm	104
	17.6 ± 0.31	15.3 ± 0.26		Activation volumes (cal/mol/atm): propagation: − 16.8 ± 0.1; termination: 9.2.	105
	30.2	6.44		Optimized from values of industrial runs	106
Propene	23.4			In gas phase	21
Isoprene	41.0			In emulsion	15

TABLE 3. ACRYLIC DERIVATIVES

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Acrylamide					
A	11.7 ± 1.2	11.7 ± 0.8	5.8 ± 1.6	Solution polymerization in H_2O/DMSO	68
B	16.3 ± 0.8	10.9 ± 0.4	10.9 ± 1.3	mixture with potassium persulfate;	
C	18.8 ± 1.9	10.9 ± 0.4	13.4 ± 0.3	initiators: H_2O : DMSO : (A) 100 : 0	
D	20.5 ± 0.8	7.9 ± 0.4	16.9 ± 1.0	(B) 88 : 12	
E	25.1 ± 0.9	0 ± 0.8	25.1 ± 1.3	(C) 65 : 35	
				(D) 38 : 62	
				(E) 0 : 100	
	22 ± 0.2			pH 1	
	20 ± 0.2			pH 4	
	11.5	6.2		Compilation of data, validated for inverse suspension polymerization	111
	57.8	10.46		Compilation from various sources, validated for solution polymerization	112
N,N-methylene-bis-acrylamide			9.3	Aqueous polymerization with temperature range: 293–313 K	113
Acrylic acid					
			23.4	Initiation with APS; temperature range: 309.5–324.5 K; solution polymerization at pH_0 4.38	107
			21.7	Precipitation polymerization; temperature range: 313–333 K	108
			14.1		109
				By PLP; temperature range: 288–328 K	110
–, sodium salt	(1) 67.5 (2) 72.1			Thermally induced solid state polymerization; two methods to find E_p: (1) ESR, (2) DSC; temperature range: 60–160 °C	87
–, chromium salt			33.5	Polymerized with styrene–arsenic sulfide complex initiator in DMF	114
–, zinc salt			13.0	Initiated with an As2S3–styrene complex in DMSO at 363 K	115
–, butyl ester	8.8	0			8
	52.3	73.7		At 20% conversion	26
	15.5			From PLP–GPC; temperature range: (208–266 K); bulk polymerization	116
		38.1			109
	14 ± 6			From PLP; temperature range: (298–353 K); conversion range: (10–80%); bulk polymerization; $P = 1$ bar.	117
			$E_p - E_T = 0$	From PLP; conversion = 30% in bulk polymerization	118
	9.6 ± 0.56			By PLP–GPC; bulk polymerization with photoinitiators: benzoin and 2,2-dimethoxy-2-phenylacetophenone; temperature range: 298–303 K	119
–, ethyl ester	41	12.3			109
–, methyl ester	29.7	22.2			
	19.7	~0			
	31.8 ± 2.5	20.1 ± 0.8		Gamma ray induced solid state polymerization; temperature range: 243–283 K	
			40.7		109
–, 1,3-hydroxyneopentyl ester			31.8	Measured by dilatometry in both benzene and 1,4 dioxane ($k_p/k_t^{0.5}$ higher in dioxane)	120
–, methyl α-acetoxy ester	35.5	46.8		By ESR; temperature range: 303–333 K; solution polymerization in 1,1,2-trichloroethane; initiator: 2,2′-azobis(4-methoxy-2,4-dimethylvaleronitrile) (V-70)	121
–, methyl α-butoxy ester	30.5	25.1		By ESR; assuming $E_d = 109.5$; solution polymerization in 1,1,2-trichloroethane; initiator: 2,2′-azobis(4-methoxy-2, 4-dimethylvaleronitrile (V-70)	121
Acrylonitrile	17.2	22.6	5.9	In water solvent	25
	16.2	15.5	8.5	In DMF solvent	32

TABLE 3. *cont'd*

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Acrylonitrile (*cont'd*)	26.8	~0	6.8	In DMF solvent	37
			21.4		109
	29.6	7.0		Estimated from data on solution copolymerization with styrene as azeotrope	122
	42.7				123
			23.9	Polymerization in NaSCN solution with $Mn(C_5H_7O_2)_2$ as free radical initiator; temperature range: 295–313 K; value estimated from overall activation energy with $E_d = 58.6$ kJ/mol	124
D-Fluoroacrylic acid					
–, methyl ester			9.6	Solution: acrylonitrile; initiator: AIBN; (assume $E_d = 128$ kJ/mol)	71

TABLE 4. METHACRYLIC DERIVATIVES

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Methacrylamide	15.5	16.7	7.1	Solvent: water	34
	22.1			By PLP; temperature range: (288–328 K); pH 1	110
Methacrylic acid	17.7			By PLP–GPC; 33% monomer in methanol; temperature range: 293–333 K	125
	17.4				109
–, butyl ester	18.4	4.6	16.1	Gamma ray initiation	27
	20.4	12.7	14.1	Kinetics from calorimetry	55
	20.9	8.8	16.7	Temperature range: 35–27°C	Quoted in 58
–, butyl ester	21.8 ± 0.27			By PLP	131
	22.9 ± 1.1			By PLP–GPC; $P = 1000$ bars; temperature range: – 10 to 60°C	141
	23.3			Temperature range: 25–55°C; by PLP bulk polymerization; photoinitiator: benzoin	135
	20.4				126
	20.5 ± 0.24			By PLP–MWD; bulk polymerization; pressure: 1 bar; photoinitiator: benzoin	127
–, *i*-butyl ester	22.5 ± 0.42				131
	21.5 ± 0.35			By PLP–MWD; bulk polymerization; pressure: 1 bar; photoinitiator: benzoin	127
–, *t*-butyl ester	27.7 ± 2.5			Temperature range: 9–66°C; by PLP with benzoinethyl ether as free rapid initiator	128
–, chloromethyl ester			5.5	Ampoule and emulsion polymerization; AIBN initiator	78
–, cyanomethyl ester			~8.4	Solution: acetonitrile AIBN initiator calculated, assuming E_d of AIBN = 128 kJ/mol from overall activation energy; temperature range: 50–70 °C	87
–, dodecyl ester (lauryl ester)		15.5			Quoted in 58
			29.8	Bulk polymerization with BPO initiator; temperature range 60–80 °C; maximum conversion 1%	66
	21.5 ± 0.34			By PLP	131
	13.7				135
	16.2			By PLP–MWD; bulk polymerization; photoinitiator: benzoin	135
–, ethyl ester	23.2	8.9	18.0	Gamma ray initiation; temperature range: – 30 to 55 °C; kinetics from calorimetry	52
	21.3	7.1	17.7		Quoted in 58
			16.5	Data from bulk and solution (50% DMF); AIBN initiator; kinetics from GLC and gravimetry	63

TABLE 4. *cont'd*

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Methacrylic acid, ethyl ester (*cont'd*)	27.0	− 6.6	30.4		Quoted in 79
	22.8 ± 0.35			By PLP	131
	20.46			By PLP; temperature range: 298–328 °C; bulk polymerization; photoinitiator: benzoin	135
	27.0			Evaluated for emulsion polymerization	129
	22.9 ± 0.46			By PLP–GPC; bulk polymerization, pressure: 1 bar; photoinitiator: benzoin	127
			22.2	Bulk polymerization; initiator: AIBN	130
			16.3	Solution polymerization in benzene; initiator: AIBN	130
–, hexadecyl ester	20.1	18.8	10.5		Quoted in 58
–, hexyl ester	18.0		~ 8.4		Quoted in 58
–, methyl ester	26.4	11.9	20.5		4
	18.4	0	18.4		7
	24.3	2.1	23.2		28
	20.9	0–16.7	20.9–12.6	Termination by combination or disproportionation	30
	18.8				47
	22.4			In emulsion	31
	22.8	13.2	11.2	Gamma ray induced; temperature range: − 25 to 55 °C; used a combination of DCS and inhibition with DPPH to find kinetic parameters	48
				Polymerization in benzene; DMDM initiator; temperature range: 50–80 °C	49
	22.6 ± 2.5	Tends to 0	22.6 ± 2.5	Bulk polymerization; DBPO initiator; maximum conversion 25%; ESR used to find kinetic parameters	53
			13.0	Isothermal bulk; polymerization with AIBN initiator; DCS used to follow reaction; value found assuming E_d AIBN = 128 kJ/mol	56
	19.7	3.3	18.0		Quoted in 58
	18.2 ± 0.2	2.9 ± 0.0	16.7 ± 0.2	Bulk polymerization; AIBN initiator temperature range 15–30 °C; reaction followed by spatially intermittent polymerization; DP 10000–15000	64
			23.4	Bulk polymerization; AIBN initiator; 1-butanethiol used as CTA; value assumes E_d AIBN = 128 kJ/mol	65
	20.4	~ 10.5	15.1	Solution: benzene; AIBN initiator; kinetic data from molecular weight data; maximum conversion 5%	68
	29.1			Emulsion data; particle sizes from turbidity; potassium persulfate initiator	72
	20.9 ± 3.3	1.6 ± 0.4	20.1 ± 3.6	Solution: benzene; AIBN initiator; kinetic parameters from intermittent illumination	77
	31.3			Bulk polymerization	85
	21.3 ± 0.25			By PLP	131
	18.2				132
	26.4	11.7			133
			3.55		109
	22.6	0 ± 2.5		Temperature range: 293–353 K	156
	18.9	2.93		Suspension polymerization	134
	15.7			Spatially intermittent polymerization/ emulsion polymerization	164
	18.0				135
	18.2	2.9			136
	24.2	26.9			137
	18.3	2.94		Solution polymerization in toluene	138
	31.3	21.1			139
		36		1 Bar; temperature range: 323–353 K, low conversion	140
		− 14 ± 8		100 bars	
		− 16 ± 15		1000 bars	
	22.2 ± 0.3				141

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TABLE 4. *cont'd*

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Methcrylic acid, methyl ester (*cont'd*)	22.4			PLP plus GPC for bulk polymerization; temperature range: 272–363 K	142
	22.2				143
		2.9			144
	23.9			By PLP–GPC; bulk polymerization; pressure: 1 bar; photoinitiator: 2-hydroxy-2,2-dimethylacetophenone; temperature range: 272–363 K	145
	22.2			By PLP–GPC; bulk polymerization; pressure: 1 bar; photoinitiator: benzoin; temperature range: 272–363 K	146
–, nonyl ester	17.2	13.0	10.9		Quoted in 58
–, octyl ester	15.9	12.1	9.7		Quoted in 58
–, phenyl ester			9.2		147
–, *o*-methylphenyl ester			9.6		147
–, *o*-ethylphenyl ester			12.2		147
–, *o*-iso-propylphenyl ester			14.4		147
–, *p*-methylphenyl ester			10.6		147
–, *p*-ethylphenyl ester			9.3		147
–, *p*-iso-propylphenyl ester			13.2		147
–, *p-tert*-butylphenyl ester			9.5		147
–, ethyl α-Benzoyloxymethyl ester			11.5	By ESR, assuming E_d = 129; solution polymerization in benzene; initiator: AIBN	148
–, ethyl α-acetacetoxymethyl ester			24.55		149
–, 2-(3-chloro-3-methylcyclobutyl)-2-hydroxyethyl ester			30.68	Polymerization in dioxane using Bz_2O_2 as initiator	150
Methacryloyl fluoride			10.4	Solution: MEK; AIBN initiator; calculated using E_d AIBN = 128 kJ/mol; temperature range: 50–70 °C	81
Methacrylonitrile	48.1	20.9	37.7		20
	29.7 ± 1.5			By PLP; solution polymerization in benzylactone; temperature range: 283–333 K	151
–, *n*-Phenyl-α-methylene-β-lactam			22.8	Solution polymerization in *n*-methyl-2-pyrrolidone with AIBN (calculated from E_{OV} assuming E_d of AIBN = 129 kJ/mol)	152

TABLE 5. VINYL HALOGENS

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Tetrafluoroethylene	17.4	13.6	10.6		46
	5.4	0.8	5.0		43
Vinyl bromide	30.0	16.3	21.8		42
Vinyl chloride	16.0	17.6	7.4		17
			12	Validated for model of suspension polymerization	153
	27.6	18.2		For suspension polymerization	154
Vinylidene chloride	104	167	20.5	Solvent: hexane	9
	37.7 ± 5.9	20.9 ± 10.5	27.2 ± 11.1	Solution: *N*-methylpyrrolidone; AIBN used as photoinitiator; most runs ≤ 1% conversion	67

TABLE 6. VINYL ETHERS AND VINYL ESTERS

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Butyl vinyl ether			46.4	Bulk polymerization; initiator DTBPO; assume E_d = 51.5 kJ/mol (Ref. 82) at given conditions; GPC data used to find kinetic parameters	84
Vinyl acetate	18.0	0	18.0		1
	30.6	21.9	19.6		5
	13	0	13		6
	18	<4	16–18		18
	18	0	0		22
	39 ± 3				38
	19.6 ± 2.9	0	19.6 ± 2.9	Bulk polymerization; DBPO and cyclohexyloxyperoxide initiators; ESR used to find kinetics	53
			~26.4	Bulk polymerization; DBPO and cyclohexyloxyperoxide initiators; temperature range: 55–70 °C; DSC used for kinetics; maximum conversion 20%	57
	20.5 ± 0.39				131
	26.4	11.7			133
	23.5			Validated for emulsion copolymerization with ethylene; temperature range: 293–323 K; pressure range: 0–34 bar	102
		14.2			155
			28.1		109
	19.7 ± 2.9	0		Temperature range: 293–353 K	156
	23.7			For emulsion polymerization	157
	23.6			Emulsion polymerization	158
	24.2	4.0			159
	26.4	13.4			160
	35.2	14.2		Rotating-sector method; bulk polymerization; photoinitiator: benzoin	155
	27.8			By PLP–MWD; bulk polymerization; photoinitiator: benzoin	161

TABLE 7. STYRENE AND DERIVATIVES

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Styrene	49.0			In emulsion	2
	27.2 ± 4.2	11.7 ± 4.2	21.3 ± 6.3		3
	26.0	8.0	22.0		10
	32.5	9.9	27.5		11
	31.0 & 35.0			In emulsions	15
	54.0 & 59.0			In emulsions	19
	25.0	2.0	24.0		29
	73.6				36
	29.0				42
			25.1	Gamma ray induced; bulk liquid phase polymerization; maximum conversion 10%; temperature range: 19–74 °C	50
	37.7			Low conversion; bulk polymerization; ESR spectroscopy used for kinetics	51
	29.5 ± 0.1	9.2 ± 0.5	24.9 ± 0.4	Bulk photopolymerization; kinetics from spatially intermittent polymerization technique; temperature range: 15–36 °C DP 2400–2700	64
			34.1	AIBN initiator; assume E_d = 128 kJ/mol; bulk polymerization 1-butanethiol as CTA; maximum conversion 0.4%	65
	29.0 ± 3.0			In emulsion; reaction followed by dilatometry	70

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Table 7. *cont'd*

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
	32.2			Emulsion data; assume $N = 0.5$, sodium persulfate and sodium bisulfite initiators	76
	32.5	14.5	25.2	Bulk polymerization; AIBN initiator; temperature range: 45–100 °C	79
	17.7			In emulsion; sodium persulfate initiator	89
	29.6				132
			25.2		109
	37.8 ± 1.7				156
	39.8	15.6		By ESR; temperature range: 273–403 K	162
	36.1	18.7		Suspension polymerization; conversion less than 0.8; temperature range: 283–353 K	163
	29.5			Spatially intermittent polymerization/emulsion polymerization	164
	44.4	36.4		High conversion suspension polymerization	165
	29			Emulsion polymerization; temperature range: 318–338 K	166
	37.5 ± 1.6	10.91		ESR; temperature range: 323–363 K	167
	30.8			By PLP; temperature range: 298–328 K	168
				By PLP; temperature range: 293–353	169
	30.0			For d_p (degree of polymerization) >4	
	29.0			For all chain lengths together	
			32.3	Bulk and diluted systems initiated by (*p*-acetylbenzylidene)triphenylarsonium	170
				Measurements by rotating sector method; initiators: AIBN (30–50 °C), BPO (70–90 °C)	171
	31.5	9.5		Styrene	
	31.5	14.2		Perdeuterated styrene	
	31.5			PLP; temperature range: 303–363 K; in bulk	172
	18			Measurments by ESR; photo and thermal initiation; temperature range: 293–363 °C	173
	32.5			PLP; temperature range: 261–366 K; bulk polymerization with photoinitiators: benzoin and 2,2-dimethoxy-2-phenylacetophenone (DMPA)	174
p-Bromostyrene	32.0				39
o-Methylstyrene	58.2			In emulsion	36
p-Methylstyrene	32.0			In emulsion	36
			25.4		109
	29.6	30.5			175
	29.6	8.27			176
α-Methyl styrene	54.3	8.4			177
Divinylbenzene	35.5	29.8		Searched by EVM	178

TABLE 8. VINYL HETEROAROMATICS

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
3-Methylene-5,5-dimethyl-2-pyrrolidone			8.2	Solution polymerization in DMSO with AIBN (calculated from E_{OV} assuming E_d of AIBN = 129 kJ/mol)	179
Methylene-*N*-methylpyrrolidone			20.1	In bulk and in solution with acetonitrile; AIBN initiator (assume E_d = 128 kJ/mol)	86
N-Vinylcarbazole	28.9				42
2-Vinylpyridine	33.5	20.9	23.0		40
N-Vinylpyrrolidone	29.7	6.7	26.4	Low conversion	41
(A)	68.0	19.0	58.5	In various solvents: (A) Water	61
(B)	40.0 ± 2.0	13.0	33.5 ± 2.0	(B) L-Propanol	
(C)	31.6 ± 3.0	9.0	27.5 ± 3.0	(C) Methanol	
(D)	23.0	8.0	19.0	(D) Ethyl acetate; rates followed by dilatometry	

Table 8. *cont'd*

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
			4.8	Template polymerization in DMF; AIBN initiator; DSC used to follow reaction	74
			(1) 12.8	Solution polymerization	75
			(2) 10.8	In DMF; assume E_d of AIBN in DMF = 142 kJ/mol; reaction followed by DSC in 2 modes: (1) dynamic (2) isothermal	
			65.8 ± 0.1	Aqueous phase polymerization with potassium peroxydiphosphate Ag^+; temperature range: 293–323 K	180
	29.7	6.7			181
4-Methylene-4H-1,3-benzodioxin-2-one			11.2	Solution polymerization in *n*-methyl-2-pyrrolidone with AIBN (calculated from E_{OV} assuming E_d of AIBN = 129 kJ/mol)	182

TABLE 9. MISCELLANEOUS COMPOUNDS

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
Acetaldehyde	46.0 ± 6.3			Radiation induced in solid phase; calorimetry used to follow reaction; temperature range: 130–150 °K	54
Diethyl fumarate			25.0 ± 2.0	Bulk polymerization; AIBN initiator; (assume E_d = 128 kJ/mol) dilatometry used to follow the reaction; temperature range: 60–80 °C	59
			26.5	Assuming E_d = 129; by dilatometry; bulk polymerization; initiator: AIBN	183
Diisopropyl fumarate	16.8	16.3			184
Formaldehyde	8.4				Quoted in 54
D-Methylene-γ-butyrolactone			12.1	Solution: DMF; AIBN initiator (assume E_d = 128 kJ/mol); $E_p - E_t \approx 12.1$	80
Vinylferrocene	20.0	7.9		Note nonclassical kinetics; overall activation energy does not equal $E_d + E_p - E_t/2$; can approximate E_t = that of styrene	62
N-Vinyl-methylacetamide			26.9	Solution: methanol; AIBN initiator; maximum conversion 10%; temperature range: 25–75 °C	83
α-Ethyl, β-hexafluoroisopropyl itaconate	18.0	57.4		Polymerization in benzene catalyzed by dimethyl 2,2-azobisisobutyrate	185
Diethyl itaconate				Polymerization in benzene catalyzed by dimethyl 2,2-azobisisobutyrate	186
	29.0	30.0		(no $SnCl_4$)	
	21.0	24.0		(0.342 mol/l $SnCl_4$)	
Diisopropyl itaconate	28.5	66.1		Polymerization in benzene catalysed by dimethyl 2,2-azobisisobutyrate	187
Di-*n*-Butyl itaconate (DBI)			0.5	Assuming E_d = 129; by ESR; solution polymerization in benzene; initiator: AIBN	188
			4.35	Assuming E_d = 129.1; By ESR; solution polymerization in benzene; initiator: 2,2′-azobis(isobutyrate): MAIB	188
1,1-bis[(1-adamantyloxy)carbonyl]-2-vinyl-cyclopropane			87.1	Ring-opening solution homopolymerization in benzene; temperature range: 323–343 K; with AIBN (assume $E_{D,AIBN}$ = 123.5 kJ/mol)	189
Diethylene glycol bis-allyl carbonate (DEAC)	53.6			Rotating sector method; Initiator: BPO	190
N-Acryloyl-2,2-dimethyl-5®-phenyl-1,3-oxazolidine (ADPO)	29	21		Assuming E_d = 124.3; temperature range: 323–343 °C; solution polymerization in benzene; initiator: 2,2′-azobis(isobutyrate): MAIB	191

Table 9. *cont'd*

Monomer	E_p	E_t	$E_p - \frac{1}{2}E_t$	Remarks	Refs.
N-Cyclohexylmaleimide (CHMIm)	40.9	20.1		By ESR; temperature range: 313–333 K; solution polymerization in benzene; initiator: AIBN	192
N-Acryloyl-*p*-aminobenzoic acid			48.3	Assuming $E_d = 129$; solution polymerization in dioxane; initiator: AIBN	193

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Activation Volumes of Polymerization Reactions

G. Luft
Institut für Chemische Technologie, Technische Hochschule, Darmsadt, FR Germany

Y. Ogo*
Research Institute for Solvothermal Technology, Takamatsu, Takamatsu, Japan

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A. INTRODUCTION

The activation volume is included in the pressure dependence of the reaction rate constant (1–4):

$$\left(\frac{\partial \ln k}{\partial p}\right)_T = -\frac{\Delta v^*}{RT} + \frac{1}{V}\left(\frac{\partial v}{\partial p}\right)_T \quad (A1)$$

where k is the reaction rate constant, p is the pressure, T, the temperature V, the volume, and Δv^*, the activation volume (analogous to the activation energy). It is the difference between the partial molar volume of the activated complex, as formed in the transition state theory by the efficient collision of molecules, and those of the initial reactants. The sign of the activation volume depends on the type of the chemical reaction. If new bonds are formed in the transition state, the activated complex is larger than the initial species, and hence the activation volume is positive. Inversely the activation volume is negative if bonds are stretched and broken.

For a rough calculation of the activation volume, we can assume that the formation of new bonds as well as stretching occurs along the axis of a cylinder, whose constant cross section is determined by the van der Waal's radii $d_{mA/2}$, $d_{mB/2}$, and $d_{mC/2}$ of the atoms A, B, C:

$$\Delta v^* = \frac{\pi}{8} N\left[(d_{mA}^2 + d_{mB}^2)(\Delta_{AB}) + (d_{mB}^2 + d_{mC}^2)(\Delta_{B,C})\right] \quad (A2)$$

with $\Delta_{AB} = (0.10\text{–}0.35)\, d_{mAB}$, $\Delta_{B,C} = (1.10\text{–}1.35) d_{mBC} - d_{mB,C}$ (see Refs. 2,5,6), N is the Avogadro number, d_{mAB}, d_{mBC} = bond length (values, see Ref. 7), and d_{mBC} is the interatomic distance at the minimum of potential (sum of van der Waal's radii), $d_{mA/2}$, $d_{mB/2}$ (see Ref. 8).

The stretching of the bonds in the transition state is about 0.01–0.1 nm, whereas the change in the distance $d_{mB,C}$ between the unbonded atoms is usually larger (up to 0.25 nm).

If the decomposition of the activated complex causes only small changes in the bond length or in the distance between the atoms, its partial molar volume differs from that of the activated complex only slightly. Hence we can assume

$$\Delta v^* \cong \Delta v$$

where Δv is the excess of the partial molar volume of the reaction products over the partial molar volumes of the initial species.

This simplification is valid for reactions in which products of cyclic structure are formed, as in the dimerization of cyclopentadiene, with $\Delta v^* \approx \Delta v = -30\,\text{cm}^3/\text{mol}$ (9, 10).

*Table 3. Activation Volumes.

A second term is added to the volume change of the reacting molecules in the transition state if a polar solvent is involved. This term takes into account the change in the packing density of the surrounding solvent molecules due to the arising or disappearing of electrostatic charges between the solvent and the reactant species. This volume change is negative in bimolecular association and positive in unimolecular dissociation and tends therefore to counteract the effect of volume change during the reaction. The activation volume can be determined according to Eq. (A1) from rate measurements at different pressures and constant temperature using a semilog plot of reaction rate constant versus pressure. In this evaluation the value of $(\partial V/\partial p)_T/V$ can often be neglected, because the compressibility of fluid reactants and compressed gases is generally small at pressures above 100–200 MPa.

At very high pressures the increase of the reaction rate constant at negative activation volume is retarded by the lower mobility of the molecules due to the increased viscosity. This effect was first measured by Hamann (11) in an examination of the alkaline etherification of ethyl bromide at pressures up to 4000 MPa. It was also found in the polymerization of styrene by Nicholson and Norrish (12).

In order to obtain the reaction rate as an explicite function of pressure, Eq. (A1) can be integrated, neglecting the compressibility and assuming that the activation volume does not change greatly with pressure (13):

$$k_p = k_0 \times \exp - \frac{\Delta v*}{RT}(p - p_0) \qquad \text{(A3)}$$

where k_p is the reaction rate constant at pressure p and k_0 is the reaction rate constant at reference pressure p_0.

According to Eq. (A3) the reaction rate constant increases exponentially with pressure if the activation volume is negative and decreases if Δv^* is positive. Eq. (A3) is valid only in the high pressure range ($p > 50$ MPa). At low pressures the compressibility cannot be neglected anymore, and the activation volume changes noticeably with pressure, especially in the neighborhood of the critical point. Simmons and Mason (14) studied the dimerization of chlorotrifluoroethylene at pressures up to 10 MPa. They found that the value of the negative activation volume decreases first with pressure and then increases rapidly. It has a maximum at the critical point and after decreasing again it approaches asymptotically a constant value.

The authors describe the pressure dependence of the rate constant, taking account of the partial molar volume of the initial reactants as well as that of the activated complex by the use of suitable equations of state (e.g., Redlich–Kwong or virial coefficient equations).

In order to appreciate the influence of pressure on the reaction rate constant one can compare it with the influence of the temperature: an increase in pressure (activation volume $\Delta v^* = -25\,\text{cm}^3/\text{mol}$) at a temperature of 50°C from 0.1 to 450 MPa corresponds to a temperature increase (activation energy $E = 84$ kJ/mol) from 50 to 105°C.

Experimentally determined overall activation volumes of some polymerization reactions are listed in Section B. The data were determined from the dependence of the overall rate constant of the polymerization reactions on pressure. The values are more or less negative, hence the rate of polymerization increases with pressure.

The overall activation volume is composed of the activation volumes of the different polymerization steps, initiation, or initiator decomposition, chain propagation and chain termination:

$$\Delta v^* = \Delta v_\text{p}^* + \Delta v_\text{d}^*/2 - \Delta v_\text{t}^*/2 \qquad \text{(A4)}$$

where Δv_p^* is the activation volume of chain propagation, Δv_d^* is the activation volume of initiation with respect to initiator decomposition, and Δv_t^* the activation volume of chain termination.

The activation volumes of initiator decomposition (values in Section C) are always positive because this reaction is a unimolecular dissociation, in which a bond (e.g., the O–O bond in peroxides and peresters or the N–N bond in azo-compounds) is stretched in the transition state and finally broken. As mentioned before, Δv_d^* depends on the solvent. It can significantly be influenced by a change of electrostatic charges, viscosity, and cage effects. The activation volume of initiator decomposition is different when induced decomposition is involved at high concentration of the initiator or when the initiator decomposes in a concerted mechanism. Δv_d^* is small for two-bond scission initiators (15). The activation volume is higher for one-bond scission initiator, bulky molecules, and when more bonds brake simultaneously. The data collected in Section C were obtained in separate measurements, observing the decrease of the initiator concentration with time at different pressures. The disappearance of the initiator can also be measured during polymerization by observing the light absorption at a characteristic waver length or using scavenger techniques.

In the chain propagation reaction, the decrease in the distance between the radical and the monomer molecule is greater than the increase in length of the double bond of the monomer. Hence the activation volumes Δv_p^* listed in Section D are always negative. The data for Δv_p^* are measured at high pressures by the method of the rotating sector together with Δv_t^*, the activation volume of chain termination.

The activation volumes Δv_t^* are also negative as shown in Section E. Mostly the termination reactions are diffusion-controlled. The reactant molecules undergo translational diffusion at first to form a collision pair. It follows the movement of the reactive sites on these molecules into a position favorable to chemical reaction. This process has been considered to be the rate-determining step. The activation volume involved in this so-called segment diffusion is observed. When chain termination is governed by translational diffusion, the activation volume, Δv_vis^* for viscous flow, is the key parameter for the evaluation of the influence of pressure.

The chain transfer of a radical to the monomer, to a "dead" polymer, or to a modifier molecule is mostly favored by the pressure which means that the activation volumes should be negative, whereas the activation volume of the intramolecular transfer (by "back biting"), which initiates the formation of short side chains, can be negative or positive. The activation volumes of these reactions are determined from the change in short- and long-chain branching or from the change of the average molar mass or degree of polymerization of the formed polymers with pressure.

Under the assumption that the monomer and the polymer concentration do not change over a wide range and that the temperature is kept constant, the following relation can be derived from kinetic considerations:

$$\Delta v_p^* - \Delta v_{tr}^* = RT\left(\frac{\partial \ln \mathrm{VZG}}{\partial p}\right)_T \qquad (A5)$$

where VZG is the number of branches and Δv_{tr}^* is the activation volume of the chain transfer reaction.

Analogously, the influence of the pressure on the chain transfer to a modifier can be described by the expression

$$\Delta v_p^* - \Delta v_{tr}^* = RT\left(\frac{\partial \ln(k_{tr}/k_p)}{\partial p}\right)_T = RT\left(\frac{\partial \ln(1/\bar{P} - 1/\bar{P}_{no})}{\partial p}\right)_T \qquad (A6)$$

where P is the average degree of polymerization obtained in the presence of a transfer agent and $\bar{P}_{no}$ is the average degree of polymerization obtained in the absence of a transfer agent.

Because of the mostly negative sign of the activation volumes (listed in Section F), the radical transfer to the modifier molecule is often slightly decreased at high pressures.

The activation volume of degradation reactions which can occur at high temperatures should be positive because bond cleavage increases the volume of the activated complex more than the formation of double bonds from single bonds decreases it.

The difference in the activation volumes of the various component reactions results in a different influence of the pressure on the rate constants and leads to modified polymers. Because of its larger negative activation volume the chain propagation reaction is more favored by high pressures than the termination. The chain length and consequently the tensile strength as well as the tensile modulus increase with pressure:

$$\left(\frac{\partial \ln \nu}{\partial p}\right)_T = -\frac{1}{RT}\left[\Delta v_p^* - \frac{1}{4}(3\Delta v_p^* + \Delta v_{td}^*\right] \qquad (A7)$$

where ν = chain length.

The small negative activation volume of the intramolecular chain transfer shows that this reaction step, which determines the short chain branching, is less favored by high pressures, which means that polymers with high density and crystallinity can be synthesized at high pressures.

Similar considerations also show that the composition of copolymers and thus their molecular structure is influenced by the synthesis pressure. The pressure dependence of the copolymerization parameters r_1 and r_2, which determine the composition of a copolymer, is expressed by the relationship

$$\left(\frac{\partial \ln(r_1/r_2)}{\partial p}\right)_T = -\frac{1}{RT}(\Delta v_{p11}^* - \Delta v_{p12}^* - \Delta v_{p22}^* + \Delta v_{p21}^*) \approx -\frac{1}{RT}(\Delta v_{p11}^* - \Delta v_{p22}^*) \qquad (A8)$$

where Δv_{p11}^*, Δv_{p22}^* are the activation volumes of the propagation reaction between a monomer molecule and a radical formed from the same monomer, and Δv_{p12}^*, Δv_{p21}^* are the activation volumes of the propagation reaction between a monomer molecule and a radical formed from the comonomer.

Equation (A8) is valid if the composition of the initial reaction mixture does not change appreciably with pressure. According to Eq. (A8), an increase in pressure favors the inclusion of monomers, which in homopolymerization show a large negative activation volume (e.g., substituted olefins). Values of copolymerization parameters obtained at different pressures and activation volumes of some copolymerization reactions are listed in Section G.

When r_1 and r_2 should be calculated for high-pressure copolymerization, following Alfrey and Price, the pressure dependence of Q, e data must be taken into account. Some values of Q and e for high pressures are collected in Section G. The dependence of the e data of two monomers on pressure is given by the equation

$$\left(\frac{\partial\left[-(e_1 - e_2)^2\right]}{\partial p}\right)_T = -\frac{1}{RT}[(\Delta v_{p11}^* - \Delta v_{p12}^*) + (\Delta v_{22}^* - \Delta v_{21})] \qquad (A9)$$

B. ACTIVATION VOLUMES (cm^3/mol) OF SOME POLYMERIZATION REACTIONS

Monomer	Maximum pressure (MPa)	Temp. (°C)	Solvent	Initiator[a]	Δv*	Refs.
Acenaphthylene	390	60		AIBN	−5.8	16
Acetaldehyde	150	100–200		Diethyamine	−12.5	127
	844	−60			−11.1	142
	844	−70			−8.0	
	844	−78			−6.2	
Acrylic acid anhydride	400	50	DMF	AIBN	−14	51
Acrylonitrile	200	50	DMF	AIBN	−22[b]	52
Allyl acetate	850	80		BPO	−13.4	17
N-(4-Anilinophenyl)acrylamide	100	60	THF	AIBN	−36.1	150
	200	60			−31.2	
	300	60			−22.3	
	500	60			−15.4	
	1500	60			−6.4	
3,3-Bis(chloromethyl)oxetane	500	60	Toluene	BF_3/diethyl ether	−16	55
Butadiene	500	50			−8.8	141
	500	70			−13.3	
	500	95			−17.2	
	100	30		ACN	−26.3	91
Butyl acrylate	100	30		ACN	−26.3	154
Butyl acrylate	100	20		Radiation	−21.0	147
	300	20			−21.2	
	460	20			−5.7	
	700	20			−11.4	
Butyl methacrylate	100	60	Benzene	AIBN	−25.6	128
	100	30		ACN	−17.4	90
	100	20		Radiation	−21	
	300	20			−21.2	94,95
	460	20			−5.7	
	>460	20			−14.4	
2-Cyclopropylpropene-1	140	70		AIBN	−23	53
	140	20		Stannic chloirde	−15	53
Diallyl cyanamide	600	80	Toluene	TBPB	−14	54
Diallyl phthalate	500	70		AIBN	−9.9 to −11.8	130
	500	70	Benzene	AIBN	−14.3	
3,3-Dichloropropene-1	1000	40		DCPC	0 to 8[b]	57
1,1-Dichloro-2-vinylcyclopropane	1000	80		AIBN	−14[b]	56
	1000	20		Stannic chlorde	−30 to −70	
Diethyl fumarate	300	60			−14	18
3,3,3-Difluorochloropropene-1	1400	30		DCPC	−15	58
1,1-Difluoro-2-vinylcyclopropane	1000	50		AIBN	−15	59
	1000	20		Stannic chloride	−45	59,60
2,3-Dimethyl-1,3-butadiene			Heptane	BuLi	−36	133
			DEE	BuLi	−48	
Ethylene	250	129		DTBP	−20 to −23	46,20
	760	50–70		AIBN	−3 to −6	19
	200	225–235		Peroxide	−20 to −26	73
	190	80		DCPC	−10	74
				Enanthylperoxide	−58 to −68	151
	100–210	200–300		Methylinobutylketone	−18	114
	110–220	190		TBPO	−18 to −22	61
	250	130–165		TBPP	−22.6	79
	110–550	170–240		Oxygen	−12 to −18	21
	175	127–197		Diphenyl disulfide	−29	85
	300	135–165		DTBP	−17.5	79
1,2-Epoxycyclohexane	840–1250	60		BPO	−13	55
n-Hexyl methacrylate	450	20		Radiation	−24	94
	800	20			−17.4	
Indene	800	64	Heptane		−21.0	22
Isobutyl methacrylate	100	60	Benzene	AIBN	−23.9	122
Isoprene	1400	20–30		Oxygen	−11.0	23
	1400	20–30		BPO	−7.9 to 18.0	
	1400	20	Toluene	HI/H_2O	−7.9	24
	1400	20	Ethyl acetate	HI/H_2O	−9.8[c]	

Monomer	Maximum pressure (MPa)	Temp. (°C)	Solvent	Initiator[a]	Δv^*	Refs.
	1400	20	Dichloromethane	HI/H_2O	− 10.8	
Isopropenylcyclopropane	1400	70		AIBN	− 23.0	158
	1400	20		Stannic chloride	− 15.0	
Itaconic acid	500	40	DMF	AIBN	− 23.2	140
	500	50	DMF	AIBN	− 27.4	
	500	60	DMF	AIBN	− 30.8	
	500	70	DMF	AIBN	− 32.3	
Maleic anhydride					− 4.6	132
Maleimide	500	20–40	Methanol	BPO	− 15 to − 25	122
Methyl acrylate	100	50	Benzene	AIBN	− 17.6	129
	180	20		Radiation	− 21.4	147
	270	20			− 22.9	
	400	20			− 3.6	
	700	20			− 12.8	
Methyl methacrylate	200	40		Peroxide	− 19	25
	300	40		Peroxide	− 19	26
	100	30		ACN	− 15.6 − 21.8[c]	87,153
	300	20		Radiation	− 23.6	93,95
	550	20			− 13.7	
	100	50	Acetone	Peroxide	− 26.0	27
	100	50	Benzene	AIBN	− 21.6	129
	100	40	Benzene	Peroxide	− 17	27
	100	50	Benzene	Peroxide	− 19	27
	100	60	Benzene	Peroxide	− 21	27
	100	70	Benzene	Peroxide	− 23	27
	400	50	Butyraldehyde	AIBN	− 25	62
	100	50	Carbon tetrachloride	AIBN	− 19	27
	100	50	Dichloroethane	AIBN	− 21	27
	100	50	Ethanol	AIBN	− 20	27
	100	50	Ethyl acetate	Peroxide	− 24	27
	100	50	*n*-Hexane	Peroxide	− 19	27
	100	50	Trichloromethane	Peroxide	− 22	27
α-Methylstyrene	350	60			− 18	18
	500	50		AIBN	− 14.5	135
	500	60		AIBN	− 13.8	
	500	70		AIBN	− 11.8	
	500	80		AIBN	− 10.7	
Octyl methacrylate	100	30		ACN	− 26.3 − 25.6[c]	99
Propylene	1600	21		Radiation	− 9.6	28
	1600	48		Radiation	− 9.6	
	1600	83		Radiation	− 12.2	
	800	80–100		AIBN	− 14	144
	400	80		BPO	− 9.0	
	400	90		BPO	− 10.8	
	400	100		BPO	− 12.7	
Sodium allylsulfonate	900		H_2O	Radiation	− 5 to − 7	145
Styrene	208	22		Radiation	− 20.5 − 18.6[c] + 5.8	137
	273	25		Radiation	− 20.9	136
	400	30		Radiation	− 18	126
	100	30		ACN	− 17.1 − 17.6[c]	89
	200	40		Radiation	− 15.8	146
	280	40		Radiation	− 50.5	146
	400	40		Radiation	− 4.3	146
	600	40		Radiation	− 29.5	146
	300	50		AIBN	− 21	64
	100	50		AIBN	− 20.2	27
	200	60		AIBN	− 15	149

Monomer	Maximum pressure (MPa)	Temp. (°C)	Solvent	Initiator[a]	Δv^*	Refs.
	293	60		AIBN	−18	29
	265	80		BPO	−17	125
	265	80		Thermal	−25.8	125
	274	25	Emulsion	Radiation	138	
			Emulsion with SDS		−18.7[c]	138
			SDS		−17.9[c]	138
			Emulsion with aerosol OT		−18.3[c]	138
	274	25	Emulsion	Radiation		139
			Emulsion with nonionic emulsifier		−21.6	139
	200–500	60	Emulsion		−11.1	35
	100	50	Acetone	AIBN	−25.5	27
	100	50	Benzene	AIBN	−19.2	27
			Benzene	AIBN	−23.0	63
	100	50	Benzene	Peroxide	−18	30
	400	50	Butyraldehyde	AIBN	−25	65
	400	50	Butyraldehyde	AIBN	−22	63
	100	50	Carbon tetrachloride	AIBN	−19.1	27
	300	25–30	Chlorobenzene	$HClO_4$	−20 to −25	155
	100	50	Chloroform	AIBN	−21.9	27
	100	50	Dichloroethene	AIBN	−21.2	27
	100	50	Ethanol	AIBN	−19.6	27
	100	50	Ethyl acetate	AIBN	−24.3	27
	400	60	Isopropyl aldehyde	AIBN	−6.8	157
	100	50	Hexane	AIBN	−19.1	27
	400	60	Propionaldehyde	AIBN	−15.5	157
	268	60	Tetrachloroethylene	Peroxide	−16	31
	293	60	Toluene	AIBN	−17	29
	440	60	Triethylamine	AIBN	−17	29
	300	30	Triethylamine	BPO	−18	32
	300	40	Triethylamine	BPO	>−11.5	33
	100–600	72	Triethylamine	Thermal	−17.5	34
1,1,2,2-Tetrachloro-1,3-butadiene	1400	25–80			−36	159
Tetrahydrofuran	250–540	60		BF_3/diethyl ether	−22	55
Vinyl acetate	100	30		ACN	−17.2	86
	600	20		Radiation	−9	148
	400	40	Acetone	AIBN	−19	62
	400	40	Butyraldehyde	AIBN	−21	62
	300	40	Carbon tetrachloride	AIBN	−13	36
	400	65	Trichloroethylene	AIBN	−10.5	65
Vinyl chloride	500	60			−16.7	131
	390	40		BPO	−4.6	143
	390	50		BPO	−6.8	
	390	60		BPO	−8.1	
	390	70		BPO	−10.4	
	250	50		LPO	−18	124
	200	60	Benzaldehyde	AIBN	−4.1	98
	300	60	Benzene	AIBN	−20.5	131
	200	60	Benzonitrile	AIBN	−12.0	98
	400	60	Toluene	AIBN	−8.2	98

[a]Abbreviation: ACN: 1,1′-azobiscyclohexane-1-carbonitrile; AIBN: 2,2′-azobisisobutyronitrile; BPO: benzoyl peroxide; DCPC: dicyclohexyl peroxidicarbonate; DEE: diethyl ehter; DMF: dimethylformamide; DTBP: di-*tert*-butyl peroxide; LPO: lauroyl peroxide; TBPB: *tert*-butyl perbenzoate; TBPO: *tert*-butyl peroctoate; THF: tetrahydrofuran; SDS: sodium dodecylsulfate; Aerosol OT: sodium dioctyl sulfosuccinate; TBPP: *tert*-butyl pervivalate.
[b]Calculated by other authors.
[c]Cationic polymerization.

C. ACTIVATION VOLUMES OF INITIATOR DECOMPOSITION

Initiator	Solvent	Absolute pressure (MPa)	Temperature (°C)	Activation volume Δv_d^* (cm^3/mol)	Refs.
AIBN[a]	Toluene	0.1–150	70	13.1	37
	Toluene	0.1–1000	62.5	3.8[b] to 9.4[c]	37
Azobis-*tert*-butanolate	Octane	0.1–630	55	4.3	104
Benzoyl peroxide	Acetophenone	0.1–650	80	4.8	38
	Allyl acetate	0.1–550	80	4.7	17
	Carbon tetrachloride	0.1–300	60	9.7	39
	Carbon tetrachloride	0.1–300	70	8.6	39
2,2-Bis(*tert*-butyl peroxy)butane	Iso-dodecane	0.1–200	135–212	22.3	81
Decanoyl peroxide	Benzene	0.1–300	<100	3	78
Dicyclohexyl peroxydicarbonate	Iso-dodecane	0.1–300	95–200	4.3	75
Di-*n*-propyl peroxydicarbonate	Benzene	0.1–300	<100	4	78
Dioctanoyl peroxide	Iso-dodecane	0.1–300	80–200	5.9	75
Di-*tert*-butyl peroxide	Benzene	0.1–300	<100	15	78
		0.1–730	120	12.6	40
	Iso-dodecane	0.1–300	143–230	13.4	75
	Carbon tetrachloride	0.1–730	120	13.3	40
	n-Heptane	10–230	140–200	10.1	77
	Cyclohexane	0.1–730	120	6.7	40
	Toluene	0.1–730	120	5.4	40
Pentaphenylethane	Toluene	0.1–150	60	7	37
	Toluene	100–270	50	5	37
tert-Amyl perneodecanoate	Iso-dodecane	0.1–300	100–200	7.0	75
tert-Amyl perpivalate	Iso-dodecane	0.1–300	120–200	9.4	75
tert-Butyl cyclohexanecarboxylate	Cumene	0.1–410	80	3.9	101
tert-Butyl perbenzoate	Cumene	0.1–410	80	10	102
	Benzene	0.1–300	<100	7	78
tert-Butyl perneodecanoate	Iso-dodecane	0.1–300	100–200	6.1	75
tert-Butyl perpivalate	Iso-dodecane	0.1–300	120–200	6.1	88
	n-Heptane	0.1–200	65–105	1.6	78
tert-Butyl peroxy-2-ethylhexanoate	Benzene	0.1–300	<100	6	78
tert-Butyl phenylperacetate	Cumene	0.1–410	80	1	103
1-Methyl-1 propylpentyl perpivalate	Iso-dodecane	0.1–300	120–200	13	76
1,1,4-Trimethylpentyl perpivalate	Iso-dodecane	0.1–300	120–200	14	76
1,1,4-Trimethylpentyl perneodecanoate	Iso-dodecane	0.1–300	100–200	9	76

[a]Azobisisobutyronitrile.
[b]Photometric analysis.
[c]By I_2 scavenger technique.

D. ACTIVATION VOLUMES OF CHAIN PROPAGATION

Monomer	Solvent	Initiator	Absolute pressure (MPa)	Temperature (°C)	Activation volume Δv^* (cm^3/mol)	Refs.
Butyl acrylate	–	ACN[a]	0.1–100	30	−22.5	91
Butyl methacrylate	–	ACN	0.1–100	30	−23.2	90
Ethylene	*t*-Butanol	Radiation	−40	24	−39	152
Ethylene	–	Diphenyl disulfide	50–175	130–200	−25.5	85
Methyl methacrylate	–	ACN	0.1–100	30	−19	87
Octyl methacrylate	–	ACN	0.1–100	30	−24.7	99
Styrene	–	ACN	0.1–100	30	−17.9	89
Vinyl acetate	–	ACN	0.1–100	30	−23.3	86

[a]ACN: 1,1-azocyclohexane-1,1′-dicarbonitrile.

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E. ACTIVATION VOLUMES OF CHAIN TERMINATION

Monomer	Solvent	Initiator	Absolute pressure (MPa)	Temperature (°C)	Activation volume Δv^* (cm^3/mol)	Refs.
Butyl acrylate	–	ACN[a]	0.1–100	30	20.8	91
Butyl methacrylate	–	ACN	0.1–100	30	17.8	90
Ethylene	–	Diphenyl disulfide	50–175	130–200	7	85
Methyl methacrylate	–	ACN	0.1–100	30	25.0	87
Octyl methacrylate	–	ACN	0.1–100	30	20.8	99
Styrene	–	ACN	0.1–100	30	13.1	89
Vinyl acetate	–	ACN	0.1–100	30	16.3	86

[a]ACN: 1,1-azocyclohexane-1,1′-dicarbonitrile.

F. ACTIVATION VOLUMES OF CHAIN TRANSFER REACTIONS

Monomer	Transfer agent	Absolute pressure (MPa)	Temperature (°C)	Activation volume (cm^3/mol)		Refs.
				Δv^*_{tr}	$\Delta v^*_p - \Delta v^*_{tr}$	
Acrylonitrile	Butyraldehyde	0.1–400	50		– 6.6	62
3,3-Dichloropropene-1	3,3-Dichloropropene-1	0.1	50		– 8	62
Ethylene	Acetone	136–238	130		– 1.1	41
		138–240	130–200	– 24.9	– 1.1	83
	Butane	136–238	130		– 3.2	41
	Butanone	136–238	130		– 2.9	41
	Cyclohexane	136–238	130		– 1.5	41
		138–240	130–200	– 24.5	– 1.5	83
	Cyclopentane	198–240	130–200	– 21.3	– 4.7	83
		136–238	130		– 4.7	41
	Ethanol	138–240	130–200	– 22.9	– 3.1	83
		136–238	130		– 3.1	41
	Ethylbenzene	138–240	130–200	– 19.3	– 6.7	83
		136–238	130	–	– 6.7	41
	Ethylene	– 250	130–255	– 20.1	–	96
	Isopropanol	138–240	130–200	– 19.9	– 6.1	83
		136–238	130	–	– 6.1	41
	Polyethylene – intermolecular	110–200	100–300	– 23	3	82,85
	intramolecular	110–200	100–300	– 21	5	82,85
		180–300	175–275		20–24	83,84
	Propane	138–240	130–200	– 22.9	– 3.1	83
		136–238	130		– 3.1	41
	Toluene	138–240	130–200	– 30.7	4.7	83
		136–238	130	4.7	4.7	41
	Xylene	138–240	130–200	– 33.8	7.8	83
		138–238	130		7.8	83
Methyl methacrylate	Butyraldehyde	0.1–400	50		– 6.6	67
Styrene	Butyraldehyde	0.1–400	50		– 15	63,65,68
	Carbon tetrachloride	600	60	– 11		33
	Isobutyraldehyde	0.1–400	50		– 6.6	68
	Triethylamine	181–440	60	– 2 to – 3		42
Vinyl acetate	Butyraldehyde	0.1–400	50		– 3.2	67
Vinyl chloride	Butyraldehyde	0.1–400	50		– 3.8	67

G. INFLUENCE OF PRESSURE ON COPOLYMERIZATION

TABLE 1. COPOLYMERIZATION PARAMETERS

Monomer 1	Monomer 2	Solvent	Absolute pressure (MPa)	Temperature (°C)	Copolymerization parameters		Refs.
					r_1	r_2	
Acrylonitrile	Ethyl cinnamate	–	0.1	60	2.4	0.17	69
			80		2.8	0.21	69
			280		3.9	0.36	69
	Ethyl fumarate		0.1		5.5	0.15	105
			300		9.20	0.10	105
	Methyl acrylate		0.1		0.65	0.46	105
			300		0.76	0.43	105
	α-Methylstyrene		0.1		0.05	0.15	105
			300		0.04	0.10	105
	Styrene		0.1		0.02	0.65	105
			300		0.05	0.53	105
	Vinyl acetate		0.1		3.10	0.10	105
			300		3.50	0.05	105
Butyl acrylate	Styrene		0.1		0.20	0.62	105
			300		0.17	0.50	105
Cyclopentene	Maleic anhydride	Benzene	0.1	60	0.49	0.049	100
			200		0.21	0.041	100
			400		0.10	0.030	100
Ethylene	Vinyl acetate	–	3.5	62	0.74	1.51	97
			60	62	0.94	1.20	97
		–	51	120	0.6	0.95	41
			102–204		0.82	0.99	41
		Benzene	3.5	62	0.80	1.39	116
		Isopropyl alcohol	3.5	62	0.77	1.485	116
		N,N-Dimethylformamide	3.5	62	0.92	1.13	116
		tert-Butyl alcohol	3.5	62	0.74	1.50	116
			60	62	0.79	1.40	117
			120	62	0.80	1.37	118
	Vinyl butyrate	*tert*-Butyl alcohol	3.5	62	0.696	1.505	120
	Vinyl chloride	–	34	74	0.16	2.7	41
			102		0.16	2.1	41
			204		0.21	2.0	41
	Vinyl formate	*tert*-Butyl alcohol	3.5	62	0.586	1.29	120
	Vinyl isobutyrate	*tert*-Butyl alcohol	3.5	62	0.609	1.49	120
	Vinyl pivalate	*tert*-Butyl alcohol	3.5	62	0.645	1.49	120
	Vinyl propionate	*tert*-Butyl alcohol	3.5	62	0.674	1.50	120
			118	62	0.68	1.26	115
Maleic anhydride	Acenaphthylene	Acetic anhydride	0.1	60	0.07	0.43	43
			288		0.10	0.32	43
	2-Ethyl-1-hexene		0.1	70	0.15	0.015	106
			300		0.11	0.011	106
	1-Hexene		0.1	70	0.15	0.015	106
			200		0.10	0.010	106
	2-Methyl-2-butene		0.1	70	0.10	0.035	106
			300		0.005	0.025	106
	α-Methylstyrene		0.1	70	0.005	0.04	106
			300		0.03	0.03	106
	Norbornene		0.1	70	0.03	0.05	106
			300		0.02	0.03	106
	Thiophene		0.1	70	0.20	0	106
			320		0.15	0	106
Methyl acrylate	α-Methylstyrene		0.1	50	0.10	0.27	105
			300		0.08	0.23	105
	Croton aldehyde		0.1	50	20	0.02	105
			600		20	0.02	105
	Methyl vinyl ketone		0.1	50	0.50	1.80	105
			300		0.60	1.20	105
	Vinyl-2-pyridine		0.1	50	0.20	1.10	105
			300		0.30	1.05	105

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TABLE 1. *cont'd*

Monomer 1	Monomer 2	Solvent	Absolute pressure (MPa)	Temperature (°C)	Copolymerization parameters		Refs.
					r_1	r_2	
Methyl methacrylate	Acenaphthylene	Toluene	0.1	60	0.57	3.1	43
			190		0.60	1.9	43
			390		0.58	1.6	43
	Acrylonitrile	Toluene	0.1	70	1.34	0.12	44
			10		1.46	0.37	44
			100		2.01	0.45	44
	Methyl acrylate	Toluene	3.4	62	2.42	0.31	119
			590	62	2.36	0.31	119
			118	62	2.40	0.30	119
Styrene	Acrylic acid	–	0.1	60	0.25	0.07	69
			100		0.27	0.08	69
			250		0.31	0.095	69
	Acrylonitrile	Toluene	0.1	70	0.37	0.07	44
			10		0.43	0.13	44
			100		0.55	0.14	44
	Diethyl fumarate	Benzene	0.1	60	0.26	0.06	70
			10		0.29	0.09	70
			100		0.32	0.15	70
	Diethyl maleate	Benzene	0.1	60	6.53	0.01	70
			10		7.08	0.02	70
			100		9.50	0.02	70
	Ethyl methacrylate	Benzene	0.1	50	0.56	0.50	45
			10		0.62	0.55	45
			100		0.72	0.67	45
	Methyl methacrylate	–	0.1	60	0.704	0.159	69
			100		0.710	0.163	69
			300		0.718	0.171	69
	Methyl acrylate	Toluene	3.4	62	1.20	0.09	119
			59	62	1.12	0.11	119
			118	62	1.10	0.13	119
	Methylacrylate	Toluene	3.4	62	0.86	0.38	119
			59	62	0.82	0.39	119
			118	62	0.77	0.41	119
	Vinyl acetate	Benzene	0.1	60	44	0.01	46
			10		46	0.01	46
			100		47	0.01	46
	Vinylidene chloride	–	0.1	60	2.6	0.04	47
			150		2.5	0.04	47
			200		2.5	0.01	47
	Vinylidene chloride	–	0.1	60	0.54–0.55	0.80–1.135	69,105
			200		0.560	1.145	69
			300		0.605–0.70	0.80–1.165	69,105
Vinyl acetate	Isopropyl acetate		0.1		0.90	0.30	105
			300		0.60	0.35	105
	Vinylidene chloride	–	0.1	60	0.025	3.2	47
			150		0.025	3.1	47
			250		0.03	3.1	47
Vinylidene chloride	Indene	–	0.1	60	0.475	0.205	69
			200		0.500	0.215	69
			400		0.525	0.225	69

TABLE 2. REACTIVITY RATIOS OF TERPOLYMERIZATION[a]

Pressure (MPa)	r_{12}	r_{21}	r_{13}	r_{31}	r_{23}	r_{32}	Refs.
0.1	5.5	0.15	0.02	0.65	0.06	0.15	107,108
300	3.2	0.10	0.05	0.53	0.15	0.25	

[a]Monomers: (i) acrylonitrile; (ii) diethyl fumarate; (iii) styrene.

TABLE 3. ACTIVATION VOLUMES

Monomer 1	Monomer 2	Solvent	Absolute pressure (MPa)	Temperature (°C)	Activation volume (cm^3/mol) Δv^*	$\Delta v^*_{11} - \Delta v^*_{12}$	$\Delta v^*_{22} - \Delta v^*_{21}$	Refs.
Acrylonitrile	Ethylfumarate		0.1–300	50		−5.0	3.7	107
	Methyl acrylate		0.1–300	50		−1.5	~0	105
	α-Methylstyrene		0.1–300	50		~0	3.7	105
	Styrene		0.1–300	50		−8.5	1.9	105
	Vinyl acetate		0.1–300	50		−1.1	6.3	105
Butyl acrylate	Styrene		0.1–300	50		0	1.0	105
Cyclopentene	Maleic anhydride	Benzene	0.1	60	−26.4 to −37.4			100
Ethylene	Vinyl acetate	–	−0.1–600	60		9.3	2.7	100
			2.5–60	62		−11.3	11.9	97
Ethylene	Vinyl acetate	–	110–190	240	−36			72
Indene	Acrylonitrile	Heptane		50	−17.5	0	−4.3	48
		Dioxane		50	−18.0	0	−3.6	48
	Methyl vinyl ketone	Heptane		50	−24.0	2.5	−1.0	49
	Methyl methacrylate	Heptane		50	−20.1	0	0	48
	Vinylidiene chloride				−17.8 to −19.1			71
Isoprene	Acrylonitrile	Heptane		50	−27.0	–	–	50
Maleic anhydride	2-Ethyl-1-hexene		0.1–300	70	−36			106
	2,3-Dimethyl-2-butene		0.1–300	70	−25			106
	1,1-Diphenyl ethylene		0.1–300	70	−50 to −60			106
	1-Hexane		0.1–200	70	−18			106
	Cyclohexene		0.1–300	70	−23			121
	2-Methyl-2-butene		0.1–300	70	−25			106
	α-Methylstyrene		0.1–300	70	−35			106
	Norbornene		0.1–300	70	−28			106
	Thiophene		0.1–320	70	−26			106
	trans-Stilbene		0.1–300	60	−25			106

COPOLYMERIZATION OF MALEIC ANHYDRIDE WITH MONO- AND POLY-SUBSTITUTED OLEFINS 160

Substitution	Comonomer	Activation volume (cm^3/mol)
mono-	=CH(Pr)	−16.6
	=CH(Bu)	−18.0
	=CH(*i*-Pr)	−17.0
	=CH(*i*-Bu)	−17.5
	=CH(*t*-Bu)	−31
	=CH(Ph)	−18.5
di-(1,2)	CH(Me)=CH(Et)	−19.0
	CH(Me)=CH(*i*-Pr)	−20.0
	CH(Me)=CH(*t*-Bu)	−35
	CH(*i*-Pr)=CH(*i*-Pr)	−18.5
	CH(Ph)=CH(Ph)	−25.0
gem-	=C(Me)(Pr)	−31
	=C(Me)(*i*-Pr)	−33
	=(Me)(*t*-Bu)	−60
	=C(Me)(CH₂*t*-Bu)	−46
	=C(Me)(Ph)	−35
	=C(Et)(Et)	−34
	=C(Et)(Bu)	−36
	=(Ph)(Ph)	−50
tri-	CH(Me)=C(Me)(Me)	−25
	CH(Et)=C(Me)(Me)	−31
tetra-	C(Me)(Me)=C(Me)(Me)	−25

Monomer 1	Monomer 2	Solvent	Absolute pressure (MPa)	Temperature (°C)	Δv^*	$\Delta v^*_{11} - \Delta v^*_{12}$	$\Delta v^*_{22} - \Delta v^*_{21}$	Refs.
Methyl acrylate	α-Methylstyrene		0.1–300	50		1.0	0.7	105
	Croton aldehyde		0.1–300	50		0	0	105
	Maleic anhydride				−18 to −25			71
	Methyl vinyl ketone		0.1–300	50		−1.9	1.9	105
	Vinyl-2- pyridine		0.1–300	50		−3.7	~0	105

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TABLE 3. *cont'd*

Monomer 1	Monomer 2	Solvent	Absolute pressure (MPa)	Temperature (°C)	Activation volume (cm^3/mol) Δv^*	$\Delta v_{11}^* - \Delta v_{12}^*$	$\Delta v_{22}^* - \Delta v_{21}^*$	Refs.
Methyl methylacrylate	Methyl acrylate		3.4–118	62		0.9	1.8	119
Styrene	Diethyl fumarate				– 18 to – 25			71,105
	Methyl acrylate				– 13.8 to – 14.5			71
	Methyl methacrylate				– 18 to – 25			71
	Vinyl-2-pyridine				– 23.5 to – 26	– 2.2	0	71

TABLE 4. ***Q, e*** **VALUES**

Monomer	Q^a At 0.1 MPa	Q^a At 300 MPa	e^a At 0.1 MPa	e^a At 300 MPa	Refs.
Acrylic acid	0.53 (0.83)[b]	0.45	+0.91 (0.88)[b]	+0.64	108
Acrylonitrile	0.53 (0.50)	0.62	+0.90 (1.20)	+0.95	105
n-Butyl acrylate	0.40 (0.30)	0.40	+0.35 (0.74)	+0.35	105
n-Butyl methacrylate	0.62 (0.66)	0.70	– 0.08 (0.34)	– 0.54	92
Crotonaldehyde	0.015 (0.02)	0.015	+0.80 (0.84)	+0.80	105
Diethyl fumarate	0.20 (0.03)	0.25	+ 1.35 (2.17)	+ 1.25	105,109,25
Diethyl maleate	0.03 (0.04)	0.03	+0.62 (1.40)	+0.40	109
Ethylene	0.015 (0.013)	0.05	– 0.15 (– 0.15)	– 0.02	110
Ethyl methacrylate	0.62 (0.57)	0.66	0.00 (0.35)	– 0.35	92
Indene	0.30 (0.36)	0.28	– 1.10 (– 1.03)	– 1.05	111,108
Isobutylene	0.025 (0.029)	0.022	– 1.72 (– 1.06)	– 1.25	112
Isopropenyl acetate	0.08 (0.02)	0.12	– 1.30 (– 0.34)	– 1.60	105
Methyl acrylate	0.44 (0.44)	0.44	+0.60 (0.60)	+0.60	105
Methyl methacrylate	0.63 (0.74)	0.63	– 0.20 (0.38)	– 0.05	108,25
α-Methylstyrene	1.40 (1.00)	1.65	– 1.30 (– 1.27)	– 1.40	105
Methyl vinyl ketone	1.07 (0.65)	1.03	+0.95 (1.11)	+ 1.15	105
Propylene	0.010 (0.008)	0.015	– 1.50 (– 2.20)	– 1.05	112
Styrene	1.20 (1.00)	1.35	– 1.10 (– 0.80)	– 1.22	105,108,92
Vinyl acetate	0.06 (0.03)	0.05	– 0.20 (– 0.22)	– 0.35	105,108,110
Vinyl chloride	0.0450 (0.056)	0.045	+0.16 (0.20)	+0.19	112,41
Vinyl pivalate	0.023 (–)	0.046	– 0.19 (–)	– 0.02	113
2-Vinylpyridine	1.05 (1.03)	0.95	– 0.60 (– 0.50)	– 0.50	105
Vinylidene chloride	0.27 (0.26)	0.24	+0.42 (0.40)	+0.43	108

[a]Reference monomer is methyl acrylate (105).
[b]Values in parentheses refer to the values of styrene.

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Activation Enthalpies and Entropies of Stereocontrol in Free Radical Polymerizations

Hans-G. Elias
Michigan Molecular Institute, 1910 West St. Andrews Rd., Midland, MI 48640, USA

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A. INTRODUCTION

In free radical polymerization, the tacticity of the resulting polymer depends on the propagation step, i.e., on stereocontrol by the propagating end. The following simple cases exist:

(a) The last monomeric unit does not control the stereospecificity of the propagation step. Isotactic (i) and syndiotactic (s) additions thus exhibit the same conditional probabilities ($p_i = p_s$). The mole fractions x of the resulting isotactic and syndiotactic diads are equal ($x_i = x_s$). If all steps occur at random, the four conditional probabilities for the formation of triads are equal ($p_{i/i} = p_{i/s} = p_{s/i} = p_{s/s}$), and so are the conditional probabilities for the formation of tetrads, pentads, etc. The resulting polymer is a true atactic polymer. It follows that

$$p_i = x_i = 1/2 \qquad p_s = x_s = 1/2 \tag{A1}$$

$$x_{ii} = x_{is} = x_{si} = x_{ss} = 1/4 \tag{A2}$$

(b) The last monomeric unit of the chain, but not the last diad, controls the propagation step. The probabilities for the formation of isotactic and syndiotactic diads are thus different ($p_i \neq p_s$). The process is Bernoullian (zeroth order Markov statistics) with respect to the formation of diads. Consequently, the probability of forming an isotactic diad at an existing isotactic diad equals the probability of forming an isotactic diad at an existing syndiotactic diad ($p_{i/i} = p_{s/i}$), and, by analogy, $p_{s/s} = p_{i/s}$. It follows for the diads (6,8)

$$p_i = x_i \neq 1/2 \qquad p_s = x_s \neq 1/2 \tag{A3}$$

and for the triads

$$x_{ii} = p_i^2 = x_i^2 \qquad x_{ss} = p_s^2 = x_s^2 \tag{A4}$$

$$x_{ht} = p_i p_s + p_s p_i = 2x_i x_s = 2x_i(1 - x_i) \tag{A5}$$

where x_{ii} is the mole fraction of isotactic triads and x_{ss} is the mole fraction of syndiotactic triads. x_{ht} is the mole fraction of heterotactic triads, regardless of whether formed by the formation of an isotactic unit at a syndiotactic one (conditional probability $p_{s/i}$) or vice versa (conditional probability $p_{i/s}$).

(c) The last two monomeric units of the chain, i.e., the last monomeric diad, regulate the stereocontrol of the propagation step. The four conditional probabilities do not equal each other ($p_{i/i} \neq p_{i/s} \neq p_{s/i} \neq p_{s/s}$). The mole fractions of isotactic (x_{ii}), syndiotactic (x_{ss}) and heterotactic triads (x_{ht}) are thus given by (8,11)

$$x_{ii} = x_i\, p_{i/i} \qquad x_{ss} = x_s\, p_{s/s} \tag{A6}$$

$$x_{ht} = x_i\, p_{i/s} + x_s p_{s/i} \tag{A7}$$

This process corresponds to a Markov trial of first order.

(d) Second order Markov statistics are present if the last two diads (i.e., the last triad or the last three monomeric

units) control the propagation step. In this case

$$x_{iii} = x_{ii}p_{i/i} \qquad x_{sss} = x_{ss}p_{s/s} \tag{A8}$$

$$x_{iis} = x_{ii}p_{i/s} \qquad x_{ssi} = x_{ss}p_{s/i} \tag{A9}$$

$$x_{iss} = x_{is}p_{s/s} \qquad x_{sii} = x_{si}p_{i/i} \tag{A10}$$

$$x_{isi} = x_{is}p_{s/i} \qquad x_{sis} = x_{si}p_{i/s} \tag{A11}$$

In order to distinguish between Markov second order and Markov first order mechanisms, at least tetrads must be known.

The probability of the addition of a 'b' diad (b = i, s) to an existing end 'a' (a = i, s) is given by the corresponding rates R:

$$P_{a/b} = \frac{R_{a/b}}{R_{a/a} + R_{a/b}} \tag{A12}$$

with a = i, s or b = i, s, in the Markov first order case, or a = ii, is, si, ss b = ii, is, si, ss, in the Markov second order case.

Using these definitions and assuming steady states and the equality of instantaneous and final diad and triad fractions, one can express ratios of all diads, triads, and tetrads in terms of rate constants (Table 1) or ratios of rate constants in terms of diad, triad, etc. fractions (Table 2). The rate constants themselves can be calculated if the rate constants of propagation are known for the corresponding experimental conditions (1).

From the temperature dependence of the expressions given in Table 2, differences in activation enthalpies ($\Delta H A^{\ddagger} - \Delta H^{\ddagger}_{B}$) and differences in activation entropies ($\Delta S^{\ddagger}_{A} - \Delta S^{\ddagger}_{B}$) can be calculated:

$$\frac{k_A}{k_B} = \exp\left(\frac{\Delta S^{\ddagger}_{A} - \Delta S^{\ddagger}_{B}}{R}\right)\exp\left(\frac{\Delta H^{\ddagger}_{A} - \Delta H^{\ddagger}_{B}}{RT}\right) \tag{A13}$$

The quantities ($\Delta H^{\ddagger}_{A} - \Delta H^{\ddagger}_{B}$) and ($\Delta S^{\ddagger}_{A} - \Delta S^{\ddagger}$) may reflect activation parameters (2,3), conformation parameters (4,5), or combinations thereof.

Table 3 gives the difference $\Delta\Delta H^{\ddagger} = \Delta H^{\ddagger}_{A} - \Delta H^{\ddagger}_{B}$ and $\Delta\Delta S^{\ddagger} = \Delta S^{\ddagger}_{A} - \Delta S^{\ddagger}_{B}$ calculated from the temperature dependence of diad ratios x_i/x_s. In the case of Bernoulli trials, they represent $\Delta H^{\ddagger}_{i} - \Delta H^{\ddagger}_{s}$ and $\Delta S^{\ddagger}_{i} - \Delta S^{\ddagger}_{s}$, respectively. For first order Markov trials, they stand for $\Delta H^{\ddagger}_{s/i} - \Delta H^{\ddagger}_{i/s}$ and $\Delta S^{\ddagger}_{s/i} - \Delta S^{\ddagger}_{i/s}$, respectively. In general, both $\Delta\Delta H^{\ddagger}$ and $\Delta\Delta S^{\ddagger}$ depend on the solvent (9,10), and consequently on the monomer/solvent ratio (11,12), but they are nearly independent of monomer conversion.

Table 4 gives the differences in activation enthalpies for modes of addition other than s/i vs. i/s, and Table 5 gives the corresponding differences in activation entropies. Only a few of these activation parameters could be calculated from literature data as very few triad fractions have been reported.

For any two modes of addition, the compensation effect between $\Delta\Delta H^{\ddagger}$ and $\Delta\Delta S^{\ddagger}$ (10,12,43) for the polymerization of a given monomer, in different solvents and/or at different monomer/solvent ratios, can be described by

$$\Delta H^{\ddagger}_{A} - \Delta H^{\ddagger}_{B} = \Delta\Delta H^{\ddagger}_{0} - (\Delta S^{\ddagger}_{A} - \Delta S^{\ddagger}_{B})T_0 \tag{A14}$$

The compensation temperature T_0 has been found to be independent, of the mode of addition (e.g., $A = i/i$ vs. $B = i/s$) within the limits of error (12,43). However, the compensation enthalpy $\Delta\Delta H^{\ddagger}_{0}$ depends on the mode of addition.

B. TABLES

TABLE 1. RATIOS OF SOME *i*-ADS FOR DIFFERENT MECHANISMS[a]

i–ad Ratio	Mechanism: Bernoulli	Markov 1st order	Markov 2nd order
$\frac{x_i}{x_s}$	$\frac{k_i}{k_s}$	$\frac{k_{s/i}}{k_{i/s}}$	$\frac{k_{ss/i}(k_{si/i}+k_{ii/s})}{k_{ii/s}(k_{is/s}+k_{ss/i})}$
$\frac{x_{ii}}{x_{ss}}$	$\frac{k_i^2}{k_s^2}$	$\frac{k_{i/i}k_{s/i}}{k_{s/s}k_{i/s}}$	$\frac{k_{ss/i}k_{si/i}}{k_{ii/s}k_{is/s}}$
$\frac{x_{iii}}{x_{sss}}$	$\frac{k_i^3}{k_s^3}$	$\frac{k_{i/i}^2k_{s/i}}{k_{s/s}^2k_{i/s}}$	$\frac{k_{ss/i}k_{si/i}k_{ii/i}}{k_{ii/s}k_{is/s}k_{ss/s}}$
$\frac{x_{is}}{x_{ss}}$	$\frac{k_i}{k_s}$	$\frac{2k_{s/i}}{k_{s/s}}$	

[a] From Ref. 42.

TABLE 2. RATIOS OF RATE CONSTANT FOR MARKOV FIRST ORDER MECHANISMS[a]

Ratios of rate constants	Expressions giving ratios of rate constants
$\frac{k_{i/i}}{k_{i/s}}$	$\frac{2x_{ii}}{x_{is}}$
$\frac{k_{i/i}}{k_{s/i}}$	$\frac{2x_sx_{ii}}{x_ix_{is}} = \frac{1+(2x_{ss}/x_{is})}{1+(x_{is}/(2x_{ii}))}$
$\frac{k_{i/i}}{k_{s/s}}$	$\frac{x_sx_{ii}}{x_ix_{is}} = \frac{1+(x_{is}/(2x_{ss}))}{1+(x_{is}/(2x_{ii}))}$
$\frac{k_{i/s}}{k_{s/i}}$	$\frac{x_s}{x_i} = \frac{x_{ss}-(x_{is}/2)}{x_{ii}-(x_{is}/2)}$
$\frac{k_{i/s}}{k_{s/s}}$	$\frac{x_sx_{is}}{2x_ix_{ss}} = \frac{1+(x_{is}/(2x_{ss}))}{1+(2x_{ii}/(x_{is}))}$
$\frac{k_{s/i}}{k_{s/s}}$	$\frac{x_{is}}{2x_{ss}}$

[a] From Ref. 43.

TABLE 3. $\Delta H^{\ddagger}_{s/i} - \Delta H^{\ddagger}_{i/s}$ AND $\Delta S^{\ddagger}_{s/i} - \Delta S^{\ddagger}_{i/s}$ OF FREE RADICAL POLYMERIZATIONS IN DIFFERENT SOLVENTS*

Monomer (+additive)	Vol.%	Solvent	$\Delta H^{\ddagger}_{s/i} - \Delta H^{\ddagger}_{i/s}$ (J/mol)	$\Delta S^{\ddagger}_{s/i} - \Delta S^{\ddagger}_{i/s}$ (J/mol/K)	Remarks	Refs.
Acrylonitrile	30	Toluene	3770 ± 59	2.7 ± 0.19	–	10,14
	100	Bulk	0	0	–	13
Acrylic acid, isopropyl ester	?	?	0	– 5.9	[a]	15
–, methyl ester	?	?	0	– 5.9	[a]	15
α-Chloroacrylic acid, methyl ester	?	Toluene	3800 ± 190	2.5 ± 0.59	–	16
Methacrylonitrile	100	Bulk	250 ± 50	3.0 ± 0.14	–	17
	100	Bulk	– 4100 ± 71	– 10.8 ± 0.21	–	18
–, (+1 mol $SnCl_4$/2 mol monomer)	3:1[b]	Toluene	– 630 ± 54	– 0.7 ± 0.18	–	18
–, (+1 mol $SnCl_4$/1 mol monomer)	2:1[b]	Toluene	170 ± 63	– 0.1 ± 0.18	–	18
–, (+1 mol $SnCl_4$/1 mol monomer)	1:1[b]	Benzene	251	0.75 ± 0.88	–	18
–, (+1 mol $SnCl_4$/2 mol monomer)	1:1[b]	Benzene	2350 ± 38	9.76 ± 0.096	–	18
Methacrylic acid	10	1-Propanol	3980 ± 92	– 2.2 ± 0.32	–	19
	20	1-Propanol	3850 ± 80	– 1.8 ± 0.28	–	19
	20	2-Propanol	7800 ± 180	10.5 ± 0.63	–	19
	20	Methanol	3140 ± 42	– 4.1 ± 0.13	–	19
–, anhydride	?	Benzene	13300 ± 210	44.4 ± 0.63	–	20
–, benzyl ester	50	Toluene	2300 ± 130	– 1.7 ± 3.8	[a]	21
–, *s*-butyl ester	50	Toluene	3430 ± 63	2.0 ± 0.22	–	10,22
–, *t*-butyl ester	50	Toluene	2090 ± 80	– 2.6 ± 0.29	–	10,22
–, *p*-carboxyphenyl ester	?	Dimethylformamide	4310	2.09	[c]	23
	?	*p*-Cetyloxybenzoic acid	0	– 6.87	–	10,23
–, cyclohexyl ester	100	Bulk	1210 ± 80	– 5.0 ± 0.20	–	10,24
–, glycidyl ester	45	Acetone	700 ± 100	9.5 ± 0.36	–	10,25
	50	Dimethylformamide	5780 ± 42	5.0 ± 0.15	–	10,25
	57	Toluene	8600 ± 130	14.2 ± 0.042	–	10,25
	100	Bulk	9800 ± 110	17.5 ± 0.28	–	10,25
–, α-methylbenzyl ester	50	Toluene	3640 ± 59	2.2 ± 0.22	–	10,22
–, methyl ester	9.1[d]	Acetone	6280 ± 75	10.2 ± 0.23	–	12
	9.1[d]	Acetonitrile	5360 ± 75	7.3 ± 0.26	–	12
	9.1[d]	Benzene	3480 ± 71	2.3 ± 0.23	–	12
	9.1[d]	Butanone	3900 ± 160	4.2 ± 0.46	–	12
	9.1[d]	γ-Butyrolactone	3140 ± 88	1.4 ± 0.27	–	12
	9.1[d]	Chloroform	5100 ± 71	7.5 ± 0.23	–	12
	9.1[d]	Dimethylformamide	3500 ± 150	3.4 ± 0.46	–	12
	9.1[d]	Dimethyl sulfoxide	3350 ± 96	2.5 ± 0.28	–	12
	9.1[d]	1,4-Dioxane	5317 ± 8	7.4 ± 0.30	–	12
	9.1[d]	Methylene chloride	3100 ± 67	2.0 ± 0.22	–	12
	9.1[d]	Pyridine	4860 ± 75	7.7 ± 0.22	–	12
	9.1[d]	Tetrachloroethane	5200 ± 100	7.2 ± 0.29	–	12
	9.1[d]	Tetrahydrofuran	3900 ± 110	4.4 ± 0.33	–	12
	9.1[d]	Toluene	2810 ± 96	0.8 ± 0.26	–	12
	20	Paraffin	2720 ± 34	1.6 ± 0.13	–	27
	25	Acetone	7030 ± 75	9.0 ± 0.23	IR	9
	25	Carbon tetrachloride	5860 ± 21	5.36 ± 0.067	IR	9
	25	Chloroform	9380 ± 71	16.0 ± 0.21	IR	9
	25	Dichloroethylene	6700 ± 46	8.4 ± 0.13	IR	9
	25	Ethanol	4980 ± 50	3.6 ± 0.14	IR	9
	25	*n*-Heptane	5200 ± 210	3.69 ± 0.059	IR	9
	25	*n*-Hexane	6700 ± 29	8.50 ± 0.092	IR	9
	28.5	Toluene	5650 ± 80	3.9 ± 0.26	–	10,26
	50	Toluene	2900 ± 420	1.3 ± 1.3	[a]	21
	100	Bulk	6200 ± 110	9 ± 3.8	–	27
	100	Bulk	4480	4.2	[a]	7
	100	Bulk	3800 ± 230	– 0.04 ± 0.63	[a]	25
	100	Bulk	2300 ± 54	– 1.8 ± 0.16	–	28
	100	Bulk	3560 ± 84	3.3 ± 0.24	–	12
–, –, (+8.7 mol $ZnCl_2$/1 mol MMA)	1.1[e]	Water	2850 ± 71	2.2 ± 0.20	–	10,29
–, –, (+1 mol $ZnCl_2$/1 mol MMA)	3.2[e]	Ethyl acetate	4100 ± 71	5.2 ± 0.2	–	10,29
–, –, (+0.04 mol $ZnCl_2$/1 mol MMA)	100	Bulk	2700 ± 190	1.13 ± 0.054	–	10,29
–, –, (+1 mol $ZnCl_2$/2 mol MMA)	100	Bulk	– 130 ± 80	– 9.80 ± 0.67	–	27
–, –, (+1 mol $ZnCl_2$/1 mol MMA)	100	Bulk	– 40 ± 130	– 6.7 ± 0.46	–	27
–, –, (+1 mol $SnCl_4$/2 mol MMA)	100	Bulk	800 ± 100	– 8.2 ± 0.33	–	27

*In all cases, except those marked by IR (infrared) (see Remarks column), diad fractions were determined via NMR.

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TABLE 3. *cont'd*

Monomer (+additive)	Vol.%	Solvent	$\Delta H^{\ddagger}_{s/i} - \Delta H^{\ddagger}_{i/s}$ (J/mol)	$\Delta S^{\ddagger}_{s/i} - \Delta S^{\ddagger}_{i/s}$ (J/mol/K)	Remarks	Refs.
–, –, (+1 mol $SnCl_4$/1 mol MMA)	100	Bulk	420 ± 13	– 14.07 ± 0.054	–	27
–, L-menthyl ester	50	Toluene	960 ± 46	0.3 ± 0.18	–	30
–, phenetyl ester	50	Toluene	5600 ± 1700	4.6 ± 4.6	[a]	21
Trifluorochloroethylene	0.4[f]	Carbon tetrachloride	0	– 5.8	[a]	31
Vinyl bromide	100	Bulk	710	2.5	[a]	32
	?	*n*-Butyl acetate	250	2.1	[a]	32
Vinyl bromide	6.5	*o*-Dichlorobenzene	1930 ± 54	5.3 ± 0.17	–	34
	100	Bulk	2140 ± 17	5.99 ± 0.080	–	34
	100	Bulk	1270 ± 30	2.72	–	44
N-Vinyl carbazole	?	Dimethylacetamide	– 4600 ± 300	– 20 ± 1	–	45
	?	Dimethylformamide	– 2850 ± 100	– 13.5 ± 0.4	–	45
	?	Dimethylsulfoxide	– 3300 ± 500	– 15.4 ± 1.4	–	45
	?	Hexamethylphosphoric triamide	– 3400 ± 200	– 14.7 ± 0.7	–	45
	?	Hexane/nonane	– 1500 ± 200	– 10.5 ± 0.7	–	45
	?	Methylene dichloride	– 2650 ± 100	– 11.7 ± 0.4	–	45
	?	Toluene	– 3650 ± 1000	– 16.0 ± 0.8	–	45
Vinyl chloride	10	Cyclohexane	1300 ± 84	2.5 ± 0.42	[a]	36
	33.3	Water/ethanol	5000 ± 1000	18 ± 4.2	–	35
	33.3	Water	1500 ± 630	2.9 ± 2.0	–	35
	100	Bulk	2900 ± 160	6.78 ± 0.067	IR	37
	100	Bulk	2260 ± 50	5.7 ± 0.14	–	34
	100	Bulk	1090 ± 20	1.9	–	44
– β, β-d_2	100	Bulk	– 2650 ± 4	– 6.28 ± 0.04	–	34
Vinyl formate	50[d]	Acetone	340 ± 25	0.21 ± 0.80	–	41
	50[d]	Chloroform	290 ± 50	0.08 ± 0.16	–	41
	50[d]	Dimethylformamide	250 ± 38	0.5 ± 0.12	–	41
	100	Bulk	1050 ± 54	3.3 ± 0.17	–	38
	100	Bulk	880 ± 25	3.4 ± 0.080	–	41
Vinyl trichloroacetate	100	Bulk	2830	84	[a]	32
	?	*n*-Butyl acetate	1800	4.6	[a]	32
	100	Bulk	1590	4.2	[a]	32
	?	*n*-Butyl acetate	880	2.1	[a]	32

[a] Data directly from literature, mechanistic assumptions unknown.
[b] Solvent/monomer molar ratio.
[c] Literature data, calculated under the assumption of Bernoulli statistics.
[d] mol%.
[e] mol/l.
[f] g/ml.

TABLE 4. ACTIVATION ENTHALPY DIFFERENCE ($\Delta H^{\ddagger}_{A} - \Delta H^{\ddagger}_{B}$) CALCULATED FROM VARIOUS LITERATURE DATA

		$\Delta H^{\ddagger}_{A} - \Delta H^{\ddagger}_{B}$ (J/mol)					
Monomer	Solvent	A = i/i, B = i/s	A = s/i, B = i/i	A = i/i, B = s/s	A = i/s, B = s/s	A = s/i, B = s/s	Refs.
Glycidyl methacrylate	Acetone	33000 ± 2300	–	–	–	7100 ± 110	25
	Bulk	–	–	–	–	9300 ± 140	25
	Dimethylformamide	–	–	–	–	580 ± 33	25
	Toluene	–	–	–	–	10000 ± 1000	25
Methacrylic acid (20 vol.%)	Methanol	25000 ± 1400	38000 ± 2500	6500 ± 750	420 ± 80	3300 ± 110	19
	1-Propanol	14000 ± 1500	20000 ± 1800	300 ± 160	– 1240 ± 75	4010 ± 96	19
	2-Propanol	27000 ± 1800	33000 ± 2600	5556 ± 8	150 ± 29	8000 ± 220	19
Methyl methacrylate/$ZnCl_2$							
9.34/0.369 (mol/mol)	Bulk	2800 ± 120	– 130 ± 110	2430 ± 59	– 340 ± 59	2310 ± 54	29
2.00/1.00 (mol/mol)	Bulk	– 13 ± 110	– 100 ± 75	– 42 ± 88	– 29 ± 29	– 140 ± 75	27
1.00/1.00 (mol/mol)	Bulk	– 20 ± 160	– 21 ± 110	– 29 ± 130	– 8 ± 17	– 46 ± 130	27
3.19/3.19 (mol/mol)	Ethyl acetate	2300 ± 230	1800 ± 180	2600 ± 170	370 ± 63	4480 ± 54	29
1.10/9.6 (mol/mol)	70% $ZnCl_2/H_2O$	700 ± 240	2200 ± 180	1400 ± 150	700 ± 92	3550 ± 38	29
Vinyl formate	Acetone	670 ± 25	– 1060 ± 88	– 419 ± 4	– 1060 ± 92	– 2150 ± 92	41
	Bulk	2850 ± 84	– 1700 ± 100	650 ± 25	– 1900 ± 130	– 900 ± 130	41
	Chloroform	1700 ± 180	– 3200 ± 190	– 520 ± 46	– 300 ± 190	– 3700 ± 1250	41
	Dimethylformamide	0 ± 150	– 250 ± 190	– 180 ± 200	– 180 ± 200	– 440 ± 230	41
Vinyl chloride	Water	423	1210	170	980	2500	35
	Water/methanol	3600 ± 63	– 1230 ± 54	4420 ± 29	830 ± 84	5600 ± 140	35
Vinyl chloride, β, β-d_2	Bulk	3180 ± 46	540 ± 46	2860 ± 21	– 330 ± 29	2320 ± 25	39

TABLE 5. ACTIVATION ENTROPY DIFFERENCES ($\Delta S_A^\ddagger - \Delta S_B^\ddagger$) CALCULATED FROM VARIOUS LITERATURE DATA

		$\Delta S_A^\ddagger - \Delta S_B^\ddagger$ (J/mol/K)					
Monomer	Solvent	A = i/i B = i/s	A = s/i B = i/i	A = i/i B = s/s	A = i/s B = s/s	A = s/i B = s/s	Refs.
Glycidyl methacrylate	Acetone	85 ± 8.8	–	–	–	10.3 ± 0.42	25
	Bulk	–	–	–	–	16.1 ± 0.54	25
	Dimethylformamide	–	–	–	–	5.8 ± 0.13	25
	Toluene	–	–	–	–	17 ± 3.9	25
Methacrylic acid (20 vol.%)	Methanol	54 ± 4.2	125 ± 8.4	– 1.3 ± 2.3	2.3 ± 0.25	– 1.1 ± 0.13	19
	1-Propanol	32 ± 7.1	72 ± 8.0	– 15.8 ± 0.54	– 3.4 ± 0.25	– 0.9 ± 0.38	19
	2-Propanol	75 ± 7.5	100 ± 11	– 1.84 ± 0.04	0.7 ± 0.13	11.1 ± 0.75	19
Methyl methacrylate/$ZnCl_2$							
9.34/0.369 (mol/mol)	Bulk	4.0 ± 0.34	– 2.9 ± 0.29	1.8 ± 0.17	– 2.2 ± 0.17	– 1.1 ± 0.13	29
2.00/1.00 (mol/mol)	Bulk	– 7.0 ± 0.46	– 2.8 ± 0.29	– 8.0 ± 0.38	– 1.5 ± 0.13	– 10.8 ± 0.29	27
1.00/1.00 (mol/mol)	Bulk	– 5.2 ± 0.63	– 1.7 ± 0.38	– 6.0 ± 0.46	– 0.8 ± 0.21	– 7.7 ± 0.42	27
3.19/3.19 (mol/mol)	Ethyl acetate	1.4 ± 0.88	3.9 ± 0.71	1.8 ± 0.63	0.4 ± 0.25	5.7 ± 0.13	29
1.10/9.6 (mol/mol)	70% $ZnCl_2$ in water	3.1 ± 0.71	5.2 ± 0.54	– 1.5 ± 0.42	1.6 ± 0.25	3.8 ± 0.13	29
Vinyl formate	Acetone	5.1 ± 0.25	– 5.6 ± 0.29	– 0.75 ± 0.04	– 5.8 ± 0.29	– 9.3 ± 0.29	41
	Bulk	11.1 ± 0.25	– 7.6 ± 0.25	2.55 ± 0.080	– 8.6 ± 0.34	– 5.0 ± 0.38	41
	Chloroform	7.7 ± 0.54	– 13.0 ± 0.63	– 1.1 ± 0.13	– 13.9 ± 0.59	– 13.9 ± 0.75	41
	Dimethylformamide	4.6 ± 0.46	– 3.9 ± 0.59	– 0.3 ± 0.13	– 4.3 ± 0.39	– 3.9 ± 0.71	41
Vinyl chloride	Water	– 1.3	4.6	4.5	3.8	6.8	35
	Water/methanol	11.7 ± 0.25	– 4.1 ± 0.21	15.3 ± 0.54	3.6 ± 0.34	20.6 ± 0.54	35
Vinyl chloride, β, β-d_2	Bulk	8.3 ± 0.17	2.1 ± 0.17	7.03 ± 0.080	– 1.30 ± 0.08	4.98 ± 0.08	39

TABLE 6. CALCULATED COMPENSATION TEMPERATURES T_0 AND COMPENSATION ENTHALPIES $\Delta\Delta H_0^\ddagger$ FOR VARIOUS MONOMERS AND MODES OF ADDITION, ASSUMING MARKOV FIRST ORDER TRIALS

	Modes of addition			
Monomer	A	B	T_0 (K)	$\Delta\Delta H_0^\ddagger$ (J/mol)
Acrylonitrile	s/i	i/s	1400	0
Methacrylic acid, in alcohols	s/i	i/s	455	2780
	i/i	i/i	294 ± 26	6300 ± 1260
	s/i	i/i	323 ± 5	– 2300 ± 510
	i/i	s/s	403 ± 140	6600 ± 200
	s/i	i/s	323 ± 10	4480 ± 21
	i/s	s/s	302 ± 74	– 180 ± 63
	s/i	s/s	333 ± 23	4250 ± 25
– , *i*-butyl ester	s/i	i/s	294 ± 3	3304 ± 4
– , *n*-butyl ester	s/i	i/s	236 ± 4	3576 ± 8
– , *p*-carboxyphenyl ester	s/i	i/s	481	3308
– , glycidyl ester	s/i	i/s	345 ± 15	3800 ± 200
	s/i	s/s	373 ± 11	3500 ± 120
– , hexyl ester	s/i	i/s	303 ± 11	3260 ± 29
– , methyl ester	i/i	i/s	315 ± 49	120 ± 160
	s/i	i/i	310 ± 20	2600 ± 130
	i/i	s/s	323 ± 124	1440 ± 84
	s/i	i/s	362 ± 15	1470 ± 50
	i/s	s/s	338 ± 51	1400 ± 92
	s/i	s/s	334 ± 54	4010 ± 75
– , – , (+ $ZnCl_2$)	i/i	i/s	314 ± 39	1650 ± 67
	s/i	i/i	321 ± 9	540 ± 33
	i/i	s/s	331 ± 24	1930 ± 42
	s/i	i/s	336 ± 21	2250 ± 50
	i/s	s/s	304 ± 10	243 ± 4
	s/i	s/s	328 ± 42	2530 ± 80
– , *i*-propyl ester	s/i	i/s	230 ± 54	3420 ± 67
– , *n*-propyl ester	s/i	i/s	248 ± 41	3300 ± 176
Vinyl acetate	s/i	i/s	1100	– 2050
Vinyl chloride	i/i	i/s	283 ± 25	820 ± 130
	s/i	i/i	282 ± 6	– 75 ± 17
	i/i	s/s	235 ± 28	900 ± 160
	s/i	i/s	305 ± 124	– 220 ± 420

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TABLE 6. *cont'd*

Monomer	Modes of addition A	Modes of addition B	T_0 (K)	$\Delta\Delta H_0^{\ddagger}$ (J/mol)
	i/s	s/s	248 ± 9	− 13 ± 33
	s/i	s/s	219 ± 10	1130 ± 59
Vinyl formate	i/i	i/s	362 ± 23	− 1400 ± 130
	s/i	i/i	315 ± 16	850 ± 80
	i/i	s/s	323 ± 27	− 200 ± 25
	s/i	i/s	330 ± 95	− 290 ± 42
	i/s	s/s	320 ± 18	970 ± 96
	s/i	s/s	316 ± 5	740 ± 21
N-Vinyl carbazole	s/i	i/s	− 243	288
Vinyl chloroacetate	s/i	i/s	300	419
Vinyl trifluoroacetate	s/i	i/s	340	167

[a]Based on data in Tables 3–5; see also Refs. 40,43.

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Products of Thermal Degradation of Polymers

John Liggat
Department of Pure and Applied Chemistry, University of Strathclyde, Glasgow, Scotland

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A. INTRODUCTION

Polymer degradation is a complex phenomenon, and the nature of the chemistry occurring during thermal decomposition can be difficult to determine precisely. The observed products of degradation can be the result of a mixture of primary, secondary or even tertiary decomposition processes, and as a consequence, the distribution of products will depend on such factors as sample thickness and melt viscosity, in addition to the more obvious factors such as temperature, atmosphere and the chemical structure of the polymer itself. It is often overlooked that abnormal structures (terminal unsaturation, head-to-head structures, peroxide links etc.) can also markedly effect polymer stability and product distribution.

Products are of three types. Firstly, there are the volatile small molecules (typically of the size of monomer or smaller) which are fairly readily separated and characterized. Secondly, there are the larger molecules that represent fragments of the chain. These species are volatile at the degradation temperature but condense outwith the degradation zone. Generally produced as a complex spectrum of oligomers, these fragments are more difficult to separate and characterize in detail, particularly as internal rearrangements of the backbone often occur before and during fragmentation. In many cases, identification is limited to key functionalities but the advent of sophisticated chromatographic and mass spectrometric techniques is leading to increasingly detailed analyses. In particular, the smaller fragments such as dimer and trimer are in principle more readily fully characterized than the larger fragments; nevertheless there often remains some uncertainty, particularly in relation to end groups. The most intractable product is the third type, the residue, which is often (but not always) insoluble, and characterization may again be limited to identification of key functionalities.

Naturally, most of the information in the literature relates to the easily identified low molecular weight species, and the data in this section reflects this. In addition, most thermal degradation studies focus on inert rather than oxidizing environments. Following the lead of the previous author, Norman Grassie, the vast majority of the entries included here are concerned with products of the first two types from purely thermal degradation processes under inert atmospheres.

B. TABLES

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Temperature range (°C)	Degradation products	Refs.
1.1. UNSATURATED POLYMERS			
Poly(acetylene)	650	Methane (0.87 moles relative to benzene = 1), ethylene (0.47), ethane (0.26), propylene (0.27), propane (0.047), 1,3-butadiene (0.19), cyclopentadiene (0.086), cyclopentene (0.063), benzene (1.0), toluene (0.18), *m*-xylene (0.091), *p*-xylene (0.015), styrene (0.041), *o*-xylene (0.013), methylstyrene (0.010), *trans*-β-methylstyrene (0.011), indane (0.0074), indene (0.036), methylindene (0.0072), naphthalene (0.052), 2-methylnaphthalene (0.015), 1-methylnaphthalene (0.018), biphenyl (0.0091), fluorene (1.0), anthracene (0.005)	82
Poly(butadiene)	325–475	14.1% of products are volatile at 25°C including 1.5% of monomer among other saturated and unsaturated hydrocarbons; 85.9% of products are larger fragments involatile at 25°C	16
	20°C/min to 15% weight loss	Effect of *cis*/*trans* ratio; increasing *trans* content gives more cyclopentene and 1,3-cyclohexadiene and less 4-vinyl-1-cyclohexene and 1,3-butadiene	83

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(butadiene-*co*-acrylonitrile) (70/30)	310–400	14.5% of products are volatile at 25°C, consisting of saturated hydrocarbons	10
25–100 mol% butadiene	350–400	Main product is structurally modified chain fragments; ammonia and hydrogen cyanide increasing with acrylonitrile content to approximately 4% each by weight of copolymer containing mole 75% acrylonitrile; traces of hydrogen and hydrocarbons up to C_7	98
Poly(butadiene)-*blend*-poly(styrene) (0–100 wt.%)	Ambient to 500	Volatile products as for individual polymers	84
Poly(butadiene-*co*-sytrene) (75/25)	327–430	11.8% of products are volatile at 25°C; 1.9% butadiene with other saturated and unsaturated hydrocarbons	10,16
Poly(chloroprene)	377	Hydrogen chloride	19
	170–400	HCl (90% of theoretical), ethylene, chloroprene (trace), chloroprene dimers and other modified chain fragments	85
	400–500	HCl (trace), methane, ethylene, propylene (trace)	85
Poly(chloroprene)-*blend* poly(methyl methacrylate)	Ambient to 500	Methyl methacrylate, HCl, CO_2, CO, methyl chloride, methanol.	86
Poly(isoprene), synthetic	287–400	3.4% isoprene, 8.8% dipentene, small amounts of *p*-menthene.	2,16,31
97% *cis*-1,4; 3%, 3,4	384	In helium; methane (0.04 wt.%), ethylene (0.08), ethane (0.03), propylene (0.15), propane (0.06), isobutylene (0.09), butenes (0.07), methyl butene (0.09), isoprene (29), toluene (0.02), 2,3-dimethyl cyclopentene (1.2), octene (0.05), 2,4-dimethyl cyclohexene (0.16), *m*-xylene (0.33), 1-methyl-4-ethyl cyclohexene (0.18), 1,5-dimethyl-5-vinyl cyclohexene (2.5), dipentene (60), $C_{11}H_{18}$ (0.2), $C_{12}H_{18}$ (0.2), $C_{15}H_{24}$ (3.5), $C_{16}H_{26}$ (1.8)	87
natural rubber	287–400	3.9% isoprene, 13.2% dipentene, small amounts of *p*-menthene	2,16,31
	450–800	Dipentene main product at 450°C, optimum yields of isoprene in range 675–800°C, e.g., 58% at 750°C and 13 mbar	32
	500	Monomer, dimers (1,7,7-trimethyl-2,2,1-bicyclohept-2-ene, 2,5,6-trimethyl 1,3,6-heptatriene, dipentene/d,1-limonene), trimers	259
gutta percha	287–400	3.0% Isoprene, 15.6% dipentene, small amounts of *p*-menthene	2,16,31
Poly(isoprene)-*blend*-poly(styrene) (4/1 to 1/4, w/w)	Ambient to 500	Styrene, isoprene, dipentene larger chain fragments of both polymers, traces of ethylene, ethane, and propane	88
chlorinated rubber	Ambient to 500	HCl (almost quantitative), CH_4, C_2H_4, and H_2 are minor products formed in the later stages of reaction	89
chlorinated rubber-*blend*-poly(vinyl chloride)	160–350	HCl	90
Poly(perfluoro-4-chloro-1,6-heptadiene)	320–400	Completely volatilized – products unknown.	49
1.2. POLY(ALKENES)			
Poly(ethylene)	335–450	Continuous spectrum of saturated and unsaturated hydrocarbons from C_2–C_{90}; lower temperature favors larger fragments	13,16
–, low density	Ambient to 500	Continuous spectrum of saturated and unsaturated hydrocarbons C_1–C_{15}; trace of hydrogen	243
	264–289	In air; CO_2, H_2O, ethene, propene, propane, cyclopropane, butene, butane, pentene, pentane, hexene, hexane, heptene, heptane, octene, octane, methanol, ethanol, furan, tetrahydrofuran, formaldehyde, acetaldehyde, propanal, acrolein, butanal, isobutanal, pentanal, acetone, methyl vinyl ketone, methyl ethyl ketone, 2-pentanone, 2-hexanone, 2-heptanone, formic acid, acetic acid, propionic acid, acrylic acid, butyric acid, isovaleric acid, hydroxyvaleric acid, crotonic acid, caproic acid, butyrolactone, valerolactone	91
Poly(ethylene-*co*-carbon monoxide) Alternating copolymer	500	CO, H_2O, ethene, series of ketones with general structure $R–[–CO–CH_2–CH_2–]_n–CO–R'$ where R, $R' = –CH_3$, $–CH_2–CH_3$ or $–CH{=}CH_2$	270
Poly(ethylene-*co*-ethyl acrylate) 18 : 1 mole ratio	Ambient to 500	Broad spectrum of saturated and unsaturated hydrocarbons, ethyl esters and carboxylic acids; ethanol, ethylene, CO_2, CO and small amounts of ketene and ethyl acrylate	243
Poly(ethylene-*co*-vinyl acetate) (12–33 mol% vinyl acetate)	Ambient to 500	Acetic acid, ketene, CO_2, ethylene, saturated and usaturated hydrocarbons, chain fragment fraction containing some vinyl acetate units	92
(38.5% (wt.%) of ester groups)	260–290	Acetic acid > 99%	93
Poly(isobutene)	288–425	18.1% monomer together with methane, isobutane, and C_5 and higher saturated and unsaturated hydrocarbons	16
	Up to 1200	As temperature is increased the yields of fragments smaller than monomer increase at the expense of larger fragments	28

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
	325	At 4.9% weight loss, products are isobutene (64.3%), CH_4 (13.6%), neopentane (10.3%); remainder C_2–C_{12} hydrocarbons	29
	345	At 15.7% weight loss, products are isobutene (78.9%), CH_4 (5.9%), neopentane (4.7%); remainder C_2–C_{12} hydrocarbons	29
	365	At 46.8% weight loss, products are isobutene (81.6%), CH_4 (3.9%), neopentane (3.1%); remainder C_2–C_{12} hydrocarbons	29
	300–320	Two types of *t*-butyl ended and two types of isopropyl ended terminal monoolefins in range 2-mers to 12-mers	249
Poly(isopropenylcyclohexane)	400–900	Methylenecyclohexane and/or methyl-1-cyclohexene, ethylcyclohexane, toluene, isopropenylcyclohexane, isomer of isopropenylcyclohexane, ethyl benzene, isopropylcyclohexadiene, pentadienylcyclohexane (5 isomers), dicyclohexylpropane, 3-cyclohexenyl-1-cyclohexylpentadiene, dicyclohexylhexadiene	94
Poly(isopropenylcyclohexane-*co*-α-methylstyrene) (92/8 and 33/67)	400–900	Methylenecyclohexane and/or methyl-1-cyclohexane, benzene, toluene, isopropenylcyclohexane, ethylbenzene (92/8 only), decalin (92/8 only), cumene (33/67 only), α-methylstyrene, styrene, (33/67 only), pentadienylcyclohexane (92/8 only), indene and methyleneindene (33/67 only), naphthalene, dicyclohexylhexadiene (92/8 only). The following from the 33/67 copolymer only: 2-methylnaphthalene, 1-methylnaphthalene, biphenyl, methylstilbene, α-methylstilbene, anthracene/phenanthrene, dihydropyrene	94
Poly(4-methyl-1-pentene)	291–341	After 22 hours at 341°C, 20% residue, 71% saturated and chain fragments; 9% of products volatile at 25°C, comprising isobutene (56%), propane (34%), traces of monomer, and hydrocarbons	43
Poly(propylene)	328–410	Saturated and hydrocarbons from C_2 upwards, monomer yield 0.17%	13
	400–1200	As temperature is raised, yield of small fragments increases at expense of large fragments	28
	360–400	At 400°C, chain fragments with 7.05 wt.% of volatile products comprising principally, methane 0.057 wt.%, ethane 0.13, propane 0.078, propene 0.83, isobutene 0.16, butane 0.004, 2-methyl-1-butene 0.010, 1-pentene 0.008, pentane 1.62, 2-pentene (*cis* and *trans*) 0.015, 2-methyl pentane 0.074, 2-methyl-1-pentene 1.19, 2,4-dimethylpentane 0.032, 2,4-di-methyl-1-pentene 0.089, 4-methylheptane 0.24, 2,4-dimethyl-1-heptene 2.20, 4,6-dimethylnonane (threo form) 0.042 (erythro form) 0.052, 2,4,6-trimethyl-1-nonene (threo form) 0.055 (erythro form) 0.066	95
	120–280	In air; ethene, ethane, propene, propane, isobutene, butane, isobutane, pentadiene, 2-methyl-1-pentene, 2,4-dimethyl-1-pentene, 5-methyl-1-heptene, dimethylbenzene, methanol, ethanol, 2-methyl-2-propene-1-ol, 2-methyl furan, 2,5-dimethylfuran, formaldehyde, acetaldehyde, acrolein, propanal, methacrolein, 2-methyl propanal, butanal, 2-vinyl crotonaldehyde, 3-methyl pentanal, 3-methyl hexanal, octanal, nonanal, decanal, ethenone, acetone, 3-buten-2-one, 2-butanone, 1-hydroxy-2-propanone, 1-cyclopropylethanone, 3-methyl-2-buten-2-one, 3-penten-2-one, 2-pentanone, 2,3-butanedione	96
	200–356	Under 254 nm radiation; additional methane and ethylene are formed compared with the thermal reaction	97
Poly(propylene)-*blend*-poly(methyl methacrylate)	Ambient to 500	Poly(methyl methacrylate) stabilized by blending with polypropylene; pre-irradiation with 2537 Å radiation at ambient temperature reduces amount of methyl methacrylate formed on subsequent thermal degradation; missing methyl methacrylate units appear in a chain fragment fraction	99
Poly(vinylcyclohexane)	335–391	Small amounts of cyclohexane, cyclohexane, methylcyclohexene, methyl cyclohexane, vinylcyclohexene, vinylcyclohexane, ethylcyclohexane with larger chain fragments	2,3
	360–380	Cyclohexane (main product), cyclohexene, vinylcyclohexane, vinylcyclo hexane oligomers, methane, ethane, ethylene, propane, propylene, butane, butylene, hydrogen	100
Poly(chlorotrifluoro-ethylene)	Ambient to 500	Monomer, traces of dichlorodifluoroethene, chloropentafluoropropene, trichlorotrifluoroethane	261

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
1.3. POLY(ACRYLICS), POLY(METHACRYLICS)			
Poly(acrylic acid)	Ambient to 500	CO, CO_2, H_2O, CH_4, acetone, ketene, ethene, propylene, 1-butene, methyl vinyl ketone, benzene, acrylic acid, toluene, xylene, short chain fragments such as dimer to octamer with unsaturated and anhydride functionalities	297
–, methyl ester	292–399	26% of products are volatile at 25°C, mainly methyl alcohol and carbon dioxide with traces of monomer and methyl methacrylate and C_4–C_6 oxygenated compounds (74% of products are large chain fragments involatile at 25°C)	2,3
	Up to 980	Methanol (1.9%), methyl formate (trace), methyl acetate (1.4%), methyl acrylate (19.0%), methyl methacrylate (1.9%), saturated ester (2.1%), dimethyl glutarate (7.5%), methyl 4-methoxycarbonyl-pent-4-enoate (11.6%), trimethyl pentane 1,3,5-tricarboxylate (0.6%) methyl 4,6-di-methoxycarbonylhept-6-enoate (53%), saturated and tetramers (1.0%)	101
	50	Irradiated with high-pressure mercury lamp; methanol, formaldehyde, methyl acetate, methyl formate, CO_2, CO, H_2, CH_4	102
–, ethyl ester	300–500	Major products, carbon dioxide, ethylene, ethanol, and chain fragments; minor products, ethane, ethyl acrylate, and ethyl methacrylate	103
	50	Irradiated with high-pressure mercury lamp; CO, CO_2, ethanol, acetaldehyde, ethane, ethyl formate, acetal, ethyl propionate	104
	Ambient to 500	Ethylene, carbon dioxide, trace of ketene, ethanol (major product), various ethyl esters (see Ref.)	243
–, *n*-propyl ester	300–500	Major products carbon dioxide, propene, propanol, and chain fragments; minor products, propane, carbon monoxide, hydrogen, *n*-propyl acrylate, and *n*-propyl methacrylate	103
–, isopropyl ester	250–500	Major products carbon dioxide, propene; minor products isopropanol with trace carbon monoxide	105
–, *n*-butyl ester	300–500	Major products carbon dioxide, 1-butene, butanol, and chain fragments; minor products, butane, *n*-butyl acrylate, and *n*-butyl methacrylate	103
	50	Irradiated with high-pressure mercury lamp. CO, CO_2 *n*-butanol, butyraldehyde, *n*-butene, *n*-butyl formate, *n*-butyl valerate (after prolonged exposure)	104
–, *tert*-butyl ester	>160	86% isobutylene, 11% water, 3% carbon dioxide	4
–, 2-ethyl hexyl ester	300–500	Carbon dioxide, 2-ethyl-1-hexene, 2-ethyl-1-hexanol	103
–, benzyl ester	260–300	Major products are benzyl alcohol, chain fragments, partially crosslinked residue; minor products are CO_2, toluene, CO, CH_4, H_2	1
	–	CO_2, benzyl alcohol, and low polymers	106
–, 1,1,5-trihydroperfluoroamyl ester	300–315	Oligomers, 1,1,5-trihydroperfluoroamyl alcohol, monomer, 1,1,5-trihydroperfluoroamyl methacrylate	107
–, 2,2,2-trichloroethyl ester	319	2,2,2-Trichloroethanol (80%), monomer (9%), 1,1-dichloroethene, 2-chloroethanal, 2,2-dichloroethanal, 1,1-dichloropropane, 1,1,1-trichloroethane, 2,2,2-trichloroethylethanoate, 2,2,2-trichloroethyl chloromethanoate, 2,2,2-trichloroethylpropanoate, 2,2,2-trichloroethylmethacrylate, 2,2,2-trichloroethyl chloroethanoate, 2,2,2-trichloroethyl-2-chloroacrylate	263
–, α-bromo-, methyl ester	110–150	Methylbromide, hydrogen bromide	5
	600	CO_2, propene, methyl bromide, vinyl bromide	305
–, α-chloro-, methyl ester	600	CO_2, propene, methyl chloride, monomer	306
–, α-chloro-, *sec*-butyl ester	190	*sec*-Butyl chloride, butylene, hydrogen chloride	7
–, α-cyano-, methyl ester	>180	Yellows and some monomer formed	6
–, α-phenyl-, methyl ester	210–280	Monomer is the sole product	8
Poly(acrylic acid, magnesium salt)	Ambient to 500	CO, CH_4, CO_2, acetone, ketene, ethene, propene, 1-butene, benzene, toluene, xylene, cyclopentene, methyl ethyl ketone, diethyl ketone, methyl-*n*-propyl ketone, di-*n*-propyl ketone, methyl vinyl ketone, methyl isopropenyl ketone, methyl isopropyl ketone, ethyl vinyl ketone, trace amounts of methyl-*n*-butyl ketone, cyclopentanone, cyclohexanone, acrolein, ethanal and butanal, chain fragments, some monomer	312
Poly(acrylic acid, calcium salt)	Ambient to 500	CO, CH_4, CO_2, acetone, ketene, ethene, propene, 1-butene, benzene, toluene, mesitylene, xylene, methyl ethyl ketone, diethyl ketone, methyl-*n*-propyl ketone, methyl-*n*-butyl ketone, ethyl vinyl ketone, methyl propenyl ketone (trace), ethyl propyl ketone (trace), 3-methyl-cyclopentanone, cyclohexanone (trace), cyclohexa-2-enone,	312

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
		2-methyl-cyclohexanone, 1-methyl-cyclohexa-1-ene-3-one (trace), acrolein, mesityl oxide, ethanal, propanal, butanal, chain fragments, some monomer	
Poly(acrylic acid, sodium salt)	Ambient to 500	CO, CH_4, CO_2, ketene, 1-butene, propene, acetone, methyl ethyl ketone, methyl isopropyl ketone, methyl-*n*-propyl ketone, diethyl ketone, methyl propenyl ketone, 3-hexanone, toluene, 2-hexanone, 1,3-cyclopentadiene, cyclopentanone, 2-methyl cyclopentanone, mesityl oxide, xylenes, benzene, propionaldehyde, acrolein, acetaldehyde, ethene, short chain fragments, traces of monomer	303
Poly(acrylic acid, potassium salt)	Ambient to 500	CO, CH_4, CO_2, ketene, 1-butene, propene, acetone, methyl ethyl ketone, methyl *n*-propyl ketone, 1,4-cyclohexadiene, toluene, 1-methyl-1,3-cyclohexadiene, 2-hexanone, cyclopentene, 1-methyl cyclopentene, mesityl oxide, xylenes, benzene, ethene, cyclopentanone, 1,3-cyclopentadiene, diethyl ketone, short chain fragments, traces of monomer	303
Poly(methyl acrylate-*co*-methyl methacrylate) (mole ratios 112/1–2/1)	Ambient to 500	Monomers, CO_2, chain fragments larger than monomer, H_2; more stable than poly(methyl methacrylate); rapid decrease in molecular weight; products of phtodegradation at 170° by 254 nm radiation are qualitatively similar	108,109
Poly(methyl acrylate-*co*-acryloyl chloride) 6, 15, 41, 83 mol% AC	Ambient to 500	Acrylic acid, HCl, H_2O, CO, CO_2, acryloyl chloride, methyl acrylate, methyl acrylate chain fragments, anhydride and γ-lactone structures, chloro-methane, methyl methacrylate, methanol, 3,5-(6-chloro-2-pyrone) and fragments thereof, C_6, C_9, C_{12}, C_{15} fragments. Relative yields depend upon copolymer composition	262
Poly(methyl acrylate-*co*-2-bromoethyl methyacrylate) (10–82 mol% methyl acrylate)	Ambient to 500	CO_2, ketene, methyl bromide, acetaldehyde, methyl acrylate, methanol, 1,2-dibromoethane, methyl methacrylate, 2-bromoethanol, ethyl methacrylate, CH_4, CO, H_2 modified chain fragments	110
Poly(methyl acrylate)-*blend*-poly((2-bromoethyl methacrylate) (50/50, w/w)	Ambient to 500	CO_2, ketene (minor), methyl bromide, vinyl bromide (minor), acetaldehyde, methanol, methyl methacrylate, methyl acrylate, 1,2-dibromoethane, 2-bromoethyl methacrylate	111
Poly(*n*-butyl acrylate-*co*-methyl methacrylate) (3.9–93.4 mol% butyl acrylate)	313–332	1-Butene, carbon dioxide, butanol methyl methacrylate, butyl acrylate, and butyl methacrylate; small quantities of methane, ethane, propane, butane, ethylene, propene, *cis*, and *trans* 2-butene, hydrogen, and carbon monoxide increase with butyl acrylate content of the copolymer	112
	165	Under 2537 Å radiation; methyl methacrylate with smaller quantities of *n*-butyl acrylate, *n*-butanol, *n*-butyraldehyde, hydrogen, carbon monoxide, and methane; a chain fragment fraction increases with *n*-butyl acrylate content	113
Poly(*tert*-butyl acrylate-*co*-glycidyl methacrylate) (34/66)	0–700	CO, CO_2, propene, ethanal, isobutene, acrolein, allyl alcohol	114
Poly(methyl-α-chloroacrylate-*co*-2,2,2-trifluoroethyl methacrylate) (70/30)	Ambient	Gamma Radiolysis; CH_4, CO, ethylene, ethane, CH_3OH, CHF_3, HCl, C_3H_6, CO_2, C_2H_3F, CH_3Cl, methyl formate, CH_3CH_2Cl, CHF_3, CH_3CF_3, $CH_2{=}C(CH_3)COOCH_2CF_3$	115
Poly(methyl-α-chloroacrylate-*co*-2,2,2-trifluoroethyl methacrylate) (70/30)	Ambient	Gamma Radiolysis; CH_4, CO, ethylene, ethane, CH_3OH, HCl, C_3H_6, CO_2, CH_3Cl, methyl formate, CH_3CH_2Cl, CH_2Cl_2, $CHCl_3$	115
Poly(acrylonitrile)	<200	Colours through yellow, orange, red, and black	9
	250–280	12% of products are volatile at 25°C, consisting of hydrogen cyanide, acrylonitrile, and vinyl acetonitrile; 88% of products are involatile at room temperature	10,11
	280–450	Five major volatile products are cyanogen, HCN, acrylonitrile, acetonitrile, vinyl acetonitrile; involatile residue remains	12
	250–350	NH_3, HCN	116
	235	HCN, hydrogenated acrylonitrile, dimer and trimer, acetonitrile, methacrylonitrile	117
–, α-chloro	150–200	Hydrogen chloride	118
	Ambient to 500	Hydrogen chloride and small amount of HCN at higher temperatures	119
–, α-phenyl	Ambient to 500	High yields of monomer	119
Poly(acrylonitrile-*co*-2-bromoethyl methacrylate	Below 310	Ethylene, CO_2, vinyl bromide acetaldehyde, 1,2-dibromoethane	120
(50/50, mol/mol)	310–500	Propane, isobutene, CO_2, HCN, isocyanic acid, yellow-chain fragment fraction	121
Poly(acrylonitrile-*co*-methyl methacrylate)(1/410–1/8)	220–280	Only methyl methacrylate from 410/1 and 40/1 (molar ratio) copolymers; methyl methacrylate and small amounts of acrylonitrile from 16/1 and 8/1 copolymers; rapid decrease in the molecular weight of all copolymers	121

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TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
	160	Photodegradation by 254 nm radiation gives methyl methacrylate from 410/1 to 8/1 copolymers with a 8/1 copolymer; rapid decrease in the molecular weight of all copolymers	121
Poly(acrylonitrile-*co*-methyl vinyl ketone)	–	Production of water from poly(methyl vinyl ketone) accelerated by copolymerization with acrylonitrile	122
Poly(acrylonitrile-*co*-styrene) (0/100–50/50, mol/mol)	292	Acrylonitrile causes increase in rate of chain scission; proportion of acrylonitrile among degradation products greater than from pure polyacrylonitrile; chain fragments increase with acrylonitrile content of copolymer; styrene, acrylonitrile, toluene, benzene, four dimers, and four trimers	123
(1.86–96.62 mol% acrylonitrile)	500	Hydrocyanic acid, acetonitrile, acrylonitrile, propionitrile, toluene, ethyl benzene, styrene, methane, ethylene, ethane, C_3 hydrocarbons, but-1-ene, prop-1-ene-3-nitrile, isopropylnitrile, benzene	124
Poly(acrylonitrile-*co*-vinyl acetate) (7.5 wt.% vinyl acetate)	260	HCN, hydrogenated acrylonitrile, dimer and trimer, acetonitrile, methacrylonitrile, acetic acid	117
Poly(acrylonitrile-*co*-methyl acrylate-*co*-vinyl bromide) (methyl acrylate, 10 wt.%; vinyl bromide, 5 wt.%)	180–320	CH_3Br, HBr, H_2O, CO_2, CH_3OH, NH_3, HCN, hydrogenated acrylonitrile, dimer and trimer, acetonitrile, methacrylonitrile, naphthyridine fragments	117
Poly(α-chloroacrylonitrile-*co*-methyl methacrylate)	> 150	Hydrogen chloride, methyl methacrylate, α-chloroacrylonitrile	125
(0–50 mol% α-chloroacrylonitrile)	Ambient	Under 254 nm radiation. HCl, CO_2, methyl chloride, methyl formate, methanol, methyl methacrylate, CO, CH_4, H_2	126
Poly(acrylonitrile)-*blend*-poly(methyl methacrylate) (50/50, w/w)	Up to 320	NH_3, HCN, MMA	127
	320–500	Chain-fragment fraction and small amounts of CO, CO_2, methanol, CH_4	
Poly(acryloyl chloride)	Ambient to 500	Acrylic acid, HCl, H_2O, CO, acryloyl chloride, 3,5-(6-chloro-2-pyrone) and fragments thereof, C_6, C_9, C_{12}, C_{15} fragments	262
Poly(methacrylic acid)	200	Almost quantitative yields of H_2O, traces of monomer, residue of poly(methacrylic anhydride)	33
	900	CO_2, propene, butenes, pentenes, pentadienes, hexene, hexadienes, hexatrienes, benzene, toluene, heptene, heptatriene, methacrylic acid, xylene, octatriene, octadienyne, nonatriene, hexadienoic acid, decatriene, decatetraene, decapentaene, undecatriene, methylbenzoic acids, trimethylbenzoic acid	128
–, methyl ester	170–300	100% monomer	34, 35
	246–400	As temperature is raised fragmentation increases to give complex series of products and monomer yields correspondingly decreases	2
	160	100% monomer under 253.7 nm radiation	36
	100–400	Under 254 nm radiation; 100% monomer	129
–, ethyl ester	250	Monomer	37
	245	Monomer, ethanol, ethanoic acid	300
–, *n*-propyl ester	250	Monomer	37
–, *iso*-propyl ester	250	Monomer	37
–, *n*-butyl ester	250	40% monomer and traces of 1-butene	38
	170	100% monomer under 253.7 nm radiation	38
–, *iso*-butyl ester	250	Monomer	37
–, *sec*-butyl ester	250	Monomer and small amount of olefin by cracking of side chain	37
–, *tert*-butyl ester	180–200	High yields of isobutylene and water, 1% monomer, trace of methacrylic acid, residue of poly(methacrylic anhydride)	39
	< 180	100% monomer under 253.7 nm radiation	
–, *n*-amyl ester	250	Monomer	37
–, *iso*-amyl ester	250	Monomer	37
–, 1,2-dimethylpropyl ester	250	Monomer and small amount of olefin by side chain cracking	37
–, neopentyl ester	250	Monomer	37
–, 3,3-dimethylbutyl ester	250	Monomer	37
–, 1,3-dimethylbutyl ester	250	Monomer and small amount of olefin by side chain cracking	37
–, 2-bromoethyl ester	Ambient to 500	2-Bromoethyl methacrylate (> 95%), CO_2 (< 1%), vinyl bromide (< 1%)	130
–, 2-sulfoethyl ester	50–600	CO, CO_2, H_2O, SO_2, ethene	290
	600	CO, CO_2, propene, acetaldehyde, methyl bromide, butene, vinyl bromide, ethyl bromide, methyl methacrylate	305
–, 2-chloroethyl ester	600	CO_2, propene, acetaldehyde, vinyl chloride, ethyl chloride, monomer	306
	268	Monomer (99%), traces of acetaldehyde, methyl methacrylate, 1,2-dichloroethane, ethylene methacrylate	268

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(methacrylic acid), 2-fluoroethyl ester	600	CO_2, vinyl fluoride, acetaldehyde, fluoroacetaldehyde	310
–, 2,2-dichloroethyl ester	242	Monomer (90.7%), chloroacetaldehyde (8%), 1,1,2-trichloroethane (0.5%), 2,2-dichloroethanol, methacrylic acid (0.1%), 2-chloroethylene methacrylate (0.1%)	268
–, 2-methoxyethyl ester	Ambient to 300	Monomer, CO_2	309
	Ambient to 500	Monomer, CO_2, CO, CH_4, ethene, formaldehyde, isobutene, methyl vinyl ether, methanol	309
–, 2,3-dibromopropyl ester	600	CO_2, propene, acetaldehyde, methyl bromide, butene, ethyl bromide, bromocyclopropane or 2-bromopropane	305
–, 2-hydroxyethyl ester	375–500	2-Hydroxyethyl methacrylate (20% at 500°C), ethylene dimethacrylate (6%at 500°C)(main products), ethylene glycol, 3-methyl-5-hydroxy-δ-valerolactone (probably), 1,2-di-iospropenyl-oxyethane (probably), CO, CO_2, methane, ethylene, ethane, propane, H_2O	131
–, 2,2,2-trifluoroethyl ester	Ambient	Gamma radiolysis; CH_4, CO, ethylene, ethane, CH_3OH, CH_3F, C_3H_6, CO_2, C_2H_3F, methyl formate, CH_3CHFOH, CHF_3, CF_3CH_3, CF_3OH, $CH_2{=}C(CH_3){-}COOCH_2CF_3$	115
	600	CO_2, vinylidene fluoride, trifluoroacetaldehyde, trifluorethanol, monomer	310
–, 2,2,2-trichloroethyl ester	600	CO_2, propene, vinyl chloride, vinylidene chloride	306
	240	1,1-Dichloroethene, chloroform, methyl methacrylate, methacrylic acid, 2,2,2-trichloroethanol, 2,2,2-trichloroethyl acrylate, 2,2,2-trichloroethyl methacrylate, 2,2-dichloroethyl methacrylate, $CH_2{=}C(CH_3){-}COOCH{=}CCl_2$ or $CH_2{=}C(CH_3){-}COOCCl{=}CHCl$	300
–, hexafluoroisopropyl ester	600	CO_2, trifluoracetaldehyde, acetaldehyde, 1,1,1,3,3,3-hexafluoropropane, hexafluoro-isopropylformate	310
–, bisphenol S ester	464	CO_2, SO_2, phenol, bisphenol S, hydroquinone, fragments of backbone, benzene sulfonic acid	248
–, allyl ester	Ambient to 500	CO_2, CH_4, CO, H_2, propene, isobutene, dimethyl ketene, acrolein, diallyl ether, allyl methacrylate monomer and dimer, chain fragments including anhydride structures from side-group cyclization and an aliphatic ketone in the vicinity of unsaturation	283
–, phenyl ester	Ambient to 500	Monomer, some CO_2	314
–, glycidyl ester	Ambient to 500	CO, CO_2, dimethyl ketene, isobutene, propene, acrolein, allyl alcohol, glycidyl methacrylate, glycidol, short chain fragments with some unsaturation	302
–, ammonium salt	Ambient to 500	Isocyanic acid, NH_3, HCN, isobutene, CO_2 (trace), methacrylonitrile (trace)	132
–, Li, Na, K, and Co salts	Ambient to 500	Ethylene, butene-1, isobutene, acetylene, CO_2, CH_4, CO, acetone, isopropylaldehyde, methacrolein, butyraldehyde, methyl ethyl ketone, benzene (trace), methyl isopropyl ketones, methyl isopropenyl ketone, diethyl ketone, methyl *n*-propenyl ketone, cyclopentanone, methyl cyclopentanone, dimethyl cyclopentanone, dimethyl cyclopentenone and traces of toluene, di-isopropyl ketone, mesitylene, mesityl oxide	133
–, Mg, Ca, Sr, and Ba salts	Ambient to 500	CO_2, dimethyl ketene trace amounts of CO, CH_4, isobutene, butene-1, ethylene, acetylene, benzene toluene isobutyraldehyde, methyl ethyl ketone, methyl isopropenyl ketone, diethyl ketone, methyl isopropenyl ketone, di-isopropyl ketone, cyclopentanone, 2-methyl cyclopentanone, 2,5-dimethyl-cyclopentanone, 2,5-dimethylcyclopent-3-ene-1-one, methacrolein, butyraldehyde	134
Poly[α-ω-(diethylene glycol phthalate)dimethacrylate]	300	Monomer	194
	400	Monomer, phthalic anhydride, diethylene glycol, C_2H_4, propylene, CO_2	194
Poly(methyl methacrylate-*co*-alkali (metal methacrylates) (Li, Na, K) (0–100 mol%)	Ambient to 500	CO_2, alkenes, CH_4, CO, propanal methanol (major), acetone, 2-methyl propanal, methacrolein, butanal, methyl ethyl ketone, methyl isopropyl ketone, methyl isopropenyl ketone, methyl methacrylate (major), methyl prop-2-enyl ketone, toluene, di-isopropyl ketone, cyclopentanone, 2-methyl cyclopentanone, 2,5-dimethyl cyclopentanone, 2,5-di-methyl cyclopent-3-enone. Relative yields depend upon salt and copolymer composition	135
Poly(methyl methacrylate-*co*-2-bromoethyl methacrylate) (50/50, mol/mol)	Ambient to 500	Methyl methacrylate, 2-bromoethyl methacrylate, traces of vinyl bromide and CO_2	130
Poly(methyl methacrylate-*co*-methacrylamide)	Up to 340	> 35 mol% methacrylamide. MMA, methanol, NH_3, H_2O	146

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
	>340	Methacrylamide; chain fragments and small amounts of CH_4, CO_2, CO, HCN, methacrylonitrile and isobutene	146
	–	<10 mol% methacrylamide. Degradation becomes progressively more like that of PMMA	146
Poly(methyl methacrylate-*co*-methacrylic acid)	<300	Water and methanol	136
	>300	Methyl methacrylate, CO_2, CO, CH_4	
	900	(50/50 and 75/25); CO_2, propene, butenes, pentenes, pentadienes, hexene, hexadienes, hexatrienes, benzene, methyl isobutyrate, methyl methacrylate, toluene, heptene, heptatriene, methyl pentenoate, methacrylic acid, xylene, octatriene, octadienyne, nonatriene, hexadienoic acid, decatriene, decatetraene, decapentaene, undecatriene, methylbenzoic acids	128
Poly(methyl methacrylate-*co*-2-chloroethylmethacrylate) 22 mol% CEMA	600	CO_2, propene, acetaldehyde, vinyl chloride, ethyl chloride, methyl methacrylate	306
Poly(methyl methacrylate-*co*-2,2,2-trichloroethyl methacrylate) 24 mol% TCEMA	600	CO_2, propene, vinyl chloride, vinylidene chloride, dichloroacetaldehyde, methyl methacrylate	306
Poly(methyl methacrylate-*co*-methyl-α-chloroacrylate) 38 mol% MCA	600	CO_2, propene, methyl chloride, methyl methacrylate	306
Poly(methyl methacrylate-*co*-2-bromoethyl methacrylate) 22 mol% BEMA	600	CO_2, propene, acetaldehyde, methyl bromide, butene, vinyl bromide, methyl methacrylate	305
Poly(methyl methacrylate-*co*-2,3-dibromopropyl methacrylate) 16 mol% DBPMA	600	CO, CO_2, ethene, propene, methyl bromide, butene, vinyl bromide, ethyl bromide, 1-bromopropene, 2-bromopropene, cyclopropyl bromide, methyl methacrylate	305
Poly(methyl methacrylate-*co*-methyl-α-bromoacrylate) 22 mol% MBA	600	CO_2, acetaldehyde, methyl bromide, butene, vinyl bromide, unidentified alkenyl bromides, methyl methacrylate	305
Poly(methyl methacrylate-*co*-chlorotrifluoroethylene) 7.7 mol% MMA	Ambient to 500	HCl, CO_2, CH_3Cl, C_2F_3Cl (monomer), C_3F_5Cl, $C_2F_3Cl_3$, methyl methacrylate, chain fragments possibly with some lactonization	281
77.7 and 85.7 mol% MMA	Ambient to 500	HCl, CO_2, CH_3Cl, C_2F_3Cl (monomer), methyl methacrylate	281
Poly(methyl methacrylate-*co*-2-sulfoethyl methacrylate) 20, 40, 60 mol% MMA	50–600	CO, CO_2, H_2O, SO_2, ethene, methanol, methyl methacrylate (only 60 and 80 mol% methyl methacrylate copolymers)	290
Poly(methyl methacrylate-*co*-4-vinylpyridine) 22, 35, 46, 56 mol% 4-vinyl pyridine	Ambient to 500	4-vinyl pyridine, methyl methacrylate, traces of pyridine and 4-methyl pyridine	260
Poly(methyl methacrylate-*co*-phenyl methacrylate) 9, 18, 47, 88 mol% PMA	Ambient to 500	CO_2, isobutene, ketene, formaldehyde, methanol, methyl methacrylate, phenyl methacrylate, chain fragments including six-membered anhydride ring structures. Product distribution varies with copolymer composition with non-monomer products most pronounced at low PMA contents	314
Poly(methyl methacrylate-*co*-glycidyl methacrylate)	Ambient to 500	CH_4, CO, CO_2, propene, isobutene, dimethyl ketene, acrolein, allyl alcohol, glycidol, glycidyl methyl ether, methyl methacrylate, glycidyl methacrylate, chain fragments. Distribution varies with copolymer composition	286
Poly(methyl methacrylate -*block*-*t*-butylaziridine) ABA type copolymer with MW 12000 butylaziridine (B) and MW 16000 MMA (A)	Ambient to 600	CO, CH_4, CO_2, ethene, propene, isobutene, aziridine, methanol, methyl methacrylate, α-methylstyrene, 2-phenyl-2-butene, 1-*t*-butylamino-2-isopropenylamino-ethane, 2-*t*-butylaminoethyl-ethyl-isopropenylamine, 2-aminoethyl-2-*t*-butylaminoethyl-isopropenylamine, oligomers – principally butylaziridine based	287
Poly(methyl methacrylate-*co*-styrene)	260–340	Methyl methacrylate, styrene and oligomers of styrene; formation of oligomers of styrene strongly inhibited by presence of methyl methacrylate units	137
Poly (methyl methacrylate-*co*-vinyl acetate) (5–40 mol% vinyl acetate)	Ambient to 500	Acetic acid, methyl methacrylate, methyl acetate, chain fragment fraction, ketene, CO_2	92

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(methyl methacrylate-*co*-vinyl bromide) (6–75 mol% vinyl bromide)	Ambient to 500	Methyl methacrylate, methyl bromide, methanol, CO_2, methanol, HBr, CO, H_2 and other unidentified minor products. Relative amounts depend upon copolymer composition	138
Poly(2-bromoethyl methacrylate-*co*-styrene) (50/50, mol/mol)	Ambient to 500	Styrene, 2-bromoethyl methacrylate, modified chain fragement fraction. Minor products; ethylene, CO_2, HBr, vinyl bromide, acetaldehyde	139
Poly(methyl methacrylate)-*blend*-ammonium polyphosphate	Ambient to 450	H_2O and NH_3 from ammonium polyphosphate. Methyl methacrylate (major product), CO, CO_2, methanol, dimethyl ether, hydrocarbons, high boiling chain fragments	140
Poly(methyl methacrylate)-*blend*-poly(styrene)	Ambient to 500	Polymers degrade separately without interaction to give same products as polymers degraded separately; copolymers and mixtures of the same molar compositions can be distinguished by degradation behavior	141
Poly(methyl methacrylate)-*blend*-poly(vinyl acetate) (10/1–1/1, w/w)	Ambient to 500	Methyl methacrylate, acetic acid, methyl acetate, methanol, CO_2, butene, benzene, ketene	142
Poly(methyl methacrylate)-*blend*-poly(vinyl bromide) (50/50, mol/mol)	Ambient to 500	Methyl methacrylate, HBr, CO, CO_2 and other unidentified products	143
Poly(methyl methacrylate)-*blend*-poly(vinyl chloride)	Ambient to 500	Major products: HCl, methyl methacrylate; minor products: CO_2, methyl chloride, benzene	144,145
Poly(methacrylamide)	Up to 340	NH_3 and H_2O	146
	Above 340	Chain fragments (50%) in which a high proportion of amide groups have been converted to cyclic imides; small amounts of CO_2, CH_4, HCN	146
	Ambient to 500	NH_3, HCN, isobutene, CO_2(trace), methacrylonitrile (trace)	132
Poly(methacrylonitrile)	<200	Non-volatile material, coloration through yellow, orange, and red	40
	220–270	50–100% monomer depending upon pretreatment and purity of polymer	40
	Ambient to 500	Ethene, propene, isobutene, HCN, CO_2(from benzoyl peroxide end groups), methacrylonitrile (major product), 2-cyanobutane, 2-cyanopentene, CH_4	277
Poly(methacrylonitrile-*co*-styrene) 10 : 1 mole ratio	Ambient to 500	Ethene, isobutene, HCN, methacrylonitrile, styrene, toluene, α-methylstyrene, β-methylstyrene, 2-phenylbutene, 4-cyano-2,4-dimethylpentene, 4-phenyl-2-methylbutene, 3-phenyl-2-propenenitrile, chain fragments	279
Poly(methacrylonitrile-*co*-styrene) 1 : 1 mole ratio	Ambient to 500	Ethene, isobutene, HCN, methacrylonitrile, styrene, toluene, α-methylstyrene, 4-phenylbutene, 4-phenyl-2-methylbutene, 3-phenyl-2-propenenitrile, chain fragments	279
Poly(methacrylonitrile-*co*-styrene) 1 : 10 mole ratio	Ambient to 500	Ethene, isobutene, HCN, methacrylonitrile, styrene, toluene, α-methylstyrene, β-methylstyrene, 4-phenylbutene, allylbenzene, 4-phenyl-2-methylbutene, 3-phenyl-2-propenenitrile, chain fragments	279
1.4. POLY(VINYLS)			
Poly(tert-butyl-*N*-vinyl carbamate)	185–220	Equal amounts of CO_2 and isobutylene, in yields ranging from 43 to 60%	196
Poly(chlorotrifluoroethylene) (KEL-F)	347–418	25% of products volatile at 25°C–monomer with traces of C_3F_5Cl and $C_3F_4Cl_2$; 72.1% of larger chain fragments involatile at 25°C	14
Poly(1,1-dichloro-2,2-difluoroethylene)	240	20% black involatile residue; 80% monomer	22
Poly(perfluoroheptene)	210–270	100% monomer	49
Poly(perfluoropropylene)	280–400	100% monomer	49
Poly(tetrafluoroethylene)	504–538	>95% monomer, 2–3% C_3F_6, no larger fragments (in vacuum)	14
	1200	Monomer yield drops, larger fragments appear (in vacuum)	23
	600–700	At 6.66 mbar pressure; pure monomer; at 1013 mbar pressure, 15.9% monomer, 25.7% C_3F_6, 58.4% C_4F_8	24
Poly(trifluoroethylene)	380–800	High yields of HF and products involatile at 25°C	23
Poly(vinyl acetate)	213–235	Quantitative yields of acetic acid	71
	300	Small amounts of aromatics including benzene	71
	280–350	Acetic acid, benzene, naphthalene, toluene, styrene, ethyl benzene, propenyl benzene, propylbenzene, methylnaphthalene, ethylnaphthalene, propenylnaphthalene, propylnaphthalene, anthracene, methylanthracene, ethylanthracene, propylanthracene	147
Poly(vinyl acetate) in presence of zinc bromide	Ambient to 500	Acetic acid produced as low as 100°C	148
Poly(vinyl acetate-*co*-maleic anhydride) alternating copolymer	Ambient to 500	Acetic acid, CO_2, H_2O, maleic anhydride, CO	240
Poly(vinyl acetate-*co*-crotonic acid) alternating copolymer	Ambient to 500	Ethene, propene, acetic acid, CO_2, propanoic acid, 2-methylpropanoic acid, butanoic acid, cyclopentanone, some unsaturated cyclic and acyclic aliphatic ketones, some chain fragments containing lactones	241

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TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(vinyl acetate-*co*-methylvinylidene cyanide) Alternating with 10-15 mol% VA homosequence	285–350	Vinyl acetate, acetonitrile, HCN, acetic acid, acetamide, 2-methyl-1-aminonaphthalene, 3-cyano-3-pentene	266
Poly(vinyl acetate-*co*-styrene) (5–20 mol% vinyl acetate)	Ambient to 500	Acetic acid, styrene, chain fragment fraction, ketene, CO_2	92
Poly(vinyl acetate-*co*-vinyl alcohol) (50–99 mol% vinyl alcohol)	0–600	Acetaldehyde, acetone, benzene, crotonaldehyde, acetic acid	154
Poly(vinyl acetate-*co*-vinyl chloride)	Ambient to 500	Bulk polymer; hydrogen chloride and acetic acid in the proportions of the monomers in the copolymer; at each end of the composition range, incorporation of the comonomer results in a copolymer less stable than the homopolymer; minimum stability at 40–50 mol% vinyl acetate	155
	180	In tritolyl phosphate solution; similar to bulk polymer with minimum in stability at 30–40 mol% vinyl acetate	156
Poly(vinyl acetate-*co*-vinyl fluoride) (91 : 9 to 1 : 89)	200–500	Hydrogen fluoride, acetic acid, hydrocarbons	150
(80 : 20 to 23 : 77)	200–500	Hydrogen fluoride, HCl, hydrocarbons	150
Poly(vinyl acetate)-*blend*-poly(styrene) (1/1, w/w)	Ambient to 500	Products as for individual polymers	158
Poly(vinyl acetate-*blend*-poly(vinyl chloride)	Ambient to 500	Acetic acid, HCl, and traces of CO_2, ketene, acetyl chloride, CO and CH_4	157
Poly(vinyl alcohol)	250	Quantitative yields of H_2O	72
	240	Main products H_2O and C_2H_5OH, with aldehydes CH_3—$(CH{=}CH)_n$—CHO and ketones CH_3—$(CH{=}CH)_n$—$COCH_3$ where $n = 0,1,2$, etc.	73
Poly(vinyl bromide)		HBr, ethylene, benzene, and other unidentified minor products	143
Poly(vinyl butyrate)	300–325	Butyric acid	74
Poly(*N*-vinylcarbazole)	230–410	Below 350°, monomer; above 350°, monomer and low-molecular weight oligomers	175
	300–500	Monomer (49% of total volatiles at 300°C, 39% at 500°C) ethane, ethene, propene, *n*-butane, isobutene, *cis* and *trans* but-2-ene, 1,3-butadiene, 2-methylbutadiene, trace amounts of C_5 and C_6 hydrocarbons	244
Poly(3,6-dichloro *N*-vinylcarbazole)	300–500	Monomer (83% of total volatiles at 300°C, 67% at 500°C), ethane, ethene, propene, *n*-butane, isobutene, *cis* and *trans* but-2-ene, 1,3- butadiene, 2-methylbutadiene, trace amounts of C_5 and C_6 hydrocarbons	244
Poly(3,6-dibromo *N*-vinylcarbazole)	350–500	Monomer (48% of total volatiles at 350°C, 40% at 500°C), ethane, ethene, propene, *n*-butane, isobutene, *cis* and *trans* but-2-ene, 1,3-butadiene, 2-methylbutadiene, trace amounts of C_5 and C_6 hydrocarbons	244
Poly(vinyl chloride)	200–300	Quantitative yields of HCl	75
	400	Saturated and unsaturated, aliphatic and aromatic hydrocarbons are produced with benzene and toluene in high yield	75
	600	In helium; quantitative yield of HCl, remainder residue and hydrocarbons; benzene is major volatile hydrocarbons product	76
	200–800	Aliphatic hydrocarbons, benzene (major product), toluene, ethylbenzene, *o*-xylene, monochlorobenzene, styrene, vinyl toluene, *p*-dichlorobenzene, *o*-dichlorobenzene, indene, 1,3,5-trichlorobenzene, 1,2,4-trichlorobenzene, naphthalene, α-methylnaphthalene, β-methylnaphthalene; effect of ZnO, SnO_2, and Al_2O_3 on the yields of products is also recorded	149
	Ambient to 1000	HCl, CO_2, ethene, ethane, propane, 1-butene, 2-butene, 1-pentene, cyclopentene, *n*-pentane, 2-methylbutane, 1,3-pentadiene, 2-methyl-1,3-pentadiene, complex series (60 identified) of aromatic and polyaromatic species, including benzene, styrene, methylstyrenes, toluene, *o*-xylene, *m*-xylene, *p*-xylene, biphenyl, naphthalene, anthracene, phenanthrene, pyrene, etc. (see Ref.)	267
Poly(vinyl chloride)-*blend*-poly(α-methylstyrene)	Ambient to 500	HCl, α-methyl styrene	159
Poly(vinyl chloride)-*blend*-poly(styrene)	Ambient to 500	HCl, styrene	159
(10/1 to 1/10, w/w)	Ambient to 500	Products as for individual polymers	160
PVC 1 : 1 blend with bisphenol A polycarbonate	Ambient to 500	CO_2, HCl, benzene, traces of toluene, phenol and other phenolic compounds, bisphenol A, polycarbonate chain fragments	291

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
PVC 1 : 1 blend with poly(dimethylsiloxane)	Ambient to 500	HCl, benzene, traces of toluene, octamethylcyclotetrasiloxane, oligomeric siloxanes	292
Poly(vinyl fluoride)	372–480	High yields of HF and products involatile at 25°C – little carbonization	23
	200–500	Hydrogen fluoride, C_2–C9 fractions	150
	450	85% wt. loss, 33 ± 5% volatile products, remainder was oily green liquid; Volatile products: HF (82 mol%), CH_4 (5.2), C_2H_6 (0.6), ethylene (0.8), acetylene (0.03), fluoroethylene (0.07), propene (0.5), C_3H_5F (0.4), butane (0.06), butene (1.1), 1,4-butadiene (0.2), 1,3-butadiene (0.7), C_4H_5F (0.06), Cyclopentadiene (0.05), benzene (4.5), fluorobenzene (0.3), toluene (1.0), $C_6H_4(CH_3)F$ (0.04), $C_6H_5C_2H_5$ or $C_6H_4(CH_3)_2$, and styrene (0.9), *n*-propylbenzene (0.2), iso-propylbenzene (0.3), C_6H_5–C_3H_5 (0.2), indene (0.3), naphthalene (0.8), fluoronaphthalene (0.3)	151
Poly(vinylidene chloride)	225–275	High yields of HCl	77
	170	Polymer prepared in presence of oxygen; phosgene, formaldehyde, HCl	152
Poly(vinylidene cyanide)	>160	High yields of monomer	78
Poly(vinylidene fluoride)	400–530	35% HF and high yields of products involatile at 25°C – some carbonization	23
	Ambient to 500	Monomer, dimer ($C_4F_3H_3$), SiF_4, (from reaction of HF with glass)	265
Poly(vinylidene fluoride-*co*-chlorotrifluoroethylene) 80 mol% vinylidene fluoride	Ambient to 500	HCl, HF, vinylidene fluoride, chlorotrifluoroethylene, dimer ($C_4F_3H_3$)	265
3, 10 mol% vinylidene fluoride	Ambient to 500	HCl, chlorotrifluoroethylene, dichlorodifluoroethene, chloropentafluoropropene, trichlorotrifluoroethane, dimer ($C_4F_3H_3$)	265
Poly(vinyltrimethylsilane)	300–600 in argon	Tetramethylsilane, trimethylvinylsilane, 2-trimethylsilylpropene, 1,3-tri-methylsilylpropane, 1,3-trimethylsilylpropene, 2,4-trimethylsilylbutene-1,2,4,6-trimethylsilylhexene-1	153
Poly(4-vinyl pyridine)	Ambient to 500	Monomer, traces of pyridine and 4-methyl pyridine	260
Poly(vinylacetophenone)	380	CO, CH_4, ethane, 4-acetyl styrene, 4-acetyl toluene, styrene, toluene, 4-vinyl acetaldehyde, α-methylstyrene, α-methyl-4-acetylstyrene, 4-methylstyrene	307
Poly(*N*-acryloyl-*N′*-cyanoacetohydrazide)	600	Cyanoactetamide	289

1.5. POLY(VINYL KETONES), POLY(VINYL ETHERS)

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(methyl isopropenyl ketone)	270–360	H_2O	41
	Ambient to 500	Methyl isopropenyl ketone (50%), modified chain fragments, water, small amounts of CH_4 and CO	161
	150–190	Monomer under 313 nm radiation	42
Poly(methyl vinyl ketone)	270–360	H_2O, 3-methyl-2-cyclohexene-1-one and other six-membered ring ketones	44
	Ambient to 500	Water, modified chain fragments, small amounts of CH_4 and CO	161
Poly(trifluorovinyl phenyl ether)	275–500	Maximum of 75% volatilization–products unknown	49

1.6. POLY(STYRENES)

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(styrene)	300–400	40.6% monomer, 2.0% toluene, 0.1% CO, remainder dimer, trimer, and tetramer – monomer yield increases with pressure of nitrogen – 62% at 1013 mbar	62,63
	500–1200	Small hydrocarbon fragments appear (C_1–C_6) – fragmentation is greater the higher the temperature and the greater the pressure of inert gas	28
	300–570	Pulsed pyrolysis and 40 μg of polymer. Styrene (92.4–99.8% depending upon temperature), benzene, toluene, and ethyl benzene	163
	Ambient to 500	Thin films (1000 Å or less), monomer yield about 55%	164
–, (crosslinked)	346–450	Crosslinking with increasing quantities of divinyl or trivinyl benzene progressively decreases the styrene yield–the yield of larger chain fragments and the amount of carbonization also increase	11,64
–, (head-to-head)	320	Monomer, dimer, trimer, tetramer, pentamer, stilbene	165
	500 under N_2	Hydrocarbons (C_1–C_4) (2.2 relative GC peak intensity), benzene (0.4), toluene (3.3), ethylbenzene (2.0), styrene (20.4), 3-phenyl-1-propene (1.5), 1-phenylpropane (2.3), α-methylstyrene (0.3), 1-phenylbutadiene (1.0), diphenylmethane (0.3), 1,1-diphenylethylene (2.6), 1,2-diphenylethane (1.3), 1,2-diphenylpropane, (0.7), 1,2-diphenyl-1-propene (0.5), 2,3-diphenyl-1-propene (2.2), 3,4-diphenyl-1-butene (0.5), 2,3-diphenylbutadiene (2.0), 1,2-diphenylethylene (6.5), 1,4-diphenylbutane (3.5), 1,4-diphenyl-1-butene (3.8), 1,4-diphenyl-1-pentene (1.3),	166

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TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
		1,3-diphenylpropadiene (2.1), 1,2-diphenylbutadiene (1.8), 1,4-diphenylbutadiene (1.9), 1,3,4-triphenylbutene (0.6), 1,2,5-triphenylpentane (1.5), 1,2,5-triphenyl-1-pentene (4.6), 2,3,6-triphenyl-1-hexene and 2,5,6-triphenyl-1-hexene (8.9), 1,4,5-triphenyl-1-pentene (4.4)	
	Ambient to 600	Styrene, 1,2-diphenylethene, 1,2-diphenylpropane, 1,4-diphenylbutane, 1,4-diphenyl-1-butene, 1,4-diphenylpentane, 4,5-diphenyl-1,8-octadiene, 2,3,6-triphenyl-1-hexene, 1,4,5-triphenyl-1-pentene	271
–, (poly(divinyl benzene))	385–450	Volatile products include toluene, benzene, styrene, and xylene	11,64
–, (poly(trivinyl benzene))	470–500	Mixture of aliphatic and aromatic hydrocarbons	11,64
–, α-acetoxy-	270	Acetic acid (99%), mixture of α-acetoxystyrene and acetophenone (1%)	167
–, *m*-amino-	340–500	Gaseous fraction CO_2, CH_4, C_2H_6, C_3H_6, C_3H_8; liquid fraction *m*-aminostyrene, *m*-toluidine; gum fraction mainly dimer and trimer; crosslinked residue remains	65
	320–500	Monomer yield rises from 41% (320°C) to 61%(500°C); minor product is *m*-toluidine, with traces of aniline, *m*-ethylaniline, α-methyl-*m*-aminostyrene, H_2, CO_2, CH_4; remainder comprises chain fragments and residue	66
–, *p*-chloro-α-methyl-	Ambient	Gamma radiolysis: CH_4 (12.9 relative mass spec. ion current), C_2H_6 (21.8), C_3H_6 (13.6), C_3H_8 (10.5), C_4H_{10} (61), HCl (4.2), CH_3Cl (17.4), C_3H_4Cl (20), C_2H_5Cl (28.1), C_3H_7Cl (3.3), CH_2Cl_2 (9.9), C_6H_5Cl (3.0), *p*-chlorostyrene (1.5), *p*-chloro-α-methyl styrene (12.5)	168
–, α-deutero-	334–387	68.4% monomer, 1.5% α-deuterostyrene, 0.6% α-methylstyrene, 29.5% larger chain fragments	2,13
–, β-deutero-	345–384	39.7% monomer, 1,2% toluene, 0.1% deuterotoluene, 59% larger chain fragments	2,13
–, *p*-fluoro-α-methyl-	Ambient	Gamma radiolysis: CH_4 (0.4 relative mass spec. ion current), C_3H_4 (3.0), C_3H_6 (0.6), C_3H_8 (0.8), C_4H_4 (3.5), C_4H_6 (6.0), C_3H_7F (3.2), C_4H_3F (6.0), C_4H_9F (14.5), C_5H_5F (9.37), C_6H_5F (29), *p*-fluorotoluene (23), *p*-fluorostyrene (6.45), *p*-fluoro-α-methyl styrene (175.5), *p*-fluoro-isopropyl benzene (11.5)	168
–, *p*-methoxy-α-methyl-	Ambient	Gamma radiolysis: CH_4 (32 relative mass spec. ion current), H_2O (26), C_2H_4 (35), C_3H_4 (7.3), C_3H_6 (15.2), C_3H_8 (68.7), C_4H_{10} (8.2), CH_3OH (24.2), phenol (63.8), methoxybenzene (38.6), *p*-methoxytoluene (19.6)	168
–, 3-methyl-	309–399	44.4% monomer, 7.3% xylene, 48.3% larger chain fragments	3
–, 4-methyl-	200–350	Ratio of monomer to oligomer rises from 40% at 200°C to 95% at 350°C	79
	560	C_1–C_4 hydrocarbons, benzene, toluene, ethylbenzene, styrene, ethyltoluene, vinyltoluene, naphthalene, ethylstyrene	278
Poly(*o*-propionylstyrene)	385	CO, CH_4, ethane, ethene, butane, 2-propionylstyrene, 2-propionyltoluene, styrene, toluene, α-methylstyrene, α-methyl-2-propionylstyrene, various dimeric and trimeric species not fully characterized	313
–, α-methyl-	200–500	95–100% monomer	28
	520–1200	Fragments both larger and smaller than monomer appear in increasing amounts the higher the temperature, particularly CH_4, C_2H_4, and C_6H_6 until at 1200°C the monomer yield is only 33.9%	28
	Ambient	Gamma radiolysis: CH_4 (1.0 relative mass spec. ion current) C_2H_6 (1.2), C_3H_4 (6.7), C_3H_6 (1.8), C_3H_8 (2.7), C_4H_4 (22), C_4H_{10} (9.9), cyclopentadiene (6.1), benzene (72.8), toluene (20), styrene (50.5), α-methyl styrene (184), isopropyl benzene (10)	168
	400–900	Benzene, toluene, ethylbenzene, cumene, styrene, α-methyl styrene, indene/phenylpropyne, methyl-1,2-dihydronaphthalene, methylene indene, naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, biphenyl, anthracene/phenanthrene, dihydropyrene	169
–, *p*-*N*,*N*-diethylamino-	350–500	Toluene, styrene, *p*-ethylstyrene, *N*,*N*-diethyl-*p*-toluidine, *N*,*N*-diethyl-*p*-ethylaniline, *p*-*N*,*N*-diethylaminostyrene, α-methyl-*N*,*N*-diethylaminostyrene, 2-(*p*-*N*,*N*-diethylaminophenyl) butane, α-propyl-*p*-*N*,*N*-diethylaminostyrene, *N*-ethyl-*p*-toluidine, *N*-ethyl-*p*-toluidine, *N*-ethyl-*p*-ethylaniline, *N*-ethyl-*p*-aminostyrene and closely related compounds	170
–, *m*-*N*,*N*-dimethylamino-	350–500	*m*-*N*,*N*-Dimethylaminostyrene, *N*,*N*-dimethyl-*m*-toluidine, *m*-xylene, styrene, *N*,*N*-dimethyl-*m*-ethylaniline, toluene, *m*-methylstyrene, α-methyl-*m*-*N*,*N*-dimethylaminostyrene, *trans*-β-methyl-*m*-*N*,*N*-dimethylaminostyrene, α-ethyl-*m*-*N*,*N*-dimethylaminostyrene, *N*-methyl-*m*-toluidine, *N*-methyl-*m*-ethylaniline, *N*-methyl-*m*-aminostyrene, oligomers of *m*-*N*,*N*-dimethylaminostyrene and closely related compounds	171

TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
–, *p*-*N*,*N*-dimethylamino-	500 for 30 min	*N*,*N*-dimethylaniline (0.2% of original polymer weight), *N*,*N*-dimethyl-*p*-toluidine (2.8%), *N*-methylaniline (0.4%), *N*,*N*-dimethyl-*p*-ethylaniline (0.4%), *N*-methyl-*p*-toluidine (0.4%), *N*-methyl-*o*-toluidine (0.4%), *p*-toluidine (0.4%), *N*-methyl-*p*-ethylaniline (0.4%), *p*-*N*,*N*-dimethyl-aminostyrene (36.3%), α-methyl-*p*-*N*,*N*-dimethylaminostyrene (0.7%)	172
Poly(*p*-(2,4-dichlorobenzyl)styrene)	Ambient to 500	Benzene, toluene, ethylbenzene, styrene, α-methylstyrene, 1,3-dichlorobenzene, 2,4-dichlorotoluene, monomer (major product), complex series of halogenated and dehalogenated chain fragments (see Ref.)	275
–, *p*-isopropyl-α-methyl-	Ambient	Gamma radiolysis: CH_4 (8, relative mass spec. ion current), C_2H_4 (4.6), C_3H_4 (7.2), C_3H_6 (21.2), C_3H_8 (108), C_4H_{10}, (57.4)	168
–, 2,3,4,5,6-pentafluoro-	390–446	63% of the products are volatile at 25°C – contains some monomer	67
–, α,β,β-trifluoro-	333–382	72% monomer, 28% larger chain fragments	14
Polystyrene (chain brominated on α-position)	150–300	HBr, trace styrene	271
	300–500	Styrene, HBr, toluene, benzene	271
	Ambient to 500	HBr, styrene, traces of toluene and benzene, *p*-bromostyrene	271
Poly(styrene-*co*-methylene) $\sim\sim CH(\phi)-CH_2-CH_2-CH(\phi)-(CH_2)_n\sim\sim$, n = 0,1,3,4 and 5	350 for 4 hr	Benzene, toluene, ethylbenzene, styrene (major volatile product), *n*-propylbenzene (except with $n = 2$), phenylpropene, butylbenzene (except with $n = 0$), phenylbutene (with $n = 4$ and 5 only), amylbenzene (with $n = 4$ and 5 only) hexylbenzene (with $n = 4$ and 5 only), chain fragment fraction (major product)	173
Poly(styrene-*co*-SO_2) (1.85 : 1)	200	At 26.7 mbar pressure; 40% weight loss; main product is 2,4-diphenyl thiophene; at least 11 unidentified minor products	68
Poly(styrene-*co*-methacrylic acid) 18, 44 and 72 mol% MAA	Ambient to 500	CO_2, H_2O, butene, isobutene, dimethyl ketene, styrene, methacrylic acid, succinic-type 5-membered cyclic anhydrides	294
Poly(styrene-*co*-chlorotrifluoroethylene) 7.7, 14, 20 mol% CTFE	Ambient to 500	Chlorotrifluoroethylene, styrene, HCl, chloropentafluoropropene, ethene, chloroethene, toluene, α-methylstyrene, dimer and trimer structures with some unsaturation; SiF_4 (from reaction of HF with glass). Distribution of products varies with polymer composition	261
Poly(styrene-*co*-glycidyl methacrylate) 10, 23, 51, 62, 78, 86 mol% GMA	Ambient to 500	CO, CO_2, propene, isobutene, dimethyl ketene, acrolein, allyl alcohol, toluene, styrene, α-methylstyrene, ethylbenzene, glycidol, glycidylmethacrylate; product distribution depends on copolymer composition	264
Poly(styrene-*co*-phenyl methacrylate) 10–90 mol% PMA	Ambient to 500	CH_4, CO, CO_2, propene, dimethyl ketene, toluene, styrene, 4-phenylbutene, 4-phenyl-2-methylbutene, phenyl methacrylate, α-methylstyrene, short chain fragments	280
Poly(styrene-*co*-1,2,2,2,-tetra-chloroethyl acrylate) (4.7/1)	310 and 500	Styrene, benzene, toluene, ethylbenzene, α-methyl styrene, diphenyl, 5,6-benzo-2-methyl-3,5-cyclohexadienone, diphenylethane, 1,3-diphenylpropane, dimers and trimers of styrene, chloroacetaldehyde, dichloroacetaldehyde, trichloroacetaldehyde, trichloropropanal	174
Poly(styrene-*co*-1,2,2,2-tetra-chloroethyl methacrylate) (3.8/1)	310 and 500	Styrene, benzene, toluene, allylbenzene, α-methylstyrene, indane, iso-propenylstyrene, 5,6-benzo-2-methyl-3,5-cyclo-hexadienone, propyl-propenylbenzene, diphenylethane, 1,3-diphenylpropane, dimers and trimers of styrene chloroacetaldehyde, dichloroacetaldehyde, trichloroacetaldehyde, trichloropropanal, benzyl chloride, 2-chloroethylstyrene, 2,2-dichloroethenyl methacrylate, 1,2,2,2-tetrachloroethyl methacrylate	174
Poly(styrene-*co*-bis-(1,2,2,2-tetra-chloroethyl)fumarate) (8.9/1)	310 and 500	Styrene, benzene, toluene, ethylbenzene, allylbenzene, α-methylstyrene, indane, diphenyl propylpropenylbenzene, diphenylethane, 1,3-diphenylpropane, dimers and trimers of styrene, chloroacetaldehyde, dichloroacetaldehyde, trichloroacetaldehyde, benzyl chloride	174
Poly(styrene-*co*-bis-(1,2,2,2-tetra-chloroethyl) muconate) (7.72/1)	310 and 500	Styrene, benzene, toluene, ethylbenzene, α-methylstyrene, diphenyl, propylpropenylbenzene, diphenylethane, 1,3-diphenylpropane, dimers and trimers of styrene, chloroacetaldehyde, dichloroacetaldehyde, trichloroacetaldehyde, trichloropropanal, benzyl chloride	174
Poly(styrene-*co*-*N*-(2,4,6-tribromophenyl)-maleimide) (6.4/1)	310 and 500	Styrene, benzene, toluene, ethylbenzene, allylbenzene, α-methylstyrene, indane, diphenylethane, 1,3-diphenylpropane, dimers and trimers of styrene, *N*-(2,4,6-tribromophenyl) maleimide, *N*-dibromophenyl maleinimide	174

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TABLE 1. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(styrene-*co*-*N*-(pentachlorophenyl)-maleimide) (4.9/1)	310 and 500	Styrene, benzene, toluene, ethylbenzene, allylbenzene, α-methylstyrene, indane, diphenylethane, 1,3-diphenylpropane, dimers and trimers of styrene, pentachlorophenyl isocyanate, *N*-pentachlorophenyl formamide, *N*-tetrachlorophenyl maleinimide, *N*-(pentachlorophenyl) maleimide, methyl maleic acid pentachlorophenylimide	174
Poly(styrene) 1 : 1 (w/w) *blend* with bisphenol A polycarbonate	Ambient to 500	CO_2 styrene, α-methylstyrene, *p*-cresol, phenol, *p*-ethylphenol, *p*-vinylphenol, *p*-isopropylphenol, polystyrene short chain fragments with vinylidene and saturated ends, polycarbonate cyclic dimer and chain fragments, bisphenol A	272
Poly(vinyl toluene-*co*-divinyl benzene) 10-50% DVB	560	C_1–C_4 hydrocarbons, benzene, toluene, ethylbenzene, styrene, ethyltoluene, α-methylstyrene, vinyltoluene, divinylbenzene, naphthalene, ethylstyrene; distribution varies with copolymer composition	278
Poly(4-methoxystyrene) 1 : 1 (w/w) *blend* with bisphenol A polycarbonate	Ambient to 500	CO_2, 4-methoxystyrene, α-methyl-4-methoxystyrene, *p*-cresol and other phenols in small amounts, poly(4-methoxystyrene) dimer and trimer with vinylidene and saturated ends, polycarbonate cyclic dimer and chain fragments, bisphenol A	272

TABLE 2. MAIN-CHAIN CARBOCYCLIC POLYMERS

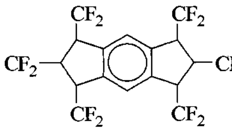
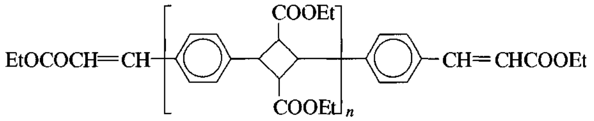
Polymer	Temperature range (°C)	Degradation products	Refs.
Poly((E,E)-[6.2]paracyclophane-1,5-diene)	460, 515, 620	Primary product is monomer; in addition, a series of secondary products based on ring-opened monomer are formed by H-abstraction (see Ref.); also detected: toluene (not 460°C) and *p*-xylene	251
Poly(perfluoro-*m*-phenylene)	700	Volatiles comprise SiF_4 (from silica vessel), CO_2, with traces of C_6F_6 and C_6F_5H; white sublimate on vessel walls; residue contains 1% fluorine	50
Poly(perfluoro-*p*-phenylene) high molecular weight (15000)	700	Volatiles comprise SiF_4 (from silica vessel), CO_2, with traces of C_6F_6 and C_6F_5H; white sublimate on vessel walls; residue contains 1% fluorine	50
low molecular weight (3700)	700	Volatiles comprise SiF_4 (from silica vessel), CO_2, with traces of C_6F_6 and C_6F_5H; no white sublimate; residue contains 33–41% fluorine	50
Poly(1,4-phenylene)	250–620	79% residue, 10% chain fragments, 11% volatiles comprising H_2, CH_4, H_2O, HCl (from catalyst)	55
–, 2-hydroxy-	300–620	60% residue, 24% chain fragments, 16% volatiles comprising CO, CO_2 H_2, CH_4	55
Poly(1,4-phenylene ethylene)	420–465	3.6% of products are volatile at 25°C and consist of 2.83% xylene, 0.29% toluene, 0.28% methylethyl benzene, 0.14% methylstyrene, 0.06% benzene, products involatile at 25°C consist of dimeric–octameric fragments	13,14,80
	408–515	Mainly chain fragments (dimer–pentamer); traces of H_2, monomer	81
	436–475	H_2, CH_4, C_2H_4, C_2H_6, toluene, *p*-xylylene, *p*-ethyltoluene, *p*-methylbibenzyl, 1,2-di-*p*-tolylethane, 4,4′-dimethylstilbene	176
Poy(1,3-phenylene-hexafluoro-trimethylene	660 for 30 s	C_2F_4 (21.6% of original weight of polymer), HF (17),  (13.9%), $C_6H_5(CF_2)_5C_6H_5$ (10.2%), C_6H_6 (8.5%), $C_6H_5(CF_2)_3C_6H_5$ (7.9%)	177
Poly(1,4-phenylenemethylene)	386–416	7.4% of products are volatile at 25°C; 5.9% toluene, 1.4% benzene, 0.1% xylene	13,14
Poly α-(ethoxycarbonyl-vinyl)-ω-[4-(ethoxycarbonyl-vinyl)-phenyl] (1,4-phenylene-2,4-bis-ethoxycarbonyl-1,3-cyclobutylene) 	320–360 for 1 h under N_2	Low-molecular-weight polymer and small amount of monomer	195

TABLE 3. MAIN-CHAIN HETEROATOM POLYMERS

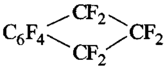
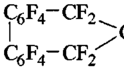
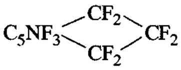
Polymer	Temperature range (°C)	Degradation products	Refs.
3.1. POLY(OXIDES) AND POLY(KETONES)			
Poly(fluoro ethers)	510–540		178
a. $-[O-CH_2-(CF_2)_3CH_2O-CH_2]_n-$		$CH_3-(CF_2)_3CH_2-OCH_3$ (46.9%) relative areas of glc traces, $CH_3(CF_2)_3CH_3$(14%), $CH_3CF_2CF_2H$ (6.7%), $CF_2=CH_2$ (6.7%), CF_2H-CF_2H (2.3%)	
b. $-[OCH_2(CF_2)_3CH_2O$-*p*-$C_6F_4]_n-$		$CF_2=CH_2$ (17.0%), $CH_3(CF_2)_3H$ (16.5%), CF_2HCF_2H (6.4%), $CH_3CF_2CF_2H$ (4.1%), C_6F_5H (9.6%),  (9.4%), C_6F_5CHO (7.2%), C_6F_4HCHO (4.9%), $C_6F_4H_2$ (3.3%)	
c. $-[OCH_2(CF_2)_3CH_2O$-*p*-C_6F_4-*p*-$C_6F_4]_n-$		HF (31%), $CF_2=CH_2$ (22.0%), $CH_3(CF_2)_3H$ (19.7%), CF_2HCF_2H (10.1%), $C_6F_5C_6F_4H$ (5.6%),  (8.1%), $C_6F_4HC_6F_4H$ (9.3%)	
d. $-[OCH_2(CF_2)_3CH_2O$-*m*-$C_5NF_5]_n-$		HF (50%), $CH_3(CF_2)_3H$ (27.6%), $CF_2=CH_2$ (7.8%), CF_2HCF_2H (4.3%),  (5.6%), $C_5NF_3H_2$ (3.1%)	
Poly(oxybutylethylene)	321–365	Mixture of saturated and hydrocarbons (C_1–C_6), aldehydes (C_1–C_6), H_2, H_2O	20
Poly(oxy-2,5-dimethoxy-1,4-phenylene)	100–550	41% residue, 29% fragments, 30% volatiles comprising H_2, CH_4, CO, CO_2, CH_3OH, traces of H_2O, C_2H_6, other hydrocarbons	55
Poly(oxy-2,6-dimethyl-1,4-phenylene)	100–550	26% residue, 66% chain fragments, 8% volatiles comprising H_2, CH_4, H_2O, CO, CO_2	55
	400–550	*o*-Cresol, 2,6-dimethyl phenol, 2,4-dimethyl phenol, 2,4,6-trimethyl phenol, various ketones, dimers, and more complicated structures (see Ref.), various combinations of the monomeric skeletons	179
Poly(oxyethylene)	324–363	9.7% of products volatile at 25°C–3.9% monomer with smaller amounts of CO_2, formaldehyde, ethanol, and saturated and C_1–C_7 compounds	25
	280	Diethyl ether, ethyl methyl ether, acetaldehyde, formaldehyde, CO_2, CO, ethene, cyclohex-3-ene-1-one	252
Poly(oxymethylene)	222	100% Monomer	27
	100–180	100% Formaldehyde; inverse relationship between molecular weight and rate for hydroxyl terminated polymers; acetylation of terminal hydroxy groups inhibits the reaction	181
Poly(oxymethyleneoxyethylene)	314–338	Major volatile products CH_4, C_2H_6, C_2H_4, C_2H_2, $HCO_2C_2H_5$	20
Poly(oxy-2-methylphenylene)	250–500	*p*-Xylene, phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, and a variety of more complex structures (see Ref.)	180
Poly(oxy-1,3-phenylene)	300–620	34% Residue, 53% chain fragments, 13% volatiles comprising H_2O, CO, H_2, CH_4, CO_2, trace of C_6H_6	55
Poly(oxy-1,4-phenylene)	550	Hydroquinone, phenol, benzene, diphenylether, 4,4′-dihydroxydiphenylether, 4-phenoxyphenol. In addition, a broad spectrum of phenyl and phenolic terminated oligomers with up to 10 aromatic units	255
	585	As 550°C plus dibenzofuran and dibenzofuran-containing oligomers	255
Poly(oxy-1,4-phenylene)-*blend*-polystyrene (60 : 40)	300–360	Ethylbenzene, styrene, α-methylstyrene, 2-methylphenol, 2,6-dimethylphenol, 2,4-dimethylphenol, 2,4,6-trimethylphenol, 1,3-diphenylpropane, 2,4-diphenyl-1-butene, 2,4,6-triphenyl-1-hexene, PPO dimers	318
Poly(oxypropylene) atactic	270–330	12.8% of products volatile at 25°C, including 4.00% acetaldehyde, 2.22% acetone, 1.43% dipropyl ether and 0.75% propylene	25
isotactic	275–355	20% of products volatile at 25°C, including 6.34% acetaldehyde, 2.39% acetone, 2.19% dipropyl ether, and 2.22% propylene	25
Poly(oxytetramethylene)	347	Volatiles comprise a mixture of CH_4, C_2H_6, C_3H_8, C_4H_{10}, C_2H_4, C_3H_6, CH_3CHO, C_2H_5CHO, C_3H_7CHO	20
Poly(oxytrichloromethyl methylene) (Poly(trichloro acetaldehyde))	Ambient	Monomer	182

TABLE 3. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(oxy-1,4-phenylene-carbonyl-1,4-phenylene) (Poly(ether ketone), PEK)	390, 490, 530	Low MW polymer at 490°C produces benzene, phenol, benzaldehyde, 4-hydroxybenzaldehyde, diphenyl ether, biphenylene, benzophenone, series of –H, –OH and –CHO terminated chain fragments containing <8 aromatic units and fragments containing dibenzofuran units. High MW polymer at 530°C as above. Low MW polymer at 390°C produces significant quantities of 4-hydroxy benzaldehyde and benzophenone-4,4′-diol	250
	506	Phenol, dibenzofuran, benzofuran derivatives, mixtures of oligomers mostly hydroxy terminated	315
Poly(oxy-1,4-phenylene-oxy-1,4-phenylene -carbonyl-1,4-phenylene) (Poly(ether ether ketone), PEEK)	506	Phenol, dibenzofuran, benzofuran derivatives, mixtures of oligomers mostly hydroxy terminated	315
Poly(etherketone-*co*-ethersulphone) Mole ratio 1 : 3, 3 : 1, 1 : 1 (random), 1 : 1 (alternating)		All polymers have same products with distribution varying with composition. Biphenyl, hydroquinone, 4-phenoxyphenol, benzaldehyde, 4-hydroxybenzaldehyde, diphenyl sulphone, diphenylether, phenol, benzophenone-4,4′-diol. Also two series of chain fragments containing PEK and PES units with –H, –OH and –CHO ends. Analogous fragments with biphenyl units	250
3.2. POLY(ESTERS)			
Poly(3-oxybenzoyl)	330	Monomer, cyclic dimer–heptamer	187
Poly(4-oxybenzoyl)	505–565	CO, CO_2, phenol, *p*-hydroxy phenyl benzoate	197
Poly(oxycarbonyl-1,3-phenylene-hexafluoroisopropylidene-1,3-phenylene carbonyloxy-1,3-phenylene-hexafluoro-isopropylidene-1,3-phenylene)		HF (12%), cyclic structures (see Ref.)	177
Poly(oxycarbonyl-1-chloroisopropylidene)	253–384	HCl and a compound with a glycollidic structure	185
Poly(oxycarbonylcyclohexylidene)	200–500	Cyclohexen-1-carboxylic acid, cyclohexanone	198
Poly(oxycarbonylcyclopentylidene)	200–500	Cyclopenten-1-carboxylic acid, cyclopentanone, dicyclopentyl glycollide	198
Poly(oxycarbonyl-3-pentylidene)	200–300	*Cis*- and *trans*-2-ethyl crotonic acid (major products)	188
Poly(oxyethyleneoxyterephthaloyl) (Poly(ethylene terephthalate))	283–306	Acetaldehyde major gaseous product with CO_2, CO, C_2H_4, H_2O, CH_4, benzene, 2-methyl-dioxolane, terephthalic acid, and more complex chain fragments	26
	900	CO, CH_4, CO_2, ethylene, acetylene, ethane, H_2O, propylene, ethanal, acetone, propanal, ethanol, benzene, toluene, ethyl benzene, styrene, *p*-vinyl toluene, benzaldehyde, *p*-ethyl toluene, acetophenone, methyl benzoate, vinyl benzoate, ethyl benzoate, *p*-methyl acetophenone, benzoic acid, *p*-methyl vinyl benzoate, *p*-vinyl acetophenone, propyl benzoate, *p*-ethyl vinyl benzoate, *p*-vinyl vinyl benzoate, biphenyl, 1-hydroxy ethyl benzoate, diacetyl benzene, *p*-acetyl vinyl benzoate, divinyl terephthalate, ethyl vinyl terephthalate, ethyl vinyl terephthalate, *p*-acetyl benzoic acid, methyl 1-hydroxyethyl terephthalate, ethylene dibenzoate	192
	Ambient to 500	CO, CH_4, CO_2, ethene, ketene, acetaldehyde, 1,4-dioxane, toluene, benzaldehyde, vinylbenzoate, divinylterephthalate, benzoic acid, terephthaldehydic acid, terephthalic acid, hydroxyethyl methyl terephthalate, short chain fragments	298
Polyester from terephthaloyl chloride and $n = 4$ polyethylene glycol	Ambient to 500	CO, CH_4 (trace), CO_2, ethene (trace), formaldehyde, acetaldehyde, 1,3-dioxalane, ethoxyacetaldehyde, 1,4-dioxane, glycidol, diethylether, 1,2-dimethoxyethane, 2-methoxyethanol, 2-ethoxyethanol, $-CH_2CH_2COCH_2-$(ring), $HOCH_2CH_2OCH_2CHO$, $CH_3OCH_2CH_2OC_2H_5$, terephthalic acid, triethylene glycol, tetraethylene glycol, chain fragments	274
Polyester from terephthaloyl chloride and $n = 22$ polyethylene glycol		CO, CH_4 (trace), CO_2, ethene (trace), formaldehyde, acetaldehyde, 1,3-dioxalane, methoxyacetaldehyde, 1,4-dioxane, 7-membered cyclic ether, methyl benzoate, ethyl benzoate, benzaldehyde, $-CH_2CH_2COCH_2-$(ring), $HOCH_2CH_2OCH_2CHO$, $CH_3OCH_2CH_2OC_2H_5$, $-(CH_2CH_2O)_2CH_2CO-$(ring), $CH_2{=}CHOCH_2CH_2OCH_2CHO$, $HO(CH_2CH_2O)_2C_2H_5$, $C_2H_5(OCH_2CH_2)_3H$, terephthalic acid, triethylene glycol, tetraethylene glycol, chain fragments	274

TABLE 3. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(oxyisophthaloyl-oxy-1,3-phenylene)	330	Cyclic monomer (10 relative abundance), cyclic dimer (83.5), cyclic trimer (24.5), benzoic acid, isophthalic acid, resorcinol and various fragments of the main chain (see Ref.)	187
Poly(oxyisophthaloyl-oxy-1,4-phenylene)	330	Cyclic dimer (17), cyclic trimer (4), *m*-phthalic acid (26), benzoic acid (7.5), hydroquinone (46), and various fragments of the main chain (see Ref.)	187
Poly(oxy-1-oxohexamethylene)	220	Monomer (ε-caprolactone)	184
Poly((D)-oxy-1-oxo-3-methyl-trimethylene) (Poly(3-hydroxybutyrate))	Ambient to 338	Dimer (41.2 wt.%), crotonic acid (35.3), trimer (12.5), tetramer (2.9), iso-crotonic acid (0.9). Small amounts of CO_2, propene, ketene, acetaldehyde, and β-butyrolactone are formed at higher temperatures due to decomposition of primary products	186
	250	Crotonic acid (64.4% of original polymer), dehydrated dimer (7.2%), dehydrated trimer (1.2%)	245
	400	Crotonic acid (65.4% of original polymer), dehydrated dimer (8.2%), dehydrated trimer (2.1%)	245
	600	Crotonic acid (58.3% of original polymer), dehydrated dimer (9.0%), dehydrated trimer (2.7%)	245
	350	Crotonic acid (*trans*), dehydrated dimer (*trans*), dehydrated trimer and tetramer (*cis*/*trans* not resolved)	246
Poly((D)-oxy-1-oxotetramethylene) (Poly(4-hydroxybutyrate))	320	Cyclic oligomers (γ-butyrolactone and higher homologues)	257
Poly(oxy-1-oxo-2-methylethylene) (Poly(l-lactic acid))	500	CO, CO_2, acetaldehyde, acetone, acrylic acid, acetic acid, DL-lactide, meso-lactide, cyclic oligomers up to nonamer, 2,3 pentanedione (?), lactoyl lactic acid (?)	282
Poly(oxy-1-oxo-2,2-dimethyltrimethylene (Poly(α,α-dimethyl-β-propiolactone))	250–600	Isobutylene and CO_2	183
Poly(oxy-1-oxo-trimethylene) (Poly(β-propiolactone))	180–220	Acrylic acid	189
Poly(oxyterephthaloyloxy-1,2-phenylene)	Ambient to 500	CO_2, benzene, phenol, benzaldehyde, catechol, cyclic dimer	285
Poly(oxyterephthaloyloxy-1,3-phenylene)	345	Cyclic dimer (2), cyclic trimer (0.3), terephthalic acid (0.4), benzoic acid (1.5), resorcinol (20) and various fragments of the main chain (see Ref.)	187
	Ambient to 500	CO_2, benzene, phenol, benzaldehyde, biphenyl, benzoic acid, 3-hydroxyphenylbenzoate, resorcinol, mono and di(3-hydroxyphenyl) terephthalate, terephthalic acid, terephthaldehydic acid, short chain fragments	285
Poly(oxyterephthaloyloxy-1,4-phenylene)	350	Cyclic dimer (0.1), terephthalic acid (0.5), benzoic acid (6), hydroquinone (40.5), and various fragments of the main chain (see Ref.)	187
	Ambient to 500	Benzene, phenol, benzaldehyde, biphenyl, benzoquinone, 4-hydroxyphenylbenzoate, benzoic acid, mono and di(4-hydroxyphenyl) terephthalate, terephthalic acid, terephthaldehydic acid, short chain fragments	285
Poly(oxyterephthaloyloxy-4,4′-diphenylene)	Ambient to 500	CO_2, benzene, phenol, benzaldehyde, biphenyl, 4-phenylphenol, *p,p′*-dihydroxybiphenyl, 4-hydroxybiphenylbenzoate, di(4-hydroxybiphenyl) terephthalate	285
Poly(oxytetramethyleneoxyterephthaloyl) (Poly(butylene terephthalate))	240–280	Butadiene, terephthalic acid, mono-3-butenyl terephthalate, and di-3-butenyl terephthalate	190
	200–400	Tetrahydrofuran, 1,3-butadiene, CO_2, CO, H_2O, benzoic acid, terephthalic acid, terephthalic acid mono-3-butenyl, toluene, phenol, benzene	191
	Ambient to 500	CO, CO_2, butadiene, tetrahydrofuran, toluene, benzene, 1,5-hexadiene, dihydrofuran, 4-vinyl cyclohexene, 1,4-butane diol, benzaldehyde, benzoic acid, terephthaldehydic acid, terephthalic acid, mono-3-butenyl terephthalate, cyclic dimer, short chain fragments	298
Poly(oxydecamethylene-oxyterephthaloyl)	Ambient to 500	CO, CO_2, 1,9-decadiene, 1,10-decane diol, 1-decene-10-ol, benzoic acid, terephthalic acid, mono-decenyl terephthalate	298
Poly(oxyethyleneoxyadipoyl)	Ambient to 500	Cyclic oligomers, CO, CO_2, acetaldehyde, 2-ethylacrolein	269
Poly(oxytetramethylene-oxysebacoyl)	Ambient to 500	CO_2, H_2O, butadiene, tetrahydrofuran	299
Polyester from maleic anhydride, hexolic acid and butanediol; mole ratio 1 : 1 : 2.2	100–440	Tetrahydrofuran, 1-butanol, toluene, maleic anhydride, chlorosuccinic acid isomers, chlorovalerolactone isomers, hydroxypyran, allylpyran, trichlorocylopentadiene, tetrachlorocylopentadiene, pentachlorocylopentadiene, hexachlorocylopentadiene, phthalic anhydride, 1,4-butanediol, 1,4-butanediol dibenzoate, benzoic acid, 4-cyclohexene-1,2-dicarboxylic acid anhydride, benzoic acid butenyl ester, cyclohexadiene carboxylic acid propyl ester, hexolic anhydride,	311

TABLE 3. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
		unidentified butenyl ester, compound containing C_5HCl_5 unit, CH_3–CH=CH–CH_2–O–CH_3, CH_3–CH=CH–CH_2–O–CH=CH_2, Cl–CH=CH–O–CH_2–CH_3	
Polyester from maleic anhydride, phthalic anhydride and butanediol; mol ratio 1:1:2.2	100–440	Tetrahydrofuran, 1-butanol, 3-butene-1-ol, toluene, maleic anhydride, phthalic anhydride, 1,4-butanediol, 1,4-butanediol dibenzoate, phthalic acid butenyl ester, various esters containing butenyl, maleate and phthalate units, CH_3–CH=CH–CH_2–O–CH_3, CH_3–CH=CH–CH_2–O–CH=CH_2	311
Unsaturated polyester resins	300–800		
a. Maleic acid–phthalic acid–propylene glycol–styrene		Ethane (above 600°C), propionaldehyde (above 400°C), styrene (major product), phthalic anhydride (major product), benzene (above (450°C), toluene (above 500°C), xylene (above 400°C)	193
b. Maleic acid–tetrabromophthalic acid–phthalic acid–propylene glycol–styrene		Styrene (major product), phthalic anhydride (major product), benzene (above 550°C), toluene (above 450°C), xylene (above 500°C)	193
c. Maleic acid–phthalic acid–dibromoneopentyl glycol–styrene		Ethane (above 500°C), propionaldehyde (above 400°C), styrene (major product), phthalic anhydride (major product), benzene (above 500°C), toluene (above 500°C), xylene (above 500°C)	193
3.3. POLY(CARBONATES)			
Poly(oxycarbonyloxy-1,3-phenylene)	270	Cyclic trimer, tetramer, and pentamer, and various chain fragments	226
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)	300–389	Major products: CO_2, bisphenol A; minor products: CO, CH_4, 4-alkyl phenols	60
	200–400	CO, CO_2, CH_4, phenol, diphenyl carbonate, 4-(4-hydroxyphenyl)-2-phenyl propane	225
	290	Cyclic dimer, cyclic trimer, bisphenol A, and other chain fragments	226
	Ambient to 500	CO, CH_4, CO_2, H_2O, phenol, *p*-cresol, *p*-ethyl phenol, *p*-isopropyl phenol, *p*-vinyl phenol, bisphenol A, cyclic dimer, chain fragments including some ester structures	304
	300	Phenol, *p*-cresol	304
	375	CO_2, phenol, *p*-cresol	304
Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene-oxy-carbonyl-tetramethylene)	240	Cyclic monomer and dimer, and higher cyclic fragments	226
Poly(oxycarbonyloxy-1,3-phenylene hexafluorotrimethylene-1,3-phenylene)		HF (3%), cyclic dimer	177
Poly(oxycarbonyloxy-1,4-phenylene-oxycarbonyloxy-tetramethylene)	270	Cyclic dimer and trimer, and higher cyclic fragments	226
Poly(oxycarbonyloxy-1,4-phenylene-phthalidylidene-1,4-phenylene)	350	CO_2, CO, O_2, H_2O, phenol, fluorenone, diphenyl carbonate, xanthone, anthraquinone, 2-hydroxyanthraquinone, 2-benzoxyanthraquinone, phenolphthalein, traces of benzoxyphenol and hydroquinone	227
Poly(trimethylene carbonate)	*Ambient to 500*	CO_2, H_2O (possibly desorbed), trimethylene carbonate, cyclic oligomers	295
Poly(neopentylene carbonate)	Ambient to 500	CO_2, monomer, oligomer	296
Poly(2-phenyl trimethylene carbonate)	Ambient to 500	CO, CO_2, H_2O (possibly desorbed), α-methylstyrene, chain fragments (85%, w/w)	296
3.4. POLY(ANHYDRIDES)			
Poly(oxycarbonyl-1,3-phenylene-hexafluorotrimethylene-1,3-phenylene-carbonyl)	350	Cyclic dimer	177
Poly(maleic anhydride-*co-trans* stilbene) (alternating copolymer)	Ambient to 500	CO_2, styrene, maleic anhydride; small amounts benzene, cyclohexadiene, dimethylbutene, ethylcyclobutanol and 4-methoxystyrene; major products (79%) are chain fragments, including aromatic, ketonic and unsaturated structures	242
3.5. POLY(SULFIDES) AND POLY(SULFONES)			
Poly(thioacetone)	145	Main product is cyclic trimer [$(CH_3)_2CS$]	69
Poly(thioethylene)	220–260	Ethylene, H_2S, ethanethiol	199
Poly(thio-1,4-perfluorophenylene)	500	73% Residue; remainder, chain fragments, H_2, SiF_4 (from silica vessel), CO_2	51
Poly(thiomethylene-1,4-phenylene-methylene)	250–350	Sulphur, styrene, thiobenzaldehyde, 4-methyl styrene, *p*-xylene, 4-ethyl toluene, H_2S, 4-methyl thiobenzaldehyde, stilbene and chain	254

TABLE 3. *cont'd*

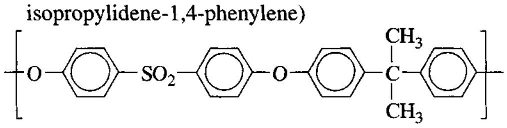
Polymer	Temperature range (°C)	Degradation products	Refs.
		fragments containing stilbene units, chain fragments containing polymer repeat units with $-CH_2SH$, $-CH{=}S$ and $-CH_3$ terminal units	
	650	Toluene, ethylbenzene, *p*-xylene, 1,4-diethylbenzene, 4-ethyltoluene; series of polycyclic aromatics containing phenanthrene and dihydrophenanthrene	254
Poly(dithiomethylene-1,4-phenylene-methylene)	250–350	Sulphur, styrene, thiobenzaldehyde, 4-methyl styrene, *p*-xylene, 4-ethyl toluene, H_2S, 4-methyl thiobenzaldehyde, stilbene and chain fragments containing stilbene units, chain fragments containing polymer repeat units with $-CH_2SH$, $-CH{=}S$ and $-CH_3$ terminal units	254
	650	Toluene, ethylbenzene, *p*-xylene, 1,4-diethylbenzene, 4-ethyltoluene; series of polycyclic aromatics containing phenanthrene and dihydrophenanthrene	254
Poly(thio-1,2-phenylene)	430	Cyclic dimer (thianthrene), some cyclic trimer	258
Poly(thio-1,3-phenylene)	540	Cyclic oligomers (trimer to heptamer) in decreasing yield	258
Poly(thio-1,4-phenylene)	460	72% Residue; remainder chain fragments, H_2, dibenzthiophene	51
	300–620	38% Residue, 47% chain fragments, 15% volatiles comprising mainly H_2S and H_2	59
	325–625	Benzene, thiophenol, diphenyl, diphenylsulfide, dibenzothiophene, chlorobenzene (from polymers with terminal chlorine atoms)	200
	560	Cyclic oligomers tetramer to heptamer (pentamer dominates)	258
Poly(oxy-1,4-phenylene-sulfonyl-1,4-phenylene-oxy-1,4-phenylene-isopropylidene-1,4-phenylene) 	380	Phenol with smaller amounts of *p*-cresol, *p*-ethyl phenol, *p*-isopropyl-phenyl phenol, bisphenol A, diphenyl ether, *p*-tolyl phenyl ether, *p*-ethyl diphenyl ether, *p*-isopropenyl diphenyl ether, isomers of tolyl (ethyl–phenyl)ether	201
	350–450	In 90 min at 450°C, 15% (of initial weight) of gaseous products are formed; SO_2 (76% of gaseous products), CO_2 (15%), CO (4.5%), CH_4 (4.5%)	202
	470 for 2 h	Benzene, toluene, *p*-xylene, isopropylbenzene, phenol (main product), diphenyl oxide, diphenyl sulfide	203
	800	SO_2, benzene, toluene, styrene, phenol, methylphenol, diphenylether, methyl diphenylether	288
Poly(oxy-1,4-phenylene-sulfonyl-1,4-phenylene)	470 for 2 h	Phenol (main product), diphenyl oxide	203
	550–600	SO_2, diphenylsulfone, phenol, diphenylether, hydroquinone, benzenesulfonic acid, 4-hydroxybenzenesulfonic acid, 4,4′-dihydroxydiphenylether, 4-phenoxyphenol; series of –H and –OH terminated fragments up to trimer, series of compounds containing consecutive diphenylether and dibenzofuran units, fragments containing biphenyl units as a result of SO_2 elimination; complex ring structures with sulfonate links	255
	800	SO_2, benzene, phenol, diphenyl ether, dibenzofuran	288
Poy(tris-(oxy-1,4-phenylene)-sulfonyl-1,4-phenylene)		Benzene, phenol (major product), diphenyl oxide, *p*-hydroxydiphenyl, or *p*-hydroxydiphenyl oxide	203
Poly(oxy-4,4′-diphenylene-oxy-1,4-phenylene sulfonyl-1,4-phenylene)		Phenol (main product), diphenyl oxide	203
Poly(oxy-1,4-phenylene-sulfonyl-1,4-phenylene-oxy-1,4-phenylenemethylene-1,4-phenylene)		Benzene, toluene, *p*-xylene, phenol (main product), diphenyl oxide	203
Poly(sulfur dioxide-*co*-1-butene)	700–800	Monomers	204
Poly(sulfur dioxide-*co*-1-hexene)	700–800	Monomers	204
Poly(sulfur dioxide-*co*-1-octadecene)	700–800	Monomers	204
Poly(sulfur dioxide-*co*-bicycloheptene)	700–800	SO_2, bicycloheptene, cyclopentadiene, ethylene, methyl cyclohexadiene, benzene, indene, naphthalene, dihydronaphthalenes	204
Poly(sulfur dioxide-*co*-cyclopentene)	700–800	SO_2, cyclopentene, xylenes, ethylbenzene, styrene, indene, decadienes, dihydronaphthalenes, tetralin, napthalene	204
Poly(sulfur dioxide-*co*-*cis*-2-butene)	700–800	SO_2, butenes, benzene, toluene, octadienes, xylenes, styrene, indene, naphthalene	204
Poly(sulfur dioxide-*co*-methyl methacrylate-*co*-1-hexene) (24.2/1)	700–800	SO_2, hexenes, hexadienes, methyl methacrylate, toluene, naphthalene, dodecadienes	204
Poly(sulfur dioxide-*co*-methyl methacrylate-*co*-bicycloheptene) (2.5/1)	700–800	SO_2, ethylene cyclopentadiene, benzene, methyl methacrylate, bicyclo-heptene, methylcyclohexa-2,4-diene, ethylbenzene, xylenes, styrene, indene, naphthalene, dihydronaphthalenes	204

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TABLE 3. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
3.6. POLY(AMIDES)			
Poly(2,5-dimethyl-1,4-piperazinediyl-isophthaloyl)	475	After 1 h, 5.1% residue, 73.8% chain fragments, 20.5% volatiles comprising mainly CO, H_2O, CH_4, CO_2, H_2, with traces of hydrocarbons, pyrazines, pyrroles	30
Poly(2,5-dimethyl-1,4-piperazinediyloxaloyl)	475	After 1 h, 1% residue, 73.5% chain fragments, comprising mainly CO, with traces of H_2, CO_2, H_2O, hydrocarbons, pyrazines, pyrroles	47
Poly(2,5-dimethyl-1,4-piperazinediyl-terephthaloyl)	475	After 1 h, 9.4% residue, 3.2% chain fragments 87.4% volatiles comprising mainly CO, H_2O, CO_2, CH_4, NH_3, with traces of hydrocarbons, pyrazines, and pyrroles	47
Poly(iminoisophthaloylimino-1,3-phenylene) (Nomex)	300–500	Mixture of H_2, CO, CO_2, H_2O, HCN, benzene, toluene, benzonitrile	57
	300–500	CO_2, H_2O, CO	205
	450–550	Benzene, HCN, toluene, benzonitrile, H_2	205
		CO, CO_2, H_2O, benzene, benzonitrile, 1,3-dicyanobenzene, 3-cyanobenzoic acid, other trace compounds	319
Poly(iminoisophthaloylimino-1,3-perchlorophenylene)	550	Water (46 mol%), CO (18), CO_2 (31), CH_4 (1.2), HCN (1.3), and smaller quantities of, N_2O, NO, CH_3Cl, ethylene, acetylene, cyanogen, acetonitrile, acetone, acetic acid, cyanogen chloride, propenenitrile, benzene, toluene, benzonitrile, phenol, chlorobenzene	206
Poly(iminoisophthalylimino-1,4-phenylene)	300–500	Mixture of H_2, CO, CO_2, H_2O, HCN, benzene, toluene, benzonitrile	57
Poly(iminoisophthaloyl-*co*-terephthaloyl-imino-1,4-phenylene)	250–620	36% residue, 24% chain fragments, 40% volatiles comprising H_2, CO, CO_2, CH_4	58
Poly(imino(1-oxohexamethylene) (Nylon 6)	327	Cyclic monomer, acetonitrile, HCN, NH_3, acrylonitrile, 3-cyanopropene, 4-cyanobutadiene, 4-cyano-1-butene, 5-cyano-1,3-pentadiene, 4-pentenal, 5-cyano-1-pentene, 3,5-hexadienal, 5-isocyanato-1-pentene, linear dimer	293
Poly(iminohexamethyleneiminoadipoyl) (Nylon 66)	310–380	H_2O, CO_2, cyclopentanone, traces of saturated and hydrocarbons; purification from water and acid polymerization catalysts increases stability and decreases yield of CO_2	45,46
	305	H_2O, CO_2, NH_3, cyclic monomer, cyclopentanone, cyclopentylidine-cyclopentanone, cyclopentylcyclopentanone, hexylamine, hexamethyleneimine, hexamethylenediamine	207
	305	CO_2, NH_3, H_2O, cyclic monomer, cyclopentanone, 2-cyclopentylidenecyclo pentanone, 2-cyclopentylcyclopentanone, hexylamine, hexamethyleneimine, hexamethylenediamine, 1,2,3,5,6,7-hexahydro dicyclopenta[b,e]pyridine	207
	400	Hexamethylenediamine, aminohexamethylene isocyanate, hexamethylenediamine-monocyclopentanimine, hexamethylenediamine-dicyclopentanimine and larger oligomers related to above; cyclopentanone	247
Poly(imino(1-oxoundecamethylene) (Nylon 11)	800	CO_2, HCN, saturated and olefinic hydrocarbons C_5–C_{11}, saturated and olefinic mononitriles $C_nH_{(2n+1)}CN$ and $C_nH_{(2n-1)}CN$, undecalactam, hydrocarbons and nitriles containing amide units	308
Poly(imino(1-oxododecamethylene) (Nylon 12)	800	CO_2, HCN, saturated and olefinic hydrocarbons C_5–C_{11}, saturated and olefinic mononitriles $C_nH_{(2n+1)}CN$ and $C_nH_{(2n-1)}CN$, dodecalactam, hydrocarbons and nitriles containing amide units	308
Poly(iminoterephthaloylimino-1,3-phenylene)	300–500	Mixture of H_2, CO, CO_2, H_2O, HCN, benzene, toluene, benzonitrile	57
Poly(iminoterephthaloylimino-1,4-phenylene) (Kevlar)	300–500	Mixture of H_2, CO, CO_2, H_2O, HCN, benzene, toluene, benzonitrile	57
	370–450	CO_2, H_2O, CO	205
	450–550	Benzene, HCN, toluene, benzonitrile, H_2	
	527	Cyanobenzene, dicyanobenzene, aniline, 1,4-diaminobenzene, 4-cyanoaniline, benzaldehyde, benzene, CO, NH_3, CO_2, H_2O, benzamide, benzoic acid, phenylisocyanate, terephthaldehyde, benzanilide, NH_2–Ph–NH–CO–Ph, NC–Ph–NH–CO–Ph, NH_2–Ph–NH–CO–Ph–CN, Ph–NH–CO–Ph–CHO	293
Poly(2-methylpiperazinediylterephthaloyl)	475	After 1 h, 11.3% residue, 46.2% chain fragments, 42.5% volatiles comprising mainly CO, H_2O, CO_2, CH_4, NH_3, H_2, with traces of hydrocarbons, pyrazines, and pyrroles	30
Poly(1,4-piperazinediylterephthaloyl)	475	After 1 h, 21.1% residue, 45.6% chain fragments, 33.3% volatiles comprising mainly H_2O, CO, H_2, CO_2, NH_3, with traces of hydrocarbons, pyrazines, and pyrroles	30

TABLE 3. *cont'd*

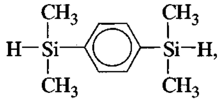
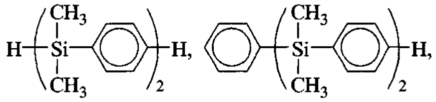
Polymer	Temperature range (°C)	Degradation products	Refs.
3.7. POLY(SILOXANES)			
Poly(oxy-dimethylsilylene) (Poly(dimethyl siloxane))	Ambient to 500	Predominantly cyclic trimer with smaller amounts of cyclic tetramer and higher cyclics; threshold degradation temperature of about 300°C reduced to 100°C by 5% KOH and CH_4 formed as additional product	208
	470	Distribution of cyclic oligomers, $n = 3$ (243.9 relative mass spec. intensity), $n = 4$ (100), $n = 5$ (35.6), $n = 6$ (37.6), $n = 7$ (13.1), $n = 8$ (1.1), $n = 9$ (0.2)	317
Poly(oxy-methylphenylsilylene)	Ambient to 500	Mixture of all possible stereoisomeric cyclic trimers and tetramers with small amounts of pentamer, benzene, and two more complex oligomers	209
Poly(oxy-methyl-3,3,3-trifluoro-propylsilylene)	400	Low-molecular-weight cyclic oligomers, $CF_2{=}CH{-}CH_3$, CHF_3	70
	615 for 30 s	Cyclic methyl-(3,3,3-trifluoropropyl)siloxanes, CH_4, CHF_3, $CF_2{=}CH{-}CH_3$, $CH_2{=}CH{-}CF_3$	210
Poly(oxy-phenylbutoxysilylene)	430–500	CO, H_2 and hydrocarbons	211
Poly(dimethyl siloxane-*co*-diphenyl siloxane)	Ambient to 500	Complex mixture of cyclic oligomers, which have been individually identified, whose composition varies with the dimethyl/diphenyl ratio; small amounts of benzene	212
Poly(dimethyl siloxane-*co*-phenylmethyl siloxane)	Ambient to 500	Complex mixture of cyclic oligomers, which have been individually identified, whose composition varies with the dimethyl/methyl phenyl ratio; small amounts of benzene	213
Poly(dimethyl-1,4-silphenylene)	400 in argon	Methane, dimethylsilane, benzene, dimethylphenylsilane,  dimethyldiphenylsilane, 	214
Poly(oxy-methylphenyl-1,4-silphenylene-silylene)	Ambient to 500	Benzene, diphenylmethylsilane, triphenylmethylsilane, and higher linear oligomers	215
Poly(oxy-tetramethyl-1,4-silphenylene-silylene)	500 in argon	Methane, $H{-}Si(CH_3)_2{-}O{-}Si(CH_3)_2{-}H$, benzene, cyclic trimer of dimethylsiloxane, and various higher chain fragments (see Ref.)	214
	Ambient to 500	Cyclic trimer and tetramer of dimethylsiloxane and a complex mixture of higher linear and cyclic oligomers	216
Poly(oxy-tetramethyl-1,3-silphenylene-silylene-hexafluoropropylenephenylene)	615 for 30 s	HF (15–18%), methane, methyltrifluorosilane, dimethyldifluorosilane, benzene, toluene, phenyldifluoromethane	210
Poly(oxy-tetramethyl-1,3-silphenylene-silylene-tetrafluoroethylenephenylene)	615 for 30 s	HF (15–18%), methane, methyltrifluorosilane, dimethyldifluorosilane, benzene, toluene, phenyldifluoromethane	210
Poly(oxy-tetramethyl-1,3-silphenylene-siloxane-*co*-dimethylsiloxane)	Ambient to 500	Cyclic trimer and tetramer of dimethylsiloxane and a complex mixture of higher linear and cyclic oligomers	216
Poly(boron tri(dimethylsiloxane)), nonlinear	250–350	Molecular weight increases; traces of cyclic products $[(CH_3)_2SiO]_3$ and $[(CH_3)_2SiO]_4$	15
3.8. POLY(URETHANES)			
Poly(oxy-2,2-dimethyltrimethylene) oxycarbonyl-*N*-imino-1,4-phenylenemethylene-1,4-phenylene-*N*-iminocarbonyl)	350	Various fragments of the main chain (see Ref.)	231
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxycarbonylimino-1,4-phenylene methylene-1,4-phenylene-iminocarbonyl)	190	4,4′-Diphenylmethane diisocyanate, bisphenol A	231
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenylene-oxycarbonyl-*N*-methylimino-1,4-phenylenemethylene-1,4-phenylene-*N*-methyliminocarbonyl)		Bisphenol A, 4,4′-*N*-methyldiphenyl methane and linear and cyclic fragments of the main chain (see Ref.)	231
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenylene-oxycarbonyl-*N*-methyliminohexa-methylene-*N*-methyliminocarbonyl)	330	Cyclic monomer and dimer, and various chain fragments	232
Poly((oxy-1,4-phenyleneisopropylidene-1,4-phenylene-oxycarbonyl-piperazine-1,4-diyl-carbonyl)	330	Cyclic dimer, bisphenol A and various chain fragments	232

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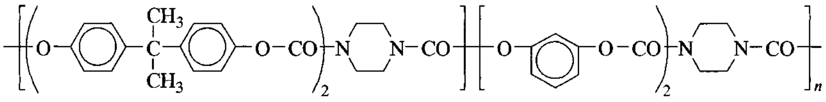
TABLE 3. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(oxy-1,3-phenylene-oxycarbonyl-*N*-methylimino-hexamethylene-*N*-methyliminocarbonyl)	320	Cyclic monomer, dimer and trimer, resorcinol	232
Poly(oxy-1,4-phenyleneoxycarbonyl-*N*-methylimino-1,4-phenylenemethylene-1,4-phenylene-*N*-methyliminocarbonyl)	325	Cyclic dimer, 4,4′-*N*-methyldiphenylmethane, hydroquinone, and higher chain fragments (see Ref.)	232
Poly(oxy-1,3-phenylene-oxycarbonyl-piperazine-1,4-diyl-carbonyl)	360	Cyclic dimer and trimer, resorcinol, and various chain fragments (see Ref.)	232
Poly(oxytetramethylene oxycarbonyl-imino-1,4-phenylenemethylene-1,4-phenylene-iminocarbonyl)	Ambient to 500	1,4-Butanediol, methylene bis-(4-phenyl isocyanate), tetrahydrofuran, CO_2, H_2O, butadiene, HCN, CO	228
with 10% (w/w) ammonium polyphosphate	Ambient to 500	Methylene bis-(4-phenyl isocyanate), tetrahydrofuran, H_2O, aniline, formaldehyde, CO_2	229
Poly(oxy-xylylene-oxycarbonylimino-xylylene-iminocarbonyl)	300	CO_2, *trans*-1,4-cyclohexane-dimethanol, 4-methylene-cyclohexane-methanol, xylylene diamine	230
Polyurethane from methylene bis-(4-phenyl isocyanate) (105 parts) and propoxylated trimethyl propane (100 parts)	600	Methane, CO_2, ethylene ethane, H_2O, propene, propane, ethanol, isobutene, acrolein, propanal, 2-methyl-1-butene, 2-methylpropenal, 2-butanone, benzene, dihydropyran, 2,2,4-trimethyl-1,3-dioxalane	234
	250–350	CO_2, propene, some methane and propanal	256
	350–500	Methane, ethane, ethene, propane, propene, ethanal, propanal, diminishing quantities of CO_2	256
	500–650	Methane (max. rate of production at 600°C), ethane, ethene, propene, ethanal, propanal	256
	650–800	Methane, ethane, ethene, propene, ethanal, propanal	256
Polyurethane from butane diol, phenylphosphonic dichloride, and methylene bis-(4-phenyl isocyanate)	Ambient to 500	CO_2 tetrahydrofuran, dihydrofuran, aniline, *p*-toluidine, *N*-phenyl pyrrolidine, *N*-(*p*-tolyl) pyrrolidine, cyclobutylene phenylphosphonate, butane diol, methylene bis-(4-phenyl isocyanate), 4,4′-methylene dianiline	235
Polyester urethane from an ethylene/propylene glycol/adipic acid polyester, butane diol and methyl bis-(4-phenyl isocyanate)	Ambient to 500	Modified chain fragments, ethylene, propylene, CO_2, ethylene oxide, propylene oxide, acetaldehyde, tetrahydrofuran, water, cyclopentanone, ethylene, glycol, propylene glycol, adipic anhydride (trace), aniline (trace)	236
Poly(urethane-*co*-carbonates)	330	Cyclic monomer, bisphenol A and higher linear and cyclic fragments of the chain (see Ref.)	237
	290	Cyclic monomer, resorcinol, and various fragments of the chain (see Ref.)	237

3.9. OTHER NITROGEN CONTAINING POLYMERS

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(*t*-butyl aziridine)	Ambient to 500	Ethene, propane, propene, isobutane, isobutene, ethylamine, aziridine, 1-*t*-butyl-perhydro-1,4-diazine, *N*-*t*-butyl ethylamine, 1-*t*-butyl-4-isopropenyl-1,2,3,4-tetrahydro-1,4-diazine, 1,4-di-(*t*-butyl)-perhydro-1,4-diazine, oligomers	276

3.10. PHOSPHOROUS CONTAINING POLYMERS

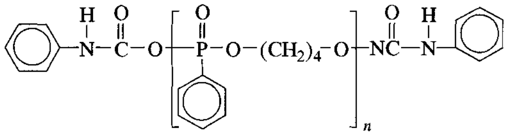
Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(oxytetramethylene oxyphenyl phosphono)	Ambient to 550	Butadiene, tetrahydrofuran, dihydrofuran, H_2O, cyclic ester of phenylphosphonic acid and 1,4-butanediol, phenylphosphonic acid, butane diol	233
Poly(oxytetramethylene oxyphenyl-phosphono) capped with phenylisocyanate) 	Ambient to 500	Butadiene, tetrahydrofuran, dihydrofuran, H_2O, cyclic ester of phenylphosphonic acid and butanediol, phenylphosphonic acid, butane diol, CO_2, aniline	233
Poly(bis(trifluoroethoxy)phosphazene)	150–400	Cyclic trimer, tetramer, pentamer, hexamer, and higher oligomers, 1,1,1-trifluoro-2-chloroethane (due to residual chlorine in the polymer)	238
Poly(diphenoxyphosphazene)	100–400	Cyclic tetramer, trimer and higher oligomers, chlorobenzene (due to residual chlorine in the polymer), phenol, triphenylphosphate	239

TABLE 3. *cont'd*

Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(diphenoxy-phosphazene) (residual chlorine content: <0.05%)	Ambient to 480	Traces of phenol, phenoxy cyclic trimer and monochlorophenoxy cyclic trimer	316
Poly(diphenoxy-phosphazene) (residual chlorine content: 2.4%)	Ambient to 480	Phenoxy cyclic trimer and tetramer, monochloropentaphenoxy cyclic trimer, monochloroheptaphenoxy cyclic tetramer, dichlorohexaphenoxy cyclic tetramers	316
Poly(diphenoxy-phosphazene) (residual chlorine content: 9.9%)	Ambient to 480	Phenoxy cyclic trimer and tetramer, monochloropentaphenoxy cyclic trimer, monochloroheptaphenoxy cyclic tetramer, dichlorohexaphenoxy cyclic tetramers, dichlorotetraphenoxy cyclic trimers, trichloropentaphenoxy cyclic tetramers, HCl	316

TABLE 4. MAIN-CHAIN HETEROCYCLIC POLYMERS

Polymer	Temperature range (°C)	Degradation products	Refs.
Phenol-formaldehyde resin	250–400	Volatiles comprise xylene (76%), traces of phenol, cresol, benzene	53
Poly(1-methylene-2-imidazolidinone)	240	Formaldehyde (trace)	253
(Poly(ethyleneurea formaldehyde))	Ambient to 600	Low boiling fraction consists of NH_3, CO_2, HCN, CH_4, CO (trace); IR data also suggests presence of isocyanate, ketamine and carbodiimide or cyanogen compounds; high boiling fraction (77% of total volatiles) consists of chain fragments up to pentamer, including *N*-methylethylene urea, corresponding unsaturated compounds and higher homologues; similarly, *N,N'*-dimethylethylene urea and homologues	253
Poly(*N*-phenylmaleimide)	100–400	Aniline, Ph–N=CH–CH_2–CH_3, *N*-phenylsuccinimide, *N*-phenylmaleimide (trace), Ph–N=CH–CH=CH–CO–NH–Ph	301
Poly(5,5'-bibenzimidazole-2,2'-diyl-1,4-phenylene)	400–700	Phenol, terephthalodinitrile, benzonitrile, 4,4'-diaminodiphenyl, H_2, CO, NH_3, HCN, traces of aniline, carbonaceous residue	56
	570, 700, 1000	H_2 (700 and 1000°C), NH_3 (570 and 700), N_2O, HCN, cyanogen (570 only), CH_4, C_2H_6, ethylene, acetylene (700 and 1000), acetonitrile (700 and 1000), propene (570 and 700), benzene, toluene, benzonitrile (700 only), ethylbenzene, methylbenzonitrile (700 only)	217
Poly(5,5'-bibenzimidazole-2,2'-diyl-1,3-phenylene)	599–667	Gaseous products; H_2, NH_3, HCN, and CH_4; products involatile at ambient temperature after approx. 50% weight loss; benzimidazole (29.8%), benzoxazole (4.9%), 2-methylbenzimidazole (7.3%), 2-phenyl-benzimidazole (24.3%), 2-(3-methylphenyl)benzimidazole (5.3%), 5-(3-aminophenyl)benzimidazole (9.6%), 2-(3-cyanophenyl)benzimidazole (7.8%), 5,5'-bibenzimidazole (4.4%), 2-phenyl-5-(3-aminophenyl)-benzimidazole (4.4%), 2-phenyl-5,5'-bibenzimidazole (1.9%), 2-phenyl-5-(benzoxazolo)-benzimidazole (0.3%)	218
Poly(1,3,5,7-tetraoxo-2,3,6,7-tetra-hydro-(1H,5H)-2,6-benzo[1,2-c : 4,5-c']-dipyrroldiyl-1,4-phenylene-carbonyl-1,4-phenylene) (Poly(pyromellitimide))	700	H_2, CO, CH_4, CO_2, H_2O, benzene, benzonitrile, chain fragments, 60% residue	61
Poly(1,3,5,7-tetraoxo-2,3,6,7-tetra-hydro-(1H,5H)-2,6-benzo[1,2-c : 4,5-c']-dipyrroldiyl-1,4-phenylene-methylene-1,4-phenylene) (Poly(pyromellitimide))	700	H_2, CO, CH_4, CO_2, H_2O, benzene, toluene, benzonitrile, chain fragments, 60% residue	61
Poly(1,3,5,7-tetraoxo-2,3,6,7-tetra-hydro-(1H,5H)-2,6-benzo[1,2-c : 4,5-c']-dipyrroldiyl-1,4-phenylene-oxy-1,4-phenylene) (Poly(pyromellitimide))	700	H_2, CO, CH_4, CO_2, H_2O, benzene, benzonitrile, phenol, chain fragments, 60% residue	61
Poly(1,5-diimino-3,7-dioxo-2,3,6,7-tetrahydro-(1H,5H)-2,6-benzo [1,2-c : 4,5-c']dipyrroldiyl-1,3-phenylene)	450–500	CO, CO_2, HCN, NH_3, H_2 and traces of CH_4 and C_6H_6; NH_3 is the main product at 440°C, CO increases at higher temperatures	219
Poly(1,5-diimino-3,7-dioxo-2,3,6,7-tetrahydro-(1H,5H)-2,6-benzo [1,2-c : 4,5-c']dipyrroldiyl-1,4-phenyleneoxy-1,4-phenylene)	450–500	CO, CO_2 HCN, NH_3, H_2 and traces of CH_4 and C_6H_6; NH_3 is the main product at 440°C, CO increases at higher temperatures	

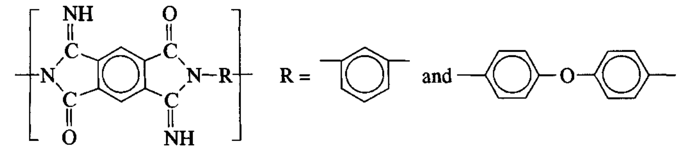


TABLE 4. *cont'd*

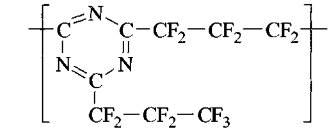
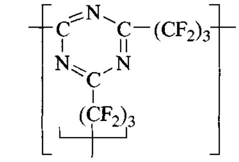
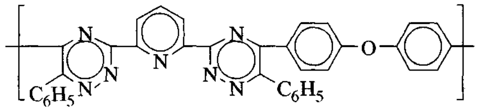
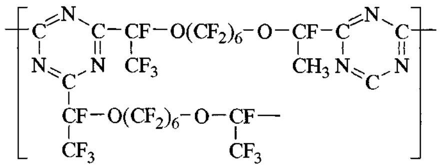
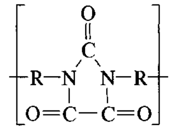
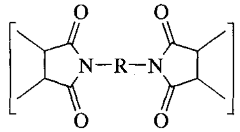
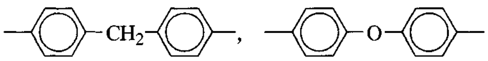
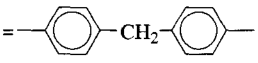
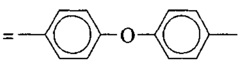
Polymer	Temperature range (°C)	Degradation products	Refs.
Poly(triazines)			
	415–505	C_2F_4, C_2F_6, and smaller amounts of C_3H_6 and C_3H_8 and larger chain fragments	48
	430–503	C_2F_4 with traces of CF_4, C_3H_6, and larger chain fragments	48
	305–465	Only volatile product is benzonitrile	54
	480–660	HCN and NH_3	54
	690–760	H_2 and carbonaceous residue	54
	424–550	Perfluoroethane, perfluoromethane, perfluoroethylene, perfluoropropane, perfluoropropylene, acetal fluoride, carbonyl fluoride	220
Poly(perfluoropyridine)	600	Volatiles comprise CO_2, CO, SiF_4 (all from silica vessel); carbonaceous residue remains	52
Poly(parabanic acid)			
	300	CO_2, CO, NO	221
Poly(bismaleimides)			
 R = $-(CH_2)_2-$, $-(CH_2)_6-$, $-(CH_2)_8-$, $-(CH_2)_{10}-$, $-(CH_2)_{12}-$, 	350–500	Aliphatic: C_2–C_6 fractions, maleimide (MI), succinimide (SI) MI–CH_3, SI–CH_3, MI–C_2H_5, SI–C_2H_5, MI–C_3H_7, SI–C_3H_7, MI–C_4H_9, SI–C_4H_9, MI–C_5H_{11}, SI–C_5H_{11}, MI–$(CH_2)_2$–MI, SI–$(CH_2)_2$–SI, MI–$(CH_2)_6$–MI, MI–$(CH_2)_8$–MI, MI–$(CH_2)_{10}$–MI, MI–$(CH_2)_{12}$–MI	222
R = 	350–500	Benzene, toluene, aniline, SI, methylaniline, phenylisocyanate, tolylisocyanate, and various other products (see Ref.)	222
R = 	350–500	Aniline, phenol, SI, anisidine, phenylisocyanate, and various other products (see Ref.)	222
Poly(3-(4-octylphenyl)-2,2′-bithiophene)	800	H_2S, COS, SO_2, CH_3SH, CS_2, S_8, C_1–C_8 alkanes and alkenes, benzene, ethylbenzene, toluene, styrene, octylbenzene, thiophene, methylthiophene, bithiophene	284
Poly(3-octylthiophene)	550–1400	C_1–C_8 alkanes and alkenes, H_2S, CS_2, benzene, toluene	284
Poly(3-octyl-2,2′-bithiophene)	550–1400	C_1–C_8 alkanes and alkenes, H_2S, CS_2, benzene, toluene	284
Poly(3-(4-octylphenyl)thiophene)	550–1400	C_1–C_8 alkanes and alkenes, H_2S, CS_2, benzene, toluene	284

TABLE 5. CELLULOSE AND ITS DERIVATIVES

Polymer	Temperature range (°C)	Degradation products	Refs.
Cellulose	250–397	H_2O with smaller amounts of CO_2 and CO and a tar containing principally levoglucosan	17,18
	Ambient to 500	H_2, CO, CO_2, H_2O, furan, furancarboxyaldehyde, methylfurans, acetone, hydroxypropanone, butenal, butanone, butanedione, levoglucosan	273
–, α form	330–440	Fixed gases (not identified), pentene, acetaldehyde, furan, propionaldehyde, acetone, acrolein, 2-methylfuran, butyraldehyde, methyl ethyl ketone, benzene, 2,5-dimethylfuran, methyl vinyl ketone, 2,3-butanedione, toluene, crotonaldehyde, H_2O, cyclopentanone, cyclooctatetraene, acetol, pyruvaldehyde, acetic acid, furfural, formic acid, 5-methyl-2-furfural, furfuryl alcohol, butyrolactone, 2-hydroxy-3-methyl-3-cyclopenten-2-one, phenol, *o*-cresol, *m*-cresol, *p*-cresol, 2,5-dimethylphenol, 3,4-dimethylphenol, 5-hydroxymethylfurfural	162
Cellulose (oxidized)	180–331	Mainly H_2O and CO_2, smaller amounts of CO, formaldehyde, methanol, acetic acid, ethanol and acetaldehyde, and very little tar	
Cellulose triacetate	250–310	Product fraction volatile at 25°C contains acetic acid, CO_2, CO, CH_4, H_2, acetaldehyde and acetone; heavier fractions do not contain levoglucosan acetate	18
	250–900	Main products: acetic acid, water, CO, CH_4, H_2, CO_2; minor products: ketene, acetaldehyde, acetone, acetylene, ethylene, ethane, propylene, and C_4, C_5 and C_6 hydrocarbons	223
	230–320	Acetic acid, acetyl derivatives of D-glucose	224
Ethyl cellulose	306	H_2O, CO, CO_2, C_2H_4, C_2H_6, C_2H_5OH, CH_3CHO, aliphatic compounds, furan derivatives	224

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TABLE 5. CELLULOSE AND ITS DERIVATIVES

Polymer	Temperature range (°C)	Degradation products	Refs.
Cellulose	250–397	H_2O with smaller amounts of CO_2 and CO and a tar containing principally levoglucosan	17,18
	Ambient to 500	H_2, CO, CO_2, H_2O, furan, furancarboxyaldehyde, methylfurans, acetone, hydroxypropanone, butenal, butanone, butanedione, levoglucosan	273
–, α form	330–440	Fixed gases (not identified), pentene, acetaldehyde, furan, propionaldehyde, acetone, acrolein, 2-methylfuran, butyraldehyde, methyl ethyl ketone, benzene, 2,5-dimethylfuran, methyl vinyl ketone, 2,3-butanedione, toluene, crotonaldehyde, H_2O, cyclopentanone, cyclooctatetraene, acetol, pyruvaldehyde, acetic acid, furfural, formic acid, 5-methyl-2-furfural, furfuryl alcohol, butyrolactone, 2-hydroxy-3-methyl-3-cyclopenten-2-one, phenol, *o*-cresol, *m*-cresol, *p*-cresol, 2,5-dimethylphenol, 3,4-dimethylphenol, 5-hydroxymethylfurfural	162
Cellulose (oxidized)	180–331	Mainly H_2O and CO_2, smaller amounts of CO, formaldehyde, methanol, acetic acid, ethanol and acetaldehyde, and very little tar	
Cellulose triacetate	250–310	Product fraction volatile at 25°C contains acetic acid, CO_2, CO, CH_4, H_2, acetaldehyde and acetone; heavier fractions do not contain levoglucosan acetate	18
	250–900	Main products: acetic acid, water, CO, CH_4, H_2, CO_2; minor products: ketene, acetaldehyde, acetone, acetylene, ethylene, ethane, propylene, and C_4, C_5 and C_6 hydrocarbons	223
	230–320	Acetic acid, acetyl derivatives of D-glucose	224
Ethyl cellulose	306	H_2O, CO, CO_2, C_2H_4, C_2H_6, C_2H_5OH, CH_3CHO, aliphatic compounds, furan derivatives	224

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Radiation Chemical Yields: *G* Values

M. C. Senake Perera
Magnetic Resonance Facility, School of Science, Griffith University, Nathan, Qld 4111, Australia

David J. T. Hill
Department of Chemistry, University of Queensland, St Lucia, Qld 4072, Australia

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A. INTRODUCTION

The *G* values quoted in the following tables are defined as the radiation chemical yields of individual atomic or molecular events for 100 eV of energy absorbed by the system. *G*(R) represents the yield of free radicals, *G*(X) the yield of crosslinks, *G*(S) the yield of main chain scission, and *G*(products) the yield of product molecules per 100 eV of absorbed radiation.

This table has been compiled from the polymer literature that has been published since the third edition of the "Polymer Handbook" (i.e. 1986–1997). In many cases, the tabulated data are only representative of the total data in the paper, and the original publication should be consulted.

B. TABLES OF *G* VALUES

Notes to the Tables

General: Unless otherwise stated, the conditions applying are γ-rays, vacuum, room temperature (ambient).

Symbols/Abbreviations

+	cation radical	d.b.	double bond
−	anion radical	*t*-v	*trans*-vinylene
vac	vacuum	Y	crosslinks
RT	room temperature	X	crosslinks
e	electron beam	n	neutron

TABLE 1. HOMOPOLYMERS

Polymer	*G*(R)	*G*(X)	*G*(S)	*G*(products)	Radiation conditions	Comments	Refs.
1.1. POLYDIENES							
Polybutadiene				38.7 (d.b.)	e, 263 K	Excitation scavenger	64
			610 (1,2)			1, 2-PBD	138
	0.0054				77 K	Radical pairs, isotactic	74
		9.3		112 (Vinyl)		Syndiotactic	97
		105		Various	e	*cis* 1,4	84
	2.1	3.36/9.4	0.34/0.19		77 K/RT		98
		5.3	90		Air, 295 K	Effect of pressure	104
	Various	Various		Various	Various	Review	186
						G(Cy) > *G*(X) *G*(X) depend on MW	261
						G (initiation), *G*(X) increases *G*(Cy), *G*(db) decreases with Crosslinker	262
		41			Vac, 303 K		180
Poly(2-phenyl butadiene)		7.2			Vac/303 K, ethylene dichloride		178
Polyisoprene	0.009				77 K	Radical pairs	74
	0.5–0.8	1.6–2.1		94–168 (d.b.), CH_4, H_2		Var *cis* content	15
	Various	Various		Various	Various	Review	186
NR latex		Various				+ acrylate	248
Polychloroprene	3.0	3.9		2.8 (–Cl)	Vac/77, 303 K		179
1.2. POLYOLEFINS							
Squalene				3.0 (H_2)			235
Poly(butene-1)		1.0	3.2	13.9 (–isotactic pentad)	RT, vac		226
Poly(ethylene)		1.09–1.39			e, air		89
		0.63	4	7 (COOH)	Vac/O_2		101
			4.1	9.1 (O_2)			107
	4			–2 (*t*-v)	300 K		172
		1.4	0.48				116
		15–30	8–15	Carries	Air, 300/450 K	Pressure effects	169
		0.25					30
		1.50–2.40	1.08–1.69	Various	303–373 K	e pre-irradiated	63
	2.8, 5.8 (C_2D_4)				He, 77 K		52
			2.4		O_2, CCl_4		147
						Fibers, *G*(S)/*G*(X) = 1	151
		1.1–2.8	0.05–2.7			e, N_2	155
				Various gases	Air	Various compounds	70
		1.1	<0.05			e, N_2	87
		1.5	0.48			Gamma/n	174
	2.6/0.56 (alkyl)				Gamma/alpha, 77 K		163
		0.74 G (H) 0.27 G (Y)			Vac, molten state		183
		1.0	0.2	3.9 (H_2)			228
				3.5 (damage)		Crystalline region units	270

TABLE 1. *cont'd*

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
–, LDPE	2.5 (alkyl)				77 K		177
				12.4–15.4 (O_2)	O_2		96
					air	G(S)/G(X) = 1.6	117
				4.45 (butanes)	303 K		10
				Various	298–423 K	$+I_2$	27
				– 1.9 (*t*-v)		$+CH_3SH$ antioxidants	71
				Alkanes			129
	3.0 (total)				77 K		164
	2.8 (alkyl)						
				Various G(*t*-v)			231
–, LLDPE		2.4	0.4				105
				Various	Air	Butene-1, hexene-1	184
–, HDPE		1.3			Air		88
	2.9–3.6				77 K		92
	2.3–4.5(alkyl)				77 K	Morphology	177
				0.16 (butanes)	303 K		10
	0.3*					Allylic	28
	0.21						32
				Alkanes			125
		0.3, 0.43		Y, C = C, (*t*-v)		Monolayer crystals	45
		3.7			303 K		47
		0.76 (bulk)		– 9.6 (*t*-v)	Air, 77 K/RT	Warming, morphology	134
		1.6*				*G(X/unsat.)	75
–, HDLPE	5.5	0.76				77 K	79
				2.4 (*trans*)			240
				0.7 (*cis*)			
–, Chlorosulfonated				4–5 (gas)			119
polyisobutylene			4.0		e		131
	2.5				77 K		133
			3.8–11.1		Various temperatures		78,90,100
	Various		Various	Various	Various		186
	2.1		3.6	Various	Vac/77, 303 K		
Poly(4-methylpentene-1)				0.3,0.6*	N2/air	*G(S)/G(X)	43
polypropylene	4.8, 2.7(dPP)				He, e, 77 K		52
			3.1/0.64		Air/vac	Also 373–623 K	129
			9.4		$O_2 + CCl_4$		147
				2.9 (H_2)		Also O_2	158
			2.19*		$+CCl_4$	Decreases with dose *G(S) – G(X)	159
				Various	Air		118
				Various	Air		40
i-Polypropylene				94 (-*i*-pentad) Various (pentad sequences)	Gamma		244
				220 (-*i*-pentad)	e		245
1.3. POLYACRYLATES							
Poly(acrylic acid)				Various gases	Vac/air		170
	3.6						2
	3.49				293–308 K		4
		0.0	0.44		Vac		185
				Various	77, 300 K		189
		0.47	0.62				190
				Various	Gamma, aq.		233
Poly(acrylic anhydride)			1.1*			*G(S) – S(X)	59
Poly(methyl acrylate)				H_2, CO, CO_2, CH_4 etc.	195–423		126

TABLE 1. *cont'd*

Polymer	*G*(R)	*G*(X)	*G*(S)	*G*(products)	Radiation conditions	Comments	Refs.
Poly(methyl bromoacrylate)	6.98						139
Poly(methyl α-chloroacrylate)	5.1				77 K		133
		0.3–0.9	3.2–7.4			Dose dependent	24
		0.8	6.0				62
			6.7*			*G(S)−G(X)	17
Poly(methyl α-cyanoacrylate)	1.6				77 K		133
Poly(methyl α-fluoroacrylate)	1.0		0.05		77 K		65

1.4. POLY (METHACRYLATES)

Polymer	*G*(R)	*G*(X)	*G*(S)	*G*(products)	Radiation conditions	Comments	Refs.
Poly(benzyl methacrylate)			0.29*		e	*G(S)−G(X)	22
		0	0		300 K	Syndiotactic	192
			0.14				238
Poly(*t*-butyl methacrylate)			1.28*		e	*G(S)−G(X)	22
Poly(cyclohexyl methacrylate)			0.44*		e	*G(S)−G(X)	22
			2.4*	Various		*G(S)−G(X)	120
Poly(glycidyl methacrylate)		9.2					246
Poly(hexafluoroisopropyl methacrylate)			2.6		7 K		65
Poly(hexyl methacrylate)			0.38*		e	*G(S)−G(X)	22
Poly(isobutyl methacrylate)			1.1*		e	*G(S)−G(X)	22
		0.1	0.8		300 K	Syndiotactic	192
Poly(2-methyl heptyl methacrylate)		0.5	0.3		300 K	Syndiotactic	192
Poly(methacrylic acid)			3.4		N_2	Aq. solution	91
				Various	Gamma/e		176
			0.6/2.9		77/273 K		123
			4.8		77 K		133
		0.2	6.0				185
				Various	77, 303 K		189
		0.04	6				195
Poly(methacrylic anhydride)				Various	Gamma/e		176
			1.8–2.9				59
Poly(methyl methacrylate)			1.9 (DMF) 1.3 (THF)			Soln.	59
	1.1–1.5(+)		1.5				73
	0.7–0.9(−)				77 K	Aromatic additives	57
	0.5, 1.5(+)				77 K	Aromatic additives	51
	2.8–4.1				303, 343 K	Absorbed on zeolite	53
			1.3		77 K		65
			1.31				50
			1.9		e		131
	0.58				77 K		132
			1.63, 1.09		Gamma/n, vac/air 206 K		135
	1.42		1.4				139
			1.5/0.33		Gamma/X	Si wafers	152
			1.2				161
				Various	e/gamma, 303–383 K		176
			0.71–1.63		Gamma/n, vac/air		86
	1.9/4.1				77/273 K	Various radicals	173
	1.04/1.11				Vac/air, 273 K		146
	1.9, 4.4				77 K	Bulk, alcohol	171
	1.5						162
			1.5*			*G(S)−G(X)	17
				Various		+ ethane diol	14
				15.8 (units)	Air	Isotactic	23
				0.34 (H_2)			33
			18.6		Vac, 363 K	Isotactic	187
			0.22,0.46,1.08	Various	Deep UV, e, X-ray		188

TABLE 1. *cont'd*

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
			1.5			Isotactic	190
			1.1		300 K	Syndiotactic	192
			1.7		N_2, RT		222
			1.7		Vac	Protons, gamma	223
			1.6		N_2	e, gamma	224
			0.99, 0.4		Vac	C_5+, O_5+ions	225
			0.77				238
			5.1 (soln.)			*i*-PMMA	249
			0.89 (amorphous solid)				
			0.48 (crystalline solid)				
			1.21 (333 K)				
			0.89 (303 K)				
			0.46 (195 K)				
				G(damage) = 8.8		Morphology effects, racemization	258
		1.0			Air, RT		264
Poly(1-naphthyl methacrylate)			0.14			Benzene solution	1
			0.14				238
Poly(2-naphthyl methacrylate)			0.19				238
Poly(2,2,2-trichloroethyl methacrylate)		0.03	3.7		Gamma/e, 298–416 K		175
			3.7			Dioxane solution	11
Poly(ethyl methacrylate)		0	1.7		300 K	Syndiotactic	192
Poly(*n*-butyl methacrylate)		0.4	1.3		300 K	Syndiotactic	192
Poly(2-hydroxyethyl methacrylate)	1.2, 1.7				77, 300 K		193
Poly(phenyl methacrylate)			0.44				238

1.5. POLY(STYRENES)

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
Poly(α-methyl styrene)			0.3		e		131
			0.33		Gamma/e, 77–373 K		38
			0.78		273–319 K	Benzene solution	25
		0	0.29 0.48,0.89, 0.97, 1.13		303, 353, 373, 383, 393 K	+ Depolymerization	194
	0.105, 0.05				77, 298 K		197
Poly(*p*-methyl styrene)		0.1			Gamma/e, 77–373 K		38
Poly(styrene)		0.45–7.9			303 K	Emulsion polymerization	48
		0.022	0.022		Air	Sheet	56
		0.17	1.09, 2.12			absorbed on silica gel	58
		0.035–0.042	0.010–0.051	0.032 (H_2)	303–373 K		60
		0.043	0.0009		303 K	Includes lit. review	61
		0.043–0.027	0.086–0.074		303–423 K		67
			0.2*		77 K	*G(S)− G(X)	73
		0.048, 0.021	0.27, 0.07		Air	Various doses	130
	0.05				77 K		132
		0.03/0.2	0.02/0.2		Gamma/n, vac/air, 206 K		135
		0.043	0.00086			Sheet	136
			3.9		O_2+CCl_4 373–623 K		147
		0.02	0.1		Air		157

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TABLE 1. *cont'd*

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
		0.077	0.055				161
	0.0009				77 K	Radical pairs	74
		0.094	0.0027		313 K		81
		Various	Various		Gamma/n, vac/air		85
	1.8				77 K		98
		0.018, 0.15	0.06, 0.07		Gamma/n/alpha, air		112
	0.5				77 K	Warming	19
		0.0174	0.0012				6
		0.0425					7
				0.033 (H_2)			33
		0.014–0.05	0.105		Gamma/e, 77–373 K		38
		0.03–0.05			Abs of air	Various sources	195
		6.7–15.2	24.7–30.4 G(degradation)		Various dose rates	+ Crosslinking agents	196
		0.05	0.01	0.03 (H_2)			228
				H_2, CH_4, C_2H_2, C_3H_4, C_6H_6	Ion beam	Deuterium subs	234
				Various ($-O_2$)		Variable temp. dose rate	250
		Various	Various	Various hydrogen	Vac, various temp.	Tacticity, crystallinity effect	257
		0.03–0.05				Gamma, X-ray, Ne, Ar	255
1.6. POLY(VINYLS)							
1.6.1. ACRYLAMIDES AND NITRILES							
Poly(acrylamide)		2.5			Air/H_2O		149
			0.04		e, O_2	Aq. soln.	103
		5			Aq. soln, 304 K	Hydrogel	108
	0.88	1.33/0.62	0.45/0.52	Various	Vac/air, 77–393 K		167
Poly(methacrylamide)			1.2*			*G(S)–G(X)	141
Poly(acrylonitrile)	3.7–4.1				303 K	Absorbed on zeolite	53
	0.15–3.0						5
	2.8, 4.2	0.59	0.0		77, 300 K		198
Poly(methacrylonitrile)	2.2, 2.8				77, 300 K		200
			0.4–3.3		Absence of O_2	Various sources	195
			3.3 gamma 3.6 X 0.5 Ne 0.4 Ar				255
Poly(α-chloroacrylonitrile)	1.4				77 K		133
			2.7*			*G(S)– G(X)	59
			1.1–7.2		Vac/air	Solution + bulk	99
			3.2				145
			2.1–3.3*			*G(S)– G(X)	59
			3.1–3.3				62
			3.3*			*G(S)– G(X)	17
1.6.2. VINYL MONOMERS							
Poly(*t*-butyl crotonate)		0.66	0.59				54
Poly(*t*-butyl vinyl ether)			3.6, 10.3		273, 348 K		122
Poly(ethyl vinyl ether)			0.36, 0.50		273, 348 K	Liquid	122
Poly(isobutyl vinyl ether)			0.39, 1.73		273, 348 K		122
Poly(isopropyl vinyl ether)			0.86, 1.50		273, 348 K		122

TABLE 1. *cont'd*

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
Poly(methyl vinyl ether)			0.31, 0.64		273, 348 K		122
Poly(tetrafluoroethylene)			0.5		$O_2 + CCl_4$ K	Also 373–623 K	147
Poly(vinyl acetate)	2.4–4.1				243–273 K		21
				0.9–2.4 gel dose	Absence of O_2		195
Poly(vinyl alcohol)			1.08		O_2		236
			1.02		Air		
			0.71		N_2		
Poly(vinyl bromide)				39–55(HBr)		Solution	9
Poly(vinyl butyral)		0.35	0.6		e, N_2		241
Poly(vinyl carbazole)	0.7 (holes)				e		168
Poly(vinyl chloride)	1.7				77 K		165
		2.36			Air	Under pressure	113
				Various	Vac/O_2		115
				7.7 (HCl)	Vac/O_2		119
		10–11	20–115	(d.b.)		THF soln. + additives	8,44
				17(HCl)	e, N_2/vac		154
				0.24 (H_2)	Vac/O_2		160
				8 (HCl)			
				2.8–3.5 (Py +)		G(cation)	247
				0–1.2 (Phenyl +)		273 K	
						G(X) Increases with crosslinker	263
				3.0 (–Cl)			269
Poly(vinyl imidazole)		10–54			Aq	+ Crosslinker	256
Poly(vinyl pyrrolidone)		0.41–0.75				Aq. soln.	12
	3.3				77 K	+ Warming	13
		0.01–1.32				Various solutions	205
1.7. MISCELLANEOUS POLYMERS							
1.7.1. CELLULOSE AND DERIVATIVES							
Cellulose				CO, CHO, COOH	Vac/air		111
			13–186		Vac/air	Post irrad.	26
Cellulose acetate			7.1		Air	H_2O incr. G(S)	156
1.7.2. POLY(SILOXANES)							
Poly(oxydimethyl diphenylsilylene)		Various				Liq.	94
Poly(oxydimethyl silylene)		2.48			N_2, 303 K	Also blends with PS	143
		18.5/120			Air	Effect of pressure	104
		2.7					76
		3.0					80
		2.8				Liquid	82
	Various	Various	Various	Various			186
						G(X) increases with crosslinker	265
Poly(methyl phenyl silane)		0.01–0.21				LET dependence	230
Poly(cyclohexyl methyl silane)	1		1.8–17.4			Dose dependence	232
Poly(dimethyl siloxane)		1.7					243
Silicon containing poly(acetylene)		0.3–2.3				Effect of various pendent groups	252
1.7.3. POLY (AMINO ACIDS)							
Poly(alanine)	2.9		3.8–7.0	Various			95
	3.6			Various			128
Poly(glycine)	2.2		3.0–3.3	Various			95
Poly(tyrosine)	< 0.4		0.12	Various			95
				0.04–0.12 (NH_3)	Air/N_2/N_2O	Aq. soln.	102
Poly(valine)				Various			95

TABLE 1. *cont'd*

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
1.7.4. POLYESTERS							
Poly(hydroxybutyrate)			1.65		Air		191
Poly(L-lactic acid)	2.0, 1.5				77, 300 K		201
	2.37–1.23				77, 300 K		203
Poly(D, L lactic acid)	2.4, 1.2				77, 300 K		201
						Pressure and temp. effect on G(S) and G(X)	274
Poly(glycolic acid)	1.72, 1.47				77, 300 K		203
						Pressure and temp. effects on G(S) and G(X)	274
1.7.5. POLYSULFONES							
Bis-A-PSF	0.13	0.13–1.34	0.11–0.67	Various gases	Various temp		207
	0.13			0.14 (SO_2)			208
	0.57			0.145 (SO_2)			211
Hydroquinone PSF	0.19			0.136 (SO_2)			207
	0.14			0.14 (SO_2)			208
	0.56			0.14 (SO_2)			211
Biphenol PSF	0.084			0.063 (SO_2)			207
	0.084			0.06 (SO_2)			208
	0.51			0.6 (SO_2)			211
Bis-S-PSF	0.128			0.198 (SO_2)			207
PES (Polyethersulfone)	0.24			0.243 (SO_2)			207
1.7.6. POLYKETONES							
PEEK	0.11				Vac, 77 K	209	
	0.004				Vac, 300 K		
	0.001				Air, 300 K		
	1.0e20 spin/kG				77 K	211	
	0.11			0.00054 gases			212
PEEKK	0.12				Vac, 77 K		209
	0.004				Vac, 300 K		
	0.001				Air, 300 K		
	1.1e20 spin/kG				77 K		211
PEEK-Me	0.28				Vac, 77 K		209
	0.009				Vac, 300 K		
	0.001				Air, 300 K		
PEEKK-Me	0.37				Vac, 77 K		209
	0.012				Vac, 300 K		
	0.001				Air, 300 K		
PEK-Ar	0.42				Vac, 77 K		209
	0.039				Vac, 300 K		
	0.005				Air, 300 K		
1.7.7. FLUOROPOLYMERS							
Fluoro elastomers	Various	Various	Various	Various	Various	Review	186
Poly(perfluoroethers)				Various gases	e, argon 9 K		202
				G(decomposition) = 0.2–1.2	e	Structure, temp. effects	259
			G(S)	G(wt. loss), G(gas)			260
Poly(tetrafluoroethylene)			2.15			As polymerized sintered, low crystalline	237
			6.0			Dose rate effects on G(S)	267

TABLE 1. *cont'd*

Polymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
			0.3 at 373 0.57 at 473 0.89 at 573 1.33 at 673 2.07 at 773			+ Dose effects	271
Poly(vinyl fluoride)	0.22			0.07 (Polyvinyl)			46
Poly(vinylidene fluoride)	0.37			0.11 (Polyvinyl)			46
		0.46–0.78	0.38–0.86	1–4 (HF)	293 K		49
		0.6–0.78	0.29			+ Crosslinker	254
1.7.8. OTHERS							
Aromatic polymers	Various			Various gases			204,211
Alkyl aromatic poly amides		Various	Various			G(S)/G(X) Reduces with increase in methylene	251
Aryloxyphosphazenes		0.22 (R = Me)		0.26			110
–[(R-Ph-O)$_2$-PN]$_n$–		2.12 (R = Et)		0.26			110
–biphenol	0.6, 0.19				77, 300 K		210
–bis phenol	0.6, 0.22				77, 300 K		210
–hydroquinone	0.6, 0.35				77, 300 K		210
Poly(bis(phenoxy)phosphazene)		0.9	0.7				273
Poly(bis(4-methyl-phenoxy)phosphazene)		3.5	2.0				273
Poly(bis(4-*t*-butyl-phenoxy)phosphazene)		0.1	0.1				273
Poly(bis(4-cumyl-phenoxy)phosphazene)		0.2	0.2				273
Poly(1-(*t*-butoxycarbonylthio)ethylene)	3.39				77 K	Warming	13
Poly(*t*-butyl isopropenyl ketone)			1.5				142
Poly(butylene), 1,4-disubstituted(urethane side chain)		0.33					93
Poly(epoxide)(Araldite)	0.59				77 K		36
Poly(ether imide) (Ultem)	0.01	0.139	0.00528		77 K		114
Hyaluronic acid				5.0–6.7 (O_2) 2.0 (H_2O_2) 0–0.1 (peroxide)		pH dependence	253
Poly(1-mercapto ethylene)	2.65				77 K	Warming	19
Poly(oxadiazole-2,5-diyl-1,4-phenylene-phthalidylidene-1,4-phenylene)			Various	Vac/air		39	
Poly(oxycarbonyl-1,1-dimethyl-2-isopropylidene-ethylene)			1.9				50
Poly(oxycarboxyethylene)		0.4–11	14.5, 40.5		N_2 air		35
Poly(oxyethylene)			2.6		e, O_2 air	Aq. soln.	103
		36			200 K		83
	5		57–144	Various		Dose rate dependence	55
Poly(oxyethyleneoxyterephthaloyl)		0.023				Also e	29
Poly(oxymethylene)			8	320 (HCHO)	423 K		37
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenelene oxy-1,4-phenylene-isopropylidene-1,4-phenylene)		0.05	0.012	0.04 gas	300–423 K		153
Poly(oxy-1,4-phenylenesulfony-1,4-phenylene)				0.04 gas	300–423 K		153
Poly(oxysebacoyloxy-1,4-phenylene) isopropylidene-1,4-phenylene)			9		Air		68
Poly(phenylene oxide)	5.7e20 spin/kG				77 K		211
	0.6, 0.33			0.08 H_2 0.015 CH_4	77, 300 K		206
Poly(phenylene sulfide)	0.16, 0.04			0.03H_2	77, 300 K		206
Poly(thiophenylene)		0.015/0.067	0.030/0.15		Gamma/e, vac/air		109
Poly(thiopropylene)	0.0014				77 K	Radical pairs	74

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TABLE 2. COPOLYMERS

Copolymers	*G*(R)	*G*(X)	*G*(S)	*G*(products)	Radiation conditions	Comments	Refs.
2.1. COPOLYMERS WITH ETHYLENE							
Poly(ethylene-*co*-1-butene)				Various	303–423 K	+ Additives	10
				Various			125
Poly(ethylene-*co*-ethyl acrylate)		2.53–3.2			e, air		89
Poly(ethylene-*co*-hexene)				Various			125
				Various	303–423 K	+ Additives	10
Poly(ethylene-*co*-propylene)		0.43, 0.83	0.11, 0.35		303 K	23%, 36% Propylene	127
				Various	Air	+ Additives	70
				Various			125
				Various	303–423 K	+ Additives	10
				8.6–11.0 (O_2)	Air		96
		0.69	1.2	5(COOH)	Air		101
		1.1	0.33				116
		0.9/3.2	3.2		Air	2.0 GPa + variation	104
	2.92	0.26	0.16			In terpolymer	16
				Various gases, O_2	293–298		182
	Various	Various	Various	Various	Various	Review	186
				0.07–0.62 gel dose		various sources	195
Butyl rubber	2.3 (total) 0.19 (allyl)	0–0.6	3.9–6.09	Various chain ends	77–398 K		219
Halogenated butyl rubber	3.7–4.0	Dose dependent	Dose dependent	Various gases	77 K	Chloro and bromo	220
2.2. COPOLYMER WITH METHYL METHACRYLATE							
Poly(methyl methacrylate-*co*-bromomethyl methacrylate)	0.2–1.4	0.06–0.1	0.7–1			139	
Poly(methyl methacrylate-*co*-chlorotrifluoroethylene)			2.1		77 K		65
			2.1				137
Poly(methyl methacrylate-*co*-dichlorostyrene)		1.3				50	
Poly(methyl methacrylate-*co*-dimethyl itaconate)			3.2–3.5*			*G(S)− G(X)	17
			1.0*			*G(S)− G(X)	59
Poly(methyl methacrylate-*co*-hexafluoroisopropyl methacrylate)			2.0–3.1		77 K		65
		0.4	3.6				137
Poly(methyl methacrylate-*co*-hexyl methacrylate)		0.53–0.87				22	
Poly(methyl methacrylate-*co*-methacrylic acid)	1.8, 2.06				273 K		146
	2.9				77 K	20% MAA	133
Poly(methyl methacrylate-*co*-methacrylic acid-styrene)		1.2				238	
Poly(methyl methacrylate-*co*-methacrylic acid-*co*-cumyl phenyl methacrylate)		1.6				238	
Poly(methyl methacrylate-*co*-methacrylic acid-*co*-2-naphthyl methacrylate)			1.09				238
Poly(methyl methacrylate-*co*-methacrylic acid)			2.0				238
Poly(methyl methacrylate-*co*-2 naphthyl methacrylate)			1.06				238
Poly(methyl methacrylate-*co*-methacrylonitrile, vinylidene chloride, methyl-α-chloroacrylate, α-chloronitrile ter polymers)		0.06	1.9–3.1				145
Poly(methyl methacrylate-*co*-methyl bromoacrylate)	2.0	0.41	4.16			139	

TABLE 2. *cont'd*

Copolymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
Poly(methyl methacrylate-*co*-methyl-α-chloroacrylate)	3.1				77 K	14% MCA	133
Poly(methyl methacrylate-*co*-methyl-α-chloroacrylate)		0.06	3.1				24
Poly(methyl methacrylate-*co*-methyl-2-chloroacrylate)			2.8*			*G(S)−G(X)	17
Poly(methyl methacrylate-*co*-methyl-α-chloroacrylonitrile)		6.6			77 K	14% CAN	133
Poly(methyl methacrylate-*co*-methyl-α-cyanoacrylate)	5.9				77 K	20% MCA	133
Poly(methyl methacrylate-*co*-methyl-α-fluoroacrylate)		0-0.44	1.0–2.2		77 K		65
Poly(methyl methacrylate-*co*-methyl fluoroacrylate)			2.4				137
Poly(methyl methacrylate-*co*-3-oximino-2-butanone methacrylate)			> 0.55	1.4–2.4	Various		69
Poly(methyl methacrylate-*co*-tribromophenyl methacrylate)		0.07–0.19	0.38–2.2		Air		72
Poly(methyl methacrylate-*co*-trichloroethyl-alpha-chloroacrylate)		3.8				Also TFEM	140
Poly(methyl methacrylate-*co*-trichlorophenyl methacrylate)		0.05–0.7	0.4–4.4				72
Poly(methyl methacrylate-*co*-trifluoroethylene methacrylate)			1.9		77 K		65
Poly(methyl methacrylate-*co*-vinylidene chloride)			2.8–3.4*			*G(S)−G(X)	17
Poly(methyl methacrylate-*co*-vinylidene fluoride)			1.6				137
			1.6		77 K		65
Poly(glycidyl methacrylate-*co*-ethyl methacrylate)		1.35–8.5	1.51–5.5			Various compositions	246
Poly(glycidyl methacrylate-*co*-ethyl acrylate)	6.5					246	

2.3. COPOLYMERS WITH STYRENE

Copolymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
Poly(styrene-*co*-acrylates)			Various				73
Poly(styrene-*co*-acrylonitrile)		0.077	0.055				34
	0.4–2.8 77 K 0.14–4.2 300 K	0.04–0.59	0.0–0.09		Vac	Various compositions	215,221
Poly(styrene-*co*-butadiene)		4.3/33	2.8/17		Air	Effect of pressure	104
		0.3–3.0			313 K		3
		Various	Various		77 K	Block copolymers	98
Poly(styrene-*co*-cyanoacrylates)		0.04–0.38	2.18–2.47				73
Poly(styrene-*co*-1-mercaptoethylene)	Various				77 K		19
Poly(styrene-*co*-methyl acrylate)				CO, CH_4, CO_2 etc.	Various temperatures	12–80% sty	126
	0.40–2.76 77 K 0.14–1.39 300 K				Vac	Various compositions	216
Poly(styrene-*co*-methyl methacrylate)	0.18			0.83 (gases)	77 K/(R), 300 K/(gas)	51% sty	132
Poly(styrene-*co*-methacrylonitrile)	0.31–2.16					Various compositions	199
Poly(styrene-*co*-butyl vinyl ketone)					e		239
Poly(styrene-*co*-methyl isopropyl ketone)					e		239

2.4. COPOYMERS WITH SULFUR DIOXIDE

Copolymer	G(R)	G(X)	G(S)	G(products)	Radiation conditions	Comments	Refs.
Poly(1-butene-*co*-sulfur dioxide)				Various gases	273–423 K		31,124,150
			12		e		131
Poly(2-butene-*co*-sulfur dioxide)				Various gases	273–423 K		31,124
Poly(cyclohexene-*co*-sulfur dioxide)				Various gases	273–423 K		31,124
Poly(4,4-dimethylpentene-*co*-sulfur dioxide)				Various gases	273–423 K		31,124

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TABLE 2. *cont'd*

Copolymer	*G*(R)	*G*(X)	*G*(S)	*G*(products)	Radiation conditions	Comments	Refs.
Poly(ethylene-*co*-sulfur dioxide)				Various gases	273–423 K		124
Poly(hexene-1-*co*-sulfur dioxide)				Various gases	273–423 K		31,124
Poly(isobutene-*co*-sulfur dioxide)				Various gases	273–423 K		31,124
Poly(3-methyl-1-butene-*co*-sulfur dioxide)	1.8			Various gases	273–423 K		Poly(31,124, 150
Poly(propylene-*co*-sulfur dioxide)	2.2			Various gases	273–423 K		31, 124, 150
2.5. OTHER COPOLYMERS							
Poly(butyl methacrylate-*co*-1-naphthyl methacrylate)			0.14			Benzene soln.	1
Poly(glutamic acid-*co*-tyrosine)		0.03–0.5	0–0.5		300 K	Various compositions	214
Poly(glycolic acid-*co*-1-lactic acid)	2.23–2.36 1.49–1.53				77 K 300 K	Various compositions	203
Poly(glycidyl methacrylate-*co*-3-chlorostyrene)	1.0	0.42					144
Poly(hydroxy butyrate-*co*-valerate)	Various				77, 263, 273, 303 K	Different compositions	217
		3.0–0.5	2.7–3.4	Various gases 1,4-ester	e, gamma		218
Poly(methacrylonitrile-*co*-methyl-2-chloroacrylate)			3.2–43.*			*G(S)− G(X)	17
Poly(*N*-vinylpyrrolidone-*co*-*t*-butyl-*s*-vinyl thiocarbonate)	3.01				77 K	+ Warming	13
Poly(acrylonitrile-*co*-butadiene)		20/150			Air		104
Poly(acrylonitrile-*co*-chloroprene)				3.5 (Gas)			119
Poly(tetrafluoroethylene-*co*-hexafluoropropylene)		3.3					106
Poly(tetrafluoroethylene-*co*-propylene)		1.3	0.42			Emulsion polymer + H_2O	121
				0.6–5.2 (HF)	N_2		116
		1.16			240 C		266
Poly(vinyl chloride-*co*-ethylglycodi-methacrylate)				30 (d.b.)			8
Poly(vinylidene chloride-*co*-dimethyl itaconate)			2.3–2.7			*G(S)− G(X)	17
Poly(vinylidene chloride-*co*-hexafluoro-propylene)		1.2			Vac/air/H_2O	+ Additives	166
Tetrafluoroethylene, perfluoro methyl vinyl ether copolymer 2:1				0.93 (CF_4) 0.31 (COF_2) 0.055 (CO_2) 0.14 (CF_3 OCF_3) 1.43 (total gas) 0.34 (acid fluoride)	e		229
		0.9		New chain ends 1 ($-CF_2-CF_3$) 0.09 ($-CF_2-O-CF_3$) 0.5 (CF_2-COOH) 0.2($-CF=CF_2$)			268
Polysulphone–polydimethyl siloxane *block* copolymer	Various					Dose and molecular weight effects	272

TABLE 3. POLYMERS BLENDS

Polymer Blends	G(X)	G(S)	Comments	Refs.
Poly(methyl methacrylate)/ Poly(1-naphthyl(methacrylate)		0.14	Benzene	1
Poly(methyl methacrylate)/ Poly(styrene-*co*-acrylonitrile)	0.025	0.051	50% PMMA	161
Poly(methyl methacrylate)/styrene-acrylonitrile	0.041	0.027	SAN 100	242
	0.034	0.15	85	
	0.02	0.21	50	
	0.008	0.23	15	
Poly(methyl methacrylate)/Acrylonitrile	0.042	0.14	ACN 100	242
	0.036	0.25	85	
	0.009	0.34	50	
	0.01	0.88	15	

TABLE 4. COMPOSITES

Polymer Composites	G(products)	Radiation conditions	Refs.
Glass-DGEBA-DDM	H_2, CO, CO_2	77 K, RT	227
Color-DGEBA-DDM	H_2, CO, CO_2	77 K, RT	227

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SECTION III

PHYSICAL PROPERTIES OF MONOMERS AND SOLVENTS

Physical Properties of Monomers

Daniel R. Bloch
Lakeshore Research, 5536 W. Branch Trail, Racine, WI 53402, USA

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A. INTRODUCTION

This chapter contains some of the principal properties of the more common monomers. The monomers are arranged alphabetically, in groups, with derivatives listed alphabetically within the groups. Compounds are listed under their most commonly used names in polymer chemistry. Therefore, some names are not in agreement with the nomenclature rules of the International Union of Pure and Applied Chemistry.

Data are taken from a variety of published literature, including the 3rd edition of the "Polymer Handbook", "The Brandon Worldwide Monomer Reference Guide and Sourcebook", the "Aldrich Catalog Handbook of Fine Chemicals", and "Polysciences Monomers/Polymers, Scientific Polymer Products", "TCI America", "Lancaster and Janssen Chemica" catalogs. Where a range is reported in the literature, the average value is used here for melting points and boiling points. No attempt was made to verify the reported values experimentally.

Linear structures are given for most monomers. Molecular formulas are provided when linear structures cannot be unambiguously drawn.

Molecular weight is calculated based on the International Atomic Weight values.
Boiling point is given in degrees Celsius (°C), at 760 mmHg, unless indicated otherwise by the value in mmHg following a slash (/).
Melting point is given in degrees Celsius (°C), at 760 mmHg, unless indicated otherwise by the value in mmHg following a slash (/).
Refractive index is given at 20°C, unless indicated otherwise by the temperature in Celsius following a slash (/).
Density is relative to water at 4°C and measured at 20°C, unless otherwise indicated by the value following a slash (/).
Flash point was determined by the closed-cup method, using a Setaflash apparatus.

RTECS# is the reference to the Registry of Toxic Effects of Chemical Substances.

R&S is the reference found in the "Sigma–Aldrich Library of Regulatory & Safety Data", available from Aldrich Chemical Company.

FT-NMR is the reference to spectra in the "Aldrich Library of ^{13}C and ^{1}H FT-NMR Spectra", available from the Aldrich Chemical Company.

FT-IR is the reference to spectra in the "Aldrich Library of FT-IR Spectra", available from the Aldrich Chemical Company.

Merck Index is the reference to "The Merck Index", Merck & Co., Inc., Whitehouse Station, NJ.

Beilstein is the reference to "Beilsteins Handbuch der Organischen Chemie", Springer–Verlag, New York, NY.

Fieser is the reference to L. F. Fieser and M. Fieser, "Reagents for Organic Synthesis", John Wiley, New York, NY.

Abbreviations: (d) decomposes; (s) sublimes; (aq) aqueous.

B. TABLES OF PHYSICAL PROPERTIES

TABLE 1. ACETYLENES

Name	Formula $RC \equiv CR'$ R	R'	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Acetylene	–H	–H	74-86-2	26.04	– 82	– 84(s)
–, Chloro	–Cl	–H		60.48	– 32	– 126
–, Dichloro-	–Cl	–Cl		94.93		– 66
–, Diphenyl-	$-C_6H_5$	$-C_6H_5$	501-65-5	178.23	60	170/19
–, Phenyl-	$-C_6H_5$	–H		102.14	143	

TABLE 2. ACID DICHLORIDES

Name	Formula ClC(O)RC(O)Cl R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Adipoyl	$-(CH_2)_4-$	111-50-2	183.03	106/2	
Azelaoyl	$-(CH_2)_7-$	123-98-8	255.12	166/18	
Diethylmanoyl	$-C(CH_2CH_3)_2-$	54505-72-5	197.06	198	
Dodecanedioyl	$-(CH_2)_{10}-$	4834-98-4	267.20	140/0.5	
Glutaryl	$-(CH_2)_3-$	2873-74-7	169.01	217	
Isophthaloyl	$-C_6H_4-$	99-63-8	203.02	276	43
Malonyl	$-CH_2-$	1663-67-8	140.95	54/19	
Methylpimeloyl	$-(CH_2)_2CH(CH_3)(CH_2)_2-$	44987-62-4	197.06	118/10	
Oxalyl	–CO–CO–	79-37-8	126.93	61	– 8
Phthaloyl	$-C_6H_4-$	88-95-9	203.02	270	12
Pimeloyl	$-(CH_2)_5-$	142-79-0	197.06	113/5	
Sebacoyl	$-(CH_2)_8-$	111-19-3	239.14	168/12	– 2.5
Suberoyl	$-(CH_2)_6-$	10027-07-3	211.09	162/15	
Succinyl	$-(CH_2)_2-$	543-20-4	154.98	190	16
Terephthaloyl	$-C_6H_4-$	100-20-9	203.02	266	80
Thionyl	ClC(S)Cl	7719-09-7	118.97	79	– 105

TABLE 3. ACROLEINS

Name	Formula HC(O)CR = CHR' R	R'	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Acrolein	–H	–H	107-02-8	56.06	53	– 87
–, 2-Chloro-	–Cl	–H		90.51	40/30	
–, 2-Methyl-	$-CH_3$	–H	78-85-3	70.09	68	– 81
–, 3-Methyl-, *trans*-(Crotonaldehyde)	–H	$-CH_3$	123-73-9	70.09		104
–, 2-Chloro-3-methyl-	–Cl	$-CH_3$		104.54	148	

TABLE 4. ACRYLAMIDES/METHACRYLAMIDES

Name	R	R'	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
4.1. ACRYLAMIDES $H_2C{=}CHC(O)NRR'$						
Acrylamide	–H	–H	79-06-1	71.08	125/25	
–, Acetyl-, *N*-	$-C(O)CH_3$	–H	1432-45-7	113.12		129
–, Adamantyl-, *N*-	$-C_{10}H_5$	–H	19026-83-6	205.30		155
–, Allyl-, *N*-	$-CH_2CH{=}CH_2$	–H	2555-13-7	111.14	120/19	
–, Benzyl-, *N*-	$-CH_2C_6H_5$	–H	13304-62-6	161.20		70
–, Butoxymethyl-, *N*-	$-CH_2O(CH_2)_3CH_3$	–H	1852-16-0	157.21	125/0.3	– 9
–, *tert*-Butyl-, *N*-	$-C(CH_3)_3$	–H	107-58-4	127.19		128
–, Cyclohexyl-, *N*-	$-C_6H_{11}$	–H	3066-72-6	153.23		113
–, Cystamine-bis-, *N,N'*-	$-CH_2CH_2SSCH_2CH_2-$	–H	60984-57-8	260.38		123
–, Diacetone-, *N*-	$-C(CH_3)_2CH_2C(O)CH_3$	–H	2873-97-4	169.23	93/0.1	55
–, Diallyl-, *N,N*-	$-CH_2CH{=}CH_2$	$-CH_2CH{=}CH_2$	3085-68-5	151.21	108/3	
–, Di-*n*-butyl-, *N,N*-	$-(CH_2)_3CH_3$	$-(CH_2)_3CH_3$	2274-13-7	183.29	97/1	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.000			AO9600000						1,11
0.990				1(2),2711I	1(3), 533A	1(2),946B	11,9428	5,656	1,335
0.929	1.548								

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.259	1.4700	>110		1(1), 867J		1(1),741A		2,653	
1.143	1.4680	>110		1(1),869C				2,709	
1.145	1.4590	74		1(1),867G	1(1),1211B	1(1),740B		2,687	
1.069	1.4680	>110		1(1),869E	1(1)1212C			2(4),2127	
1.324	1.4720	107		1(1),867I	1(1),1212A	1(1),740D		2,634	
		180	NT2625000	1(2),1981H		1(2),352A		9,834	
1.449	1.4650	47		1(1),867F	1(1),1211A	1(1),740A		2(1),252	12,291
1.217	1.4720	>110		1(1),867K	1(1),1212B	1(1),741B			
1.455	1.4290	None	KI2950000	1(1),867D		1(1),739C	11,6867	2,542	17,241
1.409	1.5684	>110		1(2),1981G		1(2),351D	11,7439	9,805	14,263
1.205	1.4690	>110		1(1),869A		1(1),741C		2,671	
1.121	1.4680	>110		1(1),869D		1(1),742B		2,719	
1.172	1.4680	>110		1(1),869B		1(1),741D		2,694	
1.407	1.4680	77	WN4900000	1(1),867H	1(1),1211C	1(1),740C	11,8844	2,613	
		180	WZ1797000	1(2),1981I		1(2),352B		9,844	
1.631	1.5190	None	XM5150000	1(2),3197F		1(2),1227B	11,9278		13,297

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.839	1.4025	−19	AS105000	1(1),515A	1(1),733B	1(1),470D	11,122	1,725	10,2
1.199	1.463								
0.847	1.4160	−16	OZ2625000	1(1),515B	1(1),733C	1(1),471A		1(3),2981	
0.846	1.4365	9	GP9625000	1(1),515G		1(1),472C	11,2599	1,728	
1.478									

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.122			AS3325000	1(1),877K	1(1),1221A	1(1),749B	11,123	2,400	
0.9790	1.4620	>110	AS3450000						
			AS3460000					4(4),664	
		>110	AS3475000	1(1),887I	1(1),1236A	1(1),750C	11,2943		

TABLE 4. *cont'd*

Name	R	R′	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
–, Diethyl-, *N,N*-	$-CH_2CH_3$	$-CH_2CH_3$	2675-94-7	127.19	93/19	
–, 1,2-Dihydroxyethylene-bis-,*N,N′*	–CH(OH)CH(OH)–	–H	868-63-3	200.19		156(d)
–, Diisopropyl-, *N,N*-	$-CH(CH_3)_2$	$-CH(CH_3)_2$	44975-46-4	155.24	54/0.4	
–, 4,4-Dimethoxybutyl-, *N*-	$-(CH_2)_3CH(OCH_3)_2$	–H	38486-53-2	187.24	135/0.7	18
–, Dimethyl-, *N,N*-	$-CH_3$	$-CH_3$	2680-03-7	99.13	82/21	
–, 3-(Dimethylamino)-propyl-, *N*-	$-(CH_2)_3N(CH_3)_2$	–H	3845-76-9	156.23	117/2	
–, 1,1-Dimethyl-2-sulfoethyl-, *N*-(AMPS)	$-C(CH_3)_2CH_2SO_3H$	–H	15214-89-8	207.25		195(d)
–, Diphenylmethyl-,*N*-	$-CH(C_6H_5)_2$	–H	10254-08-7	237.30	178	
–, Ethylenebis-,*N,N′*-	$-CH_2CH_2-$	–H	2956-58-3	168.20		140
–, Ethylhexyl-,*N*-	$-CH_2CH(CH_2CH_3)(CH_2)_3CH_3$	–H	91625-16-0	183.30	123/0.5	
–, 2-Glycolic acid, *N*-	–CH(OH)C(O)OH	–H	6737-24-2	163.13	95	
–, 2-Glycolic acid methyl ester, *N*-	$-CH(OH)C(O)OCH_3$	–H	77402-03-0	173.17		74
–, Hexamethylenebis-, -*N,N′*	$-(CH_2)_6-$	–H	7150-41-6	224.28		135
–, *tert*-Hexyl-, *N*-	$-CH_2CH_2C(CH_3)_3$	–H	51330-07-5	155.24		100
–, Hydroxymethyl-, *N*- (solution)	$-CH_2OH$	–H	924-42-5	101.11		
–, Isobornyl-, *N*-	$-C_{10}H_{17}$	–H	17159-04-5	207.31		135
–, Isobutoxymethyl-, *N*-	$-CH_2OCH_2CH(CH_3)_2$	–H	16669-59-3	157.21	108	
–, Isopropyl-, *N*-	$-CH(CH_3)_2$	–H	2210-25-5	113.16	90/2	61
–, Isopropylidenebis-, *N,N′*-	$-C(CH_3)_2-$	–H		182.22		210
–, 3-Methoxypropyl-, *N*-	$-(CH_2)_3OCH_3$	–H	107374-86-7	143.19	99/0.3	
–, Methyl-, *N*-	$-CH_3$	–H	1187-59-3	85.11	106/4	
–, Methylenebis-, *N,N′*-	$-CH_2-$	–H	110-26-9	154.17		>300
–, (1-Methoxy)						
–, (Methoxy)-acetoxymethyl-, *N*-	$-C(OCH_3)C(O)OCH_3$	–H	77402-03-0	173.17		73
–, Morpholinoethyl-, *N*-	$-CH_2CH_2NC_4H_8O$	–H	5117-12-4	141.17	158/50	>110
–, 1-Naphthyl-, *N*-	$-C_{10}H_7$	–H	22302-62-1	197.24		138
–, Octadecyl-, *N*-	$-(CH_2)_{17}CH_3$	–H	1506-54-3	323.56		75
–, Octamethylenebis-, *N,N′*-	$-(CH_2)_8-$	–H	2945-02-0	252.35		138
–, *tert*-Octyl-, *N*-	$-(CH_2)_4C(CH_3)_3$	–H	4223-03-4	183.29		58
–, Phthalamidomethyl-, *N*-	$-CH_2NC_8H_4O_2$	–H	80500-94-3	230.22		190
–, 2,2,2-Trichloro-1-hydroxyethyl-, *N*-	$-CH(OH)CCl_3$	–H		218.47		170
–, Tri(hydroxymethyl)-methyl-, *N*	$-C(CH_2OH)_3$	–H	13880-05-2	175.18		139
–, 1,1,3-Trimethylbutyl-, *N*-	$-C(CH_3)_2CH_2CH(CH_3)_2$	–H	25269-93-6	169.27	125/25	55
–, Trimethylenebis-, *N,N′*-	$-(CH_2)_3-$	–H	4887-13-2	182.22		112
–, Triphenylmethyl-, *N*-	$-C(C_6H_5)_3$	–H	102548-89-0	313.40		204
4.2. METHACRYLAMIDES $H_2C{=}C(CH_3)C(O)NRR'$						
Methacrylamide	–H	–H	79-39-0	85.11	215	109
–, Acetyl-, *N*-	$-C(O)CH_3$	–H	44810-87-9	127.14	76/1.2	138
–, Acetylphenyl-, *N*-	$-C_6H_4C(O)CH_3$	–H	58813-69-7	203.24		138
–, Allyl-, *N*-	$-CH_2CH{=}CH_2$	–H	2186-33-6	125.17	90/2.2	
–, 3-Aminopropyl-, *N*-, hydrochloride	$-(CH_2)_3NH_2{\cdot}HCl$	–H	72607-53-5	178.66		124
–, Benzyl-, *N*-	$-CH_2C_6H_5$	–H	3219-55-4	175.23		82
–, Bis(diethylaminoethyl)-, *N,N*-	$-CH_2CH_2N(CH_2CH_3)_2$	$-CH_2CH_2N(CH_2CH_3)_2$	76392-05-7	183.28	122/0.4	
–, Butoxymethyl-, *N*-	$-CH_2O(CH_2)_3CH_3$	–H	5153-77-5 28384-61-4	171.24	105/0.3	
–, *tert*-Butyl-, *N*-	$-C(CH_3)_3$	–H	6554-73-0	142.20	163	60
–, 2-Cyanoethyl-, *N*-	$-CH_2CH_2CN$	–H	24854-94-2	138.17		46
–, 2-Cyanoethyl-, *N*-, methyl-, *N*	$-CH_2CH_2CN$	$-CH_3$		152.20	113/1	46

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
				1(1),885K	**1**(1),1233C				
0.962	1.4730	71	AU3230000	**1**(1),893I	**1**(1),1244C	**1**(3),784B		**4**(3),130	
0.949	1.4820	>110						**4**(4),1268	
		160		**1**(1),1065K	**1**(1),1438C				
				1(1),883K				**4**(3),526	
				1(1),915E	**1**(1),1276B	**1**(1),781A			
			AI8967330	**1**(1),913D	**1**(1),1272B				
1.074	1.4130	None	AS3600000	**1**(1),885J		**1**(1),750A		**2**(4),1472	
0.970	1.4610	79	AS3630000						
			AS3675000					**4**(4),517	
			AS3678000	**1**(1),883J	**1**(1),1230C	**1**(1),749D			
			AI8967330	**1**(1),913D	**1**(1),1272B				
1.122	1.5120	>110						**27**(4),278	
				1(1),883M	**1**(1),1231B				
1.10			UC6475000	**1**(1),877L	**1**(1),1221B	**1**(1),749C		**2**(2),399	
	1.4702								
0.96	1.46	122							
	1.4755								

TABLE 4. *cont'd*

Name	R	R′	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
–, Cyclohexyl-, *N*-	$-C_6H_{11}$	–H	2918-67-4	167.25		102
–, Diallyl-, *N,N*-	$-CH_2CH{=}CH_2$	$-CH_2CH{=}CH_2$	13169-99-8	197.32	50/1.1	
–, Dibenzyl-, *N,N*-	$-CH_2C_6H_5$	$-CH_2C_6H_5$	57625-30-6	265.36		41
–, Dibutyl-, *N,N*-	$-(CH_2)_3CH_3$	$-(CH_2)_3CH_3$	22240-86-4	197.32	81/0.8	
–, 3-Di(butyl)aminopropyl-, *N*-	$-(CH_2)_3N((CH_2)_3CH_3)_2$	–H	76392-03-5	253.41	125/0.13	
–, Diethyl-, *N,N*-	$-CH_2CH_3$	$-CH_2CH_3$	5441-99-6	141.21	82/7	
–, 3-(Diethylamino)propyl-, *N*-	$-(CH_2)_3N(CH_2CH_3)_2$	–H		197.30	134/10	
–, Diisopropyl-, *N,N*-	$-CH(CH_3)_2$	$-CH(CH_3)_2$	51745-62-1	169.27		47
–, 2,2-Dimethoxyethyl-, *N*-	$-CH_2CH(OCH_3)_2$	–H	95984-11-5	173.21		27
–, Dimethyl-, *N,N*-	$-CH_3$	$-CH_3$	6976-91-6	113.16	66/10	
–, 2-(Dimethylamino)ethyl-, *N*-	$-CH_2CH_2N(CH_3)_2$	–H	13081-44-2	156.34	87/1.8	
–, 3-(Dimethylamino)propyl-, *N*-	$-(CH_2)_3N(CH_3)_2$	–H	5205-93-6	170.26	134/2	
–, Dodecyl-, *N*-	$-(CH_2)_{11}CH_3$	–H	1191-39-5	253.43	145/0.08	
–, Ethylenebis-, *N,N′*-	$-CH_2CH_2-$	–H	6117-25-5	196.25		170
–, 2-Ethylhexyl-, *N*-	$-CH_2CH(CH_2CH_3)(CH_2)_3CH_3$	–H		197.32	110/0.3	
–, 2-Hydroxyethyl-, *N*-	$-CH_2CH_2OH$	–H	5238-56-2	129.16	147/1.2	
–, Hydroxymethyl-, *N*-	$-CH_2OH$	–H	923-02-4	115.13	*ca.* 100	– 37
–, 4-Hydroxyphenyl-, *N*-	$-C_6H_4OH$	–H	19243-95-9	177.20		154
–, Isobutoxymethyl-, *N*-	$-CH_2OCH(CH_3)_2$	–H	4548-27-0	171.24	127/5	
–, Isopropyl-, *N*-	$-CH(CH_3)_2$	–H	13749-61-6	127.19	112/115	90
–, Methoxymethyl-, *N*-	$-CH_2OCH_3$	–H	3644-12-0	129.16	80.03	
–, Methyl-, *N*-	$-CH_3$	–H	3887-02-3	99.13	88/3.5	
–, Methylenebis-, *N,N′*-	$-CH_2-$	–H	2359-15-1	182.22		164
–, Methyl-, *N*-, Phenyl-, *N*-	$-CH_3$	$-C_6H_5$	2918-73-2	238.31	88/2	50
–, Methyl-, *N*-, 2,2-dimethoxyethyl-, *N*-	$-CH_3$	$-CH_2CH(OCH_3)_2$	95984-81-9	187.24	72/2	
–, 3-(*N*-morpholino)propyl-, *N*-	$-(CH_2)_3NC_4H_4O$	–H	55937-58-1	212.30	150/0.08	
–, 2-(2-Oxo-1-imidazolidinyl)-ethyl-, *N*-	$-CH_2CH_2C_3H_5N_2O$	–H	3089-19-8	197.24	100	
–, Phenyl-, *N*-	$-C_6H_5$	–H	1611-83-2	161.20		84
–, Phenyl-, *N*-, Phenylethyl-, *N*-	$-C_6H_5$	$-CH_2CH_2C_6H_5$	76392-02-4	266.37		63
–, 3-(Trifluoromethyl)phenyl-, *N*-	$-C_6H_4CF_3$	–H	783-05-1	229.20		95
–, 3-(Trimethylammonium)-propyl-, chloride, *N*- (eq. solution)	$-(CH_2)_3N(CH_3)_3 \cdot HCl$	–H	51410-72-1	220.74		– 22.5

TABLE 5. ACRYLATES/METHACRYLATES

Name	R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
5.1. ACRYLATE, ACIDS/ESTERS $H_2C{=}CHC(O)OR$					
Acid	–H	79-10-7	72.06	139	13
Allyl ester	$-CH_2CH{=}CH_2$	999-55-3	112.13	123	
Anhydride	$-C(O)CH{=}CH_2$	2051-76-5	126.11	97/35	
Benzyl ester	$-CH_2C_6H_5$	2495-35-4	162.19	110/8	
4-Biphenylyl ester	$-C_6H_4C_6H_5$	13026-23-8	226.27		224
Bisphenol A ethoxylate diester	$(-(CH_2CH_2OC_6H_4)_2C(CH_3)_2$	64401-02-1	424		
Bisphenol A diglycidyl ether diester	$(-CH_2CH(OH)CH_2OC_6H_4)_2C(CH_3)_2$	4687-94-9	484.55		
2-Bromo-	$H_2C{=}CBrC(O)OH$	10443-65-9	150.97		63
3-Bromo-, *cis*-	$BrCH{=}CHC(O)OH$	1609-92-3	150.96		63
2-Bromo-, ethyl ester	$H_2C{=}CBrC(O)OCH_2CH_3$	4519-46-4	164.99	72/78	
2-Bromoethyl ester	$-CH_2CH_2Br$	4823-47-6	179.03	52/5	
2-Bromomethyl-	$H_2C{=}C(CH_2Br)C(O)OH$	72707-66-5	164.99		70
2-Bromomethyl-, ethyl ester	$H_2C{=}C(CH_2Br)C(O)OCH_2CH_3$	17435-72-2	193.05	86/20	
2-Bromomethyl-, methyl ester	$H_2C{=}C(CH_2Br)C(O)OCH_3$	4224-69-5	179.02	36/1.3	
1,3-Butylene diester	$-CH_2CH_2CH(CH_3)-$	19485-03-1	198.22	73/0.1	
1,4-Butylene diester	$-(CH_2)_4-$	1070-70-8	198.22	83/0.3	
2-Butylene-1,4 diester	$-CH_2CH{=}CHCH_2-$		127.16	60/23	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
	1.4731								
	1.4600								
	1.4744								
0.940	1.4790	140							
	1.5002								
1.100	1.4300	>110	UC6380000						
0.97	1.46	107							
			SI1225000					**4**(3),276	
	1.4707								
0.97	1.4740								
1.110	1.4560	>110							
1.053	1.427								

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.051	1.4202	54	AS4375000	**1**(1),547A	**1**(1),776A	**1**(1),498B	**11**,124	**2**,397	
0.880	1.4320	8					**2**,400		
	1.4487								
1.0573	1.5143	101							
1.146	1.5450	>110							
1.180	1.5570	>110							
				1(1),563H				**2**,402	
				1(1),563I				**2**(4),1486	
1.4774	1.4770								
				1(1),563K	**1**(1),806C	**1**(1),516C			
1.388	1.478								
1.489	1.490	78	AS4900000	**1**(1),745J	**1**(1),1031C	**1**(3),696D			
1.030	1.4500	93	AS5250000						
1.051	1.4560	>110	UD3130000					**2**(4),170	
0.9344	1.4422								

TABLE 5. *cont'd*

Name	R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
2-(2-Butoxyethoxy)ethyl ester	$-CH_2CH_2OCH_2CH_2O(CH_2)_3CH_3$		232.28	103/23	
2-Butoxyethyl ester	$-CH_2CH_2O(CH_2)_3CH_3$	7251-90-3	172.22	63/2	
n-Butyl ester	$-(CH_2)_3CH_3$	141-32-2	128.17	145	−64
s-Butyl ester	$-CH(CH_3)CH_2CH_3$	2998-08-5	128.17	59/25	
t-Butyl ester	$-C(CH_3)_3$	1663-39-4	128.17	30/25	
2-Chloro-	$H_2C{=}CClC(O)OH$	26952-44-3	106.51	176(d)	60
2-Chloro-, butyl ester	$H_2C{=}CCl(O)O(CH_2)_3CH_3$	13401-85-9	162.62	100/42	
2-Chloro-, ethyl ester	$H_2C{=}CClC(O)OCH_2CH_3$	687-46-7	134.56	41/20	
2-Chloro-, methyl ester	$H_2C{=}CClC(O)OCH_3$	80-63-7	120.54	52/50	
3-Chloro-, *cis*-	$ClCH{=}CHC(O)OH$	1609-93-4	106.51		61
3-Chloro-, *trans*-	$ClCH{=}CHC(O)OH$	2345-61-1	106.51		84
2-Chloroethyl ester	$-CH_2CH_2Cl$	2206-89-5	134.57	64/20	
Cinnamyl ester	$-CH_2CH{=}CHC_6H_5$		188.23	105/2	
Crotyl ester	$-CH_2CH{=}CHCH_3$	23916-33-8	126.16	38/10	
2-Cyano-, butyl ester	$H_2C{=}C(CN)C(O)O(CH_2)_3CH_3$	6606-65-1	153.18	92/6	
2-Cyano-, ethyl ester	$H_2C{=}C(CN)C(O)OCH_2CH_3$	7085-85-0	125.13	90/5	−17
2-Cyano-, isobutyl ester	$H_2C{=}C(CN)C(O)OCH_2CH(CH_3)_2$	1069-55-2	153.18	81/4	
2-Cyanoethyl ester	$-CH_2CH_2CN$	106-71-8	125.13	103/8	−17
Cyclohexyl ester	$-C_6H_{11}$	3066-71-5	154.21	183	
Cyclopentyl ester	$-C_5H_9$	16868-13-6	282.38	145/0.08	
n-Decyl ester	$-(CH_2)_9CH_3$	2156-96-9	212.34	185/50	
2,3-Dibromopropyl ester	$-CH_2CHBrCH_2Br$	19660-16-3	271.94	105/6	
2,3-Dichloropropyl ester	$-CH_2CHClCH_2Cl$	24910-84-7	183.04	58/0.5	
Dicyclopentenyl ester	$-C_{10}H_{13}$	33791-58-1	202.25	105/4	
Dicyclopentenyloxyethyl ester	$-CH_2CH_2OC_{10}H_{13}$	65983-31-5	248.32	100/0.5	
2-(Diethylamino)ethyl ester	$-CH_2CH_2N(CH_2CH_3)_2$	2426-54-2	171.27	171.27	<−60
3-(Diethylamino)propyl ester	$-(CH_2)_3N(CH_2CH_3)_2$		185.27	44/0.1	
Di(ethylene glycol) diester	$-CH_2CH_2OCH_2CH_2-$	4074-88-8	214.22	162	
Dihydrodicyclopentadienyl ester	$-C_{10}H_{15}$	12542-30-2	204.27	119/5	−40
2,3-Dihydroxypropyl ester	$-CH_2CH(OH)CH_2OH$	10095-20-2	146.15	115/0.1	
2-(Dimethylamino) ethyl ester	$-CH_2CH_2N(CH_3)_2$	2439-35-2	143.19	64/12	<−60
3-(Dimethylamino) neopentyl ester	$-CH_2C(CH_3)_2CH_2N(CH_3)_2$	20166-73-8	181.24	53/1.4	
3-(Dimethylamino) propyl ester	$-(CH_2)_3N(CH_3)_2$	18526-07-3	157.22	167	
Dipentaerythritol pentaester	$(-CH_2)_3CCH_2OCH_2C(CH_2OH)(CH_2-)_2$	60506-81-2	524.53		
Di(propylene glycol) diester	$-CH_2CH(CH_3)OCH_2CH(CH_3)-$	85136-76-1	242.27	95/0.5	
Di(trimethylolpropane) tetraester	$((-CH_2)_2C(CH_2CH_3)CH_2)_2O$	94108-97-1	466.53		
Dodecyl ester	$-(CH_2)_{11}CH_3$	2156-97-0	240.39	120/1	
1H,1H,11H-Eicosafluoro-undecylester	$-CH_2(CF_2)_9CHF_2$	4998-38-3	586.17	115/1	49
2-(2-Ethoxyethoxy)ethyl ester	$-(CH_2CH_2O)_2CH_2CH_3$	7328-17-8	188.23	250	
2-Ethoxyethyl ester	$-CH_2CH_2OCH_2CH_3$	106-74-1	144.17	65/16	
Ethyl ester	$-CH_2CH_3$	140-88-5	100.12	99	−72
Ethylene diester	$-CH_2CH_2-$	2274-11-5	170.16	67/2	
2-Ethylhexyl ester	$-CH_2CH(CH_2CH_3)(CH_2)_3CH_3$	103-11-7	184.28	217	−90
Furfuryl ester	$-CH_2C_4H_3O$	10525-17-4	152.15	92/16	
Glycidyl ester	$-CH_2CH(-O-)CH_2$	106-90-1	128.13	115/78	
Glycerol propoxylate triester	$-CH(CH_3)CH_2OCH(CH_2OCH_2CH(CH_3)-)_2$	52408-84-1	428		
1H,1H,2H,2H-Heptadecafluoro-decyl ester	$-CH_2CH_2(CF_2)_7CF_3$	27905-45-9	518.10	100/4	
1H,1H-Heptafluorobutyl ester	$-CH_2CF_2CF_2CF_3$	424-64-6	254.11	121/743	
Heptyl ester	$-(CH_2)_6CH_3$	2499-58-3	170.25	56/1	
Hexadecyl ester	$-(CH_2)_{15}CH_3$	13402-02-3	296.50	170/15	
2,2,3,4,4,4-Hexafluorobutyl ester	$-CH_2CF_2CHFCF_3$	54052-90-3	236.11	48/12	
1H-Hexafluoroisoporpyl ester	$-CH(CF_3)_2$	2160-89-6	222.09	84	
Hexanediol diester	$-(CH_2)_6-$	13048-33-4	226.28	295	
n-Hexyl ester	$-(CH_2)_5CH_3$	2499-95-8	156.23	190	−45
4-Hydroxybutyl ester	$-(CH_2)_4OH$	2478-10-6	144.17	95/0.1	
2-Hydroxyethyl ester	$-CH_2CH_2OH$	818-61-1	116.11	90/12	−101
2-Hydroxy-3-phenoxypropyl ester	$-CH_2CH(OH)CH_2OC_6H_5$	16969-10-1	222.24		
2-Hydroxypropyl ester	$-CH_2CH(OH)CH_3$	999-61-1	130.15	77/15	−92
Isobornyl ester	$-C_{10}H_{18}$	5888-33-5	208.30	275	−15
Isobutyl ester	$-CH_2CH(CH_3)_2$	106-63-8	128.19	132	−61

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.9821	1.4394								
0.9497	1.4323	90							
0.894	1.4180	39	UD3150000	1(1),719E	1(1),974A	1(1),642A	11,1539	2(2),388	
0.8114	1.4140								
0.8850	1.4108	17		1(1),719F	1(1),974B	1(3),674D		2(3),1228	
1.1404	1.4384								
1.189	1.4420	33							
				1(1),563F	1(1),805C	1(1),516A		2,400	
			AS5960000	1(1),563G	1(1),806A	1(1),516B		2,400	
1.1404	1.4384								
1.0495	1.5660								
0.986	1.4420	99							
1.069		108							
1.0690	1.4433	124	AT1500000					3(3),543	
0.975	1.4673	29	AS7350000						
0.8781	1.440	227							
1.7803	1.5520								
1.2603	1.4765								
1.085	1.5010	99							
0.9250	1.443	68	AS8225000						
0.9180	1.441								
1.118	1.4630	> 110	AS9450000						
1.08	1.509								
0.943	1.4380	58	AS8578000	1(1),771G	1(1),1073C	1(3),734A		4(3),649	
0.90	1.439	75							
0.928	1.4400	68							
1.1915		115							
	1.4488								
1.101	1.4790	> 110							
0.884	1.4450	> 110						2(3),1230	
1.016	1.4390	102						2(3),1232	
0.9819	1.4282	65	AS9800000					2(3),1232	
0.924	1.4060	15	AT0700000	1(1),719D	1(1),973C	1(1),638C	11,3715	2,399	6,251
1.090	1.4610	100	AT0350000	1(1),727M		1(3),675B		2(4),1496	
0.8859	1.4360	79	AT0855000	1(1),719G	1(1),974C	1(3),675A		2(3),1229	
1.1125	1.4800								
1.099	1.4490	76	AS9275000		1(1),1088C			17(3),1005	
1.064	1.4610								
	1.3380								
1.418	1.3301	31						2(4),1464	
0.8846	1.4311								
0.8620	1.4470								
1.398	1.352	59							
1.330	1.3190	10		1(1),745C	1(1),1029B				
1.010	1.4562	> 110	AT1430000	1(1),729E		1(1),639B			
0.8882	1.4280	68	AT1450000					2(3),1228	
1.039	1.4520	> 110		1(1),753L	1(1),1044C	1(3),720C		2(4),1470	
1.011	1.4502	98	AT1750000	1(1),753J	1(1),1044A	1(3),720B		2(4),1496	
1.160	1.5280	89							
1.05	1.4448	65							
0.986	1.4760	93		1(1),719H					
0.8896	1.4140	33	AT2100000					2(3),1227	

TABLE 5. *cont'd*

Name	R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Isodecyl ester	$-(CH_2)_7CH(CH_3)_2$	1330-61-6	212.34	121/10	− 100
Isooctyl ester	$-(CH_2)_5CH(CH_3)_2$	29590-42-9	184.25	125/20	
Isopropoxyethyl ester	$-CH_2CH_2OCH(CH_3)_2$		159.21	82/19	
Isopropyl ester	$-CH(CH_3)_2$	689-12-3	114.14	51/103	
Methallyl ester	$-CH_2C(CH_3)=CH_2$	818-67-7	126.16	70/50	
2-(2-Methoxyethoxy) ethyl ester	$-CH_2CH_2OCH_2CH_2OCH_3$	7328-18-9	174.20	86/4.6	
2-Methoxyethyl ester	$-CH_2CH_2OCH_3$	3121-61-7	130.14	56/12	
Methyl ester	$-CH_3$	96-33-3	86.09	80	− 75
2-Methylbutyl ester	$-CH_2CH(CH_3)CH_2CH_3$		142.20	63/27	
2-(*N*-Morpholino)ethyl ester	$-CH_2CH_2NC_4H_8O$	19727-38-9	185.2	67/0.2	
1-Naphthyl ester	$-C_{10}H_7$	20069-66-3	198.22	212/1	
2-Naphthyl ester	$-C_{10}H_7$	52684-34-1	198.22	138/0.4	
Neopentyl ester	$-CH_2C(CH_3)_3$	4513-36-4	142.24	31/3	
Neopentyl glycol diester	$-CH_2C(CH_3)_2CH_2-$	2223-82-7	212.25	105/5	
Nonyl ester	$-(CH_2)_8CH_3$		198.31	76/0.2	
Octadecyl ester	$-(CH_2)_{17}CH_3$	4813-57-4	324.55	160/3	32
1H,1H,5H-Octafluoropentyl ester	$-CH_2(CF_2)_3CF_2H$	376-84-1	286.12	88/41	
n-Octyl ester	$-(CH_2)_7CH_3$	2499-59-4	184.28	57/0.05	
1H,1H-Pentadecafluorooctyl ester	$-CH_2(CF_2)_6CF_3$	307-98-2	454.13	65/5	
Pentaerythritol tetraester	$(-CH_2)_4C$	4986-89-4	352.34		18
Penterythritol triester	$(-CH_2)_3CCH_2OH$	3524-68-3	298.30	>315	15
Pentaerythritol stearate diester	$(-CH_2)_2C(CH_2OH)CH_2OC(O)(CH_2)_{16}CH_3$	92092-01-8	510.72		30
2,2,3,3,3-Pentafluoropropyl ester	$-CH_2CF_2CF_3$	356-86-5	204.10	50/100	
1,5-Pentanediol diester	$-(CH_2)_5-$	36840-85-4	212.25	94/0.3	
n-Pentyl ester	$-(CH_2)_4CH_3$	2998-23-4	142.20	47/7	
2-Phenoxyethyl ester	$-CH_2CH_2OC_6H_5$	48145-04-6	192.21	103/0.6	
Phenyl ester	$-C_6H_5$	937-41-7	148.16	87/12	
1,4-Phenylene diester	$-C_6H_4-$	6729-79-9	218.21		88
1,4-Phenylene di(acrylic acid)	$C_6H_4(CH=CHC(O)OH)_2$	16323-43-6	218.21		>300
2-Phenylethyl ester	$-CH_2CH_2C_6H_5$	3530-36-7	176.22	104/5	
Trimethyl 2-phosphonoacrylate	$(CH_3O)_2P(O)C(C(O)OCH_3)=CH_2$	55168-74-6	194.13	91/0.1	
Propargyl ester	$-CH_2C\equiv CH$	10477-47-1	110.11		138
n-Propyl ester	$-CH_2CH_2CH_3$	925-60-0	114.14	43/40	
1,2-Propylene glycol diester	$-CH_2CH(CH_3)-$		184.19	63/0.3	
1,3-Propylene glycol diester	$-(CH_2)_3-$	25151-33-1	184.19	122/0.5	
Tetradecyl ester	$-(CH_2)_{13}CH_3$	21643-42-5	268.44	138/0.4	
Tetra(ethylene glycol) diester	$-(CH_2CH_2O)_3CH_2CH_2-$	17831-71-9	302.33	>120/0.3	
2,2,3,3-Tetrafluoropropyl ester	$-CH_2CF_2CF_2H$	7383-71-3	186.11	132	
Tetrahydrofurfuryl ester	$-C_5H_9O$	2399-48-6	156.18	87/9	< − 60
S,S'-Thiodi-1,4-phenylene dithiol diester	$-SC_6H_4SSC_6H_4S-$	129283-82-5	386.56		64
2,3,3-Trichloro-	$ClCH_2=CClC(O)OH$	2257-35-4	175.40		72
Tridecyl ester	$-(CH_2)_{12}CH_3$	3076-04-8	254.41	150/10	
Tri(ethylene glycol) diester	$-(CH_2CH_2O)_2CH_2CH_2-$	1680-21-3	258.30	125/0.2	
2,2,2-Trifluoroethyl ester	$-CH_2CF_3$	407-47-6	154.09	92	
1,1,1-Tri(2-hydroxyethoxy-methyl)propane triester	$(-CH_2CH_2OCH_2)_3CCH_2CH_3$	28961-43-5	428.48	157	
Tri(2-hydroxyethyl) isocyanurate triester	$(-CH_2CH_2)_3C_3N_3O_3$	40220-08-4	423.38		97
3,5,5-Trimethylcyclohexyl ester	$-C_6H_8(CH_3)_3$	86178-38-3	196.29	40/0.1	
3,5,5-Trimethylhexyl ester	$-(CH_2)_2CH(CH_3)CH_2C(CH_3)_3$	2664-55-3	198.31	58/0.8	− 34
Trimethylolpropane triester	$(-CH_2)_3CCH_2CH_3$	15625-89-5	296.32	316	
Trimethylolpropane ethoxylate triester	$((-CH_2CH_2O)_xCH_2)_3CCH_2CH_3$	28961-43-5	ca. 428	157	
Tri(propylene glycol) diester	$(-CH_2(CH_3)CH_2O)_2CH_2CH(CH_3)-$	42978-66-5	300	>120/1	< − 20
Vinyl ester	$-CH=CH_2$	2177-18-6	98.10	91	

5.2. METHACRYLATE, ACIDS/ESTERS ($H_2C=C(CH_3)C(O)OR$)

Name	R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Acid	$-H$	79-41-4	86.09	163	16
2-(Acetoacetoxy)ethyl ester	$-CH_2CH_2C(O)OCH_2C(O)CH_3$	21282-97-3	214.22	274	
Allyl ester	$-CH_2CH=CH_2$	96-05-9	126.16	60/43	
Anhydride	$-C(O)C(CH_3)=CH_2$	760-93-0	154.17	200	− 20
2-(1-Aziridinyl)ethyl ester	$-CH_2CH(-NH-)CH_2$	6498-81-3	155.20	190	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.875	1.4420	106	AT2190000						
0.880	1.4370	80	UD3391000						
0.9549	1.4258								
0.8932	1.4060								
0.9285	1.4372								
1.0421	1.4392								
1.012	1.4272	60	KL6000000					**2**(3),1232	
0.956	1.4020	7	AT2800000	**1**(1),719C	**1**(1),973B	**1**(1),638B	**11**,5935	**3**,638B	**17**,183
0.8883	1.4800								
1.0711	1.4728								
0.859		> 37							
1.030	1.4530	123	AS8925000						
0.875	1.4375								
0.800		190						**2**(4),1468	
	1.3467	70							
0.8810	1.4350								
1.63	1.3279								
1.190	1.4870	170							
1.180	1.4840	>110	UD3370000	**1**(1),753I		**1**(1),639C			
1.018									
1.32	1.3363								
	1.4551								
0.8920	1.4240								
1.104	1.5180	>110	KM0700000					**6**(3),572	
				1(2),1775F	**1**(2),1050A	**1**(2),179B		**9**,914	
1.249	1.4540	105		**1**(1),1109B	**1**(1),1489B			**4**(4),3638	
0.9078	1.4130								
	1.4470								
	1.4529								
0.8700	1.4468								
1.110	1.4638	>110	AS8100000	**1**(1),759E	**1**(1),1053B	**1**(1),639A			
1.317	1.3629	45		**1**(1),745A				**17**(3),1104	
1.063	1.4580	>110						**17**(3),1104	
1.099	1.4609	63							
1.216	1.3506	12		**1**(1),743M	**1**(1),1028C	**1**(3),696C		**2**(4),1462	
1.110	1.4710	>110	KM2890000		**1**(1),999C				
0.9292	1.455	88							
0.875	1.4370	89	UD3643625					**2**(3),1230	
1.100	1.4736	>110	AT4810000	**1**(1),729F		**1**(1),640A			
1.110	1.4720	86	KM2890000		**1**(1),999C				
1.030	1.4500		AT4690000	**1**(1),729A		**1**(1),638D			
0.942	1.4320	2							
1.015	1.432	76	OZ2975000	**1**(1),547B	**1**(1),776B	**1**(1),499C	**11**,5849	**2**,421	
1.122	1.4560	106		**1**(1),791E	**1**(1),1107C				
0.934	1.4360	34	UD3483000	**1**(1),721E	**1**(1),977A	**1**(1),641B		**2**(3),1290	
1.035	1.454	83	OZ5700000	**1**(1),831C	**1**(1),1170C			**2**(3),1293	
								6(3),1481	

TABLE 5. *cont'd*

Name	R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Benzyl ester	$-CH_2C_6H_5$	2495-37-6	176.22	232	
Bisphenol A diester	$-C_6H_4C(CH_3)_2C_6H_4-$	3253-39-2	364.44		73
Bisphenol A tetraethoxylate diester	$((-CH_2CH_2O)_2C_6H_4)_2C(CH_3)_2$	41637-38-1	452.55	ca. 540	
2-Bromoethyl ester	$-CH_2CH_2Br$	4513-56-8	193.05	47/2.7	
1,3-Butylene diester	$-CH_2CH_2CH(CH_3)-$	1189-08-8	226.28	290	
1,4-Butylene diester	$-(CH_2)_4-$	2082-81-7	226.28	133/4	
2-Butoxyethyl ester	$-CH_2CH_2O(CH_2)_3CH_3$	13532-94-0	186.25	90/3	
n-Butyl ester	$-(CH_2)_3CH_3$	97-88-1	142.20	161	
s-Butyl ester	$-CH(CH_3)CH_2CH_3$	2998-18-7	142.20	146	
tert-Butyl ester	$-C(CH_3)_3$	585-07-9	142.20	132	
N-*tert*-Butyl-2-aminoethyl ester	$-CH_2CH_2NHC(CH_3)_3$	3775-90-4	185.27	100/12	
2-Chloro-2-hydroxypropyl ester	$-CH_2C(OH)ClCH_3$	13159-52-9	178.62	95/2	
2-Chloroethyl ester	$-CH_2CH_2Cl$	1888-94-4	148.60	59/7.5	
Chloromethyl ester	$-CH_2Cl$	27550-73-8	146.57	54/20	
Cinnamyl ester	$-CH_2CH{=}CHC_6H_5$	31736-34-2	202.25	141/3	
Chloride	$CH_2{=}C(CH_3)C(O)Cl$	920-46-7	104.54	95	
2-Cyanoethyl ester	$-CH_2CH_2CN$	4513-53-5	139.16	99/2	
1,4-Cyclohexanediol diester	$-C_6H_{10}-$	38479-34-4	252.31		50
Cyclohexyl ester	$-C_6H_{11}$	101-43-9	168.24	69/4	
Decanediol diester	$-(CH_2)_{10}-$	6701-13-9	310.44	170/2	
Decyl ester	$-(CH_2)_9CH_3$	3179-47-3	226.36	327	−44
2,3-Dibromopropyl ester	$-CH_2CHBrCH_2Br$	3066-70-4	285.96	72/0.03	
2-(Dibutylamino)ethyl ester	$-(CH_2)_2N(CH_2CH_2CH_2CH_3)_2$	2397-75-3	241.38	100/1	
Dicyclopentenyl ester	$-C_{10}H_{13}$	31621-69-9	218.30	137/13	
Dicyclopentenyloxyethyl ester	$-C_{12}H_{17}O$	68586-19-6	262.35	150/10	
2-(Diethylamino) ethyl ester	$-(CH_2)_2N(CH_2CH_3)_2$	105-16-8	185.28	80/10	<−60
3-(Dimethylamino) propyl ester	$-(CH_2)_3N(CH_3)_2$	17577-32-1	199.30	105/1.5	
Di(ethylene glycol) diester	$-CH_2CH_2OCH_2CH_2-$	2358-84-1	242.27	134/2	
3,4-Dihydroxybutyl ester	$-CH_2CH_2CH(OH)CH_2OH$	62180-57-8	174.20	110/0.25	
2,3-Dihydroxypropyl ester	$-CH_2CH(OH)CH_2OH$	5919-74-4	160.17	140/0.6	
2-(Dimethylamino) ethyl ester	$-CH_2CH_2N(CH_3)_2$	2867-47-2	157.22	187	−30
Diurethane diester (isomers)	$C_{23}H_{38}N_2O_8$	72869-86-4	470.57	200	
1H,1H,7H-Dodecafluoroheptyl ester	$-CH_2(CF_2)_5CF_2H$	2261-99-6	400.17	107/23	
Dodecanediol diester	$-(CH_2)_{12}-$	72829-09-5	338.49		0.95
Dodecyl ester	$-(CH_2)_{11}CH_3$	142-90-5	252.42	142/4	−7
2,3-Epithiopropyl ester	$-CH_2CH(-S-)CH_2$	3139-91-1	158.22	59/1.4	
2,3-Epoxybutyl ester	$-CH_2CH(-O-)CHCH_3$	68212-07-7	156.18	45/0.25	
3,4-Epoxybutyl ester	$-CH_2CH_2CH(-O-)CH_2$	55750-22-6	156.18	55/0.8	
2,3-Epoxyopropyl ester	$-CH_2CH(-O-)CH_2$	106-91-2	142.16	189	
4-Ethoxybutyl ester	$-(CH_2)_4OCH_2CH_3$	76392-24-0	186.25	85/23	
2-Ethoxyethyl ester	$-CH_2CH_2OCH_2CH_3$	2370-63-0	158.20	92/35	
Ethyl ester	$-CH_2CH_3$	97-63-2	114.15	118	<−75
Ethyl 2-bromomethyl- ester	$CH_2{=}C(CH_2Br)C(O)OCH_2CH_3$	17435-72-2	193.05	38/0.8	
2-Ethylbutyl ester	$-CH_2CH(CH_2CH_3)CH_2CH_3$	5138-86-3	170.25	74/16	
1,2-Ethylene diester	$-CH_2CH_2-$	97-90-5	198.22	240	−40
2-Ethylhexyl ester	$-CH_2CH(CH_2CH_3)(CH_2)_3CH_3$	688-84-6	198.31	218	
2-(Ethylthio)ethyl ester	$-CH_2CH_2SCH_2CH_3$	14216-25-2	174.26	102/15	
Ethyl 2-(trimethoxysilylmethyl-) ester	$CH_2{=}C(CH_2Si(OCH_3)_3)C(O)OCH_2CH_3$	74976-84-4	186.33	71/10	
Furfuryl ester	$-CH_2C_4H_3O$	3454-28-2	166.18	81/5	
Glycerol diester	$-CH_2CH(OH)CH_2-$	1830-78-0	228.25	120/1	<−18
Glycerol triester	$-CH(CH_2-)_2$	52408-84-1	296.3	150/0.1	
Glycidyl ester	$-CH(-O-)CH_2$	106-91-2	142.16	189	
1H,1H,2H,2H-Heptadeca-fluorodecyl ester	$-(CH_2)_2(CF_2)_7CF_3$	1996-88-9	532.20	120/4	
1H,1H-Heptafluorobutyl ester	$-CH_2(CF_2)_2CF_3$	13695-31-3	268.13	134	
Heptyl ester	$-(CH_2)_6CH_3$	5459-37-0	184.28	104/14	
1,6-Hexanediol diester	$-(CH_2)_6-$	6606-59-3	254.33	>315	
2,2,3,4,4,4-Hexafluorobutyl ester	$-CH_2CF_2CHFCF_3$	36405-47-7	250.14	158	
1H-Hexafluoroisopropyl ester	$-CH(CF_3)_2$	3063-94-3	236.11	99	
Hexyl ester	$-(CH_2)_5CH_3$	142-09-6	170.25	88/14	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.040	1.5120	107							
				1(2),1931F	1(2),1296C	1(2),316B			
1.120	1.5320	>110							
1.010	1.4520	130							
1.023	1.4565	113		1(1),729D	1(1),999A	1(1),639D		2(4),1534	
0.939	1.4335	93						2(3),1292	
0.894	1.4230	50	OZ3675000	1(1),721A	1(1),975C	1(1),641A		2(3),1286	
	1.4195								
0.875	1.4150	50	OZ3675500					2(4),1582	
0.914	1.4420	71	OZ3500000					4(4),1509	
1.190	1.4750	150						2(4),1533	
	1.4434								
1.070	1.4420	3	OZ5791000	1(1),857B		1(1),732C		2(3),1293	
	1.4459								
		82							
0.9626	1.459	82						6(3),25	
	1.4577								
0.875	1.443	101							
	1.4474								
1.050	1.4990	>110						6(3),1942	
1.064	1.4970	>110							
0.922	1.4442	85						4(3),676	
1.082	1.4580	66						2(3),1292	
0.933	1.4400	70	OZ4200000	1(1),771H	1(1),1074A	1(1),675C		4(3),649	
1.110	1.485	>150							
1.46									
0.868	1.4450	>110	OZ4300000	1(1),721D	1(1),976C	1(3),678B		2(3),1290	
	1.4422								
1.038	1.4472								
1.042	1.4490	76	OZ4375000	1(1),781F	1(1),1089A	1(1),668D			
	1.4223								
0.964	1.4290	71		1(1),759C	1(1),1052C	1(3),723C		2(3),1291	
0.917	1.4130	15	OZ4550000	1(1),719J	1(1),975B	1(1),640D		2,423	
1.398	1.4790	87							
1.051	1.4540	86	OZ4400000	1(1),729B	1(1),998B	1(1),642D		2(3),1292	
0.885	1.4380	92	OZ4630000	1(1),721C	1(1),976B			2(3),1289	
0.897	1.4380	59		1(2),2985A	1(3),686B				
1.078	1.4820	90						17(3),1248	
1.120	1.4720	>115							
1.042	1.4490	76	OZ4375000	1(1),781F	1(1),1089A	1(1),668D			
1.345	1.3410	37							
0.995	1.4580	150							
1.348	1.3610	57		1(1),745F	1(1),1030B				
1.302	1.3310	14		1(1),745E	1(1),1030A				
0.885	1.432	63							

TABLE 5. *cont'd*

Name	R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
4-Hydroxybutyl ester	$-(CH_2)_4OH$	997-46-6	158.20	105/0.01	
2-Hydroxyethyl ester	$-CH_2CH_2OH$	868-77-9	130.14	250	−12
3-(5-Hydroxypentyloxy)-3-oxopropyl ester	$-CH_2CH_2C(O)O(CH_2)_5OH$	85099-10-1	244.29		−48
3-Hydroxypropyl ester	$-(CH_2)_3OH$	276-09-3	144.17	90/9	
Isobornyl ester	$-C_{10}H_8$	7534-94-3	222.33	245	−51
Isobutyl ester	$-CH_2CH(CH_3)_2$	97-86-9	142.20	155	
2-Isocyanatoethyl ester	$-CH_2CH_2NCO$	30674-80-7	155.17	211	−45
Isodecyl ester	$-(CH_2)_7CH(CH_3)_2$	29964-84-9	226.36	126/10	−41
Isopropyl ester	$-CH(CH_3)_2$	4655-34-9	128.17	125	
Methallyl ester	$-CH_2C(CH_3)=CH_2$	816-74-0	140.18	157	
2-(2-Methoxyethoxy) ethyl ester	$-(CH_2CH_2O)_2CH_3$	45103-58-0	188.22	67/1	
2-Methoxyethyl ester	$-CH_2CH_2OCH_3$	6976-93-8	144.17	66/16	
Methyl ester	$-CH_3$	80-62-6	100.12	100	−48
2-Methyl-2-nitropropyl ester	$-CH_2C(CH_3)(NO_2)CH_3$	2177-42-6	187.20	102/4	
2-(Methylthio) ethyl ester	$-CH_2CH_2SCH_3$	14216-23-0	160.24	38/0.06	
Methyl 2-bromomethyl ester	$CH_2=C(CH_2Br)C(O)OCH_3$	4224-69-5	179.02	36/1.3	
Methyl 2-(1-hydroxyethyl-)ester	$CH_2=C(CH(OH)CH_3)C(O)OCH_3$	18020-65-0	130.14	91/20	
2-*N*-Morpholinoethyl ester	$-CH_2CH_2NC_4H_8O$	2997-88-8	199.25	80/0.08	
Neopentylglycol diester	$-CH_2C(CH_3)_2CH_2-$	1985-51-9	240.30	112/1.2	
Nona(ethylene glycol) diester	$-(CH_2CH_2O)_8CH_2CH_2-$	25852-47-5	550		
Nona(propylene glycol) diester	$-(CH(CH_3)CH_2O)_8CH(CH_3)CH_2-$	25852-49-7	560	>200/1	
Nonyl ester	$-(CH_2)_8CH_3$	2696-43-7	212.33		
4-Nonylphenyl ester	$-C_6H_4(CH_2)_8CH_3$	76391-98-5	288.43	125/0.03	
Octadecyl ester	$-(CH_2)_{17}CH_3$	32360-05-7	338.58	195/6	19
n-Octyl ester	$-(CH_2)_7CH_3$	2157-01-9	198.31	105/4	
Pentabromophenyl ester	$-C_6Br_5$	18967-31-2	556.69		132
Pentachlorophenyl ester	$-C_6Cl_5$	16184-61-5	334.41		87
1H,1H-Pentafluorooctyl ester	$-CH_2(CF_2)_6CF_3$	3934-23-4	468.16	67/5	
Pentaerythritol tetraester	$C(CH_2-)_4$	3253-41-6	408.45		66
2,2,3,3,3-Pentafloropropyl ester	$-CH_2CF_2CF_3$	45115-53-5	218.12	55/110	
Pentyl ester	$-(CH_2)_4CH_3$	2849-98-1	156.23	73/17	
2-Phenoxyethyl ester	$-CH_2CH_2OC_6H_5$	10595-06-9	206.24	183	
Phenyl ester	$-C_6H_5$	2177-70-0	162.19	115/10	
2-Phenylethyl ester	$-CH_2CH_2C_6H_5$	3683-12-3	190.24	119/11	
n-Propyl ester	$-CH_2CH_2CH_3$	2210-28-8	128.17	140	
1,2-Propylene diester	$-CH_2CH(CH_3)-$	1188-09-6	212.25	68/1	
1,3-Propylene diester	$-(CH_2)_3-$		212.25	68/1	
2-Sulfoethyl ester	$-CH_2CH_2SO_3H$	10595-80-9	194.21	(d)	
3-Sulfopropyl ester, potassium salt	$-(CH_2)_3SO_3K$	31098-21-2	246.33		295(d)
Tetra(ethylene glycol) diester	$-CH_2CH_2(OCH_2CH_2)_3-$	109-17-1	300.37	220	
2,2,3,3-Tetrafluoropropyl ester	$-CH_2CF_2CF_2H$	45102-52-1	200.14	124	
Trimethylsilyl ester	$-Si(CH_3)_3$	13688-56-7	158.28	51/20	
2-(Trimethylsilyloxy)ethyl ester	$-CH_2CH_2OSi(CH_3)_3$	17407-09-9	202.33	65/0.9	
3-(Trimethylsilyloxy)propyl ester	$-(CH_2)_3OSi(CH_3)_3$	2530-85-0	248.35	190	
3-(Tris(trimethylsilyloxy)silyl) propyl ester	$-(CH_2)_3Si(OSi(CH_3)_3)_3$	17096-07-0	422.82	113/0.2	
Vinyl ester	$-CH=CH_2$	4245-37-8	112.13	111	

TABLE 6. ALCOHOLS

Name	Formula HOROH R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
6.1. ALKANEDIOLS					
1,2-Butane	$-CH(C_2H_5)CH_2-$	584-03-2	90.12	191/747	
1,3-Butane	$-CH(CH_3)CH_2CH_2-$	107-88-0	90.12	203	
1,4-Butane	$-(CH_2)_4-$	110-63-4	90.12	230	16
1,10-Decane	$-(CH_2)_{10}-$	112-47-0	174.28	170/8	73
1,12-Dodecane	$-(CH_2)_{12}-$	5675-51-4	202.34	189/12	82
1,2-Ethylene	$-(CH_2)_2-$	107-21-1	62.07	197	−13

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.073	1.4520	97	OZ4725000	**1**(1),753M	**1**(1),1045A	**1**(1),665B			
1.080	1.4360	>110							
1.066	1.4470	96							
0.9830	1.4770	107							
0.886	1.420	41	OZ4900000	**1**(1),721B	**1**(1),976A	**1**(3),677C		**2**(3),1287	
1.096		97							
0.878	1.4430	>110	OZ5000000						
0.8847	1.4122								
1.020	1.4397	>110							
0.993	1.4310	65							
0.936	1.4140	10	OZ5075000	**1**(1),719I	**1**(1),975A	**1**(1),640C	**11**,5849	**2**(2),398	
1.087	1.450	>110						**2**(3),1288	
1.040	1.4800	88							
1.489	1.4900	78	AS4900000	**1**(1),745J	**1**(1),1031C				
1.071	1.4520	43							
1.003	1.4530	117						**2**(4),1535	
1.099	1.4660	>110							
1.010	1.4520	>110							
1.099	1.4660	>110							
	1.5020	>110							
0.864	1.4510	196						**2**(3),1290	
	1.4373								
		96							
		>100							
1.5732	1.3482	6							
1.0687	1.5130	100							
	1.5184								
0.98	1.508	122							
0.9022	1.4450								
	1.4450								
1.3245	1.4772								
				1(1),1065F	**1**(1),1438B	**1**(1),890D			
1.080	1.4630	82	OZ4000000					**2**(4),1531	
1.250	1.3730	50		**1**(1),745B	**1**(1),1029A				
0.890	1.4147	32		**1**(2),2985B	**1**(3),686C				
0.928	1.4280	76		**1**(2),2985C	**1**(3),687A				
1.045	1.4310	92	UC0230000	**1**(2),2985D	**1**(3),687B	**1**(2),1116C			
0.918	1.4190	>110							
0.933	1.4360	13						**2**(3),1290	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.006	1.4380	93	EK0380000	**1**(1),141A	**1**(1),196C	**1**(1),130B		**1**,477	
1.005	1.4400	121	EK0440000	**1**(1),139L	**1**(1),195C	**1**(1),130D	**11**,1566	**1**,477	
1.017	1.4450	>110	EK0525000	**1**(1),139K	**1**(1),195B	**1**(1),130A		**1**,478	
			HD8433713	**1**(1),143N	**1**(1),205C	**1**(1),136D	**11**,2842	**1**(2),560	
				1(1),145A	**1**(1),206B	**1**(1),137A		**1**(2),562	
1.113	1.4310	>110	KW2975000	**1**(1),139A		**1**(1),127D	**11**,3755	**1**,465	**15**,156

TABLE 6. *cont'd*

Name	Formula HOROH R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
1,7-Heptane	$-(CH_2)_7-$	629-30-1	132.20	259	18
1,16-Hexadiene	$-(CH_2)_{16}-$	23079-20-1	258.45	198/3	92
1,6-Hexane	$-(CH_2)_6-$	629-11-8	118.18	250	42
1,7-Heptane	$-(CH_2)_7-$	629-30-1	132.20	259	18
1,16-Hexadiene	$-(CH_2)_{16}-$	23079-20-1	258.45	198/3	92
1,9-Nonane	$-(CH_2)_9-$	3937-56-2	160.26	177/15	48
1,8-Octane	$-(CH_2)_8-$	629-41-4	146.23	172/20	60
1,5-Pentane	$-(CH_2)_5-$	111-29-5	104.15	242	
1,2-Propane	$-CH(CH_3)CH_2-$	57-55-6	76.10	187	−60
1,3-Propane	$-(CH_2)_3-$	504-63-2	76.10	214	−27
1,14-Tetradecane	$-(CH_2)_{14}-$	19812-64-7	230.39		88
6.2. ETHER DIOLS					
Di(ethylene glycol)	$-CH_2CH_2OCH_2CH_2-$	111-46-6	106.12	245	−10
Di(propylene glycol)	$-CH(CH_3)CH_2OCH(CH_3)CH_2-$	110-98-5	134.18		
Hexa(ethylene glycol)	$-CH_2CH_2(OCH_2CH_2)_5-$	2615-15-8	282.34	217/4	6
Penta(ethylene glycol)	$-CH_2CH_2(OCH_2CH_2)_4-$	4792-15-8	238.28	184/2	
Tetra(ethylene glycol)	$-CH_2CH_2(OCH_2CH_2)_3-$	112-60-7	194.23	314	−6
Tri(ethylene glycol)	$-CH_2CH_2(OCH_2CH_2)_2-$	112-27-6	150.17	285	−7
Tri(propylene glycol)	$-CH(CH_3)CH_2(OCH(CH_3)CH_2)_2-$	24800-44-0	192.26	273	

TABLE 7. ALLYL FUNCTIONAL

Name	Formula $CH_2=CHCH_2R$ R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Acetate	$-OC(O)CH_3$	591-87-7	100.12	104	
–Acetic acid	$-CH_2C(O)OH$	591-80-0	100.12	84/12	−22
Acetoacetate	$-OC(O)CH_2C(O)CH_3$	1118-84-9	142.16	194/737	
Alcohol	$-OH$	107-18-6	58.08	97	−129
–, 2-Bromo-	$H_2C=CBrCH_2OH$		136.98	152	
–, 2-Chloro-	$H_2C=CClCH_2OH$	5976-47-6	92.53	134	
–, 3-Methyl(crotyl alcohol)	$CH_3CH=CHCH_2OH$	6117-91-5	72.12	122	
–Amine	$-NH_2$	107-11-9	57.10	53	−88
–*N*-Aniline	$-NC_6H_5$	589-09-3	133.19	219	
–4-Anisole	$-C_6H_4OCH_3$	140-67-0	148.21	215	
–Benzene	$-C_6H_5$	300-57-2	118.18	156	
Benzyl ether	$-OCH_2C_6H_5$	14593-43-2	148.21	204	
Bromide	$-Br$	106-95-6	120.98	70	−119
Butyl ether	$-O(CH_2)_3CH_3$	3739-64-8	114.19		
Butyrate	$-OC(O)CH_2CH_2CH_3$	2051-78-7	128.17	44/15	
Chloride	$-Cl$	107-05-1	76.09	45	−134
Chloroacetate	$-OC(O)CH_2Cl$	2916-14-5	134.56	164/265	
Chloroformate	$-OC(O)Cl$	2937-50-0	120.54	109	
Cyanide	$-CN$	109-75-1	67.09	118	
Cyanoacetate	$-OC(O)CH_2CN$	13361-32-5	125.13	110/20	
Diallyl amine	$-NH-$	124-02-7	97.16	112	−88
2,3-Dibromide	$H_2=CBrCH_2Br$	513-31-5	199.88	141	
2,3-Dichloride	$H_2C=CClCH_2Cl$		110.97	94	
Ether	$-O-$	557-40-4	98.15	95	
Ethyl ether	$-OCH_2CH_3$	557-31-3	86.13	66	
Fluoride	$-F$	818-92-8	60.07	−10	
Formate	$-OC(O)H$		86.09	84	
Glycidyl ether	$-O-CH_2CH(-O-)CH_2$	106-92-3	114.14	154	
Iodide	$-I$	556-569	167.98	103	
Isocyanate	$-NCO$	1476-23-9	83.09	88	
Isopropyl ether	$-OCH(CH_3)_2$		100.16	84	
4-(2-Methoxyphenol)	$-C_6H_4(OCH_3)OH$	97-53-0	164.20	154	−11
Methyl ether	$-OCH_3$	627-40-7	72.11	46	
–2-Phenol	$-C_6H_4OH$	1745-81-9	134.18	220	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.951	1.4550	>110	MI9804000	1(1),143J	1(1),204B	1(1),135C		1,489	
				1(1),145E		1(1),137D			
		102	MO2100000	1(1),143D	1(1),202B	1(1),134B	11,4610	1,484	
0.951	1.4550	>110	MI9804000	1(1),143J	1(1),204B	1(1),135C		1,489	
				1(1),145E		1(1),137D		1,489	
		>110		1(1),143M	1(1),205B	1(1),136B		1,493	
				1(1),143K	1(1),204C	1(1),135D		1,490	
0.994	1.4500	129	SA0480000	1(1),141I	1(1),199A	1(1),132B	11,7073	1,481	
1.036	1.4320	107	TY2000000	1(1),139C	1(1),192C	1(1),128B	11,7868	1,472	
1.053	1.4400	79	TY2010000	1(1),139B	1(1),192B	1(1),128A	11,9629	1,475	
				1(1),145C	1(1),207A		1(2),564		
1.118	1.4460	143	ID5950000	1(1),225D	1(1),341B	1(1),223B	11,3109	1,468	
1.023	1.4410	138	UB8785000	1(1),225E	1(1),341C	1(1),226A		1(2),537	
1.127	1.4640	>110	MM3670000	1(1),229B	1(1),347A	1(1),227A		1,468	
1.126	1.4620	>110	RZ2670000	1(1),227K	1(1),346B	1(1),226D		1,468	
1.125	1.4590	177	XC2100000	1(1),227H	1(1),346A	1(1),226C		1,468	
1.125	1.4550	166	YE4550000	1(1),227D	1(1),345A	1(1),226B	11,9585	1,468	
1.021	1.4440	>110	YK6825000	1(1),227F	1(1),345B				

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.928	1.4040	7	AF1760000	1(1),715C	1(1),963C	1(1),633B		2,136	
0.981	1.4283	89	SB2800000	1(1),547H	1(1),778A	1(1),499B		2,425	
1.037	1.4390	75		1(1),787A	1(1),687C	1(1),1098A	1(1),687C	19(3),1203	
0.854	1.4120	22	BA5075000	1(1),147A	1(1),207B	1(1),138B	11,284	1,436	
1.6	1.5								
1.162	1.4590	54	UD4725000	1(1),183D				1,439	
0.845	1.4270	37	EM9275000	1(1),147C	1(1),208A	1(1),138C	11,2604	1,442	
0.761	1.4205	−29	BA5425000	1(1),347A	1(1),518C	1(1),322B	11,285	4,205	
0.982	1.5630	89		1(1),1383K	1(2),454B	1(1),1191A		12,170	
0.965	1.5210	81	BZ8225000	1(1),1243C	1(2),208B	1(1),1053B	11,3657	6,751	
0.892	1.5100	33	CY2275000	1(1),1139E	1(2),24B	1(1),946B		5,484	
0.959	1.5070	76						6(3),1459	
1.398	1.4690	−2	UC7090000	1(1),95I	1(1),135A	1(1),93D	11,286	1,201	
0.783	1.4060	14		1(1),219G	1(1),333B			1(3),1882	
0.902	1.4140	41	ES5775000	1(1),717N	1(1),970B	1(1),637B		2,272	
0.939	1.4135	−29	UC7350000	1(1),95E	1(1),133C	1(1),93C	11,287	1,198	
1.159	1.4460	61						2,198	
1.136	1.4220	31	LQ5775000	1(1),863B	1(1),1206B	1(1),737A		3,12	13,2
0.834	1.4050	23	EM8050000	1(1),991F	1(1),1358C	1(1),843A	11,288	2,408	
1.065	1.4430	>110	AG3690000	1(1),1013F	1(1),1391B				
0.787	1.4405	16	UC6650000	1(1),347K	1(1),520A	1(1),322C	11,2951	4,208	
1.934	1.5470	81	UC8200000	1(1),101K		1(1),99C	11,3009	1,201	
1.211	1.4603								
0.803	1.4160	−7	KN7525000	1(1),219H	1(1),333C	1(1),212D	11,290	1,438	
0.760	1.3880	−21		1(1),219E	1(1),332C	1(1),212C	11,291	1,438	
0.9460									
0.962	1.4330	57	RR0875000	1(1),251C	1(1),374A	1(1),233D			
1.837	1.5540	18	VD0450000	1(1),95J		1(1),94A	11,292	1,202	
0.940	1.4170	43	NQ8175000	1(1),1023E	1(1),1404A	1(1),872A		4,214	
0.7764	1.3946								
1.066	1.5410	>110	SJ4375000	1(1),1283E	1(2),278A	1(1),1091A	11,3855	6,961	
0.978	1.5200	63							
1.028	1.5450	88	SJ3850000	1(1),1265H	1(2),245B	1(1),1070D		6,572	

TABLE 7. *cont'd*

Name	Formula CH_2=$CHCH_2R$ R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Phenyl ether	$-OC_6H_5$	1746-13-0	134.18	192	
4-Chloro-	$-OC_6H_4Cl$		168.63	107/12	
2,4,6-Tribromo-	$-OC_6H_2Br_3$	3278-89-5	370.88		75
Phenyl sulfone	$-S(O)(O)C_6H_5$	16212-05-8	182.24	111/0.5	
Propyl	$-CH_2CH_2CH_3$	1471-03-0	100.16	91	
-Succinic anhydride	$-C_4H_3O_3$	7539-12-0	140.1	260	6
Sulfide	-S-	592-88-1	114.21	138	
2-Tolyl ether	$-OC_6H_4CH_3$		148.21	81/2	
3-Tolyl ether	$-OC_6H_4CH_3$		148.21	213	
4-Tolyl ether	$-OC_6H_4CH_3$		148.21	91/10	
-Urea	$-NHC(O)NH_2$	557-11-9	100.12		85

TABLE 8. AMINES, DIFUNCTIONAL

Name	Formula H_2NRNH_2 R	CAS Registry Number	Mol. wt.	Boiling Point(°C)	Melting Point(°C)
Butane-	$-(CH_2)_4-$	110-60-1	88.15	159	27
Decane-	$-(CH_2)_{10}-$	646-25-3	172.32	140/12	62
Dodecane-	$-(CH_2)_{12}-$	2783-17-7	200.37		70
Ethylene-	$-(CH_2)_2-$	107-15-3	60.10	118	8.5
Heptane-	$-(CH_2)_7-$	646-19-5	130.24	224	28
Hexane-	$-(CH_2)_6-$	124-09-4	116.21	204	43
Nonane-	$-(CH_2)_9-$	646-24-2	158.29	258/756	37
Octane-	$-(CH_2)_8-$	373-44-4	144.26	225	51
Pentane-	$-(CH_2)_5-$	462-94-2	102.18	179	
1,2-Phenylene-	$-C_6H_4-$	95-54-5	108.14	257	104
1,3-Phenylene-	$-C_6H_4-$	108-45-2	108.14	283	65
1,4-Phenylene-	$-C_6H_4-$	106-50-3	108.14	267	144
Propane-	$-(CH_2)_3-$	109-76-2	74.13	140	− 12

TABLE 9. ANHYDRIDES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
9.1. MONOANHYDRIDES					
Acetoxysuccinic	$C_6H_6O_5$	79814-40-7	158.11		56
S-Acetylmercaptosuccinic	$C_6H_6O_4S$	6953-60-2	174.18		83
Aconitic, *cis*-	$C_6H_4O_5$	6318-55-4	156.10		75
Acrylic (see Acrylates)					
Allylsuccinic	$C_7H_8O_3$	7539-12-0	140.1	260	6
4-Amino-1,8-naphthalic	$C_{12}H_7NO_3$	6492-86-0	213.20		
1,2,4-Benzenetricarboxylic (trimellitic)	$C_9H_4O_5$	552-30-7	192.13		167
Bicyclo[2.2.2.]oct-5-ene-2,3-dicarboxylic, *endo*-	$C_{10}H_{10}O_3$	24327-08-0	178.19		145
Bromomaleic	C_4HBrO_3	5926-51-2	176.96	215	
4-Bromo,1,8-naphthalic	$C_{12}H_5BrO_3$	21563-29-1	277.08		218
3-(*tert*-Butyldimethylsilyloxy)-glutaric	$C_{11}H_{20}O_4Si$	91424-40-7	244.37		80
4-*tert*-Butylphthalic	$C_{12}H_{12}O_3$	32703-79-0	204.23		73
N-Carboxybenzyloxy-L-aspartic	$C_{12}H_{11}NO_5$	4515-23-5	249.23		123
Cantharidin	$C_{10}H_{12}O_4$	56-25-7	196.20		216
5-Chloroisotoic	$C_8H_4ClNO_3$	4743-17-3	197.58		300(d)
4-Chloro-1,8-naphthalic	$C_{12}H_5ClO_3$	4053-08-1	232.63		208
Citraconic	$C_5H_4O_3$	616-02-4	112.08	213	7
Cyclohexane-1,2-dicarboxylic, *cis*-	$C_8H_{10}O_3$	13149-00-3	154.17	158/17	33

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.978	1.5200	63	DA8575000	1(1),1241M	1(2),207A	1(1),1052B	6,144	11,14	
	1.5348								
								6,205	
1.189	1.5480	>110	WR2400000	1(2),2185B	1(2),1580A			6,299	
0.767	1.3990	−5		1(1),219F	1(1),333A	1(3),2780		1,438	
0.887	1.4889	46	BC4900000	1(1),287J	1(1),432C	1(1),269C	11,295	1,440	
0.950	1.5179								
0.9564	1.5179								
0.970	1.5168								
			YR7875000	1(1),939M	1(1),1308B	1(1),800D	11,296	4,209	

Density (at 20°C)	Refractive Index(At 20°C)	Flash Point(°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.877	1.4569	52	EJ6800000	1(1),309G	1(1),465A	1(1),291D	11,7964	4,264	
			HD7175000	1(1),311I	1(1),469B	1(1),293D		4,273	
		155	JR2200000	1(1),311J	1(1),469C	1(1),294A		4,273	
0.899	1.4565	34	KH8575000	1(1),309A	1(1),463B	1(1),289C	11,3752	4,230	4,231
		88		1(1),311E	1(1),468A	1(1),293A		4,271	
		81	MO1180000	1(1),311B	1(1),467A	1(1),292C	11,4614	4,269	
		>110		1(1),311H	1(1),469A	1(1),293C		4,272	
		165	RG8841500	1(1),311F	1(1),468B	1(1),293B		4,271	
0.873	1.4582	63	SA0200000	1(1,309K		1(1,292B	11,1608	4,266	
			SS7875000	1(1),1429A	1(2),536B	1(1),1235C	11,7255	13,6	8,393
		>110	SS7700000	1(1),1431C	1(2),539A	1(1),1239A	11,7254	3,33	
			SS8050000	1(1),1433D	1(2),542C	1(1),1242B	11,7256	13,61	
0.888	1.4565	34	TX6825000	1(1),309D	1(1),464A	1(1),290A		4,261	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
								18(2),1128	
				1(1),837E	1(1),1179B	1(1),715C			
				1(1),837D				18,463	
1.163									
				1(2),1961B		1(2),336A		18(2),469	
			DC2050000	1(2),1959G	1(2),1329C	1,(2),334A	11,9617	18,468	
				1(1),835N	1(1),1178B	1(1),717D			
1.905		>110		1(1),839A	1(1),1182B	1(1),719C		17,435	
				1(2),1961A	1(2),1330B			17,523	
				1(2),2987F	1(3),692A				
			RN8575000					19,161	
				1(2),1957H		1(2),332C		27,265	
			QL6127295	1(2),1959N		1(2),335D		17,522	
1.247	1.4710	101	GE6825000	1(1),837J	1(1),1181A	1(1),718D		17,440	
		>110		1(1),835G	1(1),1175C	1(1),715D			

TABLE 9. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Cyclohexane-1,2-dicarboxylic, *trans-*	$C_8H_{10}O_3$	14166-21-3	154.17		146
Diacetyl-L-tartaric	$C_8H_8O_7$	6283-74-5	216.15		131
3,5-Diacetyltetrahydropyran-2,4,6-trione	$C_9H_8O_6$	33524-89-9	212.16		154
Dichloromaleic	$C_4Cl_2O_3$	1122-17-4	166.95		
3,6-Dichlorophthalic	$C_8H_2Cl_2O_3$	4466-59-5	217.01		188
4,5-Dichlorophthalic	$C_8H_2Cl_2O_3$	942-06-3	217.01		186
3,6-Difluorophthalic	$C_8H_2F_2O_3$	652-40-4	184.10		219
Diglycolic	$C_4H_4O_4$	4480-83-5	116.07	240	92
2,2-Dimethylglutaric	$C_7H_{10}O_3$	2938-48-9	142.16	175/60	36
3,3-Dimethylglutaric	$C_7H_{10}O_3$	4160-82-1	142.16	181/25	124
2,3-Dimethylmaleic	$C_6H_6O_3$	766-39-2	126.11	223	94
2,2-Dimethylsuccinic	$C_6H_8O_3$	17347-61-4	128.13	219	30
Diphenic	$C_{14}H_8O_3$	6050-13-1	224.22		225
2,3-Diphenylmaleic	$C_{16}H_{10}O_3$	4808-48-4	250.26		160
2-Dodecen-1-ylsuccinic	$C_{16}H_{26}O_3$	19780-11-1	266.38	180/5	42
3,6-Epoxy-1,2,3,6-tetrahydrophthalic, *exo-*	$C_8H_6O_4$	6118-51-0	166.13		118(d)
3-Ethyl-3-methylglutaric	$C_8H_{12}O_3$	6970-57-6	156.18	185/20	
3-Fluorophthalic	$C_8H_3FO_3$	652-39-1	166.11		159
4-Fluorophthalic	$C_8H_3FO_3$	319-03-9	116.11		79
2-Formamidosuccinic	$C_5H_5NO_4$	33605-73-1	143.10		145
Glutaric	$C_5H_6C_3$	108-55-4	114.10		56
1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dicarboxylic	$C_9H_2Cl_6O_3$	115-27-5	370.83		237
Hexafluoroglutaric	$C_5F_6O_3$	376-68-1	222.04	72	
Hexahydro-4-methylphthalic	$C_9H_{12}O_3$	19438-60-9	168.19		
Homophthalic	$C_9H_6O_3$	703-59-3	162.14		141
3-Hydroxyphthalic	$C_8H_4O_4$	37418-88-5	164.12		200
Isatoic	$C_8H_5NO_3$	118-48-9	163.13		233(d)
Isobutenylsuccinic	$C_8H_{10}O_3$	18908-20-8	157.17	146/14	64
Itaconic	$C_5H_4O_3$	2170-03-8	112.09	114/12	71
Maleic	$C_4H_2O_3$	108-31-6	98.06	202	52
3-Methylglutaric	$C_6H_8O_3$	4166-53-4	128.13	181/25	45
N-Methylisatoic	$C_9H_7NO_3$	10328-92-4	117.16		
Methyl-5-norbornene-2,3-dicarboxylic	$C_{10}H_{10}O_3$	25134-21-8	178.19		
4-Methylphthalic	$C_9H_6O_3$	19438-61-0	162.14	295	91
Methylsuccinic	$C_5H_6O_3$	4100-80-5	114.10	239	34
1,8-Naphthalic	$C_{12}H_6O_3$	81-84-5	198.18		268
3-Nitro-1,8-naphthalic	$C_{12}H_5NO_5$	3027-38-1	243.17		248(d)
4-Nitro-1,8-naphthalic	$C_{12}H_5NO_5$	34087-02-0	343.17		228
3-Nitrophthalic	$C_8H_3NO_5$	641-70-3	193.11		164
4-Nitrophthalic	$C_8H_3NO_5$	5466-84-2	193.11		118
5-Norbornene-*endo*-2,3-dicarboxylic, *cis-*	$C_9H_8O_3$	129-64-6	164.16		166
Octadecylsuccinic	$C_{22}H_{38}O_3$		350.55	251/4	62
2-Octen-1-ylsuccinic	$C_{12}H_{18}O_3$	26680-54-6	210.27	168/10	10
3-Oxabicyclo[3.1.0] hexane-2,4-dione	$C_5H_4O_3$	5617-74-3	112.08	100/5	60
2,5-Oxazolidenedione	$C_3H_3NO_3$	2185-00-4	101.06		120(d)
2-Phenylglutaric	$C_{11}H_{10}O_3$	2959-96-8	190.20	218/13	97
Phenylmaleic	$C_{10}H_6O_3$	36122-35-7	176.16		121
1-Phenyl-2,3-naphthalene-dicarboxylic	$C_{18}H_{10}O_3$	1985-37-1	247.28		259
Phenylsuccinic	$C_{10}H_8O_3$	1131-15-3	176.17	191/12	54
Phthalic	$C_8H_4O_3$	85-44-9	148.12	284	132
N-Phthaloylglutamic	$C_{13}H_9NO_5$	3343-28-0	259.22		199
1-Propenyloxymethylmaleic	$C_7H_{10}O_4$	130221-78-2	158.16	251	
Pyrazinedicarboxylic	$C_6H_2N_2O_3$	4744-50-7	150.09		210(d)

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
				1(1),835H	**1**(1),1176A	**1**(1),716A		**17**,452	
				1(1),837F	**1**(1),1179C			**18**,162	
				1(1),839L	**1**(1),1174A	**1**(1),457D		**17**(4),6841	
				1(1),839B		**1**(1),719D		**17**,434	**5**,195
				1(2),1959B	**1**(2),1328B			**17**,483	
				1(2),1959C	**1**(2),1328C			**17**,483	
				1(2),1959A	**1**(2),1328A			**17**(5),11,259	
				1(1),841C		**1**(1),722A		**19**,153	
				1(1),839G	**1**(1),1183C	**1**(1),720D		**17**,418	
				1(1),839H	**1**(1),1184A	**1**(1),721A		**17**,419	
			ON4025000	**1**(1),837K	**1**(1),1181B	**1**(1),719A		**17**,445	
1.135		108		**1**(1),835C	**1**(1),1175A			**17**,417	
				1(2),1959L		**1**(2),335B		**17**,526	
				1(2),1957C				**17**,532	
		177		**1**(1),835K	**1**(1),1177A	**1**(1),717A			
				1(1),837B	**1**(1),1179A			**19**(2),181	
				1(1),839I	**1**(1),1184B	**1**(1),721B		**17**(1),231	
								17(5),11,259	
								18(11),5,548	
		>110	MA3850000	**1**(1),839E	**1**(1),1183A	**1**(1),720B		**17**,411	
			RB9080000	**1**(1),839C	**1**(1),1182C	**1**(1),720A	**11**,2084		
1.654	1.3240	None		**1**(1),839K	**1**(1),1184C			**17**(4),5814	
1.162	1.4770	>110		**1**(1),835I	**1**(1),1176B	**1**(1),716B			
				1(2),1957E		**1**(2),331D		**17**,489	**11**,254
			TI3300000	**1**(2),1959F	**1**(2),1329B			**18**,94	
			DM3100000	**1**(2),1957F		**1**(2),332A		**27**,264	
				1(1),835E	**1**(1),1175B			**17**(4),5927	
				1(1),835J	**1**(1),1176C	**1**(1),716D		**17**,442	
		103	ON3675000	**1**(1),837I	**1**(1),1180C	**1**(1),718C	**11**,5586	**17**,432	**5**,422
		>110		**1**(1),839F	**1**(1),1183B	**1**(1),720C		**17**,415	
			DM3140000	**1**(2),1957G		**1**(2),332B		**27**,265	
1.232	1.5060	>110	RB9100000	**1**(1),835O	**1**(1),1178C	**1**(1),718C		**17**(2),461	
				1(2),1957M	**1**(2),1327B			**17**,492	
1.220		>110		**1**(1),835B	**1**(1),1174C	**1**(1),715B		**17**,414	
			QK5350000	**1**(2),1959M		**1**(2),335C		**17**,521	**1**,713
			QK5370000	**1**(2),1961C				**17**,523	
				1(2),1961D	**1**(2),1330C			**17**,524	
				1(2),1959H		**1**(2),334B		**17**,486	
			TI3328000	**1**(2),1959I	**1**(2),1330A	**1**(2),334C		**17**,486	
			DT5600000	**1**(1),835M	**1**(1),1177C	**1**(1),717C	**11**,1801	**17**(2),461	
1.055									
1.000	1.4694	>110							
				1(1),835F				**17**,442	
				1(1),907M				**27**,245	
				1(2),1957D		**1**(2),331C		**17**,494	
								17,510	
								17,492	
			TI3150000	**1**(2),1957J	**1**(2),1327A	**1**(2),332D	**11**,7346	**17**,469	**1**,882
			MA3900000	**1**(2),2017M	**1**(2)1391A			**21**(3),5370	
1.100	1.4610	>110							
								27,681	

TABLE 9. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
2,3-Pyridenedicarboxylic	$C_7H_3NO_3$	699-98-9	149.11		138
3,4-Pyridinedicarboxylic	$C_7H_3NO_3$	4664-08-8	149.11		76
Succinic	$C_4H_4O_3$	108-30-5	100.07	126	119
4-Sulfo-1,8-naphthalic	$C_{12}H_6O_6S$	71501-16-1	316.34		
Tetrabromophthalic	$C_8Br_4O_3$	632-79-1	463.72		275
Tetrachlorophthalic	$C_8Cl_4O_3$	117-08-8	285.90	371	256
Tetrafluorophthalic	$C_8F_4O_3$	652-12-0	220.08		95
1,2,3,6-Tetrahydrophthalic, *cis*-	$C_8H_8O_3$	935-79-5	152.15		98
3,4,5,6-Tetrahydrophthalic	$C_8H_8O_3$	2426-02-0	152.15		72
3,3-Tetramethyleneglutaric	$C_9H_{12}O_3$	5662-95-3	168.19	186/15	65
Tetrapropenylsuccinic (isomers)	$C_{16}H_{26}O_3$	26544-38-7	266.38	150/3	
Trimellitic	$C_9H_3ClO_4$	1204-28-0	210.57		67
2-(Triphenylphosphoranylidene)-succinic	$C_{22}H_{17}O_3P$	906-65-0	360.35		167(d)
9.2. DIANHYDRIDES					
Benzene-1,2,4,5-tetracarboxylic	$C_{10}H_2O_6$	89-32-7	218.12	397	283
Benzophenone-3,3′,4,4′-tetracarboxylic	$C_{17}H_6O_7$	2421-28-5	322.23		220
Bicyclo[2.2.2.]oct-7-ene-2,3,5,6-tetracarboxylic	$C_{12}H_8O_6$	1719-83-1	248.19		>300
Biphenylene-3,3′,4,4′-tetracarboxylic	$C_{16}H_6O_6$	2420-87-3	294.22		300
Cyclobutanetetracarboxylic	$C_8H_4O_6$	4415-87-6	196.11		>300
Cyclopentane-1,2,3,4-tetracarboxylic, *cis,cis*-	$C_9H_6O_6$	6053-68-5	210.14		225(d)
Diethylenetriaminepentaacetic	$C_{14}H_{19}N_3O_8$	23911-26-4	357.32		183
Ethylenediaminetetraacetic	$C_{10}H_{12}N_2O_6$	23911-25-3	256.22		190(d)
4,4′-(Hexafluoroisopropylidene) diphthalic	$C_{19}H_6F_6O_6$	1107-00-2	444.25		244
Naphthalene-1,4,5,8-tetra-carboxylic	$C_{14}H_4O_6$	81-30-1	268.18		>300
Perylene-3,4,9,10-tetracarboxylic	$C_{24}H_8O_6$	128-69-8	392.32		>300
Tetrahydrofuran-2,3,4,5-tetra-carboxylic	$C_8H_4O_7$	25774-69-0	212.11		223

TABLE 10. BUTADIENES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
10.1. 1,2-BUTADIENES					
1,2-Butadiene	$H_2C{=}C{=}CHCH_3$	590-19-2	54.09	11	−136
–, 4-Bromo-	$H_2C{=}C{=}CHCH_2Br$		133.00	110	
–, 4-Chloro-	$H_2C{=}C{=}CHCH_2Cl$		88.54	88	
–, 4-Hydroxy-	$H_2C{=}C{=}CHCH_2OH$		70.09	127	
–, 4-Iodo-	$H_2C{=}C{=}CHCH_2I$		179.99	130	
–, 3-Methyl-	$H_2C{=}C{=}C(CH_3)_2$	598-25-4	68.12	41	−148
10.2. 1,3-BUTADIENES					
1,3-Butadiene	$H_2C{=}CHCH{=}CH_2$	106-99-0	54.09	−4	−109
–, 2-Bromo-	$H_2C{=}CBrCH{=}CH_2$		133.00	42/165	
–, 1-Chloro-	$HCCl{=}CHCH{=}CH_2$		88.54	68	
–, 1-Chloro-2-methyl-	$HCCl{=}C(CH_3)CH{=}CH_2$		102.57	107	
–, 1-Chloro-3-Methyl-	$HCCl{=}CHC(CH_3){=}CH_2$		102.57	100	
–, 2-Chloro-	$H_2C{=}CClCH{=}CH_2$	126-99-8	88.54	59	
–, 2-Chloro-3-methyl-	$H_2C{=}CClC(CH_3){=}CH_2$		102.57	93	
–, 1,2-Dichloro-	$HCCl{=}CClCH{=}CH_2$		122.98	63/105	
–, 2,3-Dichloro-	$H_2C{=}CClCCl{=}CH_2$		122.98	98	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
				1(2),2547K	**1**(3),336A	**1**(2),795B		**27**,261	
				1(2),2547L	**1**(3),336B			**27**,261	
			WN0875000	**1**(1),835A	**1**(1),1174B	**1**(1),715A	**11**,8841	**17**,407	**4**,468
				1(2),2203F		**1**(2),501D			
			TI3350000	**1**(2),1959E		**1**(2),333D		**17**,485	
			TI3450000	**1**(2),1959D		**1**(2),333C		**17**,484	**15**,300
					1(2),1329A			**17**(5),11,260	
			GW5775000	**1**(1),835L	**1**(1),1177B	**1**(1),717B		**17**,462	
				1(1),837M	**1**(1),1182A	**1**(1),719B		**17**,461	
				1(1),839J		**1**(1),721C		**17**,237	
1.005	1.4790	>110	WN1300000					**17**(5),11,105	
				1(2),1981E	**1**(2),1353B	**1**(2),351B			
					1(2),1680C	**1**(2),550D			
			DB9300000	**1**(2),1959K		**1**(2),335A		**19**,196	
		162		**1**(21),1957L		**1**(2),333B			
				1(1),837H	**1**(1),1180B	**1**(1),716C			
				1(1),837G	**1**(1),1180A				
				1(1),841B					
				1(1),841A	**1**(1),1185A				
				1(2),1957N	**1**(2),1327C				
			QK3695000	**1**(2),1961F		**1**(2),336B		**19**,196	
				1(2),1961G		**1**(2),336C			

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.652	1.4205/1.3							**1**(4),975	
1.4255	1.5248								
0.9891	1.4775								
0.9164	1.4759								
1.7129	1.5709								
0.694	1.4190	−23		**1**(1),27B	**1**(1),35C	**1**(1),30C		**1**,252	
0.650/−6	1.4292/ −25		EI9275000	**1**(1),27D	**1**(1),36B		**11**,1500	**1**,249	
1.397	1.4988								
0.961	1.4709								
0.9710	1.4792								
0.9543	1.4719								
0.9583	1.4583		EI9625000						
0.9593	1.4686								
1.1991	1.4960								
1.1829	1.4890								

TABLE 10. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
–, 2,3-Dimethyl-	$H_2C=C(CH_3)C(CH_3)=CH_2$	513-81-5	82.15	68	– 76
–, 2-Fluoro-	$H_2C=CFCH=CH_2$		72.08	12	
–, Hexachloro-	$CCl_2=CClCCl=CCl_2$	87-68-3	260.76	215	– 20
–, Hexafluoro-	$CF_2=CFCF=CF_2$	685-63-2	162.03	7	– 132
–, 2-Iodo-	$H_2C=CICH=CH_2$		179.99	112	
–, 2-Methyl-	$H_2C=C(CH_3)CH=CH_2$	78-79-5	68.12	34	– 146

TABLE 11. BUTENES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
11.1. 1-BUTENES					
1-Butene	$H_2C=CHCH_2CH_3$	106-98-9	56.11	– 6	– 185
–, 4-Bromo-	$H_2C=CHCH_2CH_2Br$	5162-44-7	135.01	99	
–, 2,3-Dimethyl-	$H_2C=C(CH_3)CH(CH_3)_2$	563-78-0	84.16	56	– 158
–, 3,3-Dimethyl-	$H_2C=CHC(CH_3)_2CH_3$	558-37-2	84.16	41	– 115
–, 2-Methyl-	$H_2C=C(CH_3)CH_2CH_3$	563-46-2	70.14	31	– 137
–, 3-Methyl-	$H_2C=CHCH_2(CH_3)_2$	563-45-1	70.14	20	– 168
11.2. 2-BUTENES					
2-Butene, *cis-*	$CH_3CH=CHCH_3$	590-18-1	56.11	4	– 139
2-Butene, *trans-*	$CH_3CH=CHCH_3$	624-64-6	56.11	1	– 105
1,4-Dihydroxy-, *cis-*	$H_2C(OH)CH=CHCH_2(OH)$	6117-80-2	88.11	131/12	7
2,3-Dimethyl-	$(CH_3)_2C=C(CH_3)_2$	563-79-1	84.16	73	– 75
2-Methyl-	$(CH_3)_2C=CHCH_3$	513-35-9	70.14	36	– 134

TABLE 12. EPOXIDES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
12.1. MONOEPOXIDES $CH_2(-O-)CHR$					
Allylglycidyl ether	$-CH_2OCH_2CH=CH_2$	106-92-3	114.14	154	
2-Biphenylyl glycidyl ether	$-CH_2OC_6H_4C_6H_5$	7144-65-2	266.28	120/0.1	31
n-Butyl glycidyl ether	$-CH_2O(CH_2)_3CH_3$	2426-08-6	130.19	165	
t-Butyl glycidyl ether	$-CH_2OC(CH_3)_3$	7665-72-7	130.19	151	
4-*t*-Butylphenyl glycidyl ether	$-CH_2OC_6H_4C(CH_3)_3$	3101-60-8	206.29	166/4	
4-Chlorophenyl glycidyl ether	$-CH_2OC_6H_4Cl$	2212-05-7	184.62		32
Cyclohexene oxide	$C_6H_{10}O$	286-20-4	98.15	129	
Cyclooctene oxide	$C_8H_{14}O$	286-62-4	126.20	55/5	54
Cyclopentene oxide	C_5H_8O	285-67-6	84.12	102	
Epibromohydrin	$-CH_2Br$	3132-64-7	136.98	135	– 40
Epichlorohydrin	$-CH_2Cl$	106-89-8	92.53	116	– 57
Epifluorohydrin	$-CH_2F$	503-09-3	76.07	85	
1,2-Epoxybutane, *trans-*	$CH_3CH(-O-)CHCH_3$	21490-63-1	72.11	54	
1,2-Epoxydecane	$-(CH_2)_7CH_3$	2404-44-6	156.27	94/15	
1,2-Epoxydodecane	$-(CH_2)_9CH_3$	2855-19-8	184.32	124/15	
1,2-Epoxyhexadecane	$-(CH_2)_{13}CH_3$	7320-37-8	240.43	176/12	21
1,2-Epoxyhexane	$-(CH_2)_3CH_3$	1436-34-6	100.16	119	
2,3-Epoxynorbornane, *exo-*	$C_7H_{10}O$	3146-39-2	110.16		123
1,2-Epoxyoctadecane	$-(CH_2)_{15}CH_3$	7390-81-0	268.49	137/0.5	34
2,3-Epoxypropyl benzene	$-CH_2C_6H_5$	4436-24-2	134.18	99/17	
N-(2,3-Epoxypropyl)phthalimide	$-CH_2NC_8H_4O_2$	5455-98-1	203.20		99
1,2-Epoxytetradecane	$-(CH_2)_{11}CH_3$	3234-28-4	212.38	95/10.4	
Ethylene oxide	$-H$	75-21-8	44.05	10.7	– 111
2-Ethylhexyl glycidyl ether	$-CH_2OCH_2CH(CH_2CH_3)(CH_2)_3CH_3$	2461-15-6	186.30	61/0.3	
Furfuryl glycidyl ether	$-CH_2OCH_2C_4H_3O$	5380-87-0	154.17	103/11	
Glycidol	$-CH_2OH$	556-52-5	74.08	61/15	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.726	1.4390	−22		1(1),27F	1(1),37A	1(1),32A	11,3228	1(3),991	1,276
0.843	1.400								
1.665	1.5550	None	EJ0700000	1(1),105H	1(1),150A	1(1),102A		1,250	10,195
1.553/−20	1.378/−20								
	1.5616								
1.4220	1.4220	−54	NT4037000	1(1),27E	1(1),36C	1(1),30D	11,5087	1,252	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
	1.3962			1(1),15C			11,1513	1,203	
1.330	1.4625	9		1(1),97E	1(1),136C	1(1),94B		1(1),84	
0.684	1.3890	−18		1(1),23I	1(1),31B	1(1),22A		1(3),816	
0.653	1.3760	−29		1(1),23B	1(1),29B	1(1),25B		1,217	
0.650	1.3780	<−35		1(1),23G	1(1),30C	1(1),21B		1,211	
0.627/0	1.3640	−57		1(1),23A	1(1),29A	1(1),21C		1,213	
	1.3931/−25	37		1(1),19A				11,1514	1,205
	1.3848/−25			1(1),19B				11,1514	1,205
1.070	1.4780	126	EM4970000	1(1),153A	1(1),221A	1(1),146C		1(2),567	
0.708	1.4120	−17		1(1),25H	1(1),35B	1(1),25A	11,644	1,218	
0.662	1.3870	−46		1(1),25D	1(1),34A	1(1),21D	11,644	1,211	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.962	1.4330	57	RR0875000	1(1),251C	1(1),374A	1(1),233D			
				1(1),1253D	1(2),225A	1(1),1065C			
0.910	1.4190	56	TX4200000	1(1),249K	1(1),373A			17(3),988	
0.917	1.4170	43	RR0475000	1(1),251A	1(1),373B	1(1),232C		17(3),988	
1.038	1.5150	102	TX4250000	1(1),1253A	1(2),224A	1(1),1065B			
	1.5450	107	TX5600000	1(1),1253B	1(2),224B	1(1),1064D			
0.970	1.4520	27	RN7175000	1(1),251L	1(1),376C	1(1),235A		17,21	
		56		1(1),251M	1(1),377A	1(1),235B			
0.964	1.4340	10	RN8935000	1(1),251K	1(1),376B	1(1),234D		17,21	
1.601	1.4820	56	TX4115000	1(1),247L	1(1),370B	1(1),232A		17,21	
1.183	1.4380	34	TX4900000	1(1),247I	1(1),369B	1(1),231D	11,3563	17,6	5,290
1.067	1.3680	4	TZ3325000	1(1),247H	1(1),369A	1(1),231C			
0.804	1.3730	−27	EK3855000	1(1),245F	1(1),364C	1(1),229B		17(3),49	
0.840	1.4290	78		1(1),245J	1(1),365C	1(1),230A		17,18	
0.844	1.4360	105	JR2450000	1(1),245K	1(1),366A	1(1),230B		17(3),136	
0.846	1.4460	93	ML9450000	1(1),247A	1(1),366C	1(1),230D		17,20	
0.831	1.4060	16	MO3630000	1(1),245H		1(1),229A		17,86	
		10	RB7176000	1(1),253D	1(1),378B	1(1),235D			
		>110		1(1),247B	1(1),367A	1(1),231B		17(3),140	
1.020	1.5230	82	DA0178000	1(1),1251D	1(2),220C			17,51	
			TI4950000	1(2),2083B	1(2),1461C	1(2),408A			
0.845	1.4408	>110		1(1),245L	1(1),366B	1(2),230C		17(3),139	
0.891/4	1.3597/7		KX2450000	1(1),245A			11,3758	17,4	8,150
0.891	1.4340	97	TZ3300000	1(1), 251B	1(1),373C	1(1),232D			
1.122	1.4810	102	LU1423000	1 (2),2319J	1(3),17C			17(5),347	
1.117	1.4330	81	UB4375000	1(1),249B	1(1),370C	1(1),232B	11,4385	17,104	

TABLE 12. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
3-Glycidoxypropyl trimethoxy-silane	$-CH_2O(CH_2)_3Si(OCH_3)_3$	2530-83-8	236.34	120/2	
(R)-(−)-Glycidyl Butyrate	$-CH_2OC(O)CH_2CH_2CH_3$	60456-26-0	144.17	90/19	
Glycidyl isopropyl ether	$-CH_2OCH(CH_3)_2$	4016-14-2	116.16	131	
Glycidyl methacrylate (see Methacrylates)					
Glycidyltrimethylammonium chloride, (70% aq. solution)	$-CH_2N(CH_3)_3Cl$	3033-77-0	151.54		
Hexafluoropropylene oxide	$F_2C(-O-)CFCF_3$	428-59-1	166.02	−42	
4-Methoxyphenyl glycidyl ether	$-CH_2OC_6H_4OCH_3$	2211-94-1	180.20		46
α-Pinene oxide	$C_{10}H_{16}O$	1686-14-2	152.24	102/50	
Propylene oxide	$-CH_3$	75-56-9	58.08	34	−112
Styrene oxide	$-C_6H_5$	96-09-3	120.15	194	−37
Tetracyanoethylene oxide	$(NC)_2C(-O-)C(CN)_2$	3189-43-3	144.09		
1,1,2,2-Tetrafluoroethyl glycidyl ether	$-CH_2OCF_2CHF_2$	85567-21-1	174.10	143	
Vinylethylene oxide	$-CH{=}CH_2$	930-22-3	70.09	65	
12.2. DIEPOXIDES $CH_2(-O-)CHRCH(-O-)CH_2$					
Bis(3,4-epoxycyclohexylmethyl) adipate	$C_6H_9(-O-)CH_2OC(O)(CH_2)_4C(O)OCH_2C_6H_9(-O-)$	3130-19-6	366.46		
1,3-Butadiene diepoxide	$CH_2(-O-)CHCH(-O-)CH_2$	1464-53-5	86.09	57/25	3
1,4-Butanediol diglycidol ether	$-CH_2O(CH_2)_4OCH_2-$	2425-79-8	202.25	158/11	
1,2,5,6-Diepoxycyclooctane	$C_8H_{12}O_2$	27035-39-8	140.18	70/0.4	
1,2,7,8-Diepoxyoctane	$-(CH_2)_4-$	2426-07-5	142.20	240	
3,4-Epoxycyclohexylmethyl 3,4-epoxycyclohexane-carboxylate	$C_6H_9(-O-)CH_2OC(O)C_6H_9(-O-)$	2386-87-0	252.31		−37
Ethylene glycol digycidyl ether	$-CH_2O(CH_2)_2OCH_2-$	2224-15-9	174.20	112/4.5	

TABLE 13. ETHYLENE HALIDES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Ethylene	$H_2C{=}CH_2$	74-85-1	28.05	−104	−169
–, Bromo- (vinyl bromide)	$BrCH{=}CH_2$	593-60-2	106.96	16/750	−139
–, Chloro- (vinyl chloride)	$ClCH{=}CH_2$	75-01-4	62.50	−13.4	−154
–, 1-Chloro-1-fluoro-	$ClCF{=}CH_2$		84.48	−24	−169
–, Chlorotrifluoro-	$ClCF{=}CF_2$	79-38-9	116.47	−29	−157
–, 1,1-Dibromo- (vinylidene bromide)	$Br_2C{=}CH_2$		185.86	92	
–, 1,2-Dibromo-, *cis-*	$BrCH{=}CHBr$		185.86	112	−53
1,2-Dibromo-, *trans-*	$BrCH{=}CHBr$		185.86	108	−6
–, 1,1-Dichloro- (vinylidene chloride)	$Cl_2C{=}CH_2$	75-35-4	96.94	31	−122
–, 1,2-Dichloro-, *cis-*	$ClCH{=}CHCl$	156-59-2	96.94	60	−80
–, 1,2-Dichloro-, *trans-*	$ClCH{=}CHCl$	156-60-5	96.94	48	−50
–, Tetrabromo-	$Br_2C{=}CBr_2$		343.66	226	56
–, Tetrachloro-	$Cl_2C{=}CCl_2$	127-18-4	165.83	121	−22
–, Tetrafluoro-	$F_2C{=}CF_2$	116-14-3	100.02	−76	−142
–, Tetraiodo-	$I_2C{=}CI_2$	513-92-8	531.64		192
–, Tribromo-	$Br_2C{=}CHBr$		264.76	163	
–, Trichloro-	$Cl_2C{=}CHCl$	79-01-6	131.39	87	−85

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.070	1.4290	>110	VV4025000	**1**(2),2973B	**1**(3),667C	**1**(2),1113D			
1.018	1.4280	85		**1**(1),781E	**1**(1),1088B			**17**(5),3,34	
0.924	1.4100	33	TZ3500000	**1**(1),249J	**1**(1),372C	**1**(3),306A		**17**(3),988	
1.129	1.4780	>110	BQ3480000		**1**(1),616B			**18**,583	
			TZ3400000	**1**(1),249A				**17**(3),20	
		>110	DA0176000	**1**(1),1253C	**1**(2),224C	**1**(1),1065A			
0.964	1.4690	66	TK4565000	**1**(1),253B	**1**(1),377C	**1**(1),237A		**5**,152	
0.830	1.3660	−35	TZ2975000	**1**(1),245B	**1**(1),363B	**1**(1),228B	**11**,7869	**17**,6	
1.054	1.5350	79	CZ9625000	**1**(1),1251A	**1**(2),219C	**1**(1),1063C		**17**,49	
				1(1),1003F	**1**(1),1376C		**18**(5),7,215		
1.380	1.3490	51							
0.870	1.4170	−50	EM7350000	**1**(1),247D	**1**(1),367C	**1**(1),233A		**17**(1),13	**4**,53
1.149	1.4930	>110	MO1880550						
1.113	1.4340	46	EJ8400000	**1**(1),251E	**1**(1),374B	**1**(1),234A	**11**,3621	**19**,14	
1.100	1.4610	>110	EJ5100000	**1**(1),251I	**1**(1),375C	**1**(1),234C			
1.138	1.4690	105	GX9627000	**1**(1),253E	**1**(1),378C	**1**(1),235C			
0.997	1.4450	98	RG9450000	**1**(1),251F	**1**(1),374C	**1**(1),234B			
1.170	1.4980	118	RN7750000						
1.118	1.4630	>110	KH5780000	**1**(1),251G	**1**(1),375A			**17**(3),997	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
			KU5340000	**1**(1),15A	**1**(3),17C		**11**,3748	**1**,180	
1.517	1.4350	None	KU8400000	**1**(1),95B	**1**(1),133A	**1**(1),93A		**1**,188	
0.911	1.3700	− 61	KU9625000	**1**(1),95A			**11**,9898	**1**,186	**1**,1274
			KV0525000	**1**(1),103I				**1**(3),646	
2.178									
2.2464	1.5428								
2.2308	1.550								
1.213	1.4254	−9	KV9275000	**1**(1),101B	**1**(1),142B	**1**(1),98B	**11**,9900	**1**,186	
1.284	1.4481	6	KV9420000	**1**(1),101D	**1**(1),143A	**1**(1),98A	**11**,86	**1**,188	**14**,127
1.257	1.4456	6	KV9400000	**1**(1),101E	**1**(1),134B	**1**(1),79D	**11**,86	**1**,188	**12**,175
1.623	1.5060	None	KX3850000	**1**(1),103J		**1**(1),101C	**11**,9126	**1**,187	
1.1507/−40									
2.983			KX4125000	**1**(1),103K			**11**,9151	**1**,195	
2.708	1.6045/16								
1.463	1.4760	None	KX4550000	**1**(1),103G	**1**(1),147C	**1**(1),101B	**11**,9552	**1**,187	**11**,552

TABLE 14. FUMARATE ACIDS/ESTERS

Name	Formula ROC(O)CH=CHC(O)OR R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Acid	$-H$	110-17-8	116.07		299(s)
2-Bromo-	$HOC(O)CBr=CHC(O)OH$		194.98	200(d)	186
2-Chloro-	$HOC(O)CCl=CHC(O)OH$		150.52		193
2-Chloro-, diethyl ester	$CH_3CH_2OC(O)CCl=CHC(O)OCH_2CH_3$		206.63	136/19	
2-Chloro-, dimethyl ester	$CH_3OC(O)CCl=CHC(O)OCH_3$		178.57	224	
Di-*n*-amyl ester	$-(CH_2)_4CH_3$		256.33	162/7	
Diethyl ester	$-CH_2CH_3$	623-91-6	172.18	217	2
Diisoamyl ester	$-CH_2CH_2CH(CH_3)_2$		256.33	166/11	
Diisobutyl ester	$-CH_2CH(CH_3)_2$		228.29	170/160	
Diisopropyl ester	$-CH(CH_3)_2$		200.24	226	
2,3-Dimethyl-	$HOC(O)C(CH_3)=C(CH_3)C(O)OH$		144.13		241
Dimethyl ester	$-CH_3$	624-49-7	144.13	192	103
Dinitrile- (fumaronitrile)	$NCCH=CHCN$	764-42-1	78.07	186	96
Diphenyl ester	$-C_6H_5$		268.27	219/14	162
Di-*n*-propyl ester	$-CH_2CH_2CH_3$		200.24	110/5	
2-Methyl- (mesaconic acid)	$HOC(O)C(CH_3)=CHC(O)OH$	498-24-8	130.10	205(d)	204
2-Methyl-, diethyl ester	$CH_3CH_2OC(O)C(CH_3)=CHC(O)CH_2CH_3$			186.21	229
2-Methyl-, dimethyl ester	$CH_3OC(O)C(CH_3)=CHC(O)OCH_3$			158.16	204

TABLE 15. ISOCYANATES

Name	Formula OCNRNCO R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
1,3-Benzene diisocyanate	$-C_6H_4-$	123-61-5	160.13	121/25	50
1,4-Benzene diisocyanate	$-C_6H_4-$	104-49-4	160.13	260	98
1,3-Bis(isopropyl)benzene α,α′-diisocyanate	$-C(CH_3)_2C_6H_4C(CH_3)_2-$	2778-42-9	244.30	157/10	−10
1,4-Bis(isopropyl)benzene α,α′-diisocyanate	$-C(CH_3)_2C_6H_4C(CH_3)_2-$	2778-41-8	244.30	150/3	72
1,4-Butene diisocyanate	$-(CH_2)_4-$	4538-37-8	140.14	102/14	
α-Chlorotoluene 2,4-diisocyanate	$-C_6H_3(CH_2Cl)-$	51979-57-8	208.60	153/11	
1,4-Cyclohexylene diisocyanate, *trans-*	$-C_6H_{10}-$	7517-76-2	166.18		60
1,12-Dodecane diisocyanate	$-(CH_2)_{12}-$	13879-35-1	252.36	168/3	
1,6-Hexane diisocyanate	$-(CH_2)_6-$	822-06-0	168.20	255	
Isopherone diisocyanate (isomers)	$-C_{10}H_{18}-$	4098-71-9	222.29	158/15	
4,4′-Methylenebis(cyclohexyl isocyanate) (isomers)	$-(C_6H_{10})CH_2(C_6H_{10})-$	5124-30-1	262.35		
4,4′-Methylenebis(2,6-diethylphenyl isocyanate)	$-C_6H_2(CH_2CH_3)_2CH_2C_6H_2(CH_2CH_3)_2-$	105442-35-1	362.48		56
4,4′-Methylenebis(phenylisocyanate)	$-C_6H_4CH_2C_6H_4-$	101-68-8	250.26	200/5	43
2-Methylpentane 1,5-diisocyanate	$-CH_2CH(CH_3)(CH_2)_3-$	34813-62-2	168.20		
1,8-Octane diisocyanate	$-(CH_2)_8-$	10124-86-4	196.25	156/15	
2,4-Toluene diisocyanate	$-C_6H_3(CH_3)-$	584-84-9	174.16	120/10	21

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
			LS9625000	1(1),553A	1(1),787B	1(1),502D	11,4200	2,737	5,319
1.1880	1.4571								
1.290									
0.9681	1.4496								
1.052	1.4410	94	EM5950000	1(1),725M	1(1),993C	1(1),645A		2,742	
0.9655	1.4479								
0.9760	1.4432								
			EM6125000	1(1),725L	1(1),993B	1(1),644D		2,741	
0.9416	1.4349		LT2300000	1(1),993A	1(1),1360B	1(1),844A		2(1),302	
1.0129	1.4439								
1.466			OX5075000	1(1),553C	1(1),788A	1(1),503B	11,5806	2,763	
	1.0453	1.4488							
	1.0914	1.4512							

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
		>110	NR0150000	1(2),2165G		1(3),1432D		13,50	
		>110	CZ6150000	1(2),2165H				13,105	
1.05		153	CY8480000						
		>93							
1.105		106		1(1),1023F	1(1),1404B			4(3),578	
1.362	1.5960	>110		1(2),2169H	1(2),1572A			13(4),245	
			GU9642500	1(1),1025A	1(1),1406A			13(3),12	
0.940	1.4590	>110		1(1),1023H	1(1),1405A			4(3),624	
1.040	1.4520	140	MO1740000	1(1),1023G	1(1),1404C	1(1),871A		4(2),711	
1.049	1.4840	>110	NQ9370000	1(1),1023J	1(1),1405C				
1.066	1.4970	>110	NQ9250000	1(1),1025B				13(4),33	
				1(2),2169K	1(2),1572C				
1.180		>110	NQ9350000	1(2),2163D				13(3),461	
1.049	1.4550	>110		1(1),1023I	1(1),1405B				
1.007	1.4550	>110						4(3),614	
1.214	1.5680	>110	CZ630000	1(2),2169F		1(2),478B	11,9456	13,138	1,117

TABLE 16. LACTAMS

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
γ-Butyrolactam (2-pyrrolidinone)	$-C(O)(CH_2)_3NH-$	616-45-5	85.11	245	24
ε-Caprolactam	$-C(O)(CH_2)_5NH-$	105-60-2	113.16	137/10	69
12-Dodecanolactam	$-C(O)(CH_2)_{11}NH-$	947-04-6	197.32		151
7-Heptanolactam	$-C(O)(CH_2)_6NH-$	673-66-5	127.19	149/10	36
β-Propiolactam	$-C(O)CH_2CH_2NH-$	930-21-2	71.08	106/15	75
δ-Valerolactam	$-C(O)(CH_2)_4NH-$	675-20-7	99.13	256	39

TABLE 17. LACTONES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
γ-Butyrolactone	$-C(O)(CH_2)_3O-$	96-48-0	86.09	204	− 45
ε-Caprolactone	$-C(O)(CH_2)_5O-$	502-44-3	114.14	97/15	
β-Propiolactone	$-C(O)(CH_2)_2O-$	57-57-8	72.06	162	− 33
δ-Valerolactone	$-C(O)(CH_2)_4O-$	542-28-9	100.12	59/0.5	

TABLE 18. MALEATE ACIDS/ESTERS

Name	Formula ROC(O)CH=CHC(O)OR R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Acid	$-H$	110-16-7	116.07		141
2-Chloro-	$HOC(O)CCl=CHC(O)OH$		150.52		110
2-Chloro-, diethyl ester	$CH_3CH_2OC(O)CCl=CHC(O)OCH_2CH_3$		206.63	235	
2-Chloro-, dimethyl ester	$CH_3OC(O)CCl=CHC(O)OCH_3$		178.57	107	
Diallyl ester	$-CH_2CH=CH_2$	999-21-3	196.20	110/4	− 47
Di-*n*-amyl ester	$-(CH_2)_4CH_3$		256.33	161/10	
Di-*n*-butyl ester	$-(CH_2)_3CH_3$	105-76-0	228.29	281	
2,3-Dichloro-	$HOC(O)CCl=CClC(O)OH$		184.97		120
Diethyl ester	$-CH_2CH_3$	141-05-9	172.18	225	− 10
2,3-Dihydroxy-	$HOC(O)C(OH)=C(OH)C(O)OH$		148.07		155
Diisoamyl ester	$-CH_2CH_2CH(CH_3)_2$		156.33	157/13	
Dimethyl ester	$-CH_3$	624-48-6	144.13	204	
Diphenyl ester	$-C_6H_5$		268.27	226/15	93
Di-*n*-propyl ester	$-CH_2CH_2CH_3$		200.24	126/12	
2-Methyl-, *cis*- (citraconic acid)	$HOC(O)C(CH_3)=CHC(O)OH$	498-23-7	130.10		90
2-Methyl-, diethyl ester, *cis*-	$CH_3CH_2OC(O)C(CH_3)=CHC(O)OCH_2CH_3$		186.21	230	
2-Methyl-, dimethyl ester, *cis*-	$CH_3OC(O)C(CH_3)=CHC(O)OCH_3$			158.16	211

TABLE 19. PROPENES

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Propene	$H_2C=CHCH_3$	115-07-1	42.08	− 48	− 185
−, 1-Bromo-, *cis*-	$BrCH=CHCH_3$	590-13-6	120.98	58	
−, 1-Bromo-, *trans*-	$BrCH=CHCH_3$	590-15-8	120.98	64	
−, 2-Bromo-	$H_2C=CBrCH_3$	557-93-7	120.98	48	− 125
−, 1-Chloro-, *cis*-	$ClCH=CHCH_3$		76.53	33	− 135
−, 1-Chloro-, *trans*-	$ClCH=CHCH_3$		76.53	37	− 99
−, 2-Chloro-	$H_2C=CClCH_3$	557-98-2	76.53	22.5	− 139
−, 1-Chloro-2-methyl- (isocrotyl chloride)	$ClCH=C(CH_3)_2$	513-37-1	90.55	68	
−, 3-Chloro-2-methyl- (methallyl chloride)	$H_2C=C(CH_3)CH_2Cl$	563-47-3	90.55	71	− 80
−, 1,1-Dichloro-	$Cl_2C=CHCH_3$	563-58-6	110.97	76	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.120	1.4870	>110	UY5715000	1(1),923B	1(1),1285B	1(1),788D	11,8027	21,236	
			CM3675000	1(1),927G	1(1),1293B	1(1),792B	11,1762	21(2),216	
			CL6940000	1(1),929A	1(1),1296A	1(1),794A			
		>110	CN4810000	1(1),927M	1(1),1295B	1(1),793C		21,242	
				1(1),923A	1(1),1285A			21(3),3141	
		>110	TO0110000	1(1),927E	1(1),1292C	1(1),791D		21,238	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.120	1.4360	98	LU3500000	1(1),803J	1(1),1127A	1(1),697D	11,1596	17,234	1,101
1.030	1.4630	109	MO8400000	1(1),819E	1(1),1161C	1(1),699B		17(2),290	
1.146	1.4120	70	RQ7350000	1(1),803A			11,7832	17(1),130	1,957
1.079	1.4580	100		1(1),815A	1(1),1152A	1(1),704D		17,235	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.590			OM9625000	1(1),5510	1(1),787A	1(1),503A	11,5585	2,748	
1.1741									
1.277									
1.073	1.4690	>110	ON0700000	1(1),725K	1(1),993A			2(3),1926	
0.9741	1.4475								
0.988	1.4452	>110	ON0875000	1(1),725J	1(1),992C			2(3),1925	
1.064	1.4410	93	ON1225000	1(1),725I	1(1),992B	1(1),644C	11,3113	2,751	
0.9714	1.4459								
1.152	1.4410	91	EM6300000	1(1),725H	1(1),992A	1(1),644B		2,751	
1.0245	1.4433								
			GE6650000	1(1),553B	1(1),787C	1(1),503C	11,2323	2,768	
1.0491	1.4468								
	1.9491	1.4473							

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
			UC6740000	1(1),15B			11,7862	1,196	
1.423	1.4545	−34		1(1),95F	1(1),134A			1(3),710	
1.408	1.4530	−15		1(1),95C				1(4),754	4,236
1.362	1.436	4	UC7085000	1(1),95H	1(1),134C	1(1),96B		1,200	
0.9347	1.4055								
0.9351	1.4054								
0.899	1.3939	−34	UC7200000	1(1),95D	1(1),133B	1(1),96A		1,198	
0.920	1.4225	−1	UC8045000	1(1),97I	1(1),137C	1(1),97A	11,2147	1,209	
0.917	1.4278	−12	UC8050000	1(1),97J	1(1),138A	1(1),96D	11,2148	1,209	
1.169	1.4450	0	UC8290000	1(1),101G	1(1),144A	1(3),138D		1,199	

TABLE 19. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
–, 1,2-Dichloro-	$ClCH{=}CClCH_3$		110.97	77	
–, Hexafluoro-	$F_2C{=}CFCF_3$	116-15-4	150.02	– 28	– 153
–, 2-Methyl- (isobutylene)	$H_2C{=}C(CH_3)_2$	115-11-7	56.11	– 7	– 140
–, 1,1,2-Trichloro-	$Cl_2C{=}CClCH_3$		145.42	118	
–, 1,1,3-Trichloro-	$Cl_2C{=}CHCH_2Cl$		145.42	131	
–, 1,2,3-Trichloro-	$ClCH{=}CClCH_2Cl$		145.42	142	
–, 3,3,3-Trichloro-	$H_2C{=}CHCCl_3$		145.42	114	

TABLE 20. STYRENES

Name	Formula $CH_2{=}CHR$ R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Styrene	$-C_6H_5$	100-42-5	104.15	145	– 30
–, 4-Acetoxy-	$-C_6H_4OC(O)CH_3$	2628-16-2	162.19	260	7
–, 2-Amino-	$-C_6H_4NH_2$	3867-18-3	119.18	104/8	
–, 4-Amino-	$-C_6H_4NH_2$	1520-21-4	119.18	249	23
–, 4-Benzyloxy-3-methoxy-	$-C_6H_3(OCH_3)OCH_2C_6H_5$	55708-65-1	240.30	51	
–, 3,5-Bis(trifluoromethyl)-	$-C_6H_4(CF_3)_2$	349-59-7	240.15	60/20	7
α-Bromo-	$H_2C{=}CBrC_6H_5$	98-81-7	183.05	69/4	– 44
β-Bromo-	$HCBr{=}CHC_6H_5$	103-64-0	183.05	111/20	7
–, 2-Bromo-	$-C_6H_4Br$	2039-88-5	183.05	210	– 53
–, 3-Bromo-	$-C_6H_4Br$	2039-86-3	183.05	74/3	
–, 4-Bromo-	$-C_6H_4Br$	2039-82-9	183.05	212	4.5
–, 4-*tert*-Butyl-	$-C_6H_4C(CH_3)_3$	1746-23-2	160.26	219	– 37
–, 4-Carboxy-	$-C_6H_4CO_2H$	1075-49-6	148.16		143
α-Chloro-	$H_2C{=}CClC_6H_5$		138.60	199	– 23
β-Chloro-	$HCCl{=}CHC_6H_5$		138.60	199	
–, 2-Chloro-	$-C_6H_4Cl$	2039-87-4	138.60	188	– 63
–, 3-Chloro-	$-C_6H_4Cl$	2039-85-2	138.60	62/6	
–, 3-Chloromethyl (3-vinylbenzyl chloride)	$-C_6H_4CH_2Cl$	57458-41-0	152.62	229	
–, 4-Chloro-	$-C_6H_4Cl$	1073-67-2	138.60	192	– 16
–, 4-Chloromethyl-	$-C_6H_4CH_2Cl$	1592-20-7	152.62	229	
–, 4-Chloro-α-Methyl-	$H_2C{=}C(CH_3)C_6H_4Cl$	1712-70-5	152.62		
–, 2-Cyano-	$-C_6H_4CN$		129.16	53/0.15	
–, 3-Cyano-	$-C_6H_4CN$	5338-96-5	129.16	83/2.6	
–, 4-Cyano-	$-C_6H_4CN$	3435-51-6	129.16	92/3	– 15
–, 2,5-Dichloro-	$-C_6H_3Cl_2$	1123-84-8	173.04	74/3	
–, 2,6-Dichloro-	$-C_6H_3Cl_2$	28469-92-3	173.04	88/8	
–, 3,4-Dichloro-	$-C_6H_3Cl_2$	2039-83-0	173.04	76/3	
–, α,β-Difluoro-	$HCF{=}CFC_6H_5$		140.03	88/60	
–, 1,2-Difluoro-	$-C_6H_3F_2$	366-37-0	140.03	90/45	
–, 2,6-Difluoro-	$-C_6H_3F_2$		140.03	59/51	
–, 1,3-Diisopropenyl benzene	$C_6H_4(C(CH_3){=}CH_2)_2$	3748-13-8	158.25	231	
–, 3,4-Dimethoxy-	$-C_6H_3(OCH_3)_2$	6380-23-0	164.20	120/10	
–, α,2-dimethyl-	$H_2C{=}C(CH_3)C_6H_4CH_3$	26444-18-8	132.21	54/11	
–, 2,4-Dimethyl-	$-C_6H_3(CH_3)_2$	2234-20-0	132.21	70/11	– 64
–, 2,5-Dimethyl-	$-C_6H_3(CH_3)_2$	2039-89-6	132.21	71/10	– 35
–, Divinyl-, (isomers)	$C_6H_4(CH{=}CH_2)_2$	1321-74-0	130.19		
–, 4-Ethoxy-	$-C_6H_4OCH_2CH_3$	5459-40-5	148.21	59/1	
–, 2-Ethyl-	$-C_6H_4CH_2CH_3$	7564-63-8	132.21	191	– 127
–, 4-Ethyl-	$-C_6H_4CH_2CH_3$	3454-07-7	132.21	193	– 50
–, 3-Iodo-	$-C_6H_4I$		233.05		73
–, 2-Fluoro-	$-C_6H_4F$	394-46-7	122.14	67/15	
–, 3-Fluoro-	$-C_6H_4F$	350-51-6	122.14	30/4	
–, 4-Fluoro-	$-C_6H_4F$	405-99-2	122.14	30/14	
–, 2-Hydroxy-	$-C_6H_4OH$		120.15	108/15	29
–, 3-Hydroxy-	$-C_6H_4OH$		120.15	115	
–, 4-Hydroxy-	$-C_6H_4OH$		120.15		73.5
–, 4-Isopropyl-	$-C_6H_4CH(CH_3)_2$	2055-40-5	146.22	204	– 45

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.1818	1.4471								
			UD0350000	**1**(1),105A		**1**(3),143C		**1**(3),697	
			UD0890000	**1**(1),23F		**1**(3),28B	**11**,5024	**1**,207	
1.382	1.4827								
1.403	1.4950	48	UD1928500	**1**(1),103H	**1**(1),148A	**1**(3),142A		**1**(3),707	
1.414	1.5020								
1.369	1.4827								

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
0.9059	1.5470	31	WL3675000	**1**(1),1139A	**1**(2),23A	**1**(1),945B	**11**,8830	**5**,474	
1.060	1.5380	87	SL3784000	**1**(2),1927F	**1**(2),1287C			**6**(3),2387	
1.608									
1.014	1.6267							**12**,1187	
		>110		**1**(1),1237M	**1**(2),197C	**1**(1),1053A			
1.334	1.4250	122		**1**(1),1213A	**1**(2),155A			**5**(4),1386	
1.410	1.5880	87	WL3840000	**1**(1),1203F				**5**,477	
1.427	1.6070	102	WL3850000	**1**(1),1203H	**1**(2),136C	**1**(1),1017B		**5**,477	
1.460	1.5927	85		**1**(1),1203L	**1**(2),138A	**1**(1),1018A		**5**(3),1176	
1.406	1.5891	67		**1**(1),1205D	**1**(2),139C	**1**(3),195B		**5**(3),1176	
1.400	1.5940	75		**1**(1),1205H	**1**(2),141A	**1**(1),1019C		**5**(2),367	
0.875	1.5260	80						**5**(3),1254	
				1(2),1789D	**1**(2),1076A	**1**(2),194D		**9**(3),2755	
1.1016/18	1.5612								
1.1095/15	1.5648								
1.080	1.5648	58	WL4160000	**1**(1),1203K	**1**(2),137C	**1**(1),1017D			
1.090	1.5613	62		**1**(1),1205C	**1**(2),139B	**1**(1),1018C			
1.074		105							
1.155	1.5662	60		**1**(1),1205F	**1**(2),140B	**1**(1),1019B		**5**(2),367	
1.083	1.5740	104							
1.065	1.5550	74		**1**(1),1205G	**1**(2),140C	**1**(1),1018D			
	1.5756								
1.083	1.5630	104							
	1.575								
1.267	1.5740	71		**1**(1),1205J	**1**(2),141C	**1**(1),1019D			
	1.5061								
1.130	1.4990	30		**1**(1),1205I	**1**(2),141B				
0.925	1.5570	91	CY8535000	**1**(1),1139L	**1**(2),26B	**1**(1),947C			
1.109	1.5710	>110		**1**(1),1243D	**1**(2),208C	**1**(1),1053D		**6**,954	
0.894	1.5150	43							
0.906	1.5390	60	WL4450000	**1**(1),1141D	**1**(2),27C			**5**,491	
0.904	1.5391	63	WL4460000	**1**(1),1141E	**1**(2),28A			**5**,491	
0.914	1.5470	64	CZ9370000	**1**(1),1141B					
0.990	1.5498	87		**1**(1),1243A		**1**(3),984B		**6**,561	
0.8955	1.5351								
0.8925	1.5376								
	1.6390								
1.025	1.5200	35		**1**(1),1203J	**1**(2),137B			**5**(3),1171	
1.025	1.5175	29		**1**(1),1205B	**1**(2),139A	**1**(1),1081B		**5**(3),1171	
1.024	1.5156	26		**1**(1),1205E	**1**(2),140A	**1**(1),1019A			
1.0609/18	1.5783/27								
1.0468/35	1.5804/31								
0.885	1.5289								

TABLE 20. *cont'd*

Name	Formula CH_2=CHR R	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
–, 2-Methoxy-	$-C_6H_4OCH_3$	612-15-7	134.18	61.3	29
–, 3-Methoxy-	$-C_6H_4OCH_3$	626-20-0	134.18	144/2	
–, 4-Methoxy-	$-C_6H_4OCH_3$	637-69-4	134.18	204	
–, 2-Methoxy-4-hydroxy-	$-C_6H_3OCH_3(OH)$	7786-61-0	150.18	224	
α-Methyl-	$H_2C=C(CH_3)C_6H_5$	98-83-9	118.18	167	−24
–, 2-Methyl-	$-C_6H_4CH_3$	611-15-4	118.18	171	−69
–, 3-Methyl-	$-C_6H_4CH_3$	100-80-1	118.18	170	−82
–, 4-Methyl-	$-C_6H_4CH_3$	622-97-9	118.18	172	−34
–, β-Nitro-	$HC(NO_2)=CHC_6H_5$		149.15	250	58
–, 2-Nitro-	$-C_6H_4NO_2$		149.15		13
–, 3-Nitro-	$-C_6H_4NO_2$	586-39-0	149.15	90/3.5	−5
–, 4-Nitro-	$-C_6H_4NO_2$	100-13-0	149.15	120/10	25
–, Pentabromo-	$-C_6Br_5$	53097-59-9	498.66		188
–, Pentafluoro-	$-C_6F_5$	653-34-9	194.10	139	
–, 4-Phenoxy-	$-C_6H_4OC_6H_5$	4973-29-9	196.25		71
–, 4-Phenyl-	$-C_6H_4C_6H_5$	2350-89-2	180.25		120
–, 4-Sulfonic acid, sodium salt	$-C_6H_4SO_3Na$	2695-37-6	206.20		225
–, 2-Trifluoromethyl-	$-C_6H_4CF_3$	395-45-9	172.15	61/40	
–, 3-Trifluoromethyl-	$-C_6H_4CF_3$	402-24-4	172.15	55/12	
–, 4-Trifluoromethyl-	$-C_6H_4CF_3$	402-50-6	172.15	65/40	
–, 2,4,6-Trimethyl-	$-C_6H_2(CH_3)_3$	769-25-5	146.24	209	

TABLE 21. VINYL FUNCTIONAL

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
21.1. ARYL H_2C=CHR					
9-Anthracene	$-C_{14}H_9$	2444-68-0	204.27	62/10	65
Benzene (see Styrene)					
2-Naphthalene	$-C_{10}H_7$	827-54-3	154.21		61
2-Pyridine	$-C_5H_4N$	100-69-6	105.14	80/29	
3-Pyridine	$-C_5H_4N$	1121-55-7	105.14	68/15	
4-Pyridine	$-C_5H_4N$	100-43-6	105.14	63/15	
2-Quinoline	$-C_9H_6N$	772-03-2	155.20	71/0.5	
21.2. ESTERS H_2C=CHOC(O)R					
Acetate	$-CH_3$	108-05-4	86.09	72	−93
Acrylate (see Acrylates)					
Allyl adipate	$-(CH_2)_4C(O)OCH_2CH=CH_2$	56860-96-9	212.25	135/9	
Benzoate	$-C_6H_5$	769-78-8	148.16	203	
Bromoacetate	$-CH_2Br$	5309-70-6	165.0	50/10	
4-*tert*-Butyl benzoate	$-C_6H_4C(CH_3)_3$	15484-80-7	204.27	111/2	
Butyrate	$-(CH_2)_2CH_3$	123-20-6	114.14	116	
Carbonate	$-OCH=CH_2$	872-36-6	86.05	162	22
Chloroacetate	$-CH_2Cl$	2549-51-1	120.54	134	
2-Chlorobenzoate	$-C_6H_4Cl$	15721-27-4	182.61		
Chloroformate	–Cl	5130-24-5	106.51	68/735	
Cinnamate	$-CH=CHC_6H_5$	3098-92-8	174.20	125/7	
Crotonate	$-CH_2CH=CHCH_3$	14861-06-4	112.13	133	
Decanoate	$-(CH_2)_8CH_3$	4704-31-8	198.31	146/50	
Dodecanoate	$-(CH_2)_{10}CH_3$	2146-71-6	226.36	140/10	
2-Ethylhexanoate	$-CH(CH_2CH_3)(CH_2)_3CH_3$	94-04-2	170.25	128/20	−90
Formate	–H	692-45-5	72.06	46	
2-Furoate	$-C_4H_3O$	1917-10-8	138.12	182/10	14
Hexadecanoate (palmitate)	$-(CH_2)_{14}CH_3$	693-38-9	282.47	165/2	24
Hexanoate (caproate)	$-(CH_2)_4CH_3$	3050-69-9	142.20	160/10	
Maleate	$-CH=CHC(O)OCH=CH_2$		168.15	94/10	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.0049	1.5388								
0.9999	1.5540								
0.994	1.5620	72		1(1),1241O	1(2),207C	1(1),1052C		6,561	
1.110	1.5820	>110	SL8205000					6(3),4981	
0.909	1.5380	45	WL5075300	1(1),1139B	1(2),2437C	1(1),945C		5,484	
0.917	1.544	58	WL5075900	1(1),1139K		1(1),947A		5(1),233	
0.890	1.5408	52	WL5075800	1(1),1139M	1(2),26C	1(3),869B		5,485	
0.897	1.5412	45	WL5076000	1(1),1139N	1(2),27A	1(1),947B		5,485	
1.070	1.5840	107		1(1),1555D	1(2),687C	1(1),1334D		5,478	
	1.6016		WL5470000						
				1(1),1205N		1(1),1020B			
1.406	1.4455	34		1(1),1205K	1(2),142A	1(1),1020A			
				1(1),1145G	1(2),35B	1(1),951D			
				1(2),2207I	1(2),1598C				
1.175	1.4700	42		1(1),1207C	1(2),143A			5(4),1367	
1.161	1.4655			1(1),1207K	1(2),138C			5(3),1197	
1.165	1.4660			1(1),1209F	1(2),148A			5(4),1369	
0.906	1.5320	75		1(1),1141G		1(3),871A		5,500	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
				1(1),1153I	1(2),51A	1(1),963B			
				1(1),1151G	1(2),46A	1(1),959C			
0.975	1.5490	47	UU1040000	1(2),2495G	1(3),242C	1(2),734A		20,256	
	1.5530								
0.975	1.5500	52	UU1045000	1(2),2499B	1(3),248B	1(2),738D		20(2),170	
1.340		128				1(2),853D		20,425	
0.934	1.3950	−6	AK0875000	1(1),715A	1(1),963A	1(1),632D	11,9896	2(1),63	12,565
1.070	1.5290	82	DI1050000					9(1),65	
0.999	1.5180	>110		1(2),1903L	1(2),1248C			9(4),1885	
0.9022	1.411	20						2(4),792	
1.355	1.4210	72	FG3325000	1(1),697E	1(1),933A	1(1),644A			13,342
1.19	1.4440								
1.22									
1.253	1.4100	−4		1(1),863A	1(1),1206A	1(1),736D		3(3),28	8,530
1.07									
0.940	1.4480	27	GQ5850000	1(1),721H	1(1),978C	1(1),642B		2(3),1263	
0.886	1.4350	104						2(3),843	
0.8639	1.4387	136							
0.875	1.4256	65	MO7875000	1(1),719A	1(1),793A	1(1),637C		2(4),1005	
0.9651	1.4757		LR0525000		1(1),1206A	1(1),736C		3(3),28	8,530
0.8602	1.4444								
0.8837	1.4159								

TABLE 21. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
Maleate, monoester	$-CH=CHC(O)OH$	19896-47-0	142.11	80/1	
Methacrylate (see Methacrylates)					
Neodecanoate	$-C_9H_{19}$	51000-52-3	198.31	216	
Nonate	$-(CH_2)_7CH_3$	6280-03-1	184.28	133/50	
Octadecanoate (stearate)	$-(CH_2)_{16}CH_3$	111-63-7	310.51	181/2	32
9-Octadecenoate (oleate)	$-(CH_2)_7CH=CH(CH_2)_7CH_3$	3896-58-0	308.49	145	36
Octanoate	$-(CH_2)_6CH_3$	818-44-0	170.25	79/7	
Pentafluoropropionate	$-CF_2CF_3$		190.08	58/560	
Pentanoate	$-(CH_2)_3CH_3$	5873-43-8	128.17	132	
Pivalate	$-C(CH_3)_3$	3377-92-2	128.17	112	
Propionate	$-CH_2CH_3$	105-38-4	100.12	95	−81
Sebacate	$-(CH_2)_8C(O)OCH=CH_2$	10355-50-7	254.33	142/3	
Succinate	$-CH_2CH_2C(O)OCH=CH_2$	13416-90-5	170.16	50/3	
Tetradecanoate (myristate)	$-(CH_2)_{12}CH_3$	5809-91-6	254.41	152/3	15
Thioacetate	$H_2C=CHSC(O)CH_3$	10340-63-3	102.15	115	
Trichloroacetate	$-CCl_3$	7062-87-5	189.43	38/5	
Trifluoroacetate	$-CF_3$	433-28-3	140.06	42	
1-Trifluoromethyl acetate	$H_2C=C(CF_3)OC(O)CH_3$	2247-91-8	154.09	86	
Trithiocarbonate	$H_2C=CHSC(S)SCH=CH_2$	930-35-8	134.24		48
Undecanoate	$-(CH_2)_9CH_3$		212.33	125/8	
Versatate	$-C(CH_3)_2(CH_2)_5CH_3$	49863-74-3	198.31	60/1	
21.3. ETHERS $H_2C=CHOR$					
Allyl	$-CH_2CH=CH_2$	3917-15-5	84.12	67	
Butoxyethyl	$-CH_2CH_2O(CH_2)_3CH_3$	4223-11-4	144.21	70/20	
n-Butyl	$-(CH_2)_3CH_3$	111-34-2	100.16	94	−92
2-Butyl	$-CH(CH_2CH_3)CH_3$	4181-12-8	100.16	87	
tert-Butyl	$-C(CH_3)_3$	926-02-3	100.16	75	
1-Chloroethyl	$-CHClCH_3$	110-75-8	106.55	109	
2-Chloroethyl	$-CH_2CH_2Cl$	110-75-8	106.55	109	−70
Cyclohexyl	$-C_6H_{11}$	2182-55-0	126.20	147	−109
1,2-Dichloroethyl	$-CHClCH_2Cl$		141.00	128	
Di(ethylene glycol)	$-CH_2CH_2OCH_2CH_2OH$	929-37-3	132.16	196	
Divinyl	$-CH=CH_2$	109-93-3	70.09	28	−101
Dodecyl	$-(CH_2)_{11}CH_3$	765-14-0	212.38	118	−12
Ethyl	$-CH_2CH_3$	109-92-2	72.11	33	−116
2-Ethylhexyl	$-CH_2CH(CH_2CH_3)(CH_2)_3CH_3$	103-44-6	156.27	177	−85
Glycidyl	$-CH_2CH(-O-)CH_2$	3678-15-7	100.12	139	
Hexachlorodivinyl	$(Cl_2C=CCl)_2O$		276.76	210	
Hexadecyl	$-(CH_2)_{15}CH_3$	822-28-6	268.47	173/5	16
4-Hydroxybutyl	$-(CH_2)_4OH$	17832-28-9	116.16	189	−33
2-Hydroxyethyl	$-CH_2CH_2OH$	764-48-7	88.11	143	
Isoamyl	$-CH_2CH_2CH(CH_3)_2$		114.19	112	
Isobutyl	$-CH_2CH(CH_3)_2$	109-53-5	100.16	82	−112
Isooctyl	$-(CH_2)_5CH(CH_3)_2$	37769-62-3	156.27	175	
Isopropyl	$-CH(CH_3)_2$	926-65-8	86.13	83	−140
2-(2-Methoxyethoxy)ethyl	$-(CH_2CH_2O)_2CH_3$	26256-87-1	190.24	242	
2-Methoxyethyl	$-CH_2CH_2OCH_3$	1663-35-0	102.13	108	−83
Methyl	$-CH_3$	107-25-5	58.08	5	−123
Octadecyl	$-(CH_2)_{17}CH_3$	930-02-9	296.54	178/5	27
Perfluoropropyl	$F_2C=CFOCF_2CF_2CF_3$	1623-05-8	266.04	36	
Phenyl	$-C_6H_5$	766-94-9	120.15	154	
1-Phenylethyl	$-CH(C_6H_5)CH_3$	6230-62-2	148.21	211	
Propyl	$-CH_2CH_2CH_3$	764-47-6	86.13	65	−50
21.4. *N*-SUBSTITUTED $H_2C=CHR$					
−Caprolactam	$-NC_6H_{10}O$	2235-00-9	139.20	128/21	36
−Carbazole	$-NC_{12}H_8$	1484-13-5	193.25	154/3	65
−Formamide	$-NHC(O)H$	13162-05-5	71.08	210	−16
−Phthalimide	$-NC_8H_4O_2$	3485-84-5	173.17		85
−Pyrolidone	$-NC_4H_6O$	88-12-0	111.14		
−*N*-Methylacetamide	$-N(CH_3)C(O)CH_3$	3195-78-6	99.10	166	−36

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
								2(3),1290	
0.882	1.4360	83		1(1),719B				2(4),1045	
0.8689	1.4291								
0.904		>110							
		>110							
0.8719	1.4256								
0.866	1.4050	10							
0.9173	1.4030	6	UF8575000					2(3),532	
0.87									
1.203	1.3170	−31		1(1),745G	1(1),1030C	1(3),704B		2(4),466	
1.212	1.3410	2							
		>110		1(1),697F	1(1),933B			19(3),1598	
0.8	1.4109	<20							
0.866	1.4220	46	KH7175000					1(4),2387	
0.774	1.410	−9	KN5950000	1(1),219C	1(1),332B	1(1),213D			
	1.4558								
0.762	1.3980	−17						1(3),1863	
1.048	1.4380	16	KN6300000	1(1),221C	1(1),336A	1(1),213B	11,2139	1(2),473	
1.048	1.4380	16	KN6300000	1(1),221C	1(1),336A	1(1),213B	11,2139	1(2),473	
0.891	1.4540	35						6(3),18	
1.197	1.4558/17							1(4),2398	
0.986	1.4480	83	KM5495500					1(4),2398	
0.773	1.3989	−30							
0.817	1.4382	>110							
0.754	1.3770	−45	KO0710000	1(1),219B	1(1),332A	1(1),212B		1,433	11,235
0.816	1.4280	52	KO0175000					1(3),1864	
1.006	1.4326	35						17(5),8,12	
1.654									
0.939	1.4440	85						1(4),2518	
0.982	1.4360	48	KM5495000					1(2),520	
0.7826	1.4072								
0.7645	1.3950	−13	KO1300000	1(1),219D		1(3),278A		1(3),1862	
0.7534	1.3840	−32							
0.990	1.4390								
0.8967	1.4072	17							
0.7511/0	1.3730/0	−56	KO2300000	1(1),219A		1(3),277C		1(3),1857	1,697
0.821	1.440	177	RG0300000					1(4),2057	
1.53									
	1.5226								
	1.3908	−26						1(3),1859	
1.029		101						2(3),3207	
			FE6350000	1(2),2425E	1(3),161C			20(2),282	
1.014	1.4940	102							
								21(1),363	
1.040	1.5120	94	UY6107000	1(1),923K	1(1),1288A	1(1),790B			
0.9600	1.4835	60	AC6475000	1(1),891K	1(1),1242C	1(1),759C		4(3),442	

TABLE 21. *cont'd*

Name	Formula	CAS Registry Number	Mol. wt.	Boiling point (°C)	Melting point (°C)
21.5. SULFONATES $H_2C{=}CHSO_3R$					
Ethylene sulfonic acid	$-H$		108.10	100/0.5	
n-Amyl ester	$-(CH_2)_4CH_3$		178.23	131/17	
n-Butyl ester	$-(CH_2)_3CH_3$		164.21	117/15	
Ethyl ester	$-CH_2CH_3$		136.16	76/5	
n-Hexyl ester	$-(CH_2)_5CH_3$		192.26	146/15	
Isoamyl ester	$-(CH_2)_2CH(CH_3)_2$		178.23	124/15	
Isobutyl ester	$-CH_2CH(CH_3)_2$		164.21	78/5	
Isopropyl ester	$-CH(CH_3)_2$		152.20	70/4	
Methyl ester	$-CH_3$		122.13	91/15	
Phenyl ester	$-C_6H_5$	1562-34-1	184.21	45/2	
n-Propyl ester	$-CH_2CH_2CH_3$		152.20	110/18	

Density (at 20°C)	Refractive index (at 20°C)	Flash point (°C)	RTECS Number	R and S	FT-NMR	FT-IR	Merck	Beilstein	Fieser
1.4003	1.4493								
1.087	1.4412								
1.122	1.4416								
1.183	1.431								
1.050	1.4430								
1.082	1.4415								
1.190	1.426								
1.132	1.4321								
1.248	1.4316								
1.165	1.426	>110		**1**(2),2219A	**1**(2),1605A	**1**(3),1437A		**6**(3),651	**13**,241
1.156	1.4368								

Isorefractive and Isopycnic Solvent Pairs

Hans-G. Elias
Michigan Molecular Institute, 1910 West St. Andrews Rd., Midland, MI 48640, USA

A. INTRODUCTION

Isorefractive solvents are solvents having the same refractive index, and isopycnic solvents are those that have the same density.

The determination of molar masses by non-colligative methods such as light scattering and ultracentrifugation will lead only to *apparent* molar masses if solvent mixtures are used whose components are not isorefractive. The observed increases or decreases of these apparent molar masses depend in sign and magnitude on both the preferential solvation and the refractive index increment of solvent 2 in solvent 1 at a fixed polymer concentration. The effect disappears if isorefractive solvent pairs are used.

A similar effect may be observed in ultracentrifugal experiments with non-isopycnic solvent pairs. To suppress these effects, isopycnic-isorefractive solvent pairs should be used. A table of isorefractive and isopycnic solvent pairs was prepared (for 25°C), starting with 392 commonly used solvents. A solvent pair was classified as isorefractive and isopycnic if the components had differences no greater than ±0.002 in refractive index and ±0.015 g/ml in density. The miscibility of the components was not checked.

B. TABLE OF ISOREFRACTIVE AND ISOPYCNIC SOLVENT PAIRS

		Refractive index		Density (g/ml)	
Solvent 1	**Solvent 2**	**1**	**2**	**1**	**2**
Acetone	Ethanol	1.357	1.359	0.788	0.786
Ethyl formate	Methyl acetate	1.358	1.360	0.916	0.935
	Propionitrile	1.359	1.363	0.786	0.777
2,2-Dimethylbutane	2-Methylpentane	1.366	1.369	0.644	0.649
2-Methylpentane	*n*-Hexane	1.369	1.372	0.649	0.655
	2,3-Dimethylbutane	1.369	1.372	0.649	0.657
	3-Methylpentane	1.369	1.374	0.649	0.660
2,3-Dimethylbutane	*n*-Hexane	1.372	1.372	0.657	0.655
	3-Methylpentane	1.372	1.374	0.657	0.660
n-Hexane	3-Methylpentane	1.372	1.374	0.655	0.660
Isopropyl acetate	2-Chloropropane	1.375	1.376	0.868	0.865
2-Butanone	Butyraldehyde	1.377	1.378	0.801	0.799
Butyraldehyde	Butyronitrile	1.378	1.382	0.799	0.786
n-Propyl ether	*n*-Butyl ethyl ether	1.379	1.380	0.753	0.746
2,4-Dimethylpentane	2-Methylhexane	1.379	1.382	0.799	0.786
Acetaldehyde diethyl acetal	*n*-Butyl ethyl ether	1.379	1.380	0.753	0.746
n-Propyl acetate	Ethyl propionate	1.382	1.382	0.883	0.888
	Isobutyl formate	1.382	1.383	0.883	0.881
	1-Chloropropane	1.382	1.386	0.883	0.890
Butyronitrile	*t*-Butanol	1.382	1.385	0.786	0.781
Ethyl propionate	Isobutyl formate	1.382	1.383	0.888	0.881
	1-Chloropropane	1.382	1.386	0.888	0.890
2-Methylhexane	*n*-Heptane	1.382	1.385	0.674	0.680
	3-Methylhexane	1.382	1.386	0.674	0.683

		Refractive index		Density (g/ml)	
Solvent 1	**Solvent 2**	**1**	**2**	**1**	**2**
n-Propanol	3-Methyl-2-butanone	1.383	1.386	0.806	0.807
	2-Pentanone	1.383	1.387	0.806	0.804
Isobutyl formate	1-Chloropropane	1.383	1.386	0.881	0.890
	s-Butyl acetate	1.383	1.387	0.881	0.868
	n-Butylformate	1.383	1.387	0.881	0.888
Diethylamine	*n*-Propylamine	1.384	1.386	0.702	0.713
n-Heptane	3-Methylhexane	1.385	1.386	0.680	0.683
	2,3,3-Trimethylbutane	1.385	1.387	0.680	0.686
	2,2,4-Trimethylpentane	1.385	1.389	0.680	0.687
	2,3-Dimethylpentane	1.385	1.389	0.680	0.691
3-Methylhexane	2,3,3-Trimethylbutane	1.386	1.387	0.683	0.686
	2,4-Trimethylpentane	1.386	1.389	0.683	0.687
	2,3-Dimethylpentane	1.386	1.389	0.683	0.691
1-Chloropropane	Butyl formate	1.386	1.387	0.890	0.888
3-Methyl-2-butanone	2-Pentanone	1.386	1.390	0.807	0.802
	3-Pentanone	1.386	1.390	0.807	0.810
n-Propylamine	Diisopropylamine	1.386	1.390	0.713	0.712
	s-Butylamine	1.386	1.390	0.713	0.720
2,3,3-Trimethylbutane	2,2,4-Trimethylpentane	1.387	1.389	0.686	0.683
	2,3-Dimethylpentane	1.387	1.389	0.686	0.691
s-Butyl acetate	Methyl butyrate	1.387	1.391	0.868	0.875
n-Butyl formate	*n*-Dodecane	1.387	1.391	0.888	0.775
Isobutyl acetate	Methyl butyrate	1.388	1.391	0.871	0.875
	n-Butyl acetate	1.388	1.392	0.871	0.877
2,2,4-Trimethylpentane	2,3-Dimethylpentane	1.389	1.389	0.687	0.691
Diisopropylamine	*s*-Butylamine	1.390	1.390	0.712	0.720
2-Pentanone	3-Pentanone	1.390	1.390	0.802	0.810
	4-Methyl-2-pentanone	1.390	1.394	0.802	0.797
	2-Methyl-1-propanol	1.390	1.394	0.802	0.798
3-Pentanone	4-Methyl-2-pentanone	1.390	1.394	0.810	0.797
	2-Methyl-1-propanol	1.390	1.394	0.810	0.798
Methyl butyrate	*n*-Butyl acetate	1.391	1.392	0.875	0.877
	2-Chlorobutane	1.391	1.395	0.875	0.868
2-Chloro-2-methyl-propane	2-Chlorobutane	1.392	1.395	0.872	0.868
n-Butyl acetate	2-Chlorobutane	1.392	1.395	0.877	0.868
4-Methyl-2-pentanone	2-Methyl-1-propanol	1.394	1.394	0.797	0.798
	Valeronitrile	1.394	1.395	0.797	0.795
	2-Butanol	1.394	1.395	0.797	0.803
	2-Hexanone	1.394	1.395	0.797	0.810
	1-Butanol	1.394	1.397	0.797	0.812
	Methacrylonitrile	1.394	1.398	0.797	0.795
	3-Methyl-2-pentanone	1.394	1.398	0.797	0.808
2-Methyl-1-propanol	Valeronitrile	1.394	1.395	0.798	0.795
	2-Butanol	1.394	1.395	0.798	0.803
	2-Hexanone	1.394	1.395	0.798	0.810
	Butanol	1.394	1.397	0.798	0.812
	Methacrylonitrile	1.394	1.398	0.798	0.795
	3-Methyl-2-pentanone	1.394	1.398	0.798	0.808
Octane	2,2,5-Trimethylhexane	1.395	1.397	0.698	0.703
2-Butanol	Butanol	1.395	1.397	0.803	0.812
	Methacrylonitrile	1.395	1.398	0.803	0.795
	3-Methyl-2-pentanone	1.395	1.398	0.803	0.808
	2,4-Dimethyl-3-pentanone	1.395	1.399	0.803	0.805
2-Hexanone	Butanol	1.395	1.397	0.810	0.812

Solvent 1	Solvent 2	Refractive index 1	Refractive index 2	Density (g/ml) 1	Density (g/ml) 2
	Methacrylonitrile	1.395	1.398	0.810	0.795
	3-Methyl-2-pentanone	1.395	1.398	0.810	0.808
	2,4-Dimethyl-3-pentanone	1.395	1.399	0.810	0.805
Valeronitrile	Methacrylonitrile	1.395	1.398	0.795	0.795
	3-Methyl-2-pentanone	1.395	1.398	0.795	0.808
	2,4-Dimethyl-3-pentanone	1.395	1.399	0.795	0.805
2-Hexanone	3-Methyl-2-pentanone	1.395	1.398	0.810	0.808
Isobutylamine	Triethylamine	1.395	1.399	0.729	0.723
	n-Butylamine	1.395	1.399	0.729	0.736
2-Chlorobutane	Isobutyl *n*-butyrate	1.395	1.399	0.868	0.860
Butyric acid	2-Methoxyethanol	1.396	1.400	0.955	0.960
n-Butanol	3-Methyl-2-pentanone	1.397	1.398	0.812	0.808
	2,4-Dimethyl-3-pentanone	1.397	1.399	0.812	0.805
1-Chloro-2-methyl-propane	Isobutyl *n*-Butyrate	1.397	1.399	0.872	0.860
	Amyl acetate	1.397	1.400	0.872	0.871
	1-Chlorobutane	1.397	1.400	0.872	0.881
2,5,5-Trimethylhexane	2,2,3-Trimethylpentane	1.397	1.401	0.703	0.712
Methyl methacrylate	3-Methyl-2-pentanone	1.398	1.398	0.795	0.808
Methacrylonitrile	2,4-Dimethyl-3-pentanone	1.398	1.399	0.795	0.805
	2-Methyl-2-butanol	1.398	1.404	0.795	0.805
3-Methyl-2-pentanone	2,4-Dimethyl-4-pentanone	1.398	1.399	0.808	0.805
Triethylamine	*n*-Butylamine	1.399	1.399	0.723	0.736
	2,2,3-Trimethylpentane	1.399	1.401	0.723	0.712
	n-Nonane	1.399	1.401	0.723	0.714
	Dipropylamine	1.399	1.401	0.723	0.736
n-Butylamine	*n*-Dodecane	1.399	1.400	0.736	0.746
Isobutyl *n*-butyrate	*n*-Amyl acetate	1.399	1.400	0.860	0.871
	Isoamyl acetate	1.399	1.403	0.860	0.868
	1-Chlorobutane	1.399	1.401	8.860	0.875
1-Nitropropane	Propionic anhydride	1.399	1.400	0.995	1.007
Amyl acetate	1-Chlorobutane	1.400	1.400	0.871	0.881
	Tetrahydrofuran	1.400	1.404	0.871	0.885
n-Dodecane	Dipropylamine	1.400	1.403	0.746	0.736
	Cyclopentane	1.400	1.404	0.746	0.740
1-Chlorobutane	Tetrahydrofuran	1.400	1.404	0.871	0.885
2,2,3-Trimethylpentane	*n*-Nonane	1.401	1.403	0.712	0.714
Isovaleric acid	2-Ethoxyethanol	1.402	1.405	0.923	0.926
	Valeric acid	1.402	1.406	0.923	0.936
Dipropylamine	Cyclopentane	1.403	1.404	0.736	0.740
	Methylcyclopentane	1.403	1.407	0.736	0.744
n-Nonane	2,2,4-Trimethyl-1-pentene	1.403	1.407	0.714	0.712
Isoamylacetate	Tributyl borate	1.403	1.407	0.868	0.854
2-Pentanol	2-Methyl-1-butanol	1.404	1.404	0.804	0.805
	3-Methyl-1-butanol	1.404	1.404	0.804	0.805
	4-Heptanone	1.404	1.405	0.804	0.813
	2-Heptanone	1.404	1.406	0.804	0.811
2-Methoxybutanol	3-Methyl-1-butanol	1.404	1.404	0.805	0.805
	Capronitrile	1.404	1.405	0.805	0.801
	4-Heptanone	1.404	1.405	0.805	0.813
	2-Heptanone	1.404	1.406	0.805	0.811
	Pentanol	1.404	1.408	0.805	0.810
	3-Methyl-2-butanol	1.404	1.408	0.805	0.815
3-Methyl-1-butanol	Capronitrile	1.404	1.405	0.805	0.801
	4-Heptanone	1.404	1.405	0.805	0.813

		Refractive index		Density (g/ml)	
Solvent 1	Solvent 2	1	2	1	2
	2-Heptanone	1.404	1.406	0.805	0.811
	Pentanol	1.404	1.408	0.805	0.810
	3-Methyl-2-butanol	1.404	1.408	0.805	0.815
Cyclopentane	Methylcyclopentane	1.404	1.407	0.740	0.744
Capronitrile	4-Heptanone	1.405	1.405	0.801	0.813
	2-Heptanone	1.405	1.406	0.801	0.811
	2-Pentanol	1.405	1.407	0.801	0.804
	1-Pentanol	1.405	1.408	0.801	0.810
	3-Methyl-2-butanol	1.405	1.408	0.801	0.815
	4-Methyl-2-pentanol	1.405	1.409	0.801	0.802
	3-Isopropyl-2-pentanone	1.405	1.409	0.801	0.808
	2-Methyl-1-butanol	1.405	1.409	0.801	0.815
4-Heptanone	2-Heptanone	1.405	1.406	0.813	0.811
	1-Pentanol	1.405	1.408	0.813	0.810
	3-Methyl-2-butanol	1.405	1.408	0.813	0.815
	4-Methyl-2-pentanol	1.405	1.409	0.813	0.802
	3-Isopropyl-2-pentanone	1.405	1.409	0.813	0.808
	2-Methyl-1-butanol	1.405	1.409	0.813	0.815
2-Ethoxyethanol	Valeric acid	1.405	1.406	0.926	0.936
2-Heptanone	1-Pentanol	1.406	1.408	0.811	0.810
	3-Methyl-2-butanol	1.406	1.408	0.811	0.802
	4-Methyl-2-pentanol	1.406	1.409	0.811	0.802
	3-Isopropyl-2-pentanone	1.406	1.409	0.811	0.808
	2-Ethoxyethanol	1.406	1.409	0.811	0.815
	2-Methyl-1-butanol	1.406	1.409	0.811	0.815
	Amyl ether	1.406	1.410	0.811	0.799
2-Pentanol	1-Pentanol	1.407	1.408	0.804	0.810
	3-Methyl-2-butanol	1.407	1.408	0.804	0.815
	4-Methyl-2-pentanol	1.407	1.409	0.804	0.802
	3-Isopropyl-2-pentanone	1.407	1.409	0.804	0.808
	2-Methyl-1-butanol	1.407	1.409	0.804	0.815
	Amyl ether	1.407	1.410	0.804	0.799
2,2,4-Trimethyl-1-pentene	*n*-Decane	1.407	1.409	0.712	0.726
Tributyl borate	Isoamyl isovalerate	1.407	1.410	0.854	0.853
	Allyl alcohol	1.407	1.411	0.854	0.847
1-Pentanol	3-Methyl-2-butanol	1.408	1.408	0.810	0.815
	4-Methyl-2-pentanol	1.408	1.409	0.810	0.802
	3-Isopropyl-2-pentanone	1.408	1.409	0.810	0.808
	2-Methyl-1-butanol	1.408	1.409	0.810	0.815
	Amyl ether	1.408	1.410	0.810	0.799
3-Methyl-2-butanol	4-Methyl-2-pentanol	1.408	1.409	0.815	0.802
	3-Isopropyl-2-pentanone	1.408	1.409	0.815	0.808
	2-Methyl-1-butanol	1.408	1.409	0.815	0.815
	Amyl ether	1.408	1.410	0.815	0.799
4-Methyl-2-pentanol	3-Isopropyl-2-pentanone	1.409	1.409	0.802	0.808
	2-Methyl-1-butanol	1.409	1.409	0.802	0.815
	Amyl ether	1.409	1.410	0.802	0.799
3-Isopropyl-2-pentanone	2-Methyl-1-butanol	1.409	1.409	0.808	0.815
	Amyl ether	1.409	1.410	0.808	0.799
2-Methyl-1-butanol	Amyl ether	1.409	1.410	0.815	0.799
Isoamyl isovalerate	Allyl alcohol	1.410	1.411	0.853	0.847
Amyl ether	2-Octanone	1.410	1.414	0.799	0.814
2,4-Dimethyldioxane	Allyl chloride	1.412	1.413	0.935	0.932
	Caproic acid	1.412	1.415	0.935	0.923

Solvent 1	Solvent 2	Refractive index		Density (g/ml)	
		1	2	1	2
Diethyl malonate	Ethyl cyanoacetate	1.412	1.415	1.051	1.056
Allyl chloride	Capric acid	1.413	1.415	0.932	0.923
2-Octanone	3-Methyl-2-heptanone	1.414	1.415	0.814	0.818
	1-Hexanol	1.414	1.416	0.814	0.814
	2-Pentanol	1.414	1.416	0.814	0.826
	Caprylnitrile	1.414	1.418	0.814	0.810
	2-Heptanol	1.414	1.418	0.814	0.818
3-Octanone	3-Methyl-2-heptanone	1.414	1.415	0.830	0.818
	2-Pentanol	1.414	1.416	0.830	0.826
3-Methyl-2-heptanone	1-Hexanol	1.415	1.416	0.818	0.814
	2-Pentanol	1.415	1.416	0.818	0.826
	Caprylonitrile	1.415	1.418	0.818	0.810
	2-Heptanol	1.415	1.418	0.818	0.818
1-Hexanol	2-Pentanol	1.416	1.416	0.814	0.826
	Caprylonitrile	1.416	1.418	0.814	0.810
	2-Heptanol	1.416	1.418	0.814	0.818
	3-Methyl-2-pentanol	1.416	1.420	0.814	0.823
	2-Ethyl-1-butanol	1.416	1.420	0.814	0.829
2-Pentanol	2-Heptanol	1.416	1.418	0.826	0.818
	3-Methyl-2-pentanol	1.416	1.418	0.816	0.818
	2-Ethyl-1-butanol	1.416	1.420	0.826	0.829
Dibutylamine	Allylamine	1.416	1.419	0.756	0.758
Caprylonitrile	2-Heptanol	1.418	1.418	0.810	0.818
	3-Methyl-2-pentanol	1.418	1.420	0.810	0.823
	1-Heptanol	1.418	1.422	0.810	0.818
2-Heptanol	2-Methyl-2-pentanol	1.418	1.420	0.818	0.823
	2-Ethyl-1-butanol	1.418	1.420	0.818	0.829
	1-Heptanol	1.418	1.422	0.818	0.818
	3-Isopropyl-2-heptanone	1.418	1.423	0.818	0.815
Allylamine	Methylcyclohexane	1.419	1.421	0.758	0.765
3-Methyl-2-pentanol	2-Ethyl-1-butanol	1.420	1.420	0.823	0.829
	1-Heptanol	1.420	1.422	0.823	0.818
	3-Isopropyl-2-heptanone	1.420	1.423	0.815	0.815
2-Ethyl-1-butanol	1-Heptanol	1.420	1.420	0.829	0.818
	3-Isopropyl-2-heptanone	1.420	1.423	0.829	0.815
Methylcyclohexane	Cyclohexane	1.421	1.424	0.765	0.774
1-Heptanol	3-Isopropyl-2-heptanone	1.422	1.423	0.818	0.815
3-Isopropyl-2-heptanone	1-Octanol	1.423	1.427	0.815	0.821
	3-Methyl-2-pentanone	1.423	1.427	0.815	0.824
3-Chloro-2-methyl-1-propene	Caprylic acid	1.425	1.426	0.917	0.905
Caprylic acid	*N*-Methylalaninenitrile	1.426	1.429	0.905	0.895
1-Octanol	3-Methyl-2-pentanol	1.427	1.427	0.821	0.824
1-Chlorooctane	1-Chloro-2-ethylhexane	1.428	1.430	0.867	0.872
2-Methyl-7-ethylnonane	2-Methyl-7-ethyl-4-undecanone	1.433	1.435	0.830	0.832
Butyrolactone	Chloro-*t*-butanol	1.434	1.436	1.051	1.059
	1,3-Propanediol	1.434	1.438	1.051	1.049
	Diethyl maleate	1.434	1.438	1.051	1.064
4-*n*-Propyl-5-ethyldioxane	*N*-methylmorpholine	1.435	1.436	0.927	0.924
2-Methyl-7-ethyl-4-undecanone	2-Methyl-7-ethyl-4-nonanol	1.435	1.438	0.832	0.829
	6-Ethyl-2-nonanol	1.435	1.438	0.832	0.836
6-Ethyl-3-octanol	5-Ethyl-2-nonanol	1.435	1.438	0.832	0.830
Chloro-*t*-butanol	1,3-Propanediol	1.436	1.438	1.059	1.049
	Diethyl maleate	1.436	1.438	1.059	1.064
N-Methylmorpholine	Dibutyl sebacate	1.436	1.440	0.924	0.932

		Refractive index		Density (g/ml)	
Solvent 1	Solvent 2	1	2	1	2
2-Methyl-7-ethyl-4-nonanol	5-Ethyl-2-nonanol	1.438	1.438	0.829	0.830
	6-Ethyl-3-octanol	1.438	1.438	0.829	0.836
	Butanethiol	1.438	1.440	0.829	0.837
	7-Methyl-7-ethyl-4-undecanol	1.438	1.442	0.829	0.829
	Ethyl sulfide	1.438	1.442	0.829	0.831
	6-Ethyl-3-decanol	1.438	1.441	0.829	0.838
5-Ethyl-2-nonanol	6-Ethyl-3-octanol	1.438	1.438	0.830	0.836
	Butanethiol	1.438	1.440	0.830	0.837
	2-Methyl-7-ethyl-4-undecanol	1.438	1.442	0.830	0.829
	Ethyl sulfide	1.438	1.442	0.830	0.831
	6-Ethyl-3-decanol	1.438	1.441	0.830	0.838
1,3-Propanediol	Diethyl maleate	1.438	1.438	1.049	1.064
Methyl salicylate	2-Methyl-7-ethyl-1-undecanol	1.438	1.442	0.836	0.829
	Ethyl sulfide	1.438	1.442	0.836	0.831
	Butanethiol	1.438	1.442	0.836	0.837
6-Ethyl-3-octanol	6-Ethyl-3-decanol	1.438	1.441	0.836	0.838
Butanethiol	6-Ethyl-3-decanol	1.440	1.441	0.837	0.838
	2-Methyl-7-ethyl-4-undecanol	1.440	1.442	0.837	0.829
	Ethyl sulfide	1.440	1.442	0.837	0.831
	Mesityl oxide	1.440	1.442	0.837	0.850
6-Ethyl-3-decanol	2-Methyl-7-ethyl-4-undecanol	1.441	1.442	0.838	0.829
	Ethyl sulfide	1.441	1.442	0.838	0.831
	Mesityl oxide	1.441	1.442	0.838	0.850
1-Chlorododecane (technical)	Mesityl oxide	1.441	1.442	0.862	0.850
	Butyl stearate	1.441	1.442	0.862	0.854
	1-Chlorotetradecane	1.441	1.445	0.862	0.858
2-Methyl-7-ethyl-4-undecanol	Ethyl sulfide	1.442	1.442	0.829	0.831
	2-Butyloctyl-3-aminopropyl ether	1.442	1.446	0.829	0.842
Mesityl oxide	Butyl stearate	1.442	1.442	0.850	0.854
	1-Chlorotetradecane	1.442	1.445	0.850	0.858
	2-Butyloctyl-3-aminopropyl ether	1.442	1.446	0.850	0.842
Butyl stearate	1-Chlorotetradecane	1.442	1.445	0.850	0.858
	2-Butyloctyl-3-aminopropyl ether	1.442	1.446	0.854	0.842
Ethyl sulfide	2-Butyloctyl-3-aminopropyl ether	1.442	1.446	0.831	0.842
1,3-Butanediol sulfite	1,2-Dichloroethane	1.444	1.444	1.231	1.245
	trans-1,2-Dichloroethylene	1.444	1.444	1.231	1.257
1,2-Dichloroethane	*trans*-1,2-Dichloroethylene	1.444	1.444	1.231	1.257
1-Chlorotetradecane	2-Butyloctyl-3-aminopropyl ether	1.445	1.446	0.857	0.842
	1-Chlorohexadecane	1.445	1.448	0.857	0.859
Diethylene glycol	Formamide	1.445	1.446	1.128	1.129
	Ethylene glycol diglycidyl ether	1.445	1.447	1.128	1.134
2-Butyloctyl-3-aminopropyl ether	3-Lauroxy-1-propylamine	1.446	1.447	0.842	0.840
Formamide	Ethylene glycol diglycidyl ether	1.446	1.447	1.129	1.134
2-Methylmorpholine	Cyclohexanone	1.446	1.448	0.951	0.943
	1-Amino-2-propanol	1.446	1.448	0.951	0.961
Dipropylene glycol monoethyl ether	Tetrahydrofurfuryl alcohol	1.446	1.450	1.043	1.050
1-Amino-2-methyl-2-pentanol	2-Butylcyclohexanone	1.449	1.453	1.050	1.047
3-Methyl-5-ethyl-2,4-heptanediol	2-Propylcyclohexanone	1.452	1.452	0.922	0.923
	4-Methylcyclohexanone	1.452	1.454	0.922	0.908
	2,2′-Dimethyl-2,2′-dipropyldiethanolamine	1.452	1.456	0.922	0.922
2-Propylcyclohexanone	4-Methylcyclohexanol	1.452	1.454	0.923	0.908
	3-Methylcyclohexanol	1.452	1.455	0.923	0.913
	2,2′-Dimethyl-2,2′-dipropyldiethanolamine	1.452	1.456	0.923	0.922
	1,8-Cineole	1.452	1.456	0.923	0.921

Solvent 1	Solvent 2	Refractive index		Density (g/ml)	
		1	2	1	2
4-Methylcyclohexanol	2,2′-Dimethyl-2,2′-dipropyldiethanolamine	1.454	1.456	0.908	0.922
3-Methylcyclohexanol	2,2′-Dimethyl-2,2′-dipropyldiethanolamine	1.455	1.456	0.913	0.922
Cyclohexylamine	1-Chloroeicosane	1.456	1.459	0.862	0.872
1-Chloroeicosane (technical)	Oleic acid	1.459	1.459	0.872	0.887
Oleic acid	2-(β-Ethyl)butylcyclohexanone	1.459	1.461	0.887	0.892
	2-Butylcyclohexanol	1.459	1.462	0.887	0.898
	2-(β-Ethyl)hexylcyclohexanone	1.459	1.463	0.887	0.892
1,1′,2,2′-Tetramethyldiethanolamine	1-Aminopropanol	1.459	1.459	0.973	0.965
	N-(*n*-Butyl)diethanolamine	1.459	1.461	0.973	0.965
Carbon tetrachloride	4,5-Dichloro-1,3-dioxolane-2-one	1.459	1.461	1.584	1.591
2-(β-Ethyl)butylcyclohexanone	2,4-(bis)α-Phenylethyl)phenylmethyl ether	1.461	1.462	0.892	0.898
	2-(β-Ethyl)hexylcyclohexanone	1.461	1.463	0.892	0.892
N-(*n*-Butyl)diethanolamine	Cyclohexanol	1.461	1.465	0.965	0.968
2-Butylcyclohexanol	2-(β-Ethyl)hexylcyclohexanone	1.462	1.463	0.898	0.892
	2-Ethylcyclohexanol	1.462	1.463	0.898	0.908
N-β-Oxypropylmorpholine	Fluorobenzene	1.462	1.463	1.013	1.020
Fluorobenzene	*N*-(2-Hydroxyethyl)-2-hydroxybutyl amine	1.463	1.467	1.020	1.027
D-α-Pinene	1-α-Pinene	1.464	1.465	0.855	0.855
	trans-Decahydronaphthalene	1.464	1.468	0.855	0.867
m-Fluorotoluene	*p*-Fluorotoluene	1.465	1.467	0.994	0.995
1-α-Pinene	*trans*-Decahydronaphthalene	1.465	1.468	0.855	0.867
p-Fluorotoluene	*o*-Fluorotoluene	1.467	1.468	0.994	0.995
N-(2-Hydroxyethyl)-2-hydrobutylamine	*N*-(2-Hydroxyethyl)-2-hydropropylamine	1.467	1.468	1.027	1.042
	2-Allyloxy-2-hydroxypropylamine	1.467	1.469	1.027	1.017
	Di(2-Hydroxybutyl)ethanolamine	1.467	1.469	1.027	1.018
	Di(2-Hydroxypropyl)ethanolamine	1.467	1.469	1.027	1.042
2-Allyloxy-2-hydroxypropylamine	Di(2-Hydroxybutyl)ethanolamine	1.469	1.469	1.017	1.018
cis-Decahydronaphthalene	1-Methoxy-1-butene-3-yn	1.479	1.480	0.893	0.902
	n-Dodecyl-4-*t*-butylphenyl ether	1.479	1.482	0.893	0.881
	n-Dodecylphenyl ether	1.479	1.482	0.893	0.891
	n-Dodecyl-4-methylphenyl ether	1.479	1.483	0.893	0.889
1-Methoxy-1-butene-3-yn	*n*-Dodecylphenyl ether	1.480	1.482	0.902	0.891
	n-Dodecyl-4-methylphenyl ether	1.480	1.483	0.902	0.889
n-Dodecyl-4-*t*-butylphenyl ether	*n*-Dodecylphenyl ether	1.482	1.482	0.881	0.891
Butylbenzene	Dioctylbenzene (90% *p*; 10% *m*)	1.487	1.487	0.856	0.856
	p-Cymene	1.487	1.488	0.856	0.853
	Isopropylbenzene	1.487	1.489	0.856	0.857
	t-Butylbenzene (80% *p*, 15% *m*, 5% *o*)	1.487	1.490	0.856	0.856
	n-Propylbenzene	1.487	1.490	0.856	0.856
	s-Butylbenzene	1.487	1.490	0.856	0.856
	Hexyl-*m*-xylene	1.487	1.490	0.856	0.860
	t-Butylbenzene	1.487	1.490	0.856	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.487	1.491	0.856	0.856
p-Cymene	Isopropylbenzene	1.488	1.489	0.853	0.857
	t-Butylcumene (80% *p*, 15% *m*, 5% *o*)	1.488	1.490	0.853	0.856
	n-Propylbenzene	1.488	1.490	0.853	0.858
	s-Butylbenzene	1.488	1.490	0.853	0.858
	Hexyl-*m*-xylene (mainly 1,3,5)	1.488	1.490	0.853	0.860
	t-Butylbenzene	1.488	1.490	0.853	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.488	1.491	0.853	0.856
	t-Butyltoluene	1.488	1.491	0.853	0.858
	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.488	1.492	0.853	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.488	1.492	0.853	0.866
Isopropylbenzene	*t*-Butylcumene (80% *p*, 15% *m*, 5% *o*)	1.489	1.490	0.857	0.856

		Refractive index		Density (g/ml)	
Solvent 1	Solvent 2	1	2	1	2
	n-Propylbenzene	1.489	1.490	0.857	0.858
	s-Butylbenzene	1.489	1.490	0.857	0.858
	Hexyl-*m*-xylene (mainly 1,3,5)	1.489	1.490	0.857	0.860
	t-Butylbenzene	1.489	1.490	0.857	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.489	1.491	0.857	0.856
	t-Butylbenzene (80% *p*, 15% *m*, 5% *o*)	1.489	1.491	0.857	0.858
t-Butylcumene (80% *p*, 15% *m*, 5% *o*)	*n*-Propylbenzene	1.490	1.490	0.856	0.858
	s-Butylbenzene	1.490	1.490	0.856	0.858
	Hexyl-*m*-xylene (mainly 1,3,5)	1.490	1.490	0.856	0.860
	t-Butylbenzene	1.490	1.490	0.856	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.490	1.491	0.856	0.856
	t-Butyltoluene (80% *p*, 15% *m*, 5% *o*)	1.490	1.491	0.856	0.858
	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.490	1.492	0.856	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.490	1.492	0.856	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.490	1.492	0.856	0.869
	Dihexylbenzene	1.490	1.492	0.856	0.870
	p-Xylene	1.490	1.493	0.856	0.857
	1,3-Diethylbenzene	1.490	1.493	0.856	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.490	1.493	0.856	0.862
	Ethylbenzene	1.490	1.493	0.856	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.490	1.493	0.856	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.490	1.494	0.856	0.860
	Toluene	1.490	1.494	0.856	0.862
n-Propylbenzene	*s*-Butylbenzene	1.490	1.490	0.858	0.858
	Hexyl-*m*-xylene (mainly 1,3,5)	1.490	1.490	0.858	0.860
	t-Butylbenzene	1.490	1.490	0.858	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.490	1.491	0.858	0.856
	t-Butyltoluene (80% *p*, 15% *m*, 5% *p*)	1.490	1.491	0.858	0.858
	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.490	1.492	0.858	0.863
	Octyltoluene (96% *p*, 2% *m* 2% *o*)	1.490	1.492	0.858	0.866
	Octylcumene (90% *p*, 4% *m* 6% *o*)	1.490	1.492	0.858	0.869
	Dihexylbenzene	1.490	1.492	0.858	0.870
	p-Xylene	1.490	1.493	0.858	0.857
	1,3-Diethylbenzene	1.490	1.493	0.858	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.490	1.493	0.858	0.862
	Ethylbenzene	1.490	1.493	0.858	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.490	1.493	0.858	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.490	1.494	0.858	0.860
	Toluene	1.490	1.494	0.858	0.862
s-Butylbenzene	Hexyl-*m*-xylene (mainly 1,3,5)	1.490	1.490	0.858	0.860
	t-Butylbenzene	1.490	1.490	0.858	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.490	1.491	0.858	0.856
	t-Butyltoluene (80% *p*, 15% *m*, 5% *o*)	1.490	1.491	0.858	0.858
	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.490	1.492	0.858	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.490	1.492	0.858	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.490	1.492	0.858	0.869
	Dihexylbenzene	1.490	1.492	0.858	0.870
	p-Xylene	1.490	1.493	0.858	0.857
	1,3-Diethylbenzene	1.490	1.493	0.858	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.490	1.493	0.858	0.862
	Ethylbenzene	1.490	1.493	0.858	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.490	1.493	0.858	0.866

Solvent 1	Solvent 2	Refractive index		Density (g/ml)	
		1	2	1	2
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.490	1.494	0.858	0.860
	Toluene	1.490	1.494	0.858	0.862
Hexyl-*m*-xylene (mainly 1,3,5)	*t*-Butylbenzene	1.490	1.490	0.860	0.862
	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.490	1.491	0.860	0.856
	t-Butyltoluene (80% *p*, 15% *m*, 5% *o*)	1.490	1.491	0.860	0.858
	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.490	1.492	0.860	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.490	1.492	0.860	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.490	1.492	0.860	0.869
	Dihexylbenzene	1.490	1.492	0.860	0.870
	p-Xylene	1.490	1.493	0.860	0.857
	1,3-Diethylbenzene	1.490	1.493	0.860	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.490	1.493	0.860	0.862
	Ethylbenzene	1.490	1.493	0.860	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.490	1.493	0.860	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.490	1.494	0.860	0.860
	Toluene	1.490	1.494	0.860	0.862
t-Butylbenzene	Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.490	1.491	0.862	0.856
	t-Butyltoluene (80% *p*, 15% *m*, 5% *o*)	1.490	1.491	0.862	0.858
	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.490	1.492	0.862	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.490	1.492	0.862	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.490	1.492	0.862	0.869
	Dihexylbenzene	1.490	1.492	0.862	0.870
	p-Xylene	1.490	1.493	0.862	0.857
	1,3-Diethylbenzene	1.490	1.493	0.862	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.490	1.493	0.862	0.862
	Ethylbenzene	1.490	1.493	0.862	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.490	1.493	0.862	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.490	1.494	0.862	0.860
	Toluene	1.490	1.494	0.862	0.862
Isopropylethylbenzene (35% *p*, 60% *m*)	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.491	1.492	0.858	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.491	1.492	0.858	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.491	1.492	0.858	0.869
	Dihexylbenzene	1.491	1.492	0.858	0.870
	p-Xylene	1.491	1.493	0.858	0.857
	1,3-Diethylbenzene	1.491	1.493	0.858	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.491	1.493	0.858	0.862
	Ethylbenzene	1.491	1.493	0.858	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.491	1.493	0.858	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.491	1.494	0.858	0.860
	Toluene	1.491	1.494	0.858	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.491	1.495	0.858	0.854
	m-Xylene	1.491	1.495	0.858	0.860
	Hexylethylbenzene	1.491	1.495	0.858	0.868
t-Butyltoluene (85% *p*, 10% *m*)	Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.491	1.492	0.858	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.491	1.492	0.856	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.491	1.492	0.856	0.869
	Dihexylbenzene	1.491	1.492	0.856	0.870
	p-Xylene	1.491	1.493	0.856	0.857
	1,3-Diethylbenzene	1.491	1.493	0.856	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.491	1.493	0.856	0.862
	Ethylbenzene	1.491	1.493	0.856	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.491	1.493	0.856	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.491	1.494	0.856	0.860
	Toluene	1.491	1.494	0.856	0.862

Solvent 1	Solvent 2	Refractive index		Density (g/ml)	
		1	2	1	2
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.491	1.495	0.856	0.854
	m-Xylene	1.491	1.495	0.856	0.860
	Hexylethylbenzene(70% *p*, 25% *m*, 5% *o*)	1.491	1.495	0.856	0.868
1-Phenyl-1-hydroxyphenyl ether	1,3-Dimorpholyl-2-propanol	1.491	1.493	1.081	1.094
Hexylcumene (90% *p*, 5% *m*)	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.492	1.492	0.863	0.866
	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.492	1.492	0.863	0.869
	Dihexylbenzene	1.492	1.492	0.863	0.870
	p-Xylene	1.492	1.493	0.863	0.857
	1,3-Diethylbenzene	1.492	1.493	0.863	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.492	1.493	0.863	0.862
	Ethylbenzene	1.492	1.493	0.863	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.492	1.493	0.863	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.492	1.494	0.863	0.860
	Toluene	1.492	1.494	0.863	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.863	0.854
	m-Xylene	1.492	1.495	0.863	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.863	0.868
	1,4-Diethylbenzene	1.492	1.496	0.863	0.858
	Isopropylbenzene	1.492	1.498	0.863	0.857
Dihexylbenzene (85% *p*, 10% *m*)	Octylcumene (90% *p*, 4% *m*, 6% *0*)	1.492	1.492	0.870	0.869
	p-Xylene	1.492	1.493	0.870	0.857
	1,3-Diethylbenzene	1.492	1.493	0.870	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.492	1.493	0.870	0.862
	Ethylbenzene	1.492	1.493	0.870	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.492	1.493	0.870	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.492	1.494	0.870	0.860
	Toluene	1.492	1.494	0.870	0.862
	m-Xylene	1.492	1.495	0.870	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.870	0.868
	1,4-Diethylbenzene	1.492	1.496	0.870	0.858
	Isopropylbenzene	1.492	1.498	0.870	0.857
Octyltoluene (96% *p*, 2% *m*)	Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.492	1.492	0.866	0.869
	Dihexylbenzene (85% *p*, 10% *m*, 5% *o*)	1.492	1.492	0.866	0.870
	p-Xylene	1.492	1.493	0.866	0.857
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.492	1.493	0.866	0.862
	Ethylbenzene	1.492	1.493	0.866	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.492	1.493	0.866	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.492	1.494	0.866	0.860
	Toluene	1.492	1.494	0.866	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.866	0.854
	m-Xylene	1.492	1.495	0.866	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.866	0.868
	1,4-Diethylbenzene	1.492	1.496	0.866	0.858
	Isopropylbenzene	1.492	1.498	0.866	0.857
Octylcumene (90% *p*, 4% *m*, 6% *o*)	*p*-Xylene	1.492	1.493	0.866	0.857
	1,3-Diethylbenzene	1.492	1.493	0.866	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.492	1.493	0.866	0.862
	Ethylbenzene	1.492	1.493	0.866	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.492	1.493	0.866	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.492	1.494	0.866	0.860
	Toluene	1.492	1.494	0.866	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.866	0.854
	m-Xylene	1.492	1.495	0.866	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.492	1.495	0.866	0.868

Solvent 1	Solvent 2	Refractive index		Density (g/ml)	
		1	2	1	2
	1,4-Diethylbenzene	1.492	1.496	0.866	0.858
	Isopropylbenzene	1.492	1.498	0.866	0.857
p-Xylene	1,3-Diethylbenzene	1.493	1.493	0.857	0.860
	t-Butyl-*m*-xylene (mainly 1,3,5)	1.493	1.493	0.857	0.862
	Ethylbenzene	1.493	1.493	0.857	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.493	1.493	0.857	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.493	1.494	0.857	0.860
	Toluene	1.493	1.494	0.857	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.857	0.854
	m-Xylene	1.493	1.495	0.857	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.857	0.868
	1,4-Diethylbenzene	1.493	1.496	0.857	0.858
	Mesitylene	1.493	1.497	0.857	0.861
	Isopropylbenzene	1.493	1.498	0.857	0.857
1,3-Diethylbenzene	*t*-Butyl-*m*-xylene (mainly 1,3,5)	1.493	1.493	0.860	0.862
	Ethylbenzene	1.493	1.493	0.860	0.863
	Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.493	1.493	0.860	0.866
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.493	1.493	0.860	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.493	1.494	0.860	0.860
	Toluene	1.493	1.494	0.860	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.860	0.854
	m-Xylene	1.493	1.495	0.860	0.860
	1,4-Diethylbenzene	1.493	1.496	0.860	0.858
	Mesitylene	1.493	1.497	0.860	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.493	1.497	0.860	0.870
	Isopropylbenzene	1.493	1.498	0.860	0.860
t-Butyl-*m*-xylene (mainly 1,3,5)	Ethylbenzene	1.493	1.493	0.862	0.863
	Octylethylbenzene (80–90% *p*, 10% *m*)	1.493	1.493	0.862	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.493	1.494	0.862	0.860
	Toluene	1.493	1.494	0.862	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.862	0.854
	m-Xylene	1.493	1.495	0.862	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.862	0.868
	1,4-Diethylbenzene	1.493	1.496	0.862	0.858
	Mesitylene	1.493	1.497	0.862	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.493	1.497	0.862	0.870
	Isopropylbenzene	1.493	1.498	0.862	0.857
Ethylbenzene	Octylethylbenzene (80–90% *p*, 10% *m*)	1.493	1.493	0.863	0.866
	Isopropyl-*m*-xylene (mainly 1,3,5)	1.493	1.494	0.863	0.860
	Toluene	1.493	1.494	0.863	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.863	0.854
	m-Xylene	1.493	1.495	0.863	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.863	0.868
	1,4-Diethylbenzene	1.493	1.496	0.863	0.858
	Mesitylene	1.493	1.497	0.863	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.493	1.497	0.863	0.870
	Isopropylbenzene	1.493	1.498	0.863	0.857
Octylethylbenzene (80–90% *p*, 10% *m*)	Isopropyl-*m*-xylene (mainly 1,3,5)	1.493	1.494	0.866	0.860
	Toluene	1.493	1.494	0.866	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.866	0.854
	m-Xylene	1.493	1.495	0.866	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.493	1.495	0.866	0.868
	1,4-Diethylbenzene	1.493	1.496	0.866	0.858
	Mesitylene	1.493	1.497	0.866	0.861

Solvent 1	Solvent 2	Refractive index		Density (g/ml)	
		1	2	1	2
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.493	1.497	0.866	0.870
	Isopropylbenzene	1.493	1.498	0.866	0.857
Isopropyl-*m*-xylene (mainly 1,3,5)	Toluene	1.494	1.494	0.860	0.862
	t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.494	1.495	0.860	0.854
	m-Xylene	1.494	1.495	0.860	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.494	1.495	0.860	0.868
	1,4-Diethylbenzene	1.494	1.496	0.860	0.858
	Mesitylene	1.494	1.497	0.860	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.494	1.497	0.860	0.870
	Benzene	1.494	1.498	0.860	0.874
Toluene	*t*-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.494	1.495	0.862	0.854
	m-Xylene	1.494	1.495	0.862	0.860
	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.494	1.495	0.862	0.868
	1,4-Diethylbenzene	1.494	1.496	0.862	0.858
	Mesitylene	1.494	1.497	0.862	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.494	1.497	0.862	0.870
	Benzene	1.494	1.498	0.862	0.874
t-Butylethylbenzene (70% *p*, 25% *m*)	*m*-Xylene	1.495	1.495	0.854	0.860
	1,4-Diethylbenzene	1.495	1.496	0.854	0.858
	Mesitylene	1.495	1.497	0.854	0.861
m-Xylene	Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.495	1.495	0.860	0.868
	1,4-Diethylbenzene	1.495	1.496	0.860	0.858
	Mesitylene	1.495	1.497	0.860	0.861
	Benzene	1.495	1.498	0.860	0.874
Hexylethylbenzene (70% *p*, 25% *m*)	1,4-Diethylbenzene	1.495	1.496	0.868	0.858
	Mesitylene	1.495	1.497	0.868	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.495	1.497	0.868	0.870
	Benzene	1.495	1.498	0.868	0.874
1,4-Diethylbenzene	Mesitylene	1.496	1.497	0.858	0.861
	Hexyltoluene (70% *p*, 25% *m*, 5% *o*)	1.496	1.498	0.858	0.870
Mesitylene	Ethylbenzene	1.497	1.497	0.861	0.870
Hexyltoluene (70% *p*, 25% *m*)	Benzene	1.497	1.498	0.870	0.874
	1,2-Diethylbenzene	1.497	1.501	0.870	0.876
Benzene	Mesitylene	1.498	1.498	0.874	0.874
	1,2-Diethylbenzene	1.498	1.501	0.874	0.876
Mesitylene	1,2-Diethylbenzene	1.498	1.501	0.874	0.876
1,2-Diethylbenzene	*o*-Xylene	1.501	1.503	0.867	0.876
β-Picoline	Phenetole	1.504	1.505	0.953	0.961
Phenetole	Pyridine	1.505	1.507	0.961	0.978
Cyclohexylcumene (50% *p*, 20% *m*)	Cyclohexylethylbenzene (60% *p*, 20% *m*, 20% *o*)	1.516	1.520	0.917	0.923
Benzyl acetate	Chloro-*t*-butylbenzene	1.518	1.521	1.051	1.039
Cyclohexylethylbenzene (60% *p*, 20% *m*)	Cyclohexyltoluene	1.520	1.523	0.923	0.923
2-Furfurol	Thiophene	1.524	1.526	1.057	1.059
Benzyl alcohol	*m*-Cresol	1.538	1.542	1.041	1.037
m-Cresol	Benzaldehyde	1.542	1.544	1.037	1.041
m-Toluidine	*o*-Toluidine	1.566	1.570	0.985	0.994

Refractive Indices of Common Solvents

Hans-G. Elias
Michigan Molecular Institute, 1910 West St. Andrews Rd., Midland, MI 48640, USA

A. INTRODUCTION

Measurements which depend on the difference in refractive index between the polymer and the solvent will, in general, give greater accuracy as the refractive index increment between polymer and solvent is increased. The magnitude of the increment may be either positive or negative. Systems involving refractive index increments are those of light scattering and ultracentrifugation when either schlieren or interference optics is used. A table of commonly used solvents, arranged according to increasing refractive index, will be useful in practical work with many different polymers. Data at 25°C, D-line.

B. TABLE OF REFRACTIVE INDICES OF COMMON SOLVENTS

Solvents	Refractive index
Trifluoroacetic acid	1.283
Trifluoroethanol	1.290
Octafluoro-1-pentanol	1.316
Dodecafluoro-1-heptanol	1.316
Methanol	1.326
Acetonitrile	1.342
Ethyl ether	1.352
Acetone	1.357
Ethyl formate	1.358
Ethanol	1.359
Methyl acetate	1.360
Propionitrile	1.363
2,2-Dimethylbutane	1.366
Isopropyl ether	1.367
2-Methylpentane	1.369
Formic acid	1.369
Ethyl acetate	1.370
Acetic acid	1.370
Propionaldehyde	1.371
n-Hexane	1.372
2,3-Dimethylbutane	1.372
3-Methylpentane	1.374
2-Propanol	1.375
Isopropyl acetate	1.375
Propyl formate	1.375
2-Chloropropane	1.376
2-Butanone	1.377
Butyraldehyde	1.378
2,4-Dimethylpentane	1.379
Propyl ether	1.379
Acetaldehyde diethyl acetal	1.379
Butyl ethyl ether	1.380
Nitromethane	1.380
Trifluoropropanol	1.381
2-Methylhexane	1.382
Butyronitrile	1.382
Propyl acetate	1.382
Ethyl propionate	1.382
2-Methyl-2-propanol	1.383
Propanol	1.383
Isobutyl formate	1.383
Diethyl carbonate	1.383
Heptane	1.385
t-Butanol	1.385
Propionic acid	1.385
3-Methylhexane	1.386
Propylamine	1.386
3-Methyl-2-butanone	1.386
1-Chloropropane	1.386
2,2,3-Trimethylbutane	1.387
s-Butyl acetate	1.387
Butyl formate	1.387
Isobutyl acetate	1.388
2,2,4-Trimethylpentane	1.389
2,3-Dimethylpentane	1.389
Acetic anhydride	1.389
Diisopropylamine	1.390
2-Butylamine	1.390
2-Pentanone	1.390
3-Pentanone	1.390
Nitroethane	1.390
Methyl *n*-butyrate	1.391
Butyl acetate	1.392
2-Nitropropane	1.392
4-Methyl-2-propanone	1.394
2-Methyl-1-propanol	1.394
Octane	1.395

Solvents	Refractive index
Isobutylamine	1.395
Valeronitrile	1.395
2-Butanol	1.395
2-Hexanone	1.395
2-Chlorobutane	1.395
Butyric acid	1.396
2,2,5-Trimethylhexane	1.397
Dibutyl ether	1.397
Butanol	1.397
Acrolein	1.397
1-Chloro-2-methylpropane	1.397
Methacrylonitrile	1.398
3-Methyl-2-pentanone	1.398
Triethylamine	1.399
Butylamine	1.399
2,4-Dimethyl-3-pentanone	1.399
Isobutyl *n*-butyrate	1.399
1-Nitropropane	1.399
Dodecane	1.400
Amyl acetate	1.400
1-Chlorobutane	1.400
2-Methoxyethanol	1.400
Propionic anhydride	1.400
2,2,3-Trimethylpentane	1.401
1-Chlorobutane	1.401
β-Methoxypropionitrile	1.401
Isovaleric acid	1.402
Nonane	1.403
Dipropylamine	1.403
Isoamyl acetate	1.403
Cyclopentane	1.404
2-Methyl-2-butanol	1.404
3-Methyl-1-butanol	1.404
Tetrahydrofuran	1.404
Capronitrile	1.405
4-Heptanone	1.405
2-Ethoxyethanol	1.405
2-Heptanone	1.406
Valeric acid	1.406
Diisobutylene	1.407
Methylcyclopentane	1.407
Isoamyl ether	1.405
2-Pentanol	1.407
Tributyl borate	1.407
Pentanol	1.408
3-Methyl-2-butanol	1.408
Diethyl oxalate	1.408
Decane	1.409
4-Methyl-2-pentanol	1.409
3-Isopropyl-2-pentanone	1.409
2-Methyl-1-butanol	1.409
Butyric anhydride	1.409
Amyl ether	1.410
Isoamyl isovalerate	1.410
1-Chloropentane	1.410
Allyl alcohol	1.411
2,4-Dimethyldioxane	1.412
Ethyl lactate	1.412
Diethyl malonate	1.412
3-Chloropropene	1.413
Ethylene glycol diacetate	1.413
2-Octanone	1.414
3-Octanone	1.414
3-Methyl-2-heptanone	1.415
Caproic acid	1.415
4-Methyldioxane	1.415
1,2-Propylene glycol monobutyl ether	1.415
Ethyl cyanoacetate	1.415
Dibutylamine	1.416
Hexanol	1.416
2-Pentanol	1.416
1,1-Dichloroethane	1.416
Heptachlorodiethyl ether	1.416
3-Methoxypropylamine	1.417
Caprylonitrile	1.418
2-Heptanol	1.418
Allylamine	1.419
1,2-Propylene glycol carbonate	1.419
2-Heptanol	1.420
3-Methyl-2-pentanol	1.420
2-Ethyl-1-butanol	1.420
1-Chloro-2-methyl-1-propene	1.420
1,4-Dioxane	1.420
Methylcyclopropane	1.421
4-Hydroxy-4-methyl-2-pentanone	1.421
Heptanol	1.422
3-Isopropyl-2-heptanone	1.423
Cyclohexane	1.424
2-Bromopropane	1.424
3-Chloro-2-methyl-1-propene	1.425
Caprylic acid	1.426
Ethylene carbonate	1.426
Octanol	1.427
3-Methyl-2-heptanol	1.427
N,N-Dimethylformamide	1.427
Sulfuric acid	1.427
1-Chlorooctane	1.428
Triisobutylene	1.429
N-Methylalaninenitrile	1.429
1,2-Ethanediol	1.429
1-Chloro-2-ethylhexane	1.430
Ethylcyclohexane	1.431
1,2-Propanediol	1.431
1-Bromopropane	1.431
2-Methyl-7-ethyl-4-nonanone	1.433
Ethylene glycol monoallyl ether	1.434
Butyrolactone	1.434
2-Methyl-7-ethyl-undecanone	1.435
1,2-Dichloroisobutane	1.435
1,2-Propylene glycol sulfite	1.435
N-Methylmorpholine	1.436
Chloro-*t*-butanol	1.436

Solvents	Refractive index
Epichlorohydrin	1.436
Triethylene glycol monobutyl ether	1.437
2-Methyl-7-ethyl-4-nonanol	1.438
5-Ethyl-2-nonanol	1.438
6-Ethyl-3-octanol	1.438
1,3-Propanediol	1.438
Diethyl maleate	1.438
Butanethiol	1.440
Dibutyl sebacate	1.440
2-Chloroethanol	1.440
6-Ethyl-3-decanol	1.441
1-Chlorododecane	1.441
3-Methyl-2,4-pentanediol	1.441
Dimethyl maleate	1.441
2-Methyl-7-ethyl-4-undecanol	1.442
Ethyl sulfide	1.442
Mesityl oxide	1.442
Butyl stearate	1.442
Cyclohexene	1.443
Lauryl glycidyl ether	1.443
Dibutyl maleate	1.444
1,3-Butylene glycol sulfite	1.444
1,2-Dichloroethane	1.444
Glycol sulfite	1.444
Chloroform	1.444
1-Chlorotetradecane	1.445
Diethylene glycol	1.445
cis-1,2-Dichloroethylene	1.445
2-Butyloctyl-3-aminopropyl ether	1.446
2-Methylmorpholine	1.446
Formamide	1.446
3-Lauryl-1-hydroxypropylamine	1.447
Ethylene glycol diglycidyl ether	1.447
1-Chlorohexanedecane	1.448
Cyclohexanone	1.448
1-Amino-2-propanol	1.448
Diethylene glycol mono-β-hydroxyisopropyl ether	1.448
1-Amino-2-methyl-2-pentanol	1.449
Tetrahydrofurfuryl alcohol	1.450
2-Propylcyclohexanone	1.452
2-Aminoethanol	1.452
1,4-Butanediol glycidyl ether	1.452
4-Chloro-1,3-dioxolane-2-one	1.452
1-Chlorooctadecane	1.453
2-Butylcyclohexanone	1.453
Ethylenediamine	1.454
2-(β-Methyl)propylcyclohexanone	1.454
4-Methylcyclohexanol	1.454
3-Methylcyclohexanol	1.455
Bis(2-chloroethyl) ether	1.455
Cyclohexyl methacrylate	1.456
1,8-Cineole	1.456
2,2′-Dimethyl-2,2′-dipropyl diethanolamine	1.456
1,3-Butanediol glycidyl ether	1.456

Solvents	Refractive index
1-Chloroeicosane	1.459
Oleic acid	1.459
(1,1′,2,2′-Tetramethyl) diethanolamine	1.459
3-Aminopropanol	1.459
Carbon tetrachloride	1.459
3-Methyl-5-ethyl-2,4-heptanediol	1.459
2-(β-Ethyl)butylcyclohexanone	1.461
2-Methylcyclohexanol	1.461
N-(*n*-Butyl)diethanolamine	1.461
4,5-Dichloro-1,3-dioxolane-2-one	1.462
2-Butylcyclohexanol	1.462
N-β-Hydroxypropylmorpholine	1.462
2-(β-Ethyl)hexylcyclohexanone	1.463
2-Ethylcyclohexanol	1.463
Fluorobenzene	1.463
D-α-Pinene	1.464
L-α-Pinene	1.465
Cyclohexanol	1.465
m-Fluorotoluene	1.465
p-Fluorotoluene	1.467
N-(2-Hydroxyethyl)-2-hydroxybutylamine	1.467
4-Chloromethyl-1,3-dioxolane-2-one	1.467
trans-Decahydronaphthalene	1.468
o-Fluorotoluene	1.468
N-(2-Hydroxyethyl)-2-hydroxypropylamine	1.468
3-Allyloxy-2-hydroxypropylamine	1.469
Di(2-hydroxybutyl)ethanolamine	1.469
Di(2-hydroxypropyl)ethanolamine	1.469
D-Limonene	1.471
2-(α-Hydroxybutyl)cyclohexanol	1.473
1,2,3-Trichloroisobutane	1.473
Decahydronaphthalene	1.474
1,2,3-Propanetriol	1.475
Trichloroethylene	1.474
N-(β-Hydroxyethyl)morpholine	1.476
Dimethyl sulfoxide	1.476
cis-Decahydronaphthalene	1.479
2-(α-Hydroxyethyl)cyclohexanol	1.479
1-Methoxy-1-butene-3-yn	1.480
2-Butylidenecyclohexanone	1.481
N-(β-Chloroallyl)morpholine	1.481
n-Dodecyl-4-*t*-butyl phenyl ether	1.482
n-Dodecyl phenyl ether	1.482
n-Dodecyl 4-methylphenyl ether	1.483
N-Hydroxyethyl-1,3-propanediamine	1.483
Morpholyl *N*-(ethylhydroxy)ethylamine	1.485
2-Ethylidenecyclohexanone	1.486
Butylbenzene	1.487
Dioctylbenzene (90% *p*, 10% *m*)	1.487
p-Cymene	1.488
Isopropylbenzene	1.489
Furfuryl alcohol	1.489
t-Butylcumene (80% *p*, 15% *m*, 5% *o*)	1.490
n-Propylbenzene	1.490

Solvents	Refractive index
s-Butylbenzene	1.490
Hexyl-*m*-xylene (mainly 1,3,5)	1.490
t-Butylbenzene	1.490
Dibutyl phthalate	1.490
Isopropylethylbenzene (35% *p*, 60% *m*, 5% *o*)	1.491
t-Butyltoluene (85% *p*, 10% *m*, 5% *o*)	1.491
1-Phenyl-1-hydroxyphenyl ethane	1.491
Hexylcumene (90% *p*, 5% *m*, 5% *o*)	1.492
Octyltoluene (96% *p*, 2% *m*, 2% *o*)	1.492
Octylcumene (90% *p*, 4% *m*, 6% *o*)	1.493
Dihexylbenzene (85% *p*, 10% *m*, 5% *o*)	1.492
p-Xylene	1.493
1,3-Diethylbenzene	1.493
t-Butyl-*m*-xylene (mainly 1,3,5)	1.493
Ethylbenzene	1.493
Octylethylbenzene (80–90% *p*, 10% *m*)	1.493
1,3-Dimorpholyl-2-propanol	1.493
1,1,2,2-Tetrachloroethane	1.493
Isopropyl-*m*-xylene (mainly 1,3,5)	1.494
Toluene	1.494
Benzyl ethyl ether	1.494
t-Butylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.495
m-Xylene	1.495
Hexylethylbenzene (70% *p*, 25% *m*, 5% *o*)	1.495
1,4-Diethylbenzene	1.496
2,3-Dichlorodioxane	1.496
Mesitylene	1.497
Hexyltoluene (90% *p*, 5% *m*, 5% *o*)	1.497
2-Iodopropane	1.497
Benzene	1.498
Propyl benzoate	1.498
α-Picoline	1.499
1,2-Diethylbenzene	1.501
Pentachloroethane	1.501
1-Iodopropane	1.502
o-Xylene	1.503
Ethyl benzoate	1.503
β-Picoline	1.504
Tetrachloroethylene	1.504
Phenetole	1.505
Pyridine	1.507
Iodoethane	1.512
Phenyl methallyl ether	1.514
Anisole	1.515
Methyl benzoate	1.515
Cyclohexylcumene (60% *p*, 25% *m*, 15% *o*)	1.516
Diallyl phthalate	1.517
Benzyl acetate	1.518
Cyclohexylethylbenzene (70% *p*, 20% *m*, 20% *o*)	1.520
2-Methyl-4-*t*-butylphenol	1.521
Phenyl acetonitrile	1.521
(Chloro-*t*-butyl)benzene	1.521
Methyl salicylate	1.522
Cyclohexyltoluene (50% *p*, 20% *m*, 30% *o*)	1.523
Chlorobenzene	1.523
Furfural	1.524
Octachlorodiethyl ether	1.525
Benzonitrile	1.526
Thiophene	1.526
Nonachlorodiethyl ether	1.529
Iodomethane	1.530
4-Phenyldioxane	1.530
3-Phenyl-1-propanol	1.532
Acetophenone	1.532
Benzyl alcohol	1.538
1,2-Dibromoethane	1.538
1,2,3,4-Tetrahydronaphthalene	1.539
m-Cresol	1.542
β,β-Di(butylxanthogenic acid) diethylester	1.543
m-Dichlorobenzene	1.544
Benzaldehyde	1.544
Styrene	1.545
Nitrobenzene	1.550
o-Dichlorobenzene	1.551
Bromobenzene	1.557
o-Nitroanisole	1.560
m-Toluidine	1.566
Benzyl benzoate	1.568
o-Toluidine	1.570
1-Methoxyphenyl-1-phenylethane	1.571
Aniline	1.583
o-Chloroaniline	1.586
Bromoform	1.587
Thiophenol	1.588
2,4-Bis(α-phenylethyl)phenylmethyl ether	1.590
Carbon disulfide	1.628
1,1,2,2-Tetrabromoethane	1.633
Methylene iodide	1.749

Physical Constants of the Most Common Solvents for Polymers

Daniel R. Bloch
Lakeshore Research, Racine, WI, USA

Values given here have been taken a variety of reference books. Where a range was given, the melting and boiling points given here are average values. Flash point was determined by the closed cup method, using a Setaflash apparatus. The refractive index is reported relative to the sodium D line. Boiling points are given at 760 mmHg unless indicated otherwise by the pressure in mmHg following a slash (/). Viscosity is reported at 20°C unless indicated at another temperature in Celsius following a slash (/).

Compound	CAS Number	Formula wt.	Melting pt. (°C)	Boiling pt. (°C)	Density (at 20°C)	Viscosity at 20°C (cps)	Refractive index (at 20°C)	Flash pt. (°C)
Acetic acid	64-19-7	60.05	17	118	1.049	1.21	1.3716	40
Acetic anhydride	108-24-7	102.09	−73	140	1.082		1.3900	54
Acetone	67-64-1	58.08	−94	56	0.790	0.324	1.3588	−17
Acetonitrile	75-05-8	41.05	−48	82	0.786		1.3440	5
n-Amyl acetate	628-63-7	130.19	−71	148	0.876		1.4026	36
Aniline	62-53-3	93.13	−6	184	1.022		1.5860	70
Anisole	100-66-3	108.14	−37	154	0.995		1.5160	51
Benzene	71-43-2	78.11	6	80	0.874	0.52	1.5010	−11
Benzonitrile	100-47-0	103.12	−13	191	1.010		1.5280	71
Benzyl acetate	140-11-4	150.18	−51	206	1.040		1.5020	102
Benzyl alcohol	100-51-6	108.14	−15	205	1.045	5.8	1.5400	93
Biphenyl	92-52-4	154.21	71	255	0.992			
Bromoform	75-25-2	252.75	8.3	151	2.894		1.5960	
n-Butanol	71-36-3	74.12	−90	118	0.810	2.948	1.3990	35
n-Butyl acetate	123-86-4	116.16	−78	125	0.882	5.8	1.3940	
γ-Butyrolactone	96-48-0	86.09	−45	205	1.120		1.4360	98
Carbon disulfide	75-15-0	76.14	−111	46	1.266		1.6270	−33
Carbon tetrachloride	56-23-5	153.82	−23	77	1.594	0.969	1.4600	
Chlorobenzene	108-90-7	112.56	−45	132	1.107		1.5240	23
2-Chloroethanol	107-07-3	80.51	−89	129	1.201		1.4410	60
Chloroform	67-66-3	119.38	−63	61	1.492	0.568	1.4460	
2-Chlorophenol	95-57-8	128.56	8	176	1.241		1.5580	63
m-Cresol	108-39-4	108.14	9	203	1.034	20.8	1.5400	86
Cyclohexane	110-82-7	84.16	7	81	0.779	0.979	1.4260	−18
Cyclohexanol	108-93-0	100.16	22	161	0.948		1.4650	67
Cyclohexanone	108-94-1	98.15	−47	155	0.947	2.543/15	1.4500	46
Cyclohexyl acetate	622-45-7	142.2		173	0.966		1.4390	57
Cyclopentanol	96-41-3	86.13	−19	140	0.949		1.4530	51
cis-Decahydronaphthalene	493-01-6	138.25	−43	193	0.896		1.4750	57
Diacetone alcohol	123-42-2	116.16		166	0.931	1.4230		61
Di-*n*-amyl ether	693-65-2	158.29	−69	188	0.785		1.4119	57
1,2-Dichlorobenzene	95-50-1	147	−17	180	1.306		1.5510	65
Di-2-chlorodiethylether	111-44-4	143.01	−47	66/15	1.220		1.4560	55
1,2-Dichloroethylene, *cis* & *trans*	540-59-0	96.94	−57	48–60	1.265		1.4470	6
Dichloromethane/methylene chloride	75-09-2	84.93	−97	40	1.325		1.4240	
1,3,-Dichloro-2,4,6-trifluorobenzene	2368-53-8	200.98		162	1.599	1.4870		76
Diethyl ether	60-29-7	74.12	−116	34.6	0.708	1.26	1.3530	−40

Compound	CAS Number	Formula wt.	Melting pt. (°C)	Boiling pt. (°C)	Density (at 20°C)	Viscosity at 20°C (cps)	Refractive index (at 20°C)	Flash pt. (°C)
Di(ethylene glycol)	111-46-6	106.12	− 10	245	1.118		1.4460	143
Di(ethylene glycol mono-*n*-butyl ether	112-34-5	162.23	− 68	231	0.967		1.4320	100
Di(ethylene glycol) monoethyl ether	111-90-0	134.18		202	0.999		1.4270	96
Diisobutyl ketone	108-83-8	142.24	− 46	169	0.806		1.4113	49
Diisopropyl ketone	565-80-0	114.19	− 80	124	0.806		1.4000	15
1,2-Dimethoxyethane/ethylene glycol dimethyl ether	110-71-4	90.12	− 58	85	0.867		1.3790	0
N,N-Dimethylacetamide	127-19-5	87.12	− 20	166	0.937		1.4380	70
N,N-Dimethylformamide	68-12-2	73.1	− 61	153	0.944		1.4310	57
Dimethylsulfoxide	67-68-5	78.13	18	189	1.101		1.4790	95
1,4-Dioxane	123-91-1	88.11	12	102	1.034	1.26	1.4220	12
Diphenyl ether	101-84-8	170.21	28	259	1.073		1.5790	> 110
Di(propylene glycol)	110-98-5	134.18		230	1.023		1.4410	137
Di(propylene glycol) monomethyl ether	34590-94-8	148.2		90/12	0.938		1.4220	74
Ethanol	64-17-5	46.07	− 130	78	0.785	1.2	1.3600	8
Ethyl acetate	141-78-6	88.11	− 84	77	0.902	0.455	1.3720	− 3
Ethylene glycol diacetate	111-55-7	146.14	− 41	187	1.128		1.4150	82
Ethylene carbonate	96-49-1	88.06	39	244/740	1.321			160
Ethylene dichloride	107-06-2	98.96	− 35	83	1.256		1.4450	15
Ethylene gylcol	107-21-1	62.07	− 13	197	1.113		1.4310	> 110
Ethylene glycol mono-*n*-butyl ether	111-76-2	118.18	− 75	171/743	0.903		1.4190	60
Ethylene glycol diacetate	111-55-7	146.14	− 41	187	1.128		1.4150	82
Ethylene glycol diethyl ether	629-14-1	118.18	− 74	121	0.842		1.3923	20
Ethylene glycol dimethyl ether	110-71-4	90.12	− 58	85	0.867		1.3790	0
Ethylene glycol monoethyl ether	110-80-5	90.12	− 90	135	0.930		1.4070	44
Ethylhexyl acetate	103-09-3	172.27		200	0.870			77
(*S*)-(−)-Ethyl lactate	687-47-8	118.13	− 26	154	1.042		1.4130	28
Formaldehyde, 37% solution	50-00-0	30.03	− 15	97	1.083		1.3765	56
Formamide	75-12-7	45.04	3	210	1.134		1.4470	154
Formic acid, 96%	64-18-6	46.03	8	101	1.220		1.3704	68
Furfurol	98-00-0	98.1	− 29	170	1.135		1.4860	65
Glycerine	56-81-5	92.09	20	182/20	1.261		1.4740	160
n-Heptane	142-82-5	100.21	− 91	98	0.684		1.3870	− 1
Hexachloroethane	67-72-1	236.74	193		2.091			
Hexafluorobenzene	392-56-3	186.05	4	80	1.612		1.3770	10
Hexamethylphosphoric triamide	680-31-9	179.2	7	232/740	1.030		1.4580	105
Hexane	110-54-3	86.18	− 95	69	0.659	0.326	1.3750	− 23
Isobutanol	78-83-1	74.12	− 108	108	0.803		1.3960	27
Isobutyl isobutyrate	97-85-8	144.21	− 81	148	0.855		1.3980	37
Isobutyric acid	79-31-2	88.11	− 47	154	0.950		1.3930	55
Isophorone	78-59-1	138.21	− 8	214	0.923		1.4760	84
Isopropanol	67-63-0	60.1	− 89	82	0.785		1.3770	11
Isopropyl acetate	108-21-4	102.13	− 73	89	0.872		1.3770	16
Isopropylamine	75-31-0	59.11	− 101	34	0.694		1.3746	− 32
Mesitylene	108-67-8	120.2	− 45	163	0.864		1.4990	44
Mesityl oxide	141-79-7	98.15	− 53	129	0.858		1.4450	30
Methanol	67-56-1	32.04	− 98	65	0.791		1.3290	11
2-Methoxyethanol	109-86-4	76.1	− 85	125	0.965		1.4020	46
Methyl acetate	79-20-9	74.08	− 98	58	0.932		1.3610	− 9
Methyl ethyl ketone	78-93-3	72.11	− 87	80	0.805	0.423/15	1.3970	3
Methyl isoamyl ketone	110-12-3	114.19		145	0.888		1.4070	41
Methyl isobutyl ketone	108-10-1	100.16	− 80	118	0.801		1.3960	13
Methyl propyl ketone	107-87-9	86.13	− 78	110	0.802		1.3900	7
N-Methylpyrrolidone	872-50-4	99.13	− 24	82/10	1.033		1.4700	86
Morpholine	110-91-8	87.12	− 7	129	0.999		1.4540	35
Nitrobenzene	98-95-3	123.11	6	211	1.196		1.5510	87
Nitromethane	75-52-5	61.04	− 29	101	1.127		1.3820	35
n-Octane	111-65-9	114.23	− 57	127	0.703	2.256	1.3980	15
n-Pentanol	71-41-0	88.15	− 78	138	0.811		1.4090	48
Perfluoroacetone	684-16-2	166.02	− 129	− 26				
Perfluorotributylamine	311-89-7	671.1		178	1.883			None
Phenol	108-95-2	94.11	41	182	1.071		1.5425	79
1,4-Phenylenediamine	106-50-3	108.14	144	267				

Compound	CAS Number	Formula wt.	Melting pt. (°C)	Boiling pt. (°C)	Density (at 20°C)	Viscosity at 20°C (cps)	Refractive index (at 20°C)	Flash pt. (°C)
Piperazine	110-85-0	86.14	109	146				109
n-Propanol	71-23-8	60.1	−127	97	0.804	2.256	1.3840	15
Propyl acetate	109-60-4	102.13	−95	102	0.888		1.3840	12
Propylene carbonate	108-32-7	102.09	−55	240	1.189		1.4210	132
Propylene glycol	57-55-6	76.1	−60	187	1.036		1.4320	107
Propylene glycol mono-*n*-butyl ether		132.2		72/20	0.885		1.4160	58
Propylene glycol monomethyl ether	107-98-2	90.12	−97	119	0.922		1.4030	33
Propylene glycol mono-*n*-propyl ether	1569-01-3	118.18		140–160	0.885		1.4110	48
Propylene glycol mono-*t*-butyl ether	57018-52-7	132.20		144	0.874		1.4130	44
Pyridine	110-86-1	79.1	−42	115	0.978		1.5100	20
1,1,2,2-Tetrachloroethane	79-34-5	167.85	−45	147	1.586		1.4935	None
Tetrachloroethylene	127-18-4	165.83	−22	121	1.623		1.5060	None
Tetrahydrofuran	109-99-9	72.11	−108	66	0.889	0.486	1.4070	−17
Tetrahydrofurfuryl alcohol	97-99-4	102.13	−80	178	1.054		1.4520	83
Tetrahydronaphthalene/tetralin	119-64-2	132.21	−35	207	0.973		1.5410	77
Tetramethylene sulfone	126-33-0	120.17	27	285	1.261		1.4840	165
Tetramethylurea	632-22-4	116.16	−1	177	0.971		1.4506	65
Toluene	108-88-3	92.14	−93	111	0.865	0.59	1.4960	4
1,1,1-Trichloroethane	71-55-6	133.41	−35	75	1.338		1.4366	None
Trichloroethylene	79-01-6	131.39	−85	87	1.463		1.4760	None
Tricresyl phosphate	1330-78-5	368.37		265/10	1.143		1.5550	>110
Trifluoroacetic acid	76-05-1	114.02	−15	72	1.480			None
Water	7732-18-5	18.02	0	100	0.998	1.005	1.3329	None
o-Xylene	95-47-6	106.17	−24	144	0.870		1.5050	32
p-Xylene	106-42-3	106.17	13	138	0.866	0.648	1.4950	27

SECTION IV

PHYSICAL DATA OF OLIGOMERS

Physical Data of Oligomers

M. Rothe
Lehrstuhl Organische Chemie II, University ät Ulm, Ulm, FR Germany

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A. INTRODUCTION

Oligomers are defined as the low members of the polymeric–homologous series with molecular weights up to about 1000–2000. They are easily obtained by stepwise synthesis from suitably protected monomer derivatives or by separation from the polymers. As monodisperse oligomers are low molecular compounds of defined molecular weights, they represent ideal model substances for the polymers. By physical studies of a complete series of oligomers, substantial knowledge is gained of the relation between chain length and physical properties. In this way certain physical data of the polymers could be explained for the first time. In chemical aspects, oligomers must, on principle, have the same properties as the related polymers; they are, however, much more accessible to all studies, owing to their strictly defined and comparatively simpler structure.

Homologous oligomers differ sufficiently in their physical properties – due to their low molecular weight – so that they can be separated into individual chemicals. They can therefore be used for elucidating the structure of polymers and, in close relation, for the investigation of the mechanisms of polymerization. Oligomers are intermediates in polycondensation and polyaddition reactions and are present in more or less significant amounts in the polymers, due to equilibria between different chains, and between chains and rings. Therefore important conclusions on the structure of the related high polymers can be drawn from isolation and structure determination of oligomers, along with a comparison of the chemical properties of polymers and oligomers. In this way clear evidence can be obtained as regards the type of linkage between the monomer units in the polymer as well as the structure of unknown endgroups. Finally, unequivocal evidence on the mechanism of polymer formation is to be expected from the behavior of oligomers under the conditions of the polyreaction.

The following tables give the physical properties of the most important, linear, cyclic, and branched monodisperse oligomers which are significant for polymer chemistry. Derivatives and co-oligomers (such as co-oligo-peptides, -saccharides, and -nucleotides) as well as organosilicon and inorganic oligomers are not included, nor are any low polymers which have not been proved to be strictly monodisperse. Only those literature references are cited that indicate the best methods of synthesis and the most important physical properties of the oligomers concerned (including spectroscopic and conformational data which could not be mentioned in detail in the tables).

In the last few decades several reviews on linear and cyclic oligomers have appeared. A small list is giving below.

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B. OLIGOMERS CONTAINING MAIN CHAIN ACYCLIC CARBON ONLY

TABLE 1. OLIGO(OLEFINS)

1.1. OLIGO(METHYLENES) AND OLIGO(ETHYLENES)

1.1.1. *n*-ALKANES $H[CH_2]_nH$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	Refs.
1	16.0	– 182.6	– 161.6/1013	0.4240/– 164	21,22,75,84,88,93
2	30.1	– 183.3	– 88.5/1013	0.5462/89	21,75,84,88,93
3	44.1	– 187.1	– 42.2/1013	0.5824/– 45	21,22,75,84,88,93
4	58.1	– 138.4	– 0.5/1013	0.6011/0	21,22,75,84,88,112,178,192
5	72.2	– 129.7	36.1/1013	0.6263/20	3,7,13,21,22,30,75,84,88,93,112,178,192,195
6	86.2	– 94.0	68.7/1013	0.6594/20	3,5,7,21,22,30,75,78,84,88,93,112,178,192,195
7	100.2	– 90.5	98.4/1013	0.6838/20	3,5,7,13,21,22,30,75,84,88,93,112,178,192
8	114.2	– 56.8	125.5/1013	0.7026/20	3,5,7,13,21,22,30,78,84,87,88,93,112,178,192,195
9	128.3	– 53.5	150.8/1013	0.7177/20	1,5,7,13,21,22,30,84,87,88,93,111,112,178,192
10	142.3	– 29.7	174.1/1013	0.7301/20	1,3,5,7,18,21,22,30,84,87,88,93,111,112,178,192,195
11	156.3	– 25.6	195.9/1013	0.7402/20	1,3,7,13,21,22,30,77,83,84,87,88,93,111,112
12	170.3	– 9.7	216.3/1013	0.7487/20	1,7,17,21,22,30,79,84,87,88,93,111,112,178,185,192
13	184.4	– 6.0	235.5/1013	0.7563/20	1,7,13,21,30,77,83,84,87,88,93,112,205,206
14	198.4	5.5	253.6/1013	0.7627/20	1,7,17,21,30,84,87,88,93,111,112
15	212.4	10.1	270.7/1013	0.7684/20	1,3,7,21,30,77,83,84,87,88,93,112
16	226.4	18.1	287.1/1013	0.7733/20	1,7,11,15,16,19,21,30,78,84,87,88,93,111,112,192
17	240.5	22.1	302.6/1013	0.7767/22	1,3,7,13,14,21,30,75,77,83,84,88,93,111,112,193
18	254.5	28.2	317.4/1013	0.7768/28	1–3,7,11,14,15,17,19,21,30,75,84,88,93,111
19	268.5	32.0	331.6/1013	0.7776/32	1,3,4,7,14,15,19,21,77,83,84,88,93,97,111,121, 198,221,235
20	282.6	36.7	345.1/1013	0.7550/70	1,3–7,11,14,15,17–19,21,22,79,82,88,91,93,107, 110,111,198
21	296.6	40.4	215/20	0.7583/70	1,3,4,10,14,15,19,21,77,83,86,88,93,111,118, 194,198,232
22	310.6	44.4	222–225/20	0.7631/70	1,3,4,7,11,14,21,78,83,88,91,93,97,111,115,121,198
23	324.6	47.4	234/20	0.7641/70	1,3,4,10,14,21,77,83,86,88,93,121,198
24	338.7	51.1	243/20	0.7657/70	1,3,4,11,14,17,21,83,86,88,91,93,99,182,198,202,204
25	352.7	54	259/20	0.7693/70	1,3–5,14,21,77,83,88,93,118,193,198,232
26	366.7	57.0	262/20	0.7704/70	1–4,7,11,14,21,83,85,88,93,198
27	380.7	60.0	270/20	0.7732/70	1–4,8,14,21,77,83,85,88,93,118,198
28	394.8	61.6	279–281/20	0.7750/70	1,4,11,13–15,17,19,21,83,85,86,88,90,93,99,100, 111,198
29	408.8	64.0	286/20	0.7755/70	1,3,4,11,14,21,77,83,85,88,91,93,118,198
30	422.8	66.0	304/20	0.7795/70	1–4,6,7,11,14,18,21,82,83,85,86,88,93,110,198
31	436.9	67.9	302/20	0.7678/100	1–4,8,77,83,85,86
32	450.9	70.4	310/20	0.7645/100	1,2,4,11,15,16,19,20,83,85,91,95,97,99,109,111, 115,185,198
33	464.9	71.3			1,4,5,77,83,91,109,116,119,198,207
34	478.9	72.9			1–4,7,11,77,83,85,86,198
35	493.0	74.7	331/20	0.7436/135	1,4,7,8,10,15,19,77,79,83,85,86,88,91,95,118
36	507.0	76.1	298.4/4	0.7783/90	1,2,4,7,10,13–15,19,77,78,83,85,86,88,90,91 107,109,111,185,191,193,194,198,207,211,221, 223,232,233
37	531.0	77.2			75,109,198
38	535.0	79.2			75,77,83,198
39	549.1	80.5			12,75,77,83
40	563.1	81.5	$150/10^{-4}$		6,7,10,17,18,21,75,77,82,83,86,93,99,110,198
41	577.1	81.7			75
42	591.2	82.9			76
43	605.2	85.5	332/4	0.7812/90	10,22,77,83,86
44	619.2	86.4		0.7514/135	3,11,15,19,77,79,80,83,89,91,95,107,110,111,115, 116,118,205
45	633.2	87.2			109
46	647.2	88.0			77,80,83,91,100,198
48	675.3	88.5–89			100,109,202,204
50	703.4	92.1	420–422/20		6,7,11,15,18,21,77,80,82,83,90,93,110,116, 188,193,198
52	731.4	94.0			77,80,83,90

1.1.1. *cont'd*

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	Refs.
54	759.5	95.0			2,7,77,80,83,90
56	787.6	95.5–96			106,204
60	843.6	99.1	$250/10^{-4}$		6,7,18,21,77,80,82,83,90,93,104,109,110,187,188, 190,193,198
61	857.6	100.3			109
62	871.7	100.5			2,7,77,80,83,90,116
64	899.7	102.1		0.7654/135	2,7,13,22,77,79,80,83,90
65	913.7	102.1			109
66	927.8	103.6			9,77,80,83,90
67	941.8	104.1			9,77,80,83,90
69	969.9	104.7			109
70	983.9	105.3	$300/10^{-4}$		6,7,18,21,77,80,82,83,90,93,100,110,116
72	1012.0	103–105			100,202
80	1124.2	108.0			18,82,104,109
82	1152.2	110.1			20,77,80,81,83,89,110,188
94	1320.6	113.8		0.783/115	15,19,20,77,79,80,83,100,103,107,110, 116–118,188,204
96	1348.6	110–112			100,202
98		113–114			229
100	1404.7	115.2			18,22,77,80–83,93,104,110,185
102	1432.8	115.5–116.5			105,108,183,203
104	1460.8	115–115.5			106,203,204
120	1685.3	119.2			82,98,104,200,202
122		116–117			229
140	1965.8	121.0			82
144	2021.9	121			98,200,202
150	2106.1	123–123.5			105,108,183,203,227,248
160	2246.4	122.2			104,108
162		121–121.5			229
168	2358.5	121.9			98,114,177,189,199,200,202,221
192	2695.2	127.5			98,186,189,200–202,225
194		126.9			224,229
198	2779.4	127.0			105,108,183,184,197,203,224–227,229,248
210	2947.7	127.4			224,229
216	3029.8	128.4			98,200,202,225
240	3368.5				189,199
242	3396.6	120–121			229
246	3450.6	128–130			105,108,181,183,184,203,224–227,229,249
258	3621.0	128.8			224,229
288	4039.8	128.8			98,200,202
294	4126.0	130.4			108,183,203,224,225,229,248
384	5386.4	131.3			98,200
390	5470.5	132			105,108,183,203,229,248

Conformation, chain folding: Refs. 108,178 (n = 2–10,12), 179 (n = 9–44), 181,183,184,193,194,202,205–208,211,226,227,248.
Crystallization: Refs. 168,177–179,181,183,184,188–190,194,197,199–202,211,224–227,248.
Thermal behavior, phase transitions, DSC: Refs. 88,98,107,107,109,119,181,184,186–191,193,197–204,217,221,224–226,246.
NMR: Refs. 95,97 (n = 19,22,32), 99 (n = 6,8,10,14,18,24,28), 100,179,187,191,205,206,221,229,246.
IR, Raman: Refs. 98,108,116,119,178,182,192–194,200,202,232,248.
X-ray: Refs. 100,107,109,112,119,183,184,187,190,191,198,206,223,224,226,233.
Electron diffraction: Refs. 187,188.
MS: Ref. 195.
GPC: Ref. 185.

1.1.2. CYCLOALKANES $[CH_2]_n$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	Refs.
3	42.1	– 127.5	– 32.8/1013	0.688/– 40	23,24,93,94,178
4	56.1	– 90	12.5/1013	0.7038/0	25,93,94,178,232
5	70.1	–93.9	49.3/1013	0.7457/20	26,93,94,178,183,195
6	84.2	6.6	80.7/1013	0.7784/20	27–29,93,94,99,111,178,183,195
7	98.2	– 8.0	118.5/1013	0.8098/20	29,31,93,94,178,195
8	112.2	13.5	149/1000	0.8349/20	32–34,93,94,99,178,195,208

1.1.2. *cont'd*

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm^3)/°C	Refs.
9	126.2	9.7	69/19	0.8534/20	29,34,93,94,178,208
10	140.3	9.5	69/16	0.8575/20	29,35,36,93,94,99,178,180,208
11	154.3	−7.3	91/16	0.8591/20	29,37,93,94,99,208
12	168.3	60.6		0.861/20	29,38,39,40,93,94,99,101,111,114,178,180,196, 208,214,215,217,232
13	182.4	24.4	128/27	0.861/20	29,34,38,40,93,94,99,196,208,217
14	196.4	56.2	131/15	0.8259/79	17,29,38,40,41,93,94,99,180,196,208–210,214, 217,218,220
15	210.4	63.4	147/16	0.8240/78	29,38,40,44,93,94,99,196,208,217
16	224.4	60.5	170–171/27	0.819/79	16,38,40–42,93,94,99,111,169,180,196,208,209, 212,214,217,220
17	238.5	65		0.8200/77	40,43,44,93,94
18	252.5	72–73		0.8201/76	17,40–42,45,93,94,99
19	266.5	80			40,93,94,99
20	280.5	61–62			18,40,41,93,94,99,111
21	294.6	64–65			41,94,99,102
22	308.6	46.8	177/0.5	0.8174/75	38,40,43,48,94,96,99,220
23	322.6	53–54	177/0.1	0.8259/64	46,48,94,99
24	336.6	48.8	222–228/0.8		38,40,41,45,48,94–99,100,101,111,114,169,196, 202,210,211,213–217,219,228,235,246
25	350.7	53–54			47,94
26	364.7	44–46	218–219/0.7	0.8120/78	38,40,43,48,94,99,210
27	378.7	47–48			41,94,102
28	392.8	47–48	213–214/0.3	0.8243/58	38,41,48,94,97,99,102,111,219,222
29	406.8	54.5–55.5	215/1.5	0.8232/64	38,94,99
30	420.8	57–58	230/0.3	0.8233/69	18,41,42,45,48,90,93,94,99,102
32	448.9	65.5–66.5		0.8261/70	41,48,94,97,99,102,111,169,222
34	476.9	66–67	230–240/0.4	0.8229/76	48,92,94,113
36	505.0	70.0			41,45,94,97,99,100,101,102,111,114,115,120,196, 211,214,215,217,228,248,256
37	519.0	65–66			99
40	561.1	76–77			18,41,93,97,99,102,111,115,216,219,222,248,256
42	589.2	75–76			42,102
44	617.2	82–82.5			99,100
45	631.2	80–81			41,102
46	645.2	83.5–85			222
48	673.3	89.2			97,98,100,101,111,114,115,120,196,198,200, 202,207,211,213,217,230,235,248,256
50	701.4	87–88			18
54	757.5	90–91			41,102
60	841.6	96.5			101,120,211,247
64	897.7		^{13}C-NMR		97,111,115,234,248,256
72	1009.9	107.0	103.5–104.5		98,100,101,120,196,198,200,202,207,211,213, 216,217,228,230,231,235
80	1122.2		^{13}C-NMR		97,111,115,248,256
84	1178.3	108.8			101
96	1346.6	116.0			96,98,100,120,196,198,202,216,217,230,231,235
100	1402.7				228
104					248,256
120	1683.2				211,228
128	1795.5				219,248,256
144	2019.9	120.8			98,100,198,200,202,230
160	2294.3				219,248,256
168	2356.5				177
192	2693.2	124.3			98
200	2805.4				228,248,256
288	4039.8	129.8			98,100,202,230

Conformation, chain folding: Refs: 94,97,113,178 (n = 3–10,12), 179 (n = 3–96), 180,187,202,207–209,211–213,215–217,219,220,228,230,231,234,235,246,248.
Crystallization: Refs. 178,179,217,230,234,248.
Thermal behavior, phase transition, DSC: Refs. 96,101,179,196,209,216–221,230,246.
NMR: Refs. 95,97,99 (n = 6,8,10–16,18–24,26,28–30,32,36,37,40,44), 100 (n = 24,26,44,48,72,96), 111,114,115,179 (n = 3–96), 180,189,214–219,234,246,248,256.
IR, Raman: Refs. 92,96,178,179,200,202,209,220,235.
X-ray: Refs. 113,120,179,202,210,211,215,216,218,223,230,256.
Electron diffraction: Refs. 230,231.
GPC: Ref. 211.

1.2. OLIGO(PERFLUOROMETHYLENES) AND OLIGO (PERFLUOROETHYLENES)

1.2.1. PERFLUORO-*n*-ALKANES $F[CF_2]_nF$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	Refs.
1	88.0	– 183.6	– 128/1005	1.619/– 129	22,49,63,64,125,130,179
2	138.0	– 96.6	– 78.3/1013	1.590/– 78	49,50,63,64,125,130,154,179
3	188.0	– 147.7	– 36.7/1013		22,51,52,64,125,130,131,179
4	238.0	– 129.2	– 2.2/1013		22,52–54,64,125,126,129,132,139,144,179,241
5	288.1	– 125.4	29.2/1013	1.620/20	22,52,54–56,124,129
6	338.1	90.7	57.2/1013	1.6995/20	22,52,57,58,124–126,134,144,175,179
7	388.1	93.3	82.2/1013	1.7333/20	22,52,56,59,125,128,134,144,175,179
8	438.1	– 19.0	103.3/1013	1.776/25	22,52,59,125,134,144,175,179
9	488.1	– 16	125.3/1013	1.799/25	22,52,59,127
10	538.1	36	144.2/1013	1.770/45	22,52,59,127
11	588.1	57	161/1013	1.745/70	22,52,59
12	638.1	75.3	178/1013	1.670/113.5	22,52,59,127,175,179,250,251
14	738.1		IR, Raman spectr.		124,127,133,179,240,249
16	838.2	129.0	232/1013		54,59,127,175
18	938.2		IR, Raman spectr.		124,127,133
20	1038.2	164.7	IR, Raman spectr.		124,127,133,175,179,243–245,249,252
24	1238.2	192.0	IR, Raman spectr.		175,242,243,245

1.2.2. PERFLUORO-CYCLOALKANES $\lceil[CH_2]_n\rceil$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
3	150.0	– 80	– 31.5/1013	60,61
4	200.0	– 38.7	– 2/1013	61,63,144
5	250.0	10.3	22.5/1013	51,54–56,61,64
6	300.0	58.2	51 (subl.)	51,56,59,64,65,144
7	350.0	– 37	76.2/1013	51,59
8	400.0	– 55	101.5/1013	59
9	450.0	–56	124.6/1013	59
10	500.0	–44	146.5/1013	59

1.2.3. α,ω-DISUBSTITUTED PERFLUORO-*n*-ALKANES $X–[CF_2]_n–X$

X	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
H	1	52.0		– 51.6/1013	
	2	102.0		– 20°/1013	144,145
	3	152.0		10–11/1013	146
	4	202.0		43.5/1013	135–137,144
	5	252.1		66.5/1013	136
	6	302.1		88.5–89.5/1013	135–137,144
	7	352.1		104.2/1013	136,137
	8	402.1		130.6/1013	136,137
	10	502.1	42–43	153–154/1013	135–137
CH_3S	2	194.2		67–70/53	135
	4	294.2		80–83/27	135
	6	394.3		81–84/5	135
	8	494.3		102–106/5	135
	10	594.3		90–94/1	135
	12	694.3		118–122/1	135
CH_3SO_2	2	258.4	125		135
	4	358.4	151		135
	6	458.5	168		135
	8	558.5	171		135
	10	658.5	187		135
CH_3COO	4	318.1		115–116/133	135
	6	418.1		121–123/67	135
	8	518.1		126–127/33	135
	10	618.2		144–146/33	135
$HOCH_2$	2	164.1	81–82		135
	4	264.1	69	135–136/36	135

1.2.3. *cont'd*

X	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
I	2	353.8		113/1013	236
	4	453.8		149/1013	236
	6	553.8		186/1013	236
	8	653.8		222/1013	236
	10	753.8		258/1013	236

1.2.4. α,ω-DISUBSTITUTED PERFLUORO-*n*-ALKANES WITH DIFFERENT ENDGROUPS $X{-}[CF_2]_n{-}Y$

X	Y	n	Mol. wt.	m.p.	b.p. (°C/mbar)	d_4^{20} (g/cm^3)	Refs.
H	Cl	2	136.5		− 10/1013		61
		3	186.5		21/1013	1.556	61
		4	236.5		50/1013	1.607	61
		5	286.5		77/1013	1.661	61
		6	336.5		100/1013	1.719	61
		7	386.5		122.5/1013	1.738	61
		8	436.5		144.5/1013	1.778	61
		9	486.5		162.5/1013		61
		10	536.5	46	162.5/1013		61
		11	586.5	52	177/1013		61
		12	636.5	78	202/1013		61
		13	686.5	87	213/1013		61
		14	736.5	95	227–228/1013		61
H	F	2	120.0		− 48.5/1013		240,252
		3	170.0		− 16/986		240
		4	220.0		14/986		240
		5	270.0		46/986		240
		7	370.0		94/986		240
		12	620.0	72			250,251
$(CF_3)_2CF$	I	4	495.9		139/1026		237
		6	596.0		189/1008		237

1.2.5. SEMIFLUORINATED *n*-ALKANES $F{-}[CF_2]_m{-}[CH_2]_n{-}H$

m	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
1	1	84.0		− 46.7/1013	155,176
6	12	488.3	− 13.0		138,176
7	7	468.3			255
8	8	532.3	27.0		138,176
10		540.3	35		251
10	8	632.4	53.0		138,176
10	10	660.4	64		138,176,251,255
10	12	688.4	65		138,176,251
12	2	648.2	71.0		138,176,250,251,255
12	4	676.2	76.0		138,176,250,251,255
12	6	704.3	84		138,176,250,251,255
12	8	732.4	88		138,176,251
12	10	760.4	92		138,176,251
12	12	788.4	91		138,176,250,251,255
12	14	816.5	93		138,176,251
12	16	844.5	94		138,176,251
12	18	872.6	97		138,176,251
12	20	800.6	100		138,176,250,251,255

1.2.6. ANIONIC OLIGOMERS OF PERFLUORO-*n*-ALKENES (MAJOR OLIGOMERS, *cis/trans* MIXTURES)

n	Compound	Mol. wt.	b.p. (°C/mbar)
$CF_2{=}CF_2$ (Refs. 238,239,243):			
4	$CF_3CF_2{-}C(CF_3){=}C(CF_3){-}CF_2CF_3$	400.1	95–96/1013
5	$(CF_3CF_2)_2(CF_3)C{-}C(CF_3){=}CF(CF_3)$	500.1	135–138/1012

1.2.6. *cont'd*

n	Compound	Mol. wt.	b.p. (°C/mbar)
6	$(CF_3CF_2)_2(CF_3)C{-}C({=}CF_2){-}CF(CF_2CF_3)_2$	600.1	160–165/1013
$CF_3{-}CF{=}CF_2$ (Refs. 253,254,257):			
2	$(CF_3)_2CF{-}CF{=}CF{-}CF_3$	300.1	46–48.5/1013
	$(CF_3)_2C{=}CF{-}CF_2{-}CF_3$		46–48.5/1013
3	$(CF_3)_2C{=}C(CF_2{-}CF_3{-}CF(CF_3)_2$	450.1	114.8/1013
	$[(CF_3)_2CF]_2C{=}CF{-}CF_3$		110–115/1013
	$(CF_3)_2CF{-}CF{=}C(CF_3){-}CF_2{-}CF_2{-}CF_3$		110–115/1013

1.2.7. PERFLUORO-1-ALKENES $F{-}[CF_2]_n{-}CF{=}CR_2$

n	Mol. wt.	b.p. at ~983 mbar (°C)	n_D^{20}	Refs.
1	150.0	−29		240
2	200.0	1		240
3	250.0	28–29	1.2571	240
5	350.0	81	1.2782	240
7	450.1	123	1.2868	240

Conformation; Crystallization: Refs. 126,179,242,243–245,251.
Phase transition, DSC: Refs. 55,125,138,175,176,179,242,244,245,249,251.
NMR: Refs. 134,179,250,251.
X-ray: Refs. 65,138,175,176,179,244,245.
IR, Raman: Refs. 125–127,133,138,175,176,241,242,245,249,250,255.
MS: Ref. 56.

1.3. OLIGO(ISOBUTENES)

Compound	m.p. (°C)	b.p. (°C/1013 mbar)	d_4^{20} (g/cm^3)
MONOMER (mol. wt. 56.1)			
Isobutene $CH_2{=}C(CH_3)_2$		−6	
DIMERS (mol. wt. 112.2; Refs. 66–70,72,74,122,141,143,147,148,150–152,153)			
2,4,4-Trimethyl-1-pentene $CH_2{=}C(CH_3){-}CH_2C(CH_3)_3$	−93.6	101.4	0.7150
2,4,4-Trimethyl-2-pentene $CH_3{-}C(CH_3){=}CH{-}C(CH_3)_3$	−106.5	104.9	0.7212
3,4,4-Trimethyl-2-pentene $CH_3{-}CH{=}C(CH_3){-}C(CH_3)_3$		112.3	0.7392
2,3,4-Trimethyl-2-pentene $(CH_3)_2C{=}C(CH_3){-}CH(CH_3)_2$	−113.4	116.3	0.7434
2,3,4-Trimethyl-1-pentene $CH_2{=}C(CH_3){-}CH(CH_3){-}CH(CH_3)_2$		108	0.729
2,3,3-Trimethyl-1-pentene $CH_2{=}C(CH_3){-}C(CH_3)_2{-}CH_2{-}CH_3$	−69	108.4	0.7352
1,1,3-Trimethyl-cyclopentane $(CH_3)_2C\langle CH_2{-}CH_2{-}CH(CH_3){-}CH_2\rangle$ (ring)		105.0	0.7481

1.3. *cont'd*

Compound	m.p. (°C)	b.p. (°C/1013 mbar)	d_4^{20} (g/cm³)
TRIMERS (mol. wt. 168.3, Refs. 71,73,74,123,140,142,143,147–149,151,152)			
1,1-Dineopentylethylene $CH_2=C[CH_2C(CH_3)_2]_2$		178.0/1013	0.7599
2,2,4,6,6-Pentamethyl-3-heptene $(CH_3)_3C-CH=C-CH_2-C(CH_3)_3$ $\quad\quad\quad\quad\quad\quad\; \vert$ $\quad\quad\quad\quad\quad\; CH_3$		^{13}C-NMR	
TETRAMERS (mol. wt. 224.4; Refs. 74,141–143,147,151,152)			
2,2,6,6,8,8-Hexamethyl-4-methylene-nonane $(CH_3)_3C-CH_2-C-CH_2-C(CH_3)_2-CH_2-C(CH_3)_3$ $\quad\quad\quad\quad\quad\quad\quad \Vert$ $\quad\quad\quad\quad\quad\quad CH_2$		106–107/11 ^{13}C-NMR	
2,2,4,6,6,8,8-Heptamethyl-4-nonene $(CH_3)_3C-CH_2-C=CH-C(CH_3)_2-CH_2-C(CH_3)_3$ $\quad\quad\quad\quad\quad\quad\quad \vert$ $\quad\quad\quad\quad\quad\quad CH_3$		^{13}C-NMR	

1.4. OLIGO(1-ALKENYLENES)

x	*n*	Configuration	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{25}	Refs.
2	2	*cis/trans*	108.2	−70	150.8/1002		163,170–172
	3	*cis/trans*	162.3		104/15		164,173,174
	4	*cis/trans*	216.3		88–91/0.07		161,164
	5	*cis/trans*	270.4		105–110/0.07		161,164
	6	*cis/trans*	324.5		162/0.1		161
	$n=4$–13 *cis/trans* GC Refs. 161,166						
	$n=4$–7,10,11 *cis/trans* ^{1}H-, ^{13}C-NMR Ref. 161						
3	2	*cis*	136.2	21–23		1.4972	162
4	2	*cis*	164.3	0	51/0.5 (*cis/trans*)	1.4971	40,157,162
	3	*cis/trans*	246.4		112/0.5		157
	4	*cis*	328.6	25–27			40
5	2	*cis*	192.3	46	48/0.001 (*cis/trans*)		40,157
	3	*cis/trans*	288.5		116/0.001		157
6	2	*cis*	220.4	18.5	89/0.07 (*cis/trans*)		40,157,158
	3	*cis/trans*	330.6		130/0.07		157,158
$n=2$–8 (*cis/trans*): GPC, b.p., n_D^{20}, IR, UV, MS Refs. 158–160							
7	2	*cis*	248.4	38.5	122/0.4 (*cis/trans*)		40,157
8	2	*cis*	276.5	38–39	123–124/0.2 (*cis/trans*)		40,157
10	1	*cis/trans*	166.3		100/0.11		156
	2	*cis/trans*	332.6	54–55	150/0.09		156–158,160
		trans/trans		IR: 970 cm^{-1}			156
		trans/cis		970, 725 cm^{-1}			156
		cis/cis		725 cm^{-1}			156
	3	*cis/trans*	498.3		220/0.12		156
	4	*cis/trans*	665.2		255/0.12		156
	$n=2$–14: MS Refs. 167,168						
	$n=2$–9: GPC Ref. 160						
13	$n=2$–7: MS Ref. 166						

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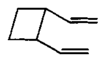
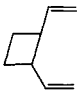
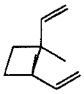
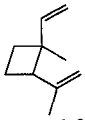
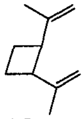
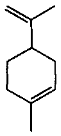
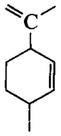
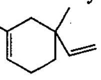
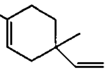
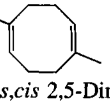
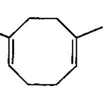
TABLE 2. OLIGO(DIENES)

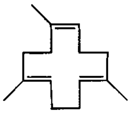
2.1. OLIGOMERS OF 1,3-BUTADIENE

Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
LINEAR DIMERS	2	108.2				
3-Methyl-1-*trans*-4,6-heptatriene CH_2=CH-CH(CH_3)-CH=CH-CH=CH_2				117/1013	1.4657/20	13,14,33,35,36,38
1,3,6-Octatriene CH_2=CH-CH=CH-CH_2-CH=CH-CH_3				129/1013	1.4743/20	33,36
1,3,7-Octatriene CH_2=CH-CH=CH-CH_2-CH_2-CH=CH_2						31,32,35,36,39
trans				124–125/1013	1.4686/20	39
cis				115–117/1013	1.4594/20	39
2,4,6-Octatriene (*cis*/*trans*) CH_3-CH=CH-CH=CH-CH=CH-CH_3				65–66/53		34,40,41
all-*trans*			52.5	147–148/1019	1.5131/27	34,40,41
$\Delta^{3,3'}$-Octahydro-diphenyl	3	162.3		230–232/1013		42,43
Vinylcyclopolyenes $[(CH_2CH{=}CHCH_2)_xCH(CH{=}CH_2)CH_2]$ (cyclic)						
4-Vinyl-1-cyclohexene (x = 1)	2	108.2		129–130/1013	1.4642/20	1-7,34-37,44,48,49
17-Vinyl-all-*trans*-1,5,9,13-cyclo-octadecatetraene (x = 4)	5	270.4		~136/1.3	1.5093/20	37
21-Vinyl-all-*trans*-1,5,9,13,17-cyclodocosapentaene (x = 5)	6	324.5		~170/1.3	1.5098/20	37
1,2-Divinyl-cyclobutane	2	108.2				
cis 				38/51	1.4563	1,8,48,49
trans 				112–113/1013	1.4451/20	8,44,48,49
CYCLOPOLYENES $[CH_2{-}CH{=}CH{-}CH_2]_n$ (cyclic)						
1,5-Cyclooctadiene	2	108.2				1,3-10,35-37
cis,cis			−70.1	150.8/1002	1.4936/20	1,4,8,9
trans,trans			−62		1.4933/20	4
1,5,9-Cyclododecatriene	3	162.3				5-7,10-12,35-37
trans,trans,trans			34	237.5/1013	1.5005/20	5-7,12,45,46
cis,trans,trans			−16.8	241.5/1013	1.5078/20	5,6,12,45-47
cis,cis,trans			−9 to −8	244/1013	1.5129/20	6,12,46
All-*trans*-1,5,9,13-cyclohexadecatetraene	4	216.4	19–20	~97/1	1.507/20	37
All-*trans*-1,5,9,13,17-cycloeicosapentaene	5	270.4		~142/1	1.5133/20	37
All-*trans*-1,5,9,13,17,21-cyclotetracosahexaene	6	324.5		~176/1	1.5133/20	37

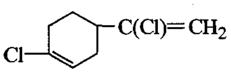
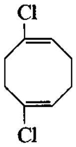
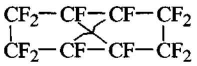
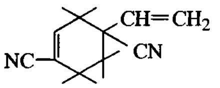
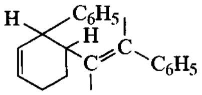
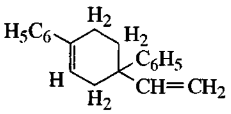
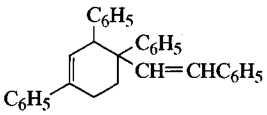
2.2. OLIGOMERS OF ISOPRENE

Oligomers	n	Mol. wt.	b.p. (°C/mbar)	n_D/°C	Refs.
LINEAR OLIGOMERS					
2,7-Dimethyl-1-*trans*-3,7-octatriene $CH_2=C(CH_3)-CH=CH-CH_2-CH_2-C(CH_3)=CH_2$	2	136.3	176/1013	1.4721/25	50,51
2,6-Dimethyl-1,3,6-Octatriene $CH_2=C(CH_3)-CH=CH-CH_2-C(CH_3)=CH-CH_3$	2	136.3	57–58/16	1.4794	6,30,52,27
2,7-Dimethyl-1-*trans*-3,6-octatriene $CH_2=C(CH_3)-CH=CH-CH_2-CH=C(CH_3)-CH_3$	2	136.3	54/13	1.4786/20	11,29,30
2,6-Dimethyl-1-*trans*-3,7-octatriene $CH_2=C(CH_3)-CH=CH-CH_2-CH(CH_3)-CH=CH_2$	2	136.3	167/1013	1.4704/25	50
3-Methyl-6-methylene-1,7-octadiene $CH_2=CH-C(CH_3)-(CH_2)_2-C(=CH_2)-CH=CH_2$	2	136.3	161/1013	1.4570/25	50
2,6,10-Trimethyl-1-*trans*-3,5,10-dodecatetraene $CH_2=C(CH_3)-CH=CH-CH=C(CH_3)-(CH_2)_3-C(CH_3)=CH-CH_3$	3	204.3	78/1.3	1.4963/20	53
7,11-Dimethyl-3-methylene-1-*trans*-6,11-dodecatriene (β-farnesene) $CH_2=C(CH_3)-(CH_2)_3-C(CH_3)=CH-(CH_2)_2-C(=CH_2)-CH=CH_2$	3	204.3	70/1.3	1.4786/20	53
2,6,10,14-Tetramethyl-1-*trans*-3,6,10,14-hexadecapentaene $CH_2=C(CH_3)CH=CH-[CH_2C(CH_3)=CHCH_2]_3=H$	4	272.5	160/1.3	1.5013/20	53
CYCLIC OLIGOMERS					
trans-1,2-Dimethyl-1,2-divinylcyclobutane 	2	136.3	134.5–135/992	1.4541/27	49
trans-1-Isopropenyl-2-methyl-2-vinylcyclobutane 	2	136.3	152.5–153/992	1.4591/27	49
trans-1,2-Diisopropenylcyclobutane 	2	136.3	155.1–155.4/987	1.4585/29	49
4-Isopropenyl-1-methyl-1-cyclohexene (dipentene) (D,L) 	2	136.3	178/1013	1.4727/18	15–17, 55,62,71
6-Isopropenyl-3-methyl-1-cyclohexene (diprene) (D,L) 	2	136.3	173–175/1000	1.4735/20	15,16, 59,71
2,4-Dimethyl-4-vinyl-1-cyclohexene 	2	136.3	162/1000	1.4654/20	11,29,30, 49,55, 58–60,71
1,4-Dimethyl-4-vinyl-1-cyclohexene 	2	136.3	160.5–161.5/988	1.4658/28	11,17,30, 49,53,55, 57–59,71
cis,cis 1,5-Dimethyl-1,5-cyclooctadiene 	2	136.3	182.4/988	1.4863/28	49,54, 56–59,71
cis,cis 2,5-Dimethyl-1,5-cyclooctadiene 	2	136.3	182.5–184/992	1.4870/27	49,54, 56–59,71

2.2. *cont'd*

Oligomers	n	Mol. wt.	b.p. (°C/mbar)	n_D/°C	Refs.
1,5,10-Trimethyl-*cis,trans,trans*-1,5,9-cyclododecatriene	3	204.3	138/17	1.5120	61
					

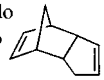
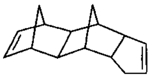
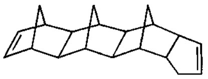
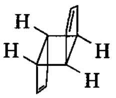
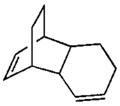
2.3. OLIGOMERS OF 1,3-BUTADIENE DERIVATIVES

Monomer	Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
2-Chloro-1,3-butadiene	1-Chloro-4-(α-chloro-vinyl)-1-cyclohexene	2	177.1		53/1.2	1.5135/25	63–66
							
	1,6-Dichloro-1,5-cyclooctadiene	2	177.1	13.8	64/0.33	1.5339/25	9,63–66
							
2,3-Dichloro-1,3-butadiene	3,4,7,8-Tetrachloro-1,5-cyclooctadiene	2	246.0	98–99	140–146/4.8		63
Hexafluoro-1,3-butadiene	Cyclic dimer	2	324.1	40	80/1013		20,21
							
2-Cyano-1,3-butadiene	4-Vinyl-1,4-dicyano-1-cyclohexene	2	158.2	55–56	110–112/1.3		69
							
1-Phenyl-1,3-butadiene	3-Phenyl-4-*trans*-styryl-1-cyclohexene	2	260.4		189–191/3		67
							
2-Phenyl-1,3-butadiene	1,4-Diphenyl-4-vinyl-1-cyclohexene	2	260.4	60	220–222/17		68
							
1,3-Diphenyl-1,3-butadiene	1,3,4-Triphenyl-4-*trans*-styryl-1-cyclohexene	2	412.3	137–138		18,19	
							

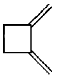
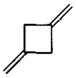
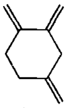
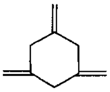
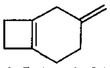
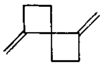
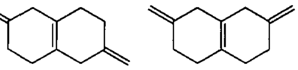
2.4. 1,4-OLIGO(ALKADIENES) CH_3CH_2–[CH_2–CX=CH–CH_2]$_n$–CH_2CH_3

X	n	Configuration	Mol. wt.	b.p. (°C/mbar)	n_D/°C	Refs.
H	1	*cis*	112.2	121.7/985	1.4136/20	87
		trans		121.4/985	1.4116/20	87
	2	All-*cis*	166.3	90–91/23	1.4455/23	85
		All-*trans*		87–88/23	1.4415/24	85
	3	All-*cis*	220.4	120–125/2	1.4638/19	86
CH_3	1		126.2	138–140/1013	1.4224/20	75
	2		194.3	92/7	1.4540/20	75
	3		262.5	98/0.3	1.4729/20	75
	4		330.6	140/0.2	1.4878/16	75

2.5. OLIGOMERS OF CYCLOPENTADIENE AND 1,3-CYCLOHEXADIENE

Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
Dicyclopentadiene	2	132.2				84
endo			32	163/1021		22,23,49,70,74
exo				170/1017	1.5070/25	49,70,72
						
Tricyclopentadiene	3	198.3	68	251/1021		22,23,74,84
						
Tetracyclopentadiene	4	264.4	207	344/1021		22,23,74,84
						
trans-Tricyclo[5,3,0,$0^{2,6}$]-3,9-decadiene	2	132.2		170–172/1013	1.5080/25	49,70
						
Dicyclohexadiene	2	160.3		229/1013		22,73,74
						

2.6. OLIGOMERS OF ALLENE

Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
DIMERS	2	80.1				
1,2-Dimethylene-cyclobutane				74/1013	1.4690/20	24–27,77,81,82
						
1,3-Dimethylene-cyclobutane				69/1013	1.4485/20	77–80
						
TRIMERS	3	120.2				
1,2,4-Trimethylene-cyclohexane				68–69/80	1.4919/25	76,77
						
1,3,5-Trimethylene-cyclohexane			33.5–35	68–69/80	1.4919/25	76
						
3-Methylenebicyclo-[4,2,0]-octa-1(6)-ene			UV, ^{1}H-NMR, MS			77
						
1.5-(or 1,6-)-Dimethylenespiro-[3,3]heptane			IR, UV, ^{1}H-NMR, MS			77
						
TETRAMERS	4	160.3				
2,6- + 2,7-Dimethylenebicyclo-[4,4,0]-dec-9,10-ene (β-tetramer)				107–108/17	1.5248/25	24,25,28,60,83
						

2.6. *cont'd*

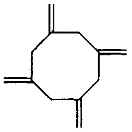
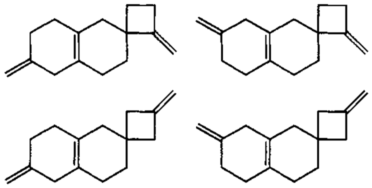
Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
1,3,5,7-Tetramethylene cyclooctane 				60/4.7	1.5102/25	76
PENTAMERS	5	200.4				
6′-Methylene-3′,4′,7′,8′-tetrahydrospiro[2- and 3-methylene]-cyclobutane-1,2′(1′H,5′H)-naphthalene + 7′-methylene-3′,4′,5′,6′-tetrahydrospiro[2- and 3-methylene]cyclobutane-1,2′-(1′H,8′H)-naphthalene 				73/0.03	1.5307/20	24,88

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TABLE 3. OLIGO(ACETYLENES)

3.1. LINEAR OLIGOMERS OF ACETYLENE

	n	Mol. wt.	b.p. (°C/mbar)	*d* (g/cm^3)/°C	n_D^{20}	Refs.
Vinylacetylene CH$_2$=CH–C≡CH	2	52.1	5/1009	0.705/0		1,2
Divinylacetylene CH$_2$=CH–C≡C–CH=CH$_2$	3	78.1	84.5–85/1013	0.772/20	1.5055	1–3
1,3-Hexadiene-5-yne *cis/trans* CH$_2$=CH–CH=CH–C≡CH	3	78.1	81–82/1013	0.780/28	1.4900	1,2,4–6,25
1,3,7-Octatriene-5-yne CH$_2$=CH–CH=CH–C≡C–CH=CH$_2$ (E)-: GC; ^{1}H-, ^{13}C-NMR; Ref. 7 (Z)-: GC; ^{1}H-, ^{13}C-NMR; Ref. 7	4	105.1	10/27	0.830/20	1.5834	1,2,7

3.2. POLYENYNE OLIGOMERS $(CH_3)_3C-[C\equiv C-CH=CH]_n-C\equiv C-C(CH_3)_3$

n	Mol. wt.	m.p. (°C)	Refs.
1	188.3	69–72	26
2	238.4	118–120	26
3	288.4	155–156	26
5	388.5	220 d	26
7	488.6	204 d	26

3.3. OLIGOMERIC α,ω-DIYNES $H[C\equiv C-(CH_2)_x-C\equiv C]_nH$

x	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
1	1	64.1	− 20 to − 19	63–64/1013		8
	2	126.1	65–66			8,9
	3	188.2	103–104			8
2	1	78.1		87.5–88.5/1011	1.4381/23	10
	2	154.2	99–100			11–14
	4	30.4	167–168 d			11,12
3	1	92.1	− 84.8	111.5/1013	1.4423/20	15
	2	182.3	∼ − 5	110–111/0.9		11,12
	4	362.5	60–61			11,12
4	1	106.2		93–95/253	1.4521/18	16
	2	210.3	21–22	119–120/0.1	1.5205/23	11,17
	4	418.6	93–94			11,17
5	1	120.2	− 27.3	162/1013	1.4490/20	15
	2	238.4	21–22		1.5119/26	11,12
6	1	134.2		68–71/18		18
	2	266.4	30–31			11,12
	4	530.8	59–61			11,12

3.4. OLIGO(ALKYNES) $H[C\equiv C-(CH_2)_x]_n-C\equiv CH$

x	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
1	1	64.1	− 21 to − 19	63–64/1013		8
	2	102.1	21–21.5		1.4833/22	8
	3	140.2	44–45			8
	4	178.2	73–74			8
	6	254.3	112–113.5			8
2	1	78.1		87.5–88.5/1011	1.4381/23	10
	2	130.2	46	61–63/3		19
4	1	106.2		93–95/253	1.4521/18	16
	2	186.2	− 3	111/1.3	1.4775/25	9
	3	266.4	19	167/0.4	1.4918/25	9
	7	586.9	36			9
	8	667.0	55			9
5	1	120.2	− 27.3	162/1013	1.4490/20	15
	2	214.3	8	113/1.1	1.4791/26	9
	3	308.5	33	170/0.1		9
6	1	134.2		68–71/18		18
	2	242.4	24	131/0.3	1.4806/25	9

3.5. CYCLIC OLIGO(ALKYNES) $\ulcorner[(C\equiv C)_x-(CH_2)_y]_n\urcorner$

x	*y*	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
1	4	2	160.2	39	87/0.3	9,20,21
		4	320.5	71	215/0.3	9,20
	5	2	188.3	100	100–110/0.001	9,20
	6	2	216.4	− 3.5	110–120/0.001	20
	7	2	244.4	97	160–180/4	20
	8	2	272.5	38–39	145–147/0.01	20
	9	2	300.5	106.5	198–202/0.001	20

3.5. *cont'd*

x	*y*	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	2	3	228.3	175–180 d		14
		4	304.4	170–180 d		14
		5	380.5	165 d		14
		6	456.6	~180 d		14
		7	532.6	~180 d		14
	3	2	180.2	115–120 (expl.)		11,12
		3	270.4	174–175		13
		4	360.5	213–214		13,22
	4	2	208.3	163		12,13,17,20,22
		3	312.4	173–174		13,22
		4	416.6	154–155		13,22
		5	520.7	155–157		13,22
	5	2	236.3	212		11–13,20,22
		3	354.5	125–126		13,22
		4	472.7	135–136		13,22
		5	590.9	144–145		13,22
		6	709.0	144–145		13,22
	6	2	264.4	82		12,20,22
		3	396.6	135–136		22
		4	528.8	152–154		22
	7	2	292.4	171		20
	8	2	320.5	85		20,22
	9	2	348.5	142		20
	10	1	188.3	18		23
		2	376.6	101–102		23
3	5	2	284.4	>200		20

3.6. PERICYCLYNES $\overline{[C\equiv C-C(CH_3)_2]_n}$ (cyclic)

n	Mol. wt.	m.p. (°C)	Refs.
5	330.5	201–202	24
6	396.6	249–250	24
7	462.7	173–174	24
8	528.8	189–190	24

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TABLE 4. OLIGOMERS WITH ALIPHATIC SIDE CHAINS WHICH IN ADDITION CONTAIN HETEROATOMS

4.1. OLIGOMERIC ACRYLIC DERIVATIVES

4.1.1. OLIGO(ACRYLIC ACIDS)

4.1.1.1. $H[CH_2CH(COOH)]_nCH_3$

n	Mol. wt.	Configuration	m.p. (°C)	b.p. (°C/mbar)	Refs.
1	88.1		−46	153/1012	
2	160.2	Isotactic (meso)	128		1–3,11
		Syndiotactic (racemic)	141		1–3,11
3	232.2	Isotactic (meso)	167.5–170.0		3,78
		Heterotactic (racemic)	160.0–163.0		3,78
		Syndiotactic (meso)	153.5–154.5		3,78

4.1.1.2. $(CH_3)_2C(COOH)-[CH_2CH(COOH)]_n-C(COOH)(CH_3)_2$

n	Mol. wt.	m.p. (°C)	Refs.
1	246.3	30–35	4
2	318.3	70–80[a]	4
3	390.4	181–183	4
4	462.5	80–82	5

[a] *p*-Nitrobenzyl ester.

4.1.2. OLIGO (ACRYLATES)

4.1.2.1. $H[CH_2CH(COOH)]_nCH_3$

n	Mol. wt.	Configuration	b.p. (°C/mbar)	n_D/°C	Refs.
1	102.1		91.5/990	1.3838/20	6
2	188.2	Isotactic (meso)	64/0.9	1.4258	3,6,101
		Syndiotactic (racemic)	NMR		3
3	274.3	Isotactic (meso)	163/15	1.4440	3,6,78
		Heterotactic (racemic)	160/15	1.4420	3,6,78
		Syndiotactic (meso)	156/15	1.4407	3,6,78

4.1.2.2. Anionic Oligomers $RO[CH_2CH(COOR)]_nH$

R	*n*	Mol. wt.	b.p. (°C/mbar)	n_D^{25}	Refs.
CH_3	1	118.1	55–56/27		7
CH_3	2	204.2	90/1	1.433	7
C_2H_5	1	146.2	75–77/27		7,42,56
C_2H_5	2	246.3	82/0.15	1.446	7,42,56,62

4.1.2.3. Unsaturated Oligomers

Oligomers	R	*n*	Mol. wt.	b.p. (°C/mbar)	n_D^{25}	Refs.
Dialkyl-Δ^2-dihydromuconate (*trans*)	CH_3	2	172.2	86–88/1.3	1.4497	42,44,58,60,61,63
ROOC–CH=CH–CH_2CH_2COOR	C_2H_5	2	200.2	80–84/1.3		58
Dialkyl-Δ^3-dihydromuconate	CH_3	2	172.2	74–75/1.3		42,58,60,63
ROOC–CH_2–CH=CH–CH_2COOR	C_2H_5	2	200.2	107–108/1.3		58,63
Dialkyl-α-methyleneglutarate oligomers	CH_3	1	172.2	59/0.3		7,8,42,44,62

4.1.2.3. cont'd

Oligomers	R	n	Mol. wt.	b.p. (°C/mbar)	n_D^{25}	Refs.
CH_2=C(COOR)–[CH_2CH(COOR)]$_n$H		2	258.2	120/0.9		8
		3	344.3	166–168/0.4		8
		4	430.4	180/0.03		8
	C_2H_5	1	200.2	52–53/0.2	1.0392	42,52,56,62

4.1.3. ANIONIC OLIGOMERS OF ACRYLAMIDE CH_2=CHCO–[NHCH$_2$CH$_2$CO]$_n$NH$_2$

n	Mol. wt.	m.p. (°C)	Refs.
1	142.2	149–150	110–112
2	213.2	179–181	112

4.1.4. OLIGO(ACRYLONITRILES)

4.1.4.1. H[CH$_2$CH(CN)]$_n$H

n	Mol. wt.	b.p. (°C/mbar)	n_D/°C	Refs.
1	55.1	97.1/1013	1.3689/15	
2	108.1	116–118/6.5	1.4320/25	9,45
3	161.2	195–196/3.5	1.4609/20	9,10,45

4.1.4.2. H[CH$_2$CH(CN)]$_n$CH$_3$

n^a	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4^{64}/°C (g/cm^3)	n_D/°C	Refs.
1	69.1	−71.5	107–108/1013	0.773	1.3720/20	37
2	122.2	8.8[b]	106/3	0.9051	1.4191/60	10,11,38,54,80
		55[c]	94/3	0.8940	1.4155/60	10,11,38,54,80
3	175.2	37–39[b]				10,38,53
		53–54[d]				10,53
		80–81[e]				10,53
4	228.3	130–132[f]				10
		158				10

[a] n = 2–5 (diastereomers): ^{13}C-NMR, Ref. 35.
[b] Isotactic (meso).
[c] Syndiotactic (racemic).
[d] Heterotactic (racemic).
[e] Syndiotactic (meso).
[f] Two stereoisomers.

4.1.4.3. H[CH(CN)CH$_2$]$_n$CH$_2$CN

n	Mol. wt.	b.p. (°C/mbar)	n_D/°C	Refs.
1	94.1	287.4/1013	1.4347/20	
2	147.2	85/0.01	1.4644/25	9,12
3	200.2	95/0.01		9,12

4.1.4.4. 1,2-Dicyanocyclobutanes

n	Configuration	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{25}	Refs.
1	*cis/trans*	106.1				13,42,43,66,81
	cis		67–67.5	190/20	1.4628	13,14,79
	trans		30.5/31.5	160/20		13,14,79

4.1.4.5. Unsaturated Oligomers

Oligomers[a]	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{25}	Refs.
2,3-Dihydromuconitrile $NCCH_2CH{=}CHCH_2CN$	2	106.1	76			14,15,82
1,4-Dicyano-1-butene $CN{-}CH{=}CH{-}CH_2CH_2CN$	2	106.1				42,46,49,67
cis			−19 to −17	99.5–102.5/0.5	1.4677	49,50,83
trans			−13 to −12	84.5–86.5/0.5	1.4646	49,50
2-Methyleneglutaronitrile $CH_2{=}C(CN){-}CH_2CH_2CN$ (*cis/trans*)	2	106.1	−9.6	65/0.13	1.4550	42,44–48,52
2,4,6-Tricyano-1-hexene $CH_2{=}C(CN){-}CH_2CH(CN){-}CH_2CH_2CN$	3	159.2		152–164/2.5	1.4762	42,45
1,1,4,4-Tetracyanoethyl-1,4-dicyano-2-butene $(NCCH_2CH_2)_2C(CN){-}CH{=}CH{-}C(CN)(CH_2CH_2CN)_2$	6	318.4	240			14,45,46
1,4-Dicyano-1,3-butadiene NC–CH=CH–CH=CH–CH	2	104.1				42,51
cis,cis			128–129			83
trans,trans			159–161			97

4.2. OLIGOMERIC METHACRYLIC DERIVATIVES

4.2.1. OLIGO(METHACRYLIC ACIDS)

4.2.1.1. $H[CH_2C(CH_3)(COOH)]_n{-}C(COOH)(CH_3)_2$

n	Mol. wt.	m.p. (°C)	Refs.
2	260.3	Oil	19
3	346.4	45–48	18,19
4	432.5	56–59	19

4.2.1.2. Anionic Oligo(methacrylic acids)

n	Mol. wt.	m.p. (°C)	Refs.
$CH_3O{-}[CH_2C(CH_3)(COOH)]_nH$			
2	204.2	82	17
3	290.3	160	17

4.2.2. OLIGO(METHACRYLATES)

4.2.2.1. Anionic Oligo(methacrylates) $RO{-}[CH_2C(CH_3)(COOOR)]_nH$

R	R′	n	Mol. wt.	b.p. (°C/mbar)	d^{20}/(g/cm³) °C	n_D^{20}	Refs.
CH_3O	CH_3O	1	132.2	147/1013	0.7949	1.4053	17,36,41,73
		2	232.3	241/1013	1.0540	1.4378	17,36,41
		3	332.4	116/0.1	1.1045	1.4567	17,36,41
		4	432.5	190/0.1	1.12	1.4681	17
		6	632.8		1.565		17
			n = 2–10: GPC Ref. 36				
$n{-}C_4H_9O$	$n{-}C_4H_9O$	1	216.3	59–61/0.13	0.8970	1.4213	74
		2	358.5	128–130/0.13	0.9436	1.4400	74
		3	500.7	186–90/0.13	0.9736	1.4508	74
		4	642.9	246–250/0.4	0.9909	1.4574	74

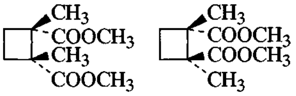
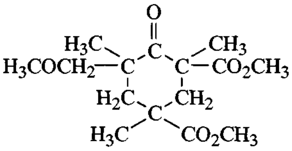
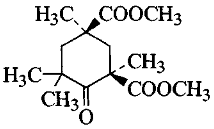
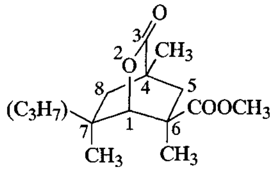
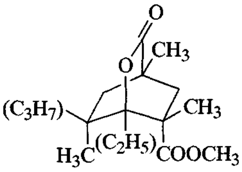
Isotactic and syndiotactic oligomers, $(CH_3)_3C{-}[CH_2C(CH_3)COOCH_3]_n{-}H$, n = 2–100 (mol. wt. 158.2–10070.0): HPLC, GPC, SFC; DSC (T_g, T_m), X-ray (n = 2–5), NMR, MS; Refs. 114–124.
Reviews: Refs. 114,115.
Properties of specific oligomers: n (isotactic and syndiotactic, resp.) = 2–8,13,14,16,19,21,22–25,27–29,31,36,41,44,45,50,58,80,100.
m.p. (°C), (isotactic oligomers): n = 28: 98.5, n = 31: 104.5, n = 36: 109.6, n = 41: 117.3, n = 44: 124.3; Ref. 116.

4.2.2.2. Unsaturated Oligomers[a] $CH_2{=}C(COOCH_3){-}[CH_2{-}X{-}(COOCH_3)]_n{-}CH_3$

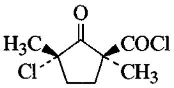
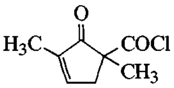
X	*n*	Mol. wt.	b.p. (°C/mbar)	n_D^{25}	Refs.
CH_2CH	1	188.2	107/4	1.4445	16,20,42,59,65,77
	2	276.3	173/4	1.4588	16,20,42,59,65,77
$C(CH_3)$	1	188.2		IR, MS, ^{1}H-NMR	Ref. 65,77
					Ref. 75

[a] *n* = 2–4: 2D-COSY-NMR

4.2.2.3. Cyclic Oligomers

Oligomers	R	*n*	Configuration	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
1,2-Dimethylcyclobutane-1,2-dicarboxylates 	CH_3	2	*cis*	200.2	IR, MS, ^{1}H-NMR		65
			trans		IR, MS, ^{1}H-NMR		65
2,4,6-Trimethyl-6-methoxy-methyl-cyclohexanone-2,4-dicarboxylate 	CH_3	3		268.3		122/0.13	17,36
1,3,3,5-Tetramethylcyclohexane-2-one-1,5-dicarboxylate 	CH_3	3	*cis*	270.1		128–138/3	64,72
			trans		52–54	128–138/3	64,72
4,6,7-Trimethyl-3-oxo-7-propyl-2-oxabicyclo-[2,2,2]octane-6-carboxylate 	CH_3	3	6-endo	268.3	117–119		64
			6-exo		Oil		64
1-Ethyl-4,6,7-trimethyl-3-oxo-7-propyl-2-oxa-bicyclo[2,2,2]octane-6-carboxylate 	CH_3	4	6-exo	296.4	IR, MS, ^{1}H-NMR		64

4.2.3. OLIGO(METHACRYLOYL CHLORIDES)

Oligomers	*n*	Mol. wt.	b.p. (°C/mbar)	Refs.
2-Chloro-2,5-dimethylcyclopentanone-5-carboxylic chloride 	2	209.1	111–117/23	40
2,5-Dimethyl-Δ^2-cyclopentenone-5-carboxylic acid chloride 	2	209.1	111–117/23	40

4.2.4. ANIONIC OLIGOMERS OF METHACRYLAMIDE $CH_2{=}C(CH_3)CO{-}[NHCH_2CH(CH_3)CO]_nNH_2$

n	Mol. wt.	m.p. (°C)	Refs.
1	170.2	118–120	84
2	255.3	155–158	84
3	340.4	195	84
n = 4–9: GPC, MS, Ref. 84			

4.2.5. OLIGO(METHACRYLONITRILES)

4.2.5.1. Anionic Oligo(methacrylonitriles) $CH_3O[CH_2C(CH_3)CN]_nH$

n	Mol. wt.	b.p. (°C/mbar)	n_D/°C	Refs.
1	99.1	160.6/1013	1.4038/20	113
2	166.2	92/0.7	1.438	21,34
3	233.3	165/0.7	1.464	21,34
4	300.4	235/0.7	1.478	21,34
5	367.5	300–305/0.7	1.488	21,34

4.2.5.2. 1,2-Dicyano-1,2-dimethyl-cyclobutanes $\lfloor [CH_2C(CH_3)(CN){-}C(CH_3)(CN)CH_2]_n \rfloor$

n	Configuration	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	*cis*	134.2	107–108	170/33	16,66,89
2	*trans*	134.2	90.3	120/33	16,66,89

4.2.5.3. Unsaturated Oligomers

Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{25}	Refs.
α-Methylene-δ-methyladiponitrile $CH_3CH(CN){-}CH_2CH_2C(CN){=}CH_2$	2	134.2		148/33	1.4502	16,42,89
5-Cyano-8-methyl-2-methylene-nonanedinitrile $CH_2{=}C(CN){-}[CH_2CH_2CH(CN)]_2{=}CH_3$	3	201.3	47–49	194/1.3	1.4720	16

4.3. OLIGOMERS OF β-ALKYL-SUBSTITUTED VINYL DERIVATIVES

4.3.1. OLIGO(ESTERS)

Monomer	R	Oligomers	*n*	Mol. wt.	b.p. (°C/mbar)	n_D^{25}	Refs.
$CH_3CH{=}CHCOOR$		2-methyl-3-pentene-1,3-dicarboxylate (*cis/trans*) $CH_3CH{=}C(COOR){-}CH(CH_3)CH_2COOR$					
	CH_3		2	200.2	70–80/96		42,55,68,70,71
	C_2H_5		2	228.3	84/0.75	1.4512	42,55,56,69
	CH_3	2-Methyl-4-pentene-1,3-dicarboxylate (*cis/trans*) $CH_2{=}CH{-}CH(COOR){-}CH(CH_3)CH_2COOR$	2	200.2	90–110/13		42,70,71
n-$C_3H_7CH{=}CHCOOR$	CH_3	2-*n*-Propyl-3-heptene-1,3-dicarboxylate $C_3H_7{-}CH{=}C(COOR){-}CH(CH_2COOR){-}C_3H_7$	2	252.3	100–102/4		55
i-$C_3H_7CH{=}CHCOOR$	CH_3	2-Isopropyl-5-methyl-4-hexene-1,3-dicarboxylate $(CH_3)_2C{=}CH{-}CH(COOR){-}CH(CH_2COOR){-}CH(CH_3)_2$	2	252.3	90–93/3		55

4.3.2. OLIGO(CROTONONITRILES)

Oligomers	*n*	Mol. wt.	b.p. (°C/mbar)	n_D^{25}	Refs.
1,3-Dicyano-2-methyl-3-pentene (*cis/trans*) $CH_3CH{=}C(CN){-}CH(CH_3)CH_2CN$	2	134.2	81–83/0.3	1.4730	42,52,55–57
1,3,5-Tricyano-2,4,6-trimethylcyclohexane ┌[CH(CN)–CH(CH₃)]₃┐	3	201.3	152–155/0.3	1.4950	42,57
1,3,5-Tricyano-2,4-dimethyl-5-heptene $CH_3CH{=}C(CN){-}CH(CH_3)CH(CN){-}CH(CH_3)CH_2CN$	3		150–160/0.13		42,52

4.4. OLIGO(VINYL) DERIVATIVES

4.4.1. OLIGO(VINYL ALCOHOLS) AND OLIGO(VINYL ACETATES) $H[CH_2CHOR]_nCH_3$

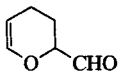
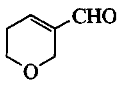
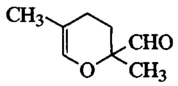
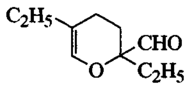
R	*n*	Configuration	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
H	2	Isotactic (meso)	104.1		73/4	1.4327	80,86,87
		Syndiotactic (racemic)		48–49	74/4	1.4378	80,86,87
	3	Isotactic (meso)	148.2	67	120/1.3		84,85
		Heterotactic (racemic)			120/1.3		84,85
		Syndiotactic (meso)		87.5–88			84,85
$COCH_3$	2	Isotactic (meso)	188.2		20/1013	1.4172	86,88,97
		Syndiotactic (racemic)			201/1013	1.4142	86,88,97
		Mixture			103–107/27	1.4170	96
	3	Isotactic	274.3		116–117.5/0.7	1.4342	84,88
		Heterotactic		21–22	115–116/0.7	1.4319	84
		Syndiotactic		32.5–33.5	112–114/0.5	1.4297	84,88
		Mixture			120–122/0.7	1.4320	84,96

4.4.2. OLIGO(VINYL CHLORIDES) $H[CH_2CHCL]_nCH_3$ [a]

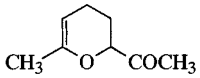
n	Configuration	Mol. wt.	b.p. (°C/mbar)	n_D^{20}	Refs.
2[b]	Isotactic (meso)	141.0	40/16	1.4409	80,90–95,97
	Syndiotactic (racemic)		36/16	1.4390	80,90–95,97
	Mixture		140–141/1013	1.4409	95
3[b]	Isotactic	203.5	102.5/20	1.4722	89,94,95
	Heterotactic		103.5/20	1.4704	89,94,95
	Syndiotactic		104.5/20	1.4686	89,94,95
	Mixture		102.5–104.5	1.4699	89

[a] Oligomers $(CH_3)_3C{-}[CH_2CHCl]_n{-}H$, $n = 1,2,3$ (threo-; erythro-), 4 (ribo-; xylo-; arabino-; lyxo-): HPLC, ^{13}C-NMR, Ref. 39.
[b] 2,4-Dibromopentanes and 2,4,6-tribromoheptanes: Kerr Effekt, Ref. 98.

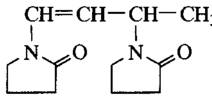
4.4.3. OLIGO(VINYL ALDEHYDES) AND OLIGO(VINYL KETONES)

Monomer	Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (C/mbar)	Refs.
Acrolein $CH_2{=}CHCHO$	2-Formyl-2,3-dihydropyran 	2	112.1		145–148/1013	22–25
	3-Formyl-5,6-dihydropyran 	2	112.1		77–78/16	26,27
α-Methylacrolein $CH_2{=}C(CH_3)CHO$	2-Formyl-2,5-dimethyl-2,3-dihydropyran 	2	140.2	−75	166/1000	24,28
α-Ethylacrolein $CH_2{=}C(CH_2H_5)CHO$	2-Formyl-2,5-diethyl-2,3-dihydropyran 	2	168.2		195/1013	24

4.4.3. *cont'd*

Monomer	Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (C/mbar)	Refs.
Methyl vinyl ketone $CH_2=CH-CO-CH_3$	2-Methyl-6-acetyl-5,6-dihydropyran 	2	128.2		68/17	29
	3-Methylene-2,6-heptanedione $CH_3COC(=CH_2)CH_2CH_2COCH_3$	2	140.2	5–7	91–92/7	46
2-Methyl-1-butene-(3)-one $CH_2=C(CH_3)COCH_3$	2,6-Dimethyl-3,7-dioxo-1-octene $CH_3COCH(CH_3)CH_2CH_2COC(CH_3)=CH_2$	2	168.2		83–85/23	30,99,100
Phenyl vinyl ketone $CH_2=CH-CO-C_6H_5$	2,4-Dibenzoylpentane $CH_3CH(COC_6H_5)CH_2CH(COC_6H_5)CH_3$	2	280.4	^{1}H-NMR		99,100
	Isotactic (meso)			64–65	100/1.3	99,100
	Syndiotactic (racemic)			62–63	155/1.3	99,100

4.4.4. OLIGOMERIC *N*-VINYL DERIVATIVES

Monomer	Oligomers	n	Mol. wt.	m.p. (°C)	Ref.
N-Vinyl-pyrrolidone	1,3-Bis-[*N*-pyrrolidone-(2)-yl]-1-butene 	2	212.3	75	31

4.4.5. OLIGO(VINYL PYRIDINES)

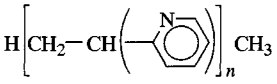
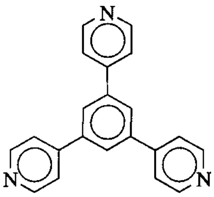
Monomer	Oligomers	n	Configuration	Mol. wt.	b.p. (°C/mbar)	Refs.
2-Vinylpyridine		2	Isotactic (meso)	226.3	106–108/0.33	102,105–107,109
		3	Isotactic (meso)	331.4	LC, GC, ^{1}H-, ^{13}C-NMR	103,105,107,109
		4	Isotactic (meso)	436.6	LC, GC, ^{1}H-, ^{13}C-NMR	104,103,107,109
	$n = 2$–7: LC, ^{1}H-, ^{13}C-NMR Refs. 108,109					
4-Vinylpyridine	sym-Tri(4-pyridyl)-cyclohexane 	3		315.4	m.p. (°C): 228.5	32,33

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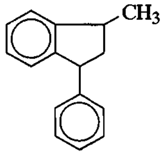
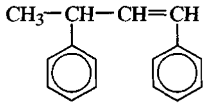
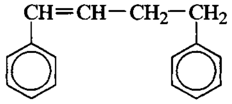
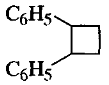
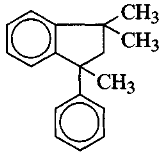
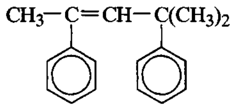
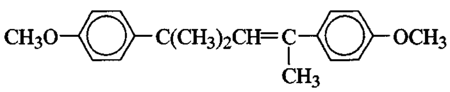
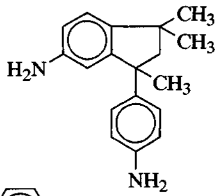
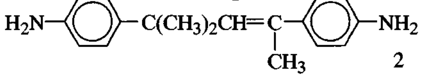
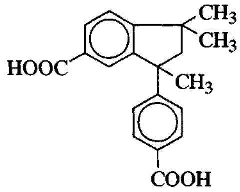
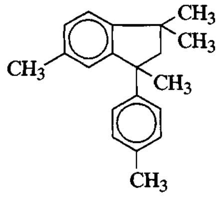
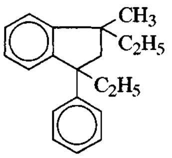
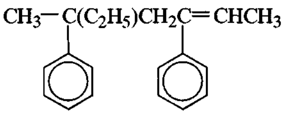
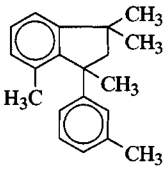
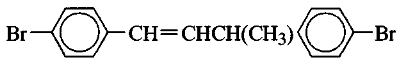
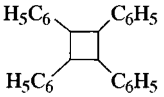
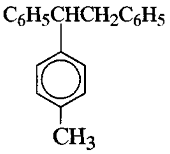
TABLE 5. OLIGO(STYRENES)

No.	Monomer	Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
	Styrene	3-Methyl-1-phenylindane	2	208.3	9.5	168–169/21	1.5810	1–5
		(2 stereoisomers) 			25.5	157/16	1.5809	

5.1. *cont'd*

No.	Monomer	Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
		1,3-Diphenyl-1-butene 	2	208.3		181–182/27 134–135/1	1.5930	1–3,6,23
		1,4-Diphenyl-1-butene 	2	208.3		124/1013		6,23
		1,2-Diphenylcyclobutane 	2	208.3			1.5913	7
	α-Methylstyrene	1,3,3-Trimethyl-1-phenylindane 	2	236.4	53	158–160/13		8–10
		4-Methyl-2,4-diphenyl-2-pentene 	2	236.4	52	166–167/20	1.5728	8,11,12
	α-Methyl-*p*-methoxystyrene		2	296.4		237–240/24	1.5703	9,13
	α-Methyl-*p*-aminostyrene	1,3,3-Trimethyl-4′,6-diamino-phenylindane 	2	266.4	93–94			9
			2	266.4	173			9,14
	α-Methyl-*p*-carboxystyrene	1,3,3-Trimethyl-1-phenylindane-4′,6-dicarboxylic acid 	2	348.4	297			9,14
	α-*p*-Dimethylstyrene	1,3,3,4′,6-Pentamethyl-1-phenylindane 	2	264.4	40	142–144/1.1		9,15,16

5.1. *cont'd*

No.	Monomer	Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
	α-Ethylstyrene	1,3-Diethyl-3-methyl-1-phenylindane 	2	264.4		104–106/0.4	1.5642	17
		3,5-Diphenyl-5-methyl-2-heptene 	2	264.4		133–135/1.6	1.54345/25	17
	α-*m*-Dimethylstyrene	1,3,3,3′,7-Pentamethyl-1-phenylindane 	2	264.4	57			9
	p-Bromostyrene	*cis*-1,3-Di(*p*-bromophenyl)-1-butene 	2	366.1	67–68			18,19
	Stilbene	1,2,3,4-Tetraphenylcyclobutane 	2	360.5	164–165			20–22
		1,2-Diphenyl-1-*p*-tolyethane 	2	272.4	42–43			20

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C. OLIGOMERS CONTAINING HETEROATOMS IN THE MAIN CHAIN

TABLE 6. OLIGOMERS CONTAINING O IN THE MAIN CHAIN

6.1. OLIGO(ETHERS) AND OLIGO(ACETALS)

6.1.1. OLIGO(OXYETHYLENES)

6.1.1.1. Linear Oligo(oxyethylenes) $H[OCH_2CH_2]_nOH$

n[a]	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	(g/cm^3)	d_{20} n_D^{20}/°C	Refs.
1	62.1	−12.6	197.8/1013	1.1136/20	1.4324	23–26,55,119,149,209
2	106.1	−6	245/1013	1.120/20	1.4479	23–26,55,57,119,129,149,209
3	150.2	−4.3	122–123/0.1	1.1274/15	1.4573	23–25,26,55,57,119,129,149,209
4	194.2	−3	155–156/0.8	1.127/20	1.4611	23–27,55,57,70,119,120,129,149,209
5	238.3	−2 to 0	173–174/0.8		1.4629	25–27,55,57,68,71,119,149,209
6	282.3	9	175–177/0.07	1.127/20	1.4640	23–28,55,68–70,119,120,209,215
7	326.4	17.8–18.8	230–232/0.9		1.4653	25,26,55,57,69,71,119,219
8	370.4	19.7–21.8	206–209/0.02	1.1278/20	1.4660	27,120,215,219
9	414.5	30.0	186–192/0.001			37,50,52–54,56,59,219
10	458.6	25.8–28.3	210/0.1			27,51,54,71,219
12	546.6	36.5–38.5				219
14	634.7	29.5				25
15	678.8	40.0	246–257/0.001			37,50–54,59
16	722.9	49.5–505				219
18	811.0	35.0				25,37,211
20	899.1	44.4				51,54
25	1119.3	47.0				51,53,54,59
27	1207.5	44.6–44.8				37
30	1321.6	46.4				25,54
35	1559.8	50.1				51,53,54,59
36	1604.0	43.0–43.4				37
45	2000.4	53.0				37,54
54	2396.9	54.2				212

[a] n = 1–27: HPLC, Refs. 72–74; n = 1–45: GPC, Ref. 220; n = 6,8,9,10,15,16,18,25,35,54: IR, Raman, NMR, MS, DSC, Ref. 211,212,214,215,219,224.

6.1.1.2. Oligo(oxyethylene) Monoalkyl Ethers $R{-}[OCH_2CH_2]_n{-}OH$

R	n[a]	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
CH_3	1	76.1	−85.1	124/1009	1.4024	26,124,125,127–129,177,196
	2	120.1		194.2/1013	1.4260	127
	3	164.2		245.3/1013		180
	5	252.3		110/0.013		178
	6	296.4		125/0.013		178
	7	341.4		150/0.007		178
	8	385.5		165/0.007		178
	9	429.5	13–14	185/0.003		178
	10	473.6	18–18.5	218–220/0.013		178
	11	518.1	22	236–238/0.013		178
	18	825.0	24–25			24
C_2H_5	1	90.1		135/1013	1.4075	24,125–129,176,177,196
	2	134.2		196/1013	1.4273	126,129
	3	178.2		248/1013	1.4380	126
	4	222.3		284/1013	1.4499	129
n-C_3H_7	1	148.2		152–153/1012	1.4133	128,129,175–177,196
	2	192.3		215.8/1023		175
	3	236.3		148–150/23		175
n-C_4H_9	1	118.2		171/1013	1.4196	24,125,129,176,177,194,196
	2	162.2	−68.1	112–114/15		194
	3	206.3		278/1013		206
n-C_6H_{13}	1	146.2	−50.1			102
	2	190.3	−36.9			102
	3	234.3	−30.3			102
	4	278.4	−15.0			102

6.1.1.1. cont'd

n^a	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	(g/cm³)	d_{20} n_D^{20}/°C	Refs.
	5	322.4	−3.3			102
	6	366.5	1.2			102
	9	498.6	13.0			102
n-C_9H_{19}	4	320.5		180–182/0.5	NMR, MS	225
	8	496.7	22.7			225
n-$C_{12}H_{25}$	1	186.3	20.2	144/0.13	1.4456	70,207
	2	230.4	18.6	164/0.13	1.4485	70,207
	3	274.4	17.0	178/0.13	1.4510	70,207
	4	318.5	20.0	188/0.07	1.4531	70,207
	5	362.5	22.8	212/0.07	1.4548	70,207
	6	406.6	25.4	233/0.13	1.4560	70,207
	7	550.8	28.5	236–240/0.15	1.4576	207
	8	594.8	32.3			207
	9	638.9	33.5			207
	10	683.0	40.0			207
	11	727.0	40.3			207
	12	771.1	42.0			207
n-$C_{16}H_{33}$	9	638.9	40.5			56
	12	771.1	43.5			56
$C_6H_5CH_2$	3	240.3		166–169/0.5	1.503	75,175
	4	284.3			1.501	75
	5	328.4			1.499	75
	6	372.4			1.493	75
	8	460.6			1.488	75
	9	504.6			1.483	75
$(C_6H_5)_3C$	3	392.4			1.540	75
	4	436.5			1.544	75
	5	480.6			1.549	75
	6	524.6			1.561	75
C_6H_5	1	138.2		120.5/12	1.5370	109
	2	182.2		163.0/11	1.5230	109
	3	226.3		190.5/11	1.5144	109
	4	270.3		181/0.3	1.5075	109
	5	314.4		218/0.5	1.5030	109

[a] n = 4,6,8,12,16 with R= n-C_9H_{19} and n-$C_{15}H_{31}$: Raman spectr., Ref. 213.

6.1.1.3. Oligo(oxyethylene) Dialkyl Ethers $H(CH_2)_x–[OCH_2CH_2]_n–O(CH_2)_xH$

n^a	x	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
1	1	90.1		84/1013	1.3797/20	130,131,133,134,195
	2	118.2		124/1013	1.3922/20	24,131,132,135
	3	145.7		159–160/965		131,175
	4	174.2		204/1013		24,131,132
2	1	134.2		161/1013	1.4183/20	24,26,134,179,195
	2	162.2		189/1013	1.4143/20	8,24,135,179
	3	190.2		219/983	1.4025/25	179
	4	218.3		250/1013	1.4265/20	24,179
3	1	178.8		216/1013	1.4233/20	134
	2	206.3		118/13		135
4	1	222.3		148/19	1.4371/20	8,24,134
	2	250.3		159/15	1.4332/20	24,135
	4	306.4		192/13	1.4384/20	24
5	1	266.3		149–151/3.3		134,136,166
	2	294.4		174/4		135
6	1	310.4		135/0.1	1.4471/20	24,134
	2	338.4		125/0.01	1.4454/20	24,135
	4	394.5		155/0.4	1.4509/20	24
7	1	354.4		205–207/4		134
9	1	442.5	16.0			52,58,59
	2	470.6	21.5			58,59
	3	498.6	12.7			58
	4	526.7	11.7			58
	6	582.8	13.0			58

6.1.1.3. *cont'd*

n^a	x	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
	8	638.8	19.5			58
	10	695.0	28.5			58,63
	12	751.1	37.0			58,63,64
	16	863.3	49.5			58,63,64
	18	919.4	54.0			58,63
	21	1003.8	62.0			58
	26	1143.8	69.0			58,63
15	1	706.8	28.7			52,59,60
	2	734.9	35.1		Raman	59,60,224
	3	762.9	30.8			60,63
	4	791.0	31.3			60,63
	5	819.0	32.0			60,63
	6	847.1	32.2			60,63
	7	875.2	33.7			60,63
	8	903.2	35.3			60,63
	9	931.2	38.4			60,63
	10	959.3	39.5			60,63
	11	987.4	42.5			60,63
	12	1015.4	45.5			60,63
	13	1043.5	47.3			60,63,64,67
	14	1071.6	50.0			60,63,64,67
	15	1099.6	51.7			60,63,64,67
	16	1127.6	54.4			60,63,64,67
	17	1155.7	57.6			60,63,64,67
	18	1183.7	59.0			60,63,64,67
	21	1267.9	62			60,62,65
	26	1408.2	68			62
	30	1520.4	71			62
25	4	1231.5	43.5			66
	15	1540.1	55.5			66
	30	1960.9	72.7			66
45	1	2028.4	51.3			61
	10	2280.9	52.8			61
	13	2365.0	56.1			61
	15	2449.2	57.1			61
	18	2505.3	61.2			61
	21	2589.4	64.3			61
	30	2841.9	66			66

[a] $n = 2–45$, $x = 1$: GPC, Ref.: 220; α-alkyl (CH_3, C_9H_{19}, $C_{15}H_{31}$), ω-methoxy oligo(oxyethylenes), $n = 4–12,15,16,25$: Ref. 214; $n = 15$, $x = 5,6,7$: micelliation and surface properties, Ref. 221.

6.1.1.4. *Amino Derivatives of Oligo(oxyethylenes) α,ω-Diamines* $RNH–CH_2CH_2–[OCH_2CH_2]_n–NHR$

R	n	Mol. wt.	b.p. (°C/mbar)	n_D/25°C	Refs.
H	1	94.2	48–50/1.3		76
	2	148.2	77–78/0.3		76
	3	192.3	115/0.3	1.4637	76,77
	4	236.3	133–134/0.2	1.4647	77
	5	280.4	175–177/0.07	1.4668	77
CH_3	3	220.3	97–98/0.2	1.4511	77
	4	264.4	131–133/0.2	1.4549	77
	5	308.4	146–148/0.07	1.4562	77

[a] *N*-Oligoethylene mono- and dialkylamines $R_1R_2N(CH_2CH_2O)_nH$; R_1, $R_2 = C_4H_9$ and $R_1 = n\text{-}C_{10}H_{21}$, $R_2 = H$; $n = 1–6$; GC; Ref. 88.

6.1.1.5. *Cyclic Oligo(oxyethylenes)* $[OCH_2CH_2]_n$ (cyclic)

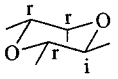
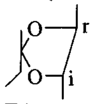
n^a	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	Refs.
1	44.1	−111.3	10.7/1013	1.8922/6	29
2	88.1	11.8	101.3/1013	1.0336/20	30,85–87,92,102,145
3	132.2	0	168–172/1013		78,79,102
4	176.2	17	106/13	1.109/25	31,40,79–81,86,102,145,216
5	220.3	Oil	152/1.7	1.113/20	31,39,79,81,83,102,145,216

6.1.1.5. cont'd

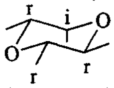
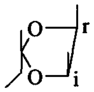
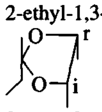
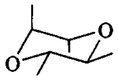
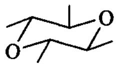
n[a]	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm^3)/°C	Refs.
6	264.3	39.5–40.5	80/0.013		39,41,79,81–83,102,145,216
7	308.4	Oil			39,84,145,216
8	352.4	19			39,84,145
9	396.9	Oil			217
10	441.0	35.5–36.8			217,219
11	485.1	Oil			217
12	529.2	36.5–38.5			217,219
13	573.3	Oil			217
14	617.4	28.5–31			217
15	661.5	38–41.5			217
16	705.6	49.5–50.5			217,219
17	749.7	44–47			217
18	793.8	47–50			217
19	837.9	51–53.5			217
20	882.0	46–50.5			217

[a] n = 2, 4–8; GC, MS; Ref. 145; n = 4–20: IR, NMR, MS, Refs. 216,217,219.

6.1.1.6. Oligomers of Substituted Ethylene Oxides

Epoxide	Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
Oxirane	Crown ethers $[OCH_2CH_2]_n$	1–8		cf. Tab. 1.1.1.5			
(Ethylene oxide)						110–112	
	2-Methyl-1,3-dioxolane $[OCH(CH_3)-OCH_2CH_2]$	2	88.1		82–83/1013	1.3970/20	85–87,92, 110–112
	2-Methyl-1,3,6-trioxocane $[OCH(CH_3)-(OCH_2CH_2)_2]$	3	132.2		110/13		70,150
Methyloxirane	Dimers	2	116.2		117–130/1013		80,90,92,93
(Propylene oxide)	*cis-* + *trans*-2,5-Dimethyl-1,4-dioxane				GC, MS, ^{1}H-NMR, IR		89,114
	trans- $[OCH(CH_3)CH_2]_n$			−4.5	121.5/1000	1.4147/22	112,113
	cis- + *trans*-2,6-Dimethyl-1,4-dioxane $[OCH(CH_3)CH_2-OCH_2CH(CH_3)]$				127.7–129/1001 GC, MS, ^{1}H-NMR, IR	1.4169/20	89,119
	cis- + *trans*-2-Ethyl-4-methyl-1,3-dioxolane				GC, MS, ^{1}H-NMR, IR		89
	cis-					1.4029/24	115
	trans- $[OCH(C_2H_5)-OCH_2CH(CH_3)]$					1.4044/24	115
	Higher Oligomers	4	232.3	93	61–65/0.009	1.4453/23	49,89–93
	$[OCH(CH_3)CH_2]_n$	5[a]	290.4		77–83/0.009	1.4453/23	90–92
					n = 4–6: GPC, Ref. 91		
Ethyloxirane	$[OCH(CH_2CH_3)CH_2]_n$	4	288.4		99–101/0.13	1.4503/23	90–92
(1,2-Butene oxide)					n = 4–6: GPC, Ref. 91		
2,3-Dimethyl oxirane							
(2,3-Butene oxide)							
cis-	Monomer	1	72.1		59.9–60.4/996	1.3826/20	116
	Dimers	2	144.2				94,95
	2,*cis*-3,*trans*-5,*cis*-6-Tetramethyl-1,4-dioxane[b] 				GC, ^{1}H-NMR		94,95
	2,*cis*-4,*trans*-5-Trimethyl-2-ethyl-1,3-dioxane[b] 				GC, ^{1}H-NMR		94,95
	Trimers	3	216.3		GPC, ^{1}H-NMR		95
	Tetramers	4	288.4		GPC, ^{1}H-NMR		95

6.1.1.6. cont'd

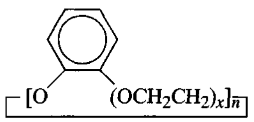
Epoxide	Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
trans-	Monomer	1	72.1		53.6–54.1/996	1.3736/20	116
	Dimers	2	144.2				94,95
	2,*cis*-3,*trans*-5-*cis*-6-Tetramethyl-1,4-dioxane[b] 				GC, ^{1}H-NMR		94,95
	2,*cis*-4,*cis*-5-Trimethyl-2-ethyl-1,3-dioxolane[b] 				GC, ^{1}H-NMR		94,95
	2,*trans*-4,*trans*-5-Trimethyl-2-ethyl-1,3-dioxolane[b] 				GC, ^{1}H-NMR		94,95
cis-, *trans-*	2,*trans*-3,*cis*-5-*trans*-6-Tetramethyl-1,4-dioxane 	2			GC, ^{1}H-NMR		94,95,114
	2,*trans*-3,*trans*-5,*cis*-6-Tetramethyl-1,4-dioxane 			39.5–40.0	GC, ^{1}H-NMR		94,95,114,117
2,2-Dimethyloxirane (Isobutene oxide)	Dimers	2	144.2				96
	2,5-Tetramethyl-1,4-dioxane $\overline{[OC(CH_3)_2CH_2]_n}$				140/1013		96
	2-Isopropyl-4,4-dimethyl-1,3-dioxolane $\overline{[OCH\{CH(CH_3)_2\}-OC(CH_3)_2CH_2]}$				135/1013		96
	2,4,6-Triisopropyl-1,3,5-trioxane $\overline{[OCH\{CH(CH_3)_2\}]_n}$	3	216.3	64			96
(R)-*tert*, Butyloxirane	$\overline{[OCH\{C(CH_3)_3\}CH_2]_n}$ 2R, 5R, 8R, 11R-	4	400.6	168.0 $[\alpha]_D^{25} = 50,8$ ($c = 1.1$, C_6H_{12})			92,97
Methyleneoxirane (Epoxyallene)	$\overline{[OC(=CH_2)CH_2]_n}$	4	224.2	120–122	146–147/1007	1.4880/20	98,118
Epichlorohydrin	$\overline{[OCH(CH_2Cl)CH_2]_n}$	2	185.0		60/0.2 (subl.)		92,100,103–105
	cis-			65–66	67–75/0.7		99
	trans-			109–110			99
	2R, 5R, 8S, 11S-	4	370.1	136–136.5	190–205/1		90,92,98,100,101,103,104
				n = 2–6: GPC, Refs. 100,103,104			
n-Propoxymethyloxirane (*n*-Propyl glycidyl ether)	$\overline{[OCH(CH_2OC_3H_7)CH_2]_n}$	2	232.3		88/0.6	1.4330/30	91
				n = 2–5: GPC, Ref. 91			
Phenyloxirane (Styrene oxide)	2-Benzyl-4-phenyl-1,3-dioxolane $\overline{[OCH(CH_2C_6H_5)-OCH(C_6H_5)CH_2]}$	2	240.3	37–40	150–151/1		43,106
	2,5-Diphenyl-1,4-dioxane	2	240.3	152			92,106,107
	cis-			121–122			42,43
	trans- $\overline{[OCH(C_6H_5)CH_2]_n}$			177			42–44
	2,4,6-Tribenzyl-1,3,5-trioxane $\overline{[OCH(CH_2C_6H_5)]_n}$	3	360.4		GPC, NMR		106
			3*n* = 2–5:		GPC, MS,		106

[a] Stereoisomers.
[b] The letters r and i indicate retention and inversion at the carbon, respectively.

6.1.1.7. Oligo(oxyethylenes) Containing Spirane Residues ┌[OCH_2C(◇A)CH_2—$(OCH_2CH_2)_x$]$_n$┐

A	*n*	*x*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
O	1	1	144.2		97–99/13	182
		2	188.2	Oil	MS, ^{1}H-NMR	182,183
		3	232.3		97–98/0.008	182
		7	408.3		182–183/0.004	182
	2	1	288.3	163–165		182
		2	376.4	86–87		182–183
		3	464.5	52–53		182
		7	816.6	42–43		182
$OCH(C_6H_5)O$	1	2	294.1	Oil	MS, ^{1}H-NMR	183
	2	2	588.3	99		183
	3	2	882.4	86–87		183

6.1.1.8. Benzo Crown Ethers[a]



Position of phenolic groups	*x*	*n*	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
o-	1	2	272.3	208.5		102
		3	408.4	190–192		41,188
		4	544.6	150–152		41,188
	2		180.2	67–69		41
		2	360.4	164.0	380–384/1025	41,102,188,189
	3	1	224.2	44–45.0		41
		2	448.5	113–114		41,102,188,189
	4	1	268.3	79–79.5		41
		2	536.3	106.8		41,188
	9	2	977.1	<26		41,188
p	3	2	448.5	95.5–96.5		187,190
	4	2	536.6	93.5–94		187,190
	5	2	624.7	67–68		187,190

[a] Ref. 187.

6.1.2. OLIGO(OXYPOLYMETHYLENES)

6.1.2.1. Linear Oligomers $R\text{–}[O(CH_2)_x]_n\text{–}R'$

R	R′	*x*	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
H	OH	4	1	90.1	20.1	85/0.01	1.4460/20	137
			2	162.2	3	108/0.01	1.4544/26	108,120,137
			3	234.4	10.1	151/0.01	1.4484/60	33,120,137,222,223
			4	306.4	18	183/0.01		137
			5	378.5	37	226/0.01		137
			6	450.6	31	253/0.01		137
			7	522.7	42			137
			8	594.8	34			137
			9	667.0	41			137
			14	1027.5	38			137
		5	1	104.2	– 18	137–138/16	1.4494/20	
			2	190.3	16–18	141–142/0.7	1.4570/25	108
			3	276.4	29.5	188–190/1	1.4495/60	33,222
			7	620.9	36–38		1.4538/60	33
		6	1	118.2	43	132/2		
			3	318.5	56	209–210/1	1.4538/60	33,222
		10	1	174.3	72–75	175–176/19		
			3	486.8	80	290–300/1	1.4518/60	33
				$n = 3$, $x = 3\text{–}6$: X-ray, IR, Raman Spectr., DSC				
H	Cl	4	1	108.6		81–82/19		137,138
			2	180.7		87/0.01		137
			3	252.8		132/0.01		137
			4	324.9		160/0.01		137

6.1.2.1. cont'd

R	R′	x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
C_6H_5NHCO	$OCONHC_6H_5$	4	1	328.4	180			137
			2	400.5	119			137
			3	472.6	74			137
			4	544.7	54			137
			5	616.8	48			137
			6	688.9	47			137
						$n = 2$–7: HPLC, MS; Ref. 146		
CH_3	OCH_3	4				$n = 2$–8: GC,MS; Ref. 139		

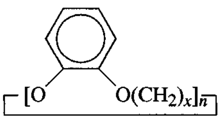
6.1.2.2. Oligo(oxypolymethylene) Ethers $H(CH_2)_x$–$[O(CH_2)_x]_n$–H

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4(g/cm³)/°C	n_D^{20}	Refs.
3	2	160.3		180/1013	0.836/20	1.4090	33
	3	218.3		240–250/1013			33
4	2	202.3		234–236/1013	0.843/20	1.4226	24,32,33
	3	274.4		137/2	0.878/20	1.4357	32,33
	4	346.6		190/1	0.895/20	1.4393	32,33
5	2	244.4		120/03	0.843/20	1.4318	33
	3	330.6		160/0.4	0.870/20	1.4416	33
	4	416.7		200/0.3	0.890/20	1.4471	33
6	2	286.5		130/0.5	0.842/20	1.4379	33
	3	386.7		184/0.8	0.867/20	1.445	33
	4	486.8	20.5	260/2	0.879/20	1.451	33
10	2	454.8	40	233/0.4	0.819/60	1.4370/60	33
	3	611.1	50	310–330/3	0.834/60	1.4416/60	33
	4	767.4	59		0.850/60	1.4457/60	33

6.1.2.3. Cyclic Oligomers

Oligomers	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
⌈$[O(CH_2)_3]_n$⌉ (cyclic)	1	58.1	47		140
	4	232.3	70		38,92,140,141,143
		$n = 3$–8: GC, MS; Refs. 140,141,143			
⌈$[OCH_2C(CH_3)_2CH_2]_n$⌉ (cyclic)	1	86.1		79–80/1013	142,143
	4	344.5	157		38,92,140,143
		$n = 3$–9: GLC, MS; Refs. 140,143			
⌈$[OCH_2C(CH_2CH_3)_2CH_2]_n$⌉ (cyclic)	1	114.2		139–141/1013	142
	4	456.7	138		144
⌈$[OCH_2C(CH_2Cl)_2CH_2]_3$⌉ (cyclic)	3	465.1	122		34,92
⌈$[O(CH_2)_4]_n$⌉ (cyclic)	2	144.2	183–185	60/13	147,148
		$n = 2$–9: GC, MS; Refs. 139			

6.1.2.4. Oligomers of Catechol Poly(methylene ethers)



x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4^{20}	n_D^{20}	Refs.
1	1	122.1	− 18	172–173/1013	1.0640	1.5423	198,199,208–211
	2	244.2	261.6–262.6				198
2	1	136.1		212–214/1009	1.180		208,210
	2	272.3	208–209				41
3	1	150.2	14–15	120/27	1.1343	1.5396	199–203,210
	2	300.3	150–152				41,202
5	1	178.2	Oil	95/3	1.0847	1.5346	199–201
	2	356.4	185.5–187.5				201

6.1.2.4. cont'd

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4^{20}	n_D^{20}	Refs.
6	1	192.2	38	104/1.3			200,204
	2	384.5	140–141	200–201/0.11			41,204
	3	576.7	112				204
7	1	206.3	17–18	156/13	1.0638		200
	2	412.5	158–159				205
10	2	248.4	Oil	179/13	1.0342		200
	2	496.7	137–138.5				41

6.1.3. OLIGO(FORMALDEHYDE) DERIVATIVES

6.1.3.1. Oligo(oxymethylene) Dihydrates $H[OCH_2]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
4	138.1	95–105 d	1,2
8	258.1	115–120 d	1,2

6.1.3.2. Oligo(oxymethylene) Diacetates $CH_3CO–[OCH_2]_n–OCOCH_3$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d (g/cm³)/°C	n_D/°C	Refs.
1	132.1	−23	39–40/0.13	1.128/24	1.4025/24	2–4
2	162.1	−13	60–62/0.13	1.158/24	1.4124/24	3,4
3	192.2	−3	84/0.13	1.179/24	1.4185/24	3
4	222.2	7	102–104/0.13	1.195/24	1.233/24	2,3
5	252.2	17	124–126/0.13	1.204/24	1.4258/24	3
8	342.3	32–34		1.216/36	1.4297/36	2,3
9	372.3	40–43		1.353/15		3
10	402.4	63.1–66.2				3,218
11	432.4	71.2–73.7				3,218
12	462.4	79.9–82.5				2,3,218
14	522.5	84–86				3
15	552.5	90.5–92		1.364/15		3
16	582.5	93–95				2,3
17	612.6	98.5–99.5		1.370/15		3
19	672.6	107–109		1.390/15		3
20	702.6	111–112				2,23
22	762.7	116–118		1.465		3

6.1.3.3. Oligo(oxymethylene) Dimethyl Ethers $CH_3–[OCH_2]_n–OCH_3$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d (g/cm³)/°C	Refs.
1	76.1	104.8	45.5/1013	0.8538/20	5,8,12,15
2	106.1	−69.7	105.0/1013	0.9597/25	5,13–15,197
3	136.2	−42.5	155.9/1013	1.0242/25	5,197
4	166.2	−9.8	201.8/1013	1.0671/25	5,197
5	196.2	18.3	242.3/1013	1.1003/25	5,197
6	226.3	31–34			3
8	286.4	49–51			3
10	346.4	63.1–66.2			3,218
11	376.4	71.2–73.7			3,218
12	406.5	79.9–82.5			3,218
13	436.5	89–91			3
14	466.5	101–104			3
15	496.5	109–111			3

6.1.3.4. Oligo(oxymethylene) Dipropyl Ethers $C_3H_7-[OCH_2]_n-OC_3H_7$

C_3H_7	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	*d*/°C (g/cm³)	n_D/°C	Refs.
n-	1	132.2		137.5/1013	0.83325/25	1.3913/25	6–9
	2	162.2		67/15	0.89725/25	1.4004/25	6,9
	3	192.2		97/15	0.94325/25	1.4086/23	6,9
	4	222.3	– 15 to – 13		0.99025/25	1.4137/26	6
	5	252.3	8–8.56		1.01424/25	1.4181/26	6
i-	1	132.2		117–119/1013	0.8242/20	1.3864/20	8,10
	2	162.2		39.5–41/31	0.8897/20	1.3971/20	10
	3	192.2		68.2–68.5/4	0.9348/20	1.4035/20	10
	4	222.3		93.5–94.5/4	0.9751/20	1.4117/20	10
	5	252.3		120–123/4	1.0275/20	1.4235/20	10
	6	282.3	23.4–24.3	159–163/5	1.101/26	1.4467/26	10

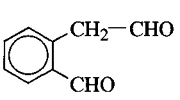
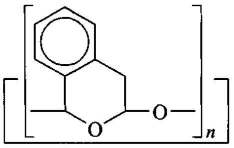
6.1.3.5. Oligo(oxymethylene) Diallyl Ethers $CH_2=CHCH_2-[OCH_2]_n-OCH_2CH-CH_2$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_{25}/(g/cm³)	n_D/°C	Refs.
1	128.2		138–139/1013		1.4226/21	6,11
2	158.2		75–76.5/20	0.946	1.4280/25	6
3	188.2		58.5–64/0.4	0.992	1.4320/25	6
4	218.2	– 4.3	82–87/0.4	1.027	1.4350/25	6
5	248.3	15.5	105–107/0.4	1.059	1.4377/25	6
6	278.3	22.5	144–155/0.5	1.079	1.4411/25	6

6.1.3.6. Cyclic Oligo(oxymethylenes) $[OCH_2]_n$ (cyclic)

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	*d* (g/cm³)	Refs.
3	90.1	67–68	114.5/1013	1.39	16–18,31,46–48,121,122
4	120.1	114		1.435	17–19,31,46–48,122,123
5	150.2	61		1.480	31,45–47
6	180.2	72.5		1.440	47
15	450.4	68–70			31

6.1.4. OLIGOMERS OF HIGHER ALDEHYDES

Aldehyde	Oligomers	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
CH_3-CHO	$[OCH(CH_3)]_n$ (cyclic)	3	132.3	12.6	125/1013	20
		4	176.2	246.2	112–115 (Subl.)	20,21
C_6H_5-CHO	$[OCH(C_6H_5)]_n$ (cyclic)	3	318.4	175–176	75/1013	35
		3	444.5	284–285		36

6.1.5. HIGHER CYCLIC OLIGO(ACETALS)

6.1.5.1. Oligomers of 1,3-Dioxacycloalkanes $[OCH_2-O(CH_2)_x]_n$ (cyclic)

x	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	n_D/°C	Refs.
2	1	74.1	– 95.3	75/1013	1.0595/20	1.4002/20	151
	2	148.2	67				152–155
	5	370.4	28				152

n = 2–5: NMR, Ref. 152
n = 2–9: GC, MS, Refs. 153–155

6.1.5.1. cont'd

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	n_D/°C	Refs.
4	1	102.1		117/1009	1.003/20	1.4308/20	22,147,156–158
	2	204.3	90–92				157
5	1	116.2		40–44/15			22,169–171
	2	232.3	56–58				22,152,169
6	2	260.4	71–72				22
8	1	158.2	−63	196/1013	0.985/25	1.4564/25	159,160,162
	2	316.5	82				159,160
9	2	344.5	68–69				22
10	2	372.6	93–94				22
14	2	484.8	103.5–104				22

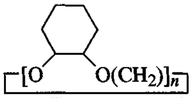
6.1.5.2. Oligomers of Poly(oxacycloalkanes) $-[OCH_2-(OCH_2CH_2)_x]_n-$

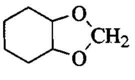
x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D/°C	Refs.
2	1	118.1		157/1013	1.4421	151,158,168,170
	2	236.3	59.9–60.3			152,168,171
	3	354.4	Oil			152,168
	4	472.5	34.7–35.2			152,168
	5	590.7	Oil			168
	6	708.8	39.7–40.1			168
			n = 1–9: GPC, Ref. 168			
3	1	162.2	27	56/0.5	1.4541/30	22,159,161,164,166–168
	2	324.4	88.0–88.6	85 (subl.)		159,161,164,165,168,214
	3	486.5	27			159,164,165,168,214
	4	648.7	56.5			159,164,165,168,214
	5	810.9	19			159,164,165,168,214
	6	973.1	38.3–39.5			159,164,168,214
	7	1135.3	23			159,164,214
	8	1297.5	28.5			164
			n = 1–8: GPC, ¹H-NMR, ¹³C-NMR, Refs. 163,164,168			
4	1	206.2	23.5	90/0.3	1.4616/25	161,162,166–168
	2	412.5	44.0–44.6			167,168,214
	3	618.7	16			167,168,214
	4	824.9	54			168,214
	5		27			214
	6		30			214
			n = 1–4: GPC, Ref. 168			
5	1	250.3	−6.5	142–144/0.3	1.4642/20	166–168
	2	500.6	79.1–79.5			168,214
	3	750.9	34			168,214
	4	1001.1	63			168,214
	5		32			214
	6		48			214
6	1	294.3		142–144/0.3		166
			n = 1–7: GPC, Ref. 168			

6.1.5.3. Oligomers of Substituted 1,3-Dioxacycloalkanes $-[OCR_2-OCH_2-X-(CH_2)]_n-$

R	X	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	n_D/°C	Refs.
CH_3	CH_2-CH_2	1	130.2		73–74/139			181
		2	260.4	145.7/146.8				181
H	CH=CH	1	100.1	−55.2	128/979	1.067/20	1.4570/20	173,174
		2	200.2	117				174,184,185
				n = 2–6:	HP-GPC			Ref. 174
H		1	154.2	1	30/0.03		1.4932/24	160,186
		2	308.4	234				186

6.1.5.4. Oligomers of 7,9-Dioxabicyclo[4,3,0]nonane



Monomer	Configuration	n	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
	*cis*	1	128.2		52.0/12	191
		2	256.3	142–143		191,192
	trans	1	128.2		57.0/27	191
		2	256.3	107–109		191,192

6.1.5.5. Oligomers of Substituted Poly(oxacycloalkanes) $-[OCH(CH_3)-(OCH_2CH_2)_x]_n-$

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	1	132.2		32/1.3	172
	2	264.3	36–37		172
3	1	176.2		60/0.3	172
	2	352.4	61–62		172
4	1	220.3		82/0.2	172
	2	440.5	33–34		172
5	1	264.3		120/0.13	172
	2	528.6	52–53.5		172

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6.2. OLIGO(CARBONATES)

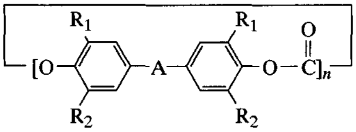
6.2.1. CYCLIC OLIGO(DIOL CARBONATES) $\overline{[O(CH_2)_xO-CO]_n}$

x	*n*	Mol. wt.	m.p. (°C)	Refs.
4	2	232.2	175–176	1,2,9
5	2	260.3	117–118	2,8,9
6	2	288.3	128–129	2,8,9
7	2	316.4	97–98	2,9
8	1	172.2	21.5–23	2,9
8	2	344.5	116–117	2,8,9
9	1	186.3	35–35	2,9
9	2	372.5	95–95.5	2,9
10	1	200.3	10–11	2,9
10	2	400.6	105–106	2,8,9
11	1	214.3	40–41	2,9
11	2	428.6	97–97.5	2,9
12	1	228.3	11–12	2,9
12	2	456.7	93–95	2,8,9

6.2.2. CYCLIC OLIGO(CARBONATES) OF DI- AND TRI-ETHYLENE GLYCOL $\overline{[O(CH_2CH_2O)_x-CO]_n}$

x	*n*	Mol. wt.	m.p. (°C)	Refs.
2	2	264.2	139–140	8
2	3	396.3	165–167	8
3	1	176.2	39–40	8
3	2	352.4	120–121	8

6.2.3. CYCLIC OLIGO(*p,p*′-BISPHENOL CARBONATES)



A	R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
$C(CH_3)_2$	H	H	3	762.9	335–340	6,7,9,10
	H	H	4	1017.1	375	3,4,9,10
	CH_3	H	4	1129.4	301–303	3,9
	Cl	Cl	4	1568.2	420	3,9
S	H	H	4	977.1	320–322	3,9

6.2.4. CYCLIC OLIGO(*o,o*′-BISPHENOL CARBONATES)

R	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	1	254.3	144–146	7
	2	508.6	276–279	5–7
Cl	2	295.1	365–368	5

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6.3. OLIGO(ESTERS)

6.3.1. OLIGO(ESTERS) OF HYDROXY ACIDS

6.3.1.1. Oligo(esters) of Aliphatic Hydroxy Acids

6.3.1.1.1. Oligo(α-hydroxy acid) Methyl Esters $H[OCHRCO]_nOCH_3$

R	n	Mol. wt.	b.p. (°C/mbar)	Refs.
CH_3	1	104.1	58–59/39	
	2	176.2	79–80/3	53
$CH(CH_3)_2$	1	132.2	81–82/60	51
	2	232.3	106.5–107/1	51
$CH(CH_3)_2$	3	332.4	151–153/1	51
	4	432.5	197–199.5/1	51
	5	532.6	207–212	51

6.3.1.1.2. Acetyl Oligo(α-hydroxy acid) Methyl Esters $CH_3CO–[OCHRCO]_nOCH_3$

R	n	Mol. wt.	b.p. (°C/mbar)	$[\{\alpha\}]_D^{25}$	Conc.	Refs.
CH_3	1	146.1	67–68/17	−47.3	1.41[a]	48,53
	2	218.2	87–88/0.7	−65.6	1.98[a]	53
	3	290.3	144–146/1	−81.8	1.53[a]	53
$CH(CH_3)_2$	1	174.2	89–89.5	−30.9	1.78[b]	51
$CH(CH_3)_2$	2	274.3	101–101.5	−43.8	1.14[b]	51
	3	374.4	153–154	−49.0	1.21[b]	51
	4	474.5	186–188	−53.6	1.14[b]	51
	5	574.6	230–232	−60.8	0.86[b]	51

[a]In CH_2Cl_2.
[b]In $CHCl_3$.

6.3.1.1.3. Cyclic Oligo(esters) of α-Hydroxy Acids cyclo-$[OCHRCO]_n$

R	Config.	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	$[\{\alpha\}]_D$	Refs.
H		2	116.1	86–87	169/16		1,2,100,101
		5	290.2	230			102
		6	348.2	215			102
CH_3	L	2	144.1	98.7	150/33	−280[a]	3,4
	DL	2	144.1	128	256		2–7
$CH(CH_3)_2$	L	2	200.2	152–153		−256[b]	103
	DL	2	200.2	134–135			103
$CH_2CH(CH_3)_2$	L	2	228.3	169–170		−226[b]	103
	DL	2	228.3	138–140			103

[a] c = 0.58, C_6H_6, 18°C.
[b] c = 1, $CHCl_3$, 25°C.

6.3.1.1.4. Oligo((R)-β-hydroxybutyric acids) $H[OCH(CH_3)CH_2CO]_nOH$

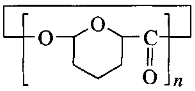
n	Mol. wt.	m.p. (°C)	$[\{\alpha\}]_D^{20}$	(c = 1, CH_2Cl_2); λ (nm)	Method	Refs.
2	190.2		−19.7	(H_2O); 389	IR, NMR, MS	149,150
3	276.3			NMR, MS		149
4	362.4	49	−52.9, 365		NMR, MS	63,64,73,144,149
5	448.5	65			NMR, MS	64,73,144,149
6	534.5	81				64,73
7	620.6	89				64,73
8	706.7	100–101	11.7; 365		IR, NMR, MS	64,73,144,151
12	1051.1	128–129		−7.7; 365	IR, NMR, MS	144
16	1395.5	134.3			NMR	144
24	2084.2	155–156.5			IR, NMR, MS	144
32	2772.9	154.3		3.8; 365	IR, NMR, MS	144
64	5527.9	161.3		7.1; 365		144
128	11037.8				NMR, MS	144

6.3.1.1.5. Oligo(β-hydroxypivalic acids) $H[OCH_2C(CH_3)_2CO]_nOH$

n	Mol. wt.	m.p. [°C]	Refs.
1	118.1	123–124	50
2	218.2	71.5–72.5	50
3	318.4	67–68	50
4	418.5	111.5–112.5	50
5	518.6	119.5–120.5	50
6	618.7	138–139	50

6.3.1.1.6. Oligo(β-hydroxypivalic acid) Isobutyl Esters $H[OCH_2C\text{-}(CH_3)_2CO]_nOCH_2CH(CH_3)_2$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	274.4		115–117/0.7	49
3	374.5		175–177/1	49
4	474.6	75.5–76		49
5	574.7	97–98		49
6	674.8	120.5–121.5		49
7	774.9	134–135		49

6.3.1.1.7. Cyclic Oligo(esters) of 6-Hydroxytetrahydropyran-2-Carboxylic Acid 

Config.	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	$[\alpha]_D^{25}$ ($CHCl_3$)	Refs.
RS	1	128.1	18–20	64–65/5		79,82,105
	2	256.2	160			76,79,80,82–84
	4	512.5	155			76,79,80,82,83,85
	5	640.7	175			76,79,80,82,83,86
R	1	128.1			+142	81,83,87
	4	512.5	115		−189	76,78,82–84,87
	5	640.7	125		−136	76,81–83,86,87

6.3.1.1.8. Cyclic Oligo(esters) of ω-Hydroxy Acids $[O(CH_2)_xCO]_n$

x[a]	*n*[a]	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	1	72.1		51/133	
	3	216.2	56–58		104
	4	288.3	116–120		104
	5	350.3	80–85		104
	6	432.4	133–135		104
	7	504.5	84–86		104
5	1	114.1	5	140–106/13	8–10,91
	2	228.3	112–113	130/0.2	8,9,65,66,69,77,91–95
	3	342.4		250/0.3	9,65,66,72,91–95
6	1	128.2		80–82/15	10
	2	256.3	45	135/0.3	9,69
	3	384.5		202/0.3	9
7	1	142.2		72–73/15	10,91
	2	284.4	93	152/0.2	9,69,91
8	1	156.2	31–31.5	86–87/13	9–11
	2	312.5	57–58	158/0.04	9,10,69,77
	3	468.7	20	240/0.1	9
9	1	170.3	6.4	100/13	9–12,77
	2	340.5	97	192/0.4	9,12–14,69,77
	3	510.8	29	270/0.4	9
10	1	184.3	3	116/13	9–12,77,91
	2	368.6	74		9,12,69,77,91
11	1	198.3	2	130/13	10,11,15,77,91
	2	396.6	104		9,69,77,91
12	1	212.3	27.5	143/13	9–12,16,77,91
	2	424.7	84		9,14,77,91
13	1	226.4	33–33.7	165/20	9,11,16,77
	2	452.7	107		9,12,77
14	1	240.4	37–37.5	169/13	9–11,16,77,91
	2	480.7	90–91		9,15,69,76,77,88,91
15	1	254.4	35.5–36.5	188/20	9,11,16,77
	2	508.8	111		9,69,77
16	1	268.4	42–43	194/20	9,11,16
	2	536.9	97		9
17	1	282.5	37	143/0.3	9
	2	564.9	114		9
22	1	348.6	36	175/0.3	9
	2	697.2	105		9

[a] $x = 10$, $n = 2.7$ (sharp fractions): GPC, NMR, MS, Ref. 154.

6.3.1.1.9. Cyclic Oligoesters of (R)-β-Hydroxybutyric Acid $[OCH(CH_3)CH_2CO]_n$

n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{20}$ ($c = 1$, $CHCl_3$)	Methods	Refs.
2	172.2	124.5–125	−91.7	IR, NMR, MS, X-ray	146
3	258.3	110–110.5	−33.9	IR, NMR, MS, X-ray	144,145,148,151
4	344.4	178–178.5	15.4	IR, NMR, MS, X-ray	144,151
5	430.5	102.5–103.5	6.7	IR, NMR, MS, X-ray	144,151,152
6	516.6	112–113.5	11.1	IR, NMR, MS, X-ray	144,151,152

6.3.1.1.9. *cont'd*

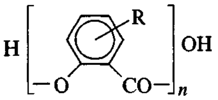
n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{20}$ ($c = 1$, $CHCl_3$)	Methods	Refs.
7	602.6	118–119.2	– 1.0	IR, NMR, MS, X-ray	144,151,152
8	688.7	84–85	3.1	NMR, X-ray	144,151
9	774.8	92.5–93	0.8	IR, NMR, MS	144,151
10	860.9	89.5–90.5	+0.5	IR, NMR, MS	144,151
12	1033.1	98–99	6.5 (CH_2Cl_2)	IR, NMR, MS	144
16	1377.5	122–123	1.3 (CH_2Cl_2)	IR, NMR, MS	144
32	2754.9			NMR, MS	144

6.3.1.1.10. Cyclic Oligesters of (R)-3-Hydroxypentanoic Acid $\ulcorner[OCH(C_2H_5)CH_2CO]_n\urcorner$

n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{20}$ ($c = 1$, $CHCl_3$)	Refs.
3	300.4	98.5–99.0	– 19.4	147
4	400.5	36.0–36.6	34.0	147
5	500.6	110.5–111	19.8	147
6	600.7	97.5–98.5	19.6	147
7	700.8	54.0–54.5	13.2	147
8	801.0		15.3	147
9	901.1		14.5	147
10	1001.2		13.9	147
11	1101.3		13.8	147
12	1201.4		13.2	147

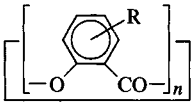
6.3.1.2. Oligo(esters) of Aromatic Hydroxy Acids

6.3.1.2.1. Linear Oligo(esters) of Salicylic Acids



R_3	R_4	R_5	R_6	*n*	Mol. wt.	m.p. (°C)	Refs.
H	H	H	H	2	258.2	148–149	17–19
				3	378.3	150–152	130
				4	498.4	177–183	130
H	Me	H	H	2	286.3	162	20
H	H	Me	H	2	286.3	128–129	20

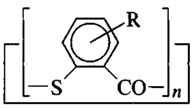
6.3.1.2.2. Cyclic Oligo(esters) of Salicylic Acids



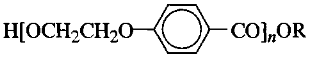
R_3	R_4	R_5	R_6	*n*	Mol. wt.	m.p. (°C)	Refs.
H	H	H	H	2	240.2	234	17,19,132,135
				3	360.3	200	17,21,132,135
				4	480.4	298–300	17,132,135,141
				6	720.7	375	17
Me	H	H	H	2	268.3	240	20–23,135
				3	402.4	264–265	22,135,139
				4	536.5	299–300	22,135,141
H	Me	H	H	2	268.3	255	20,22,23,135
				3	402.4	207–207.5	22,135,139
				4	536.5	305	22
H	H	Me	H	2	268.3	235–235.5	20,22,23,135
				3	402.4	244.5–245	22,135
				4	536.5	347	21,22
Me	H	H	Me	2	296.3	211–212	137
				3	444.5	255	137,138
$CHMe_2$	H	H	Me	2	352.4	209	24,139,142
				3	528.7	217	24,133,134,136,138,142

6.3.1.2.2. *cont'd*

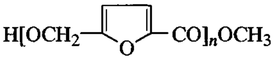
R_3	R_4	R_5	R_6	*n*	Mol. wt.	m.p. (°C)	Refs.
Me	H	H	$CHMe_2$	2	352.4	176–178	137,139
				3	528.7	247	136–138,140
				4	704.8	323	137
CMe_3	H	H	Me	2	380.5	238	137
H	$CHMe_2$	H	Me	2	352.4	136	137
				3	528.7	191	137
Ph	H	H	H	4	784.8	360	137

6.3.1.2.3. Cyclic Oligo(esters) of Thiosalicylic Acids 

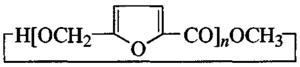
R_3	R_4	R_5	R_6	*n*	Mol. wt.	m.p. (°C)	Refs.
H	H	H	H	2	272.3	182–183	25,26,131,141,143
				3	408.5	257–258	25,131
				4	544.7	288–290	25
Me	H	H	H	2	300.0	245–250	131,136
				3	450.0	300–302	131,136
				4	600.1	320	131
H	H	Me	H	2	300.0	155–157	131
				3	450.0	250–255	131
H	H	H	Me	2	300.0	155	131,136
				3	450.0	>300	131,136
Me	H	H	Me	2	328.1	235	131
				3	492.1	>300	131
$CHMe_2$	H	H	Me	2	384.1	203	131

6.3.1.2.4. Linear Oligo(esters) of *p*-(β-hydroxy)-Ethoxybenzoic Acid 

	n	Mol. wt.	m.p. (°C)	Refs.
R=H	1	182.2	177	27
	2	346.3	165	27
	3	510.5	183	27
	4	674.7	192	27
R=$-CH_2CH_2OH$	1	226.2	77	28
	2	390.4	114	28
	3	554.6	136	28
	4	718.7	156	28

6.3.1.2.5. Linear Oligo(esters) of 2,5-Hydroxymethylfuran Carboxylic Acid 

n = 1–5: GPC, HPLC, ^{1}H-NMR; Ref. 67,68.

6.3.1.2.6. Cyclic Oligo(esters) of 2,5-Hydroxymethylfuran Carboxylic Acid 

n = 3–5: GPC, MS, ^{1}H-NMR, ^{13}C-NMR; Ref. 67,68.

6.3.2. OLIGO(ESTERS) OF DIOLS AND DICARBOXYLIC ACIDS

6.3.2.1. Aliphatic Oligo(esters)

6.3.2.1.1. Cyclic Oligo(alkylene succinates) $[O(CH_2)_xO—CO(CH_2)_2CO]_n$

x	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	2	288.3	131		29,30,89,108,116,118
3	1	158.2	82	90–92/3	29,108,118,128
	2	316.3	138		29,108,118,129
4	1	172.2	42	95–96/3	29,108,118,128
	2	344.4	121		29,108,118

6.3.2.1.1. *cont'd*

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
5	1	186.2	19	88–89/1	29,108,118,128
	2	372.4	87		29,108,118
6	1	200.2	−15	108–110/3	29,108,118,128
	2	400.5	110		29,108,118
7	1	214.3	49	116–118/1–3	29,108,118
	2	428.5	86		29,108,118
8	1	228.3	71		29,108,118
	2	456.6	109		29,108,118
10	1	256.3	60	130–132/1	29,108,118,128
	2	512.7	109		15,29,108

6.3.2.1.2. Cyclic Oligo(alkylene adipates)

$\ulcorner[OCH_2-X-CH_2O-CO(CH_2)_4CO]_n\urcorner$

X	n	Mol. wt.	m.p. (°C)	Refs.
$C(CH_3)_2$	2	428.5	127–128	47
$(CH_2)_2$	2	400.4	57	106
$(CH_2)_3$	2	428.5	82–84	115
$(CH_2)_8$	n = 1–5 (sharp fractions):		GPC, NMR	156

6.3.2.1.3. Cyclic Oligo(alkylene sebacates)

$\ulcorner[O(CH_2)_xO-CO(CH_2)_8CO]_n\urcorner$

x	n	Mol. wt.	m.p. (°C)	Refs.
2	1	228.3	42	15,29
	2	456.6	81	15,29
3	1	242.3	14	29,31
	2	484.6	113–113.5	15,29,31
8	1	312.5	68	69

6.3.2.1.4. Cyclic Oligo(ethylene dicarboxylates)

$\ulcorner[O(CH_2)_2O-CO(CH_2)_xCO]_n\urcorner$

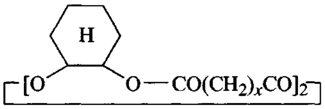
x	n	Mol. wt.	m.p. (°C)	Refs.
1	2	260.2	160	109
2	2	288.3	131	29,30,116,118
3	2	316.3	144	106,107
4	2	344.4	56	107
5	2	372.4	147	106,107
6	2	400.5	54	107
7	1	214.3	52	15,29
	2	428.5	147	15,29,106–108
8	1	228.3	42	15,29
	2	456.6	81	15,29,106–108
9	1	242.3	35	15
	2	484.6	143	15
10	1	256.3	18	29
	2	512.7	96	15,29
11	1	270.4	−8	29
	2	540.7	145–146	15,29
12	2	568.8	102–103	15,108

6.3.2.1.5. Cyclic Oligo(thioesters) of Dicarboxylic Acids

$\ulcorner[S(CH_2)_xS-CO(CH_2)_yCO]_n\urcorner$

x	y	n	Mol. wt.	m.p. (°C)	Refs.
2	1	2	324.5	144	109
	3	2	380.5	140–145	110,111
	4	2	408.4	97–105	111
	5	1	218.2	75–78	111
	5	2	436.4	125–129	110
3	3	2	408.4	97–102	111
	4	1	218.2	115–117	111
	4	2	436.4	108–110	111

6.3.2.1.6. Cyclic Oligo(cyclohexylene dicarboxylates)



x	Mol. wt.	Config.	m.p. (°C)	Config.	m.p. (°C)	Refs.
1	368.4	*trans*	233–235	*cis*	189–191	112,113
3	424.5		220–222		144–146	112,113
5	480.6		210–212		143–145	112,113
7	536.7		160–162		134–136	112,113
8	564.8		145–148		93–95	112,113

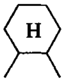
6.3.2.1.7. Cyclic Oligo(esters) of Oxalic Acid

$\ulcorner[OCH_2-X-CH_2O-COCO]_2\urcorner$

X	Mol. wt.	m.p. (°C)	Refs.
CH_2	260.2	185–187	108,125
CH_2OCH_2	320.2	162.5–164	62,108,115
$(CH_2OCH_2)_2$	408.3	68–72	62,108

6.3.2.1.8. Cyclic Oligo(esters) of Diglycolic Acid

$\ulcorner O-X-O-COCH_2OCH_2CO]_2 \urcorner$

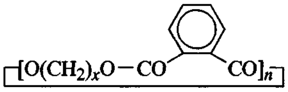
X		Mol. wt.	m.p. (°C)	Refs.
CH_2CH_2		320.3	185–187	114,129
$CH(CH_3)$–$CH(CH_3)$		376.4	128–130	114
$(CH_2)_2O(CH_2)_2$		408.4	125–126	129
	*trans*	428.4	276–278	114
	cis	428.4	265–268	114
		416.3	208–209	114

6.3.2.1.9. Cyclic Oligo(tetraethylene glycol succinate)

$n = 1$: X-ray, NMR, MS; $n = 2$–8: (sharp fractions): GPC, NMR, MS, Refs. 160–162.

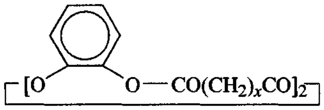
6.3.2.2. Aromatic Oligo(esters)

6.3.2.2.1. Cyclic Oligo(alkylene phthalates)



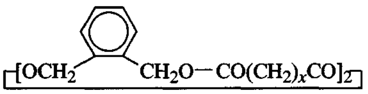
x	n	Mol. wt.	m.p. (°C)	Refs.
2	1	192.2	60–62	118,119
	2	384.3	198	90,108,118–120
3	2	412.4	193	108,120
4	1	220.2	106	108,120
	2	440.5	140	108,120
5	1	234.3	101–102	108,119,120
	2	468.5	139	108,120
6	1	248.3	64–65	108,119,120
	2	496.6	66	108,120
7	2	524.6	163	108,120
8	2	552.7	64–65	108,120
9	2	580.7	140–141	108,120
10	2	608.8	78–79	108,120
11	2	636.8	138–139	108,120
12	2	664.9	84	108,120

6.3.2.2.2. Cyclic Oligo(*o*-phenylene dicarboxylates)



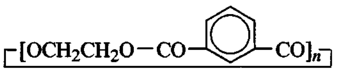
x	Mol. wt.	m.p. (°C)	Refs.
3	412.4	238–240	122
5	468.5	145–147	122
7	524.6	110–112	122
8	552.7	108–110	122

6.3.2.2.3. Cyclic Oligo(*o*-xylylene dicarboxylates)



x	Mol. wt.	m.p. (°C)	Refs.
0	320.3	233–235	117
1	348.4	215–218	117
2	376.5	217	117
3	404.5	173	117
4	432.6	144	117
5	460.6	121	117
6	488.7	134	117
7	516.7	119	117
8	544.8	135	117

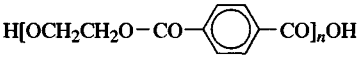
6.3.2.2.4. Cyclic Oligo(ethylene isophthalates)



n	Mol. wt.	m.p. (°C)	Refs.
2	384.4	330	34,90

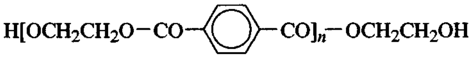
6.3.2.2.5. Oligo(ethylene terephthalates)

6.3.2.2.5.1. Oligomeric Hydroxy Acids



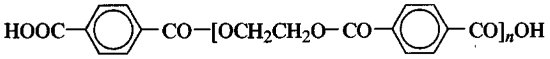
n	Mol. wt.	m.p. (°C)	Refs.
1	210.2	178	35
2	402.4	200–205	36
3	594.6	219–223	36

6.3.2.2.5.2. Oligomeric Diols



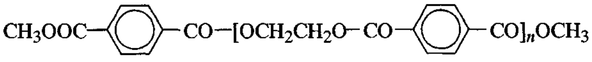
n	Mol. wt.	m.p. (°C)	Refs.
1	254.2	109–110	35,36,59,74,75
2	446.4	173–174	35,36,74,75
3	638.6	200–205	35,36,74,75
4	830.8	213–216	35,36,74
5	1023.0	218–220	36

6.3.2.2.5.3. Oligomeric Dicarboxylic Acids



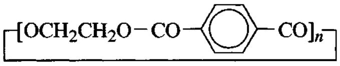
n	Mol. wt.	m.p. (°C)	Refs.
1	358.3	>360	36–38
2	550.5	284–286	33,36–38
3	742.7	274–276	33,37,38
4	934.9	252–255	38
5	1127.1	233–236	38

6.3.2.2.5.4. Oligomeric Dicarboxylates



n	Mol. wt.	m.p. (°C)	Refs.
1	386.3	168–170	35,52,74
2	578.5	194–198	35,52,74
3	770.7	215–217	52,74
4	962.8	231–232	52
5	1155.0	242–243	52
6	1347.1	248–249	52
7	1539.3	250–252	52
8	1731.5	251–253	52
9	1923.7	253–254	52
10	2115.8	254–256	52

6.3.2.2.5.5. Cyclic Oligo(esters)

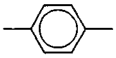


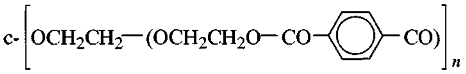
n	Mol. wt.	m.p. (°C)	Refs.
2	384.0	225	32,33,46,57,75,90,159
3	576.5	321	33,39,40,43,44,46,57,58,60,61,70,75,90,163–165
4	768.7	326	33,40,43,46,57,58,61,75,166
5	960.9	264	33,40,46,57,58,61,75
6	1152.7	306	33,46,58,61,75
7	1344.8	238–240	33,61,75

n = 3–13 (sharp fractions): GPC, MS, NMR, Ref. 158

6.3.2.2.6. Cyclic Oligo(esters) of Di- and Tri-Ethylene Glycols

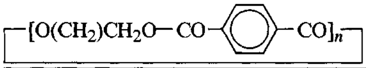
c-[OCH_2YCH_2O–CO–X–CO–OCH_2ZCH_2O–CO–X–CO]

X	Y	Z	Mol. wt.	m.p. (°C)	Refs.
	-	CH_2OCH_2	428.4	173–179	40,43,57,90
	CH_2OCH_2	CH_2OCH_2	472.4	223	45,90,115
	$(CH_2OCH_2)_2$	$(CH_2OCH_2)_2$	560.5	130	90
	CH_2OCH_2	CH_2OCH_2	472.4	168–170	115
	$(CH_2OCH_2)_2$	$(CH_2OCH_2)_2$	560.5	108–111	115



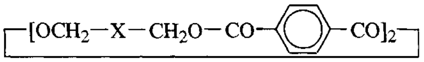
n = 3–7 (sharp fractions): GPC, MS, NMR, Ref. 158

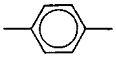
6.3.2.2.7. Cyclic Oligo(esters) of Tetraethylene Glycol



n	Mol. wt.	m.p. (°C)	Refs.
1	324.3	98–99	126
2	648.7	96	90,126,127

6.3.2.2.8. Cyclic Oligo(alkylene terephthalates)

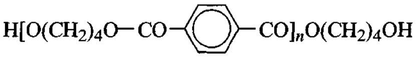


X[a]	n[a]	Mol. wt.	m.p. (°C)	Refs.
(CH_2)		412.4	251	90
$(CH_2)_3$	2	440.4	208	90
$(CH_2)_4$	2	454.5	149	90
$C(CH_3)_2$	2	234.3	284	90
	2	268.3	384	90

[a] X = $(CH_2)_8$, n = 2–5 (sharp fractions): GPC, NMR, MS 157.

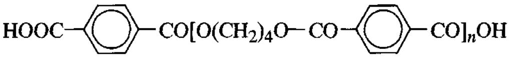
6.3.2.2.9. Oligo(butylene terephthalates)

6.3.2.2.9.1. oligomeric diols



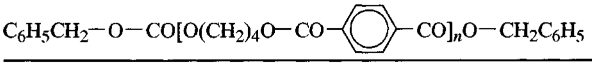
n	Mol. wt.	m.p. (°C)	Refs.
1	310.3	72	96–99
2	530.6	138	43,96–99
3	750.8	175	96–99
5	1191.1	193	96–99
7	1630.5	202	97–99

6.3.2.2.9.2. oligomeric dicarboxylic acids



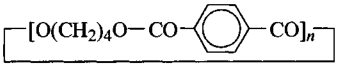
n	Mol. wt.	m.p. (°C)	Refs.
1	386.4	290	43,96–98
2	606.6	266	96–98
3	826.8	254	97,98
4	1047.0	247	97,98
6	1487.5	235	97,98

6.3.2.2.9.3. oligomeric dicarboxylic acid dibenzyl esters



n	Mol. wt.	m.p. (°C)	Refs.
1	566.6	139	96–98
2	786.8	168	96–98
3	1007.1	178	97,98
4	1227.3	187	97,98
6	1667.8	199	97,98
8	2108.2	205	97,98
10	2548.7	208	97,98

6.3.2.2.9.4. cyclic oligo(esters)

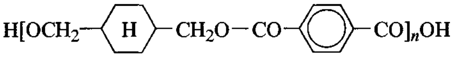


n	Mol. wt.	m.p. (°C)	Refs.
2	440.5	199	54–56,90,96,159
3	660.7	171.5	55,56,96
4	880.9	251	43,55,56,96
5	1101.2	207	96

n = 2–9 (sharp fractions): GPC, MS, X-ray (n = 2), Ref. 155

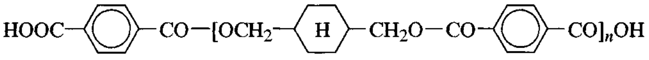
6.3.2.2.10. Oligo(1,4-cyclohexylenedimethylene terephthalates)

6.3.2.2.10.1. Oligomeric hydroxy acids



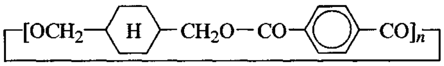
n	Config.	Mol. wt.	m.p. (°C)	Refs.
1	*trans*	292.3	175–178	41

6.3.2.2.10.2. Oligomeric dicarboxylic acids



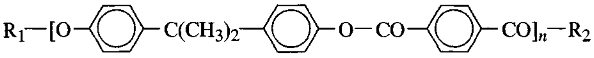
n	Config.	Mol. wt.	m.p. (°C)	Refs.
1	*trans*	440.4	>310	41
1	*cis*	440.4	>300	41

6.3.2.2.10.3. Cyclic oligo(esters)

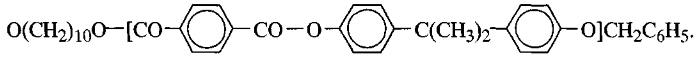


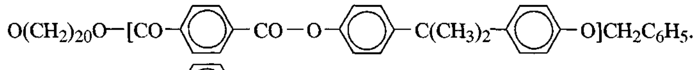
n	Config.	Mol. wt.	m.p. (°C)	Refs.
2	*trans*	548.7	299	90
3	*trans*	823.0	385	41,42,90

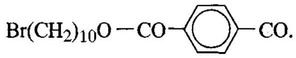
6.1.3.2.2.11. Oligomeric 4,4′-Isopropylidenediphenol (bisphenol A) Terephthalates



R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
$C_6H_5CH_2$	O-C(CH$_3$)$_3$	1	522.6	120	123,124
		2	881.0	197	123,124
		3	1239.4	265	123,124
		4	1597.7	307	123,124
		5	1956.1	–	123,124
H	O-C(CH$_3$)$_3$	1	432.5	147	123,124
		2	790.9	160	123,124
		3	1149.2	280	123,124
		4	1513.6	297	123,124
		5	1866.0	314	123,124
$C_6H_5CH_2$	OH	1	466.4	213	123,124
		2	824.9	280	123,124
		3	1183.3	300	123,124
		4	1541.6	305	123,124
		5	1900.0	315	123,124
H	OH	1	376.4	193	123,124
H	OH	2	734.8	275	123,124
		3	913.1	292	123,124
		4	1451.5	305	123,124
$C_6H_5CH_2$	O(CH$_2$)$_{10}$Br	1	685.7	63	123,124
		2	1044.1	134	123,124
		3	1402.5	232	123,124
	O(CH$_2$)$_{20}$Br	1	826.0	88	123,124
		2	1184.4	130	123,124
		3	1542.8	236	123,124
	A[a]	1	1071.3	132	123,124
		2	1788.1	170	123,124
	B[b]	1	1211.6	83	123,124
C[c]	O-C(CH$_3$)$_3$	1	798.8	117	123,124
		2	1157.5	177	123,124
C[c]	O(CH$_2$)$_{10}$Br	1	962.8	47	123,124

[a]A = 

[b]B = 

[c]C = 

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6.4. OLIGO(URETHANES)

6.4.1. OLIGO(ALKYLENE URETHANES)

6.4.1.1. Oligo(ethylene urethanes) R–$[OCH_2CH_2NHCO]_n$–OCH_3

R	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
CH_3CO	2	248.2	69–70		15
	3	335.3	98–99		15
	4	422.4	138.5–139.5		15
	5	509.5	164–165		15
	6	596.6	174–176		15
	7	683.6	185–186		15
H	1	119.1	~0	116–117/3	15
	2	206.2	62–63		15
	3	293.3	101.5–102.5		15
	4	380.4	129–130		15
	5	467.4	152–153		15
	6	554.5	168.5–169.5		

6.4.1.2. Oligo[(3-methyl)ethylene urethanes] R–[$OCH_2CH(CH_3)NHCO$]$_n$–OCH_3

R	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	$[\alpha]_D$	c (%), EtOH	Refs.
CH_3CO	1	175.2		109–110/4	−23.2	1.39	11
	2	276.3	93–98		−30.2	0.32	11
	3	377.4	113–117		−31.8	0.77	11
	4	478.5	143–147		−30.9	1.14	11
	5	579.6	153–154		−30.6	0.42	11
	6	680.7	167				11
	7	781.8	173				11
H	1	133.2		109–110/3	−15.8	2.8	11,16
	2	234.3	60–64				11
	3	335.4	86–87				11
	4	436.5	120–122				11
	5	537.6	135–137				11
	6	638.7	152–153				11

6.4.1.3. Oligo[(3-isopropyl)ethylene urethanes] $CH_3CO\left[OCH_2\underset{\displaystyle CH(CH_3)_2}{CH}NHCO\right]_n-OCH_3$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	$[\alpha]_D$	c (%), EtOH	Refs.
1	203.2		117.5–118/1	−22.2	0.79	10
2	332.4	111.5–112.5		−33.5	2.0	10
3	461.6	142–143		−28.4	2.1	10
4	590.7	156.5–158		−4.2	1.9	10

6.4.1.4. Oligo[(3-isobutyl)ethylene urethanes] $R\left[OCH_2\underset{\displaystyle CH_2CH(CH_3)_2}{CH}NHCO\right]_n-OCH_3$

R	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	$[\alpha]_D^{25}$	c (%), EtOH	Refs.
CH_3CO	1	217.3		128–129/1			9
	2	360.5	73–74		−41.7	2.0	9,14
	3	503.6	97–98		−42.9	1.0	9,14
	4	646.8	136–138		−41.5	1.4	9,14
	5	790.0	149–150		−38.5	2.0	9,13
	6	933.2	162–164		−35.9	1.0	9,13
	7	1076.4	168–169		−30.5	2.2	9,13
	8	1219.5	180–181				12
	9	1362.7	185.5–186.5				12
H	1	175.3		119–121/1	−34.1	2.6	14
	2			Oil	−47.2	2.3	14
	3			Oil	−45.0	0.99	14

6.4.1.5. Oligo [(3-benzyl)ethylene urethanes] $R\left[OCH_2\underset{\displaystyle CH_2C_6H_5}{CH}NHCO\right]_n-OCH_3$

R	n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	c (%), EtOH	Refs.
CH_3CO	2	428.5	104.5–106.5	−17.9	1.2	11,14
	3	605.7	138–139	−18.1	0.71	11,14
	4	782.9	149–150			11
H	1	209.2	51.5–53	−25.9	0.72	11,14
	2	386.4	130–131	−27.8	0.77	11,14
	3	563.6	153–154			11

6.4.1.6. Oligo(trimethylene urethanes)

R	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3CO	2	276.3	57.5–58.5	18
	3	377.4	95–97	18
	4	478.5	118.5–120	18
	5	579.6	133.5–135	18
H	1	133.2	Oil	18
	2	234.3	Oil	18
	3	335.4	76.5–79	18
	4	436.5	106.5–108.5	18
	5	537.6	126–128	18

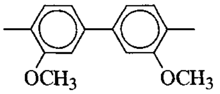
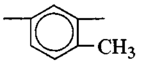
6.4.1.7. Oligo(pentamethylene urethanes)
$R-[O(CH_2)_5NHCO]_n-OCH_3$

R	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
CH_3CO	2	332.4	63.7		1,18–21
	3	461.6	98.7		1,18–21
	4	590.7	109.2		1,18–21
	5	719.9	124.7		1,18–21
	6	849.0	131.2		1,18–21
	7	978.2	138.2		1,18–21
	8	1107.4	143.2		1,18–21
	9	1236.6	150.2		1,18–21
	10	1365.7	155.2		1,18–21
H	1	161.2		131–134/0.3	1,18–20
	2	290.4	75.2		1,18–20
	3	419.5	100.2		1,18–20
	4	548.7	112.2		1,18–20
	5	677.8	116.2		1,18–20
	6	807.0	125.2		1,18–20
	7	936.2	135.2		1,18–20
	8	1065.3	141.2		1,18–20

6.4.2. OLIGO(URETHANES) OF DIISOCYANATES AND GLYCOLS

6.4.2.1. Oligo(urethanes) of Diisocyanates and 1,4-Butanediol

6.4.2.1.1. Diol Oligo(urethanes)
$H[O(CH_2)_4O-CO-NH-X-NH-CO]_n-O(CH_2)_4OH$

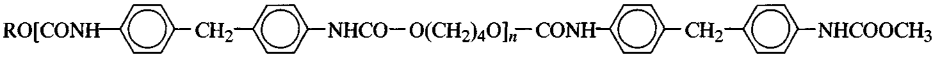
X	*n*	Mol. wt.	m.p. (°C)	Refs.
$(CH_2)_6$	1	348.4	103–105	2,3,5,6
	2	606.8	146	2,3,5
	3	865.1	162–163	2,3,5
	4	1123.4	169–170	2,3
	5	1381.7	171–173	2,3
	6	1640.0	173–174	2,3
	7	1898.3	175–176	2,3
	9	2414.9	177–179	2,3
	1	476.5	133.5	2,3
	2	862.9	127–128	2,3
	3	1249.4	164–166	2,3
	7	2795.0	190–195	2,3
	15	5886.3	210–215	2,3
	1	404.4	115	22
	2	710.7	122	22
	3	1021.0	120	22
	4	1331.3	136	22
	5	1641.6	133	22

6.4.2.1.2. Diamine Oligo(urethanes)
$H[NR-X-NR-CO-O(CH_2)_4O-CO]_n-NR-X-NHR$

X	R	*n*	Mol. wt.	m.p. (°C)	Refs.
$(CH_2)_6^a$	H	1	536.4	228	5
		2	794.7	226	5
		3	1053.0	218	5
		4	1311.4	212	5
		1	314.4	97–98	23
		2	542.6	126.5	23
		3	770.9	147–148	23
		4	999.2	169	23

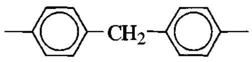
[a] Dihydrobromides.

6.4.2.1.3. Alkoxyacylamine Oligo(urethanes)



R	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	0	314.3	181.7	24
	1	654.7	185.2	24
	2	995.1	201.6	24
	3	1335.5	176.9	24
C_2H_5	0	328.3	125.3	24
	1	668.7	187.6	24
	2	1009.1	208	24
	3	1449.5	182.5	24
C_8H_{17}	0	412.5	114	24
	1	752.9	183.3	24
	2	1093.3	208.2	24
	3	1433.7	185	24
$C_{18}H_{37}$	0	552.7	123.8	24
	1	893.1	166.2	24
	2	1233.5	192.4	24
	3	1573.9	199	24

6.4.2.1.4. Cyclic Oligo(urethanes) ⌐[NR—X—NR—CO—O—Y—O—CO]$_n$⌐

R	X	Y	*n*	Mol. wt.	m.p. (°C)	Refs.
H	$(CH_2)_6$	$(CH_2)_4$	1	258.3	164	4,6,7
			2	516.6	198	6,8
CH_3		$CH_2C(CH_3)_2CH_2$	2	764.9	254–255	25

6.4.2.2. Oligo(urethanes) of Hexamethylene Diisocyanate and Diglycols

6.4.2.2.1. Diol Oligo(urethanes)
$HO[(CH_2)_2X(CH_2)_2O\text{-}CO\text{-}NH(CH_2)_6NH\text{-}CO\text{-}O]_n\text{-}(CH_2)_2X(CH_2)_2OH$

X	*n*	Mol. wt.	m.p. (°C)	Refs.
O	1	380.4	68–69	2,3
	2	654.8	103–104	2
	3	929.1	123–125	2,3
	4	1203.4	120–123	2
	5	1478.7	123–124	2,3
	7	2026.3	122–124	2,3
	15	4221.0	119–123	2,3
S	1	412.6	105–106	2
	3	993.4	132–134	2
	7	2155.5	133–135	2

6.4.2.2.2. Cyclic Oligo(urethanes)
⌐$[(CH_2)_2X(CH_2)_2O$—$CONH(CH_2)_6NH$—CO—$O]_n$⌐

X	*n*	Mol. wt.	m.p. (°C)	Refs.
O	1	274.3	138	4,17
	2	548.6	170	17
	3	722.9	131–133	17
	4	1097.2	151–153	17
	5	1371.5	136	17
	6	1645.8	145–148	17
	7	1920.1	134	17
S	1	290.4	128	4

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TABLE 7. OLIGO(SULFIDES) AND OLIGO(SELENIDES)

7.1. CYCLIC OLIGO(THIOMETHYLENES) AND OLIGO(SELENOMETHYLENES) $\ulcorner[\mathrm{XCH_2}]_n\urcorner$

X	*n*	Mol. wt.	m.p. (°C)	Refs.
S	2	92.2	105–106	11
	3	138.3	215–218	1–7,15,16,20
	4	184.4	49–50	1,5,6,8,13,18,20
	5	230.5	123–125	6,9,13,14,19,20
S	6	276.5	227–229	12
Se	3	279.0	226–228	1,17
	4	372.0	80–81	1

7.2. CYCLIC OLIGO(THIOALKYLENES) $\ulcorner[\mathrm{S(CH_2)}_x]_n\urcorner$

x	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
2	2	120.2	112–113	199–200/1013	43–45
	3	180.4	84		22,24,27
	4	240.5	224–225		23,25,26,30
	5	300.6	97.5–99		25
	6	360.7	91–93		25,28,29
3	2	148.3		86–87/1	25,29,42
	3	222.4	87–88		23,30
	4	296.6	57.5–59		25,29,30,42
	6	444.9	29–30		25
4	2	176.3	94–95.5		25
4	4	352.7	31–32		25
	6	529.0	67–70		25
5	2	204.3	81–82.5		25,26
	4	408.6	33–33.5		25
	6	612.8	36.5–38		25
6	2	232.5	82		21,25
	4	464.9	30–32		25
	6	697.4	56–59.5		25
10	2	344.7	48–49		21,26
16	2	513.0	75–77		26

7.3. SUBSTITUTED CYCLIC OLIGO(THIOETHYLENES) $\ulcorner[\mathrm{S{-}CR_1R_2{-}CHR_3}]_n\urcorner$

R_1	R_2	R_3	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	H	H	4	296.6		32,33
			5	370.7	Oil	32,33
C_2H_5			4	352.7		33
$(CH_3)_2CH$			4	408.8		33
C_6H_5			2	272.4		33,34
CH_3	CH_3	H	2	176.3		33
CH_3	H	CH_3	4	352.6	155–180 (NMR)	33,35
H			2	280.5		33

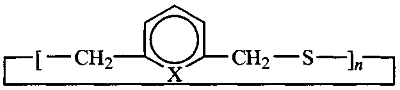
7.4. CYCLIC CO-OLIGOMERS OF FORMALDEHYDE AND THIOFORMALDEHYDE $\ulcorner[\mathrm{OCH_2{-}(SCH_2)}_x]\urcorner$

x	Mol. wt.	m.p. (°C)	Refs.
4	214.4	106–108	6,10
5	260.5	163–165	6,10

7.5. CYCLIC OLIGO(ETHER SULFIDES) $-[(SCH_2CH_2)_x-(OCH_2CH_2)_y]_n-$

x	*y*	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
1	1	1	104.2	− 17	147/1007	45,46
	1	2	208.3	22.5–23		26,36
	2	1	148.2		40–48/0.2	30,31
	2	2	296.5	90–91		26,31,36
	3	1	192.3		90–95/1	31,36
	3	2	384.6	Liquid		26,36
	4	1	236.3		123–124/0.1	30,31
	5	1	280.4		164–170/0.1	30,31
2	1	1	164.3		62–64/0.1	30,31
	1	2	328.6	50		28,29
	1	3	492.9	123		28
	2	1	208.3	20–24	134–136/0.1	31
	3	1	252.4	51–52	34–36/0.1	29–31
	4	1	296.4	54–56		30,31
3	1	1	224.4	89–90		30,31
	2	1	268.5	43–44		30,31
	3	1	312.5		200–206/3	30,31
	4	1	356.6	Liquid		30,31
4	1	1	284.5	93–95		30,31
	2	1	328.6	125		31

7.6. THIACYCLOPHANES



X	*n*	Mol. wt.	m.p. (°C)	Refs.
CH	2	272.4	122–123	30,37,39
	3	408.7	124–125	37,39
	4	544.9	161–162	39
N	2	274.4	220–222	30,37,38,41
	3	411.6	185–188	30,37,40,41

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TABLE 8. OLIGOMERS CONTAINING N IN THE MAIN CHAIN

8.1. OLIGO(AMIDES)

8.1.1. OLIGO(AMIDES) OF β-AMINO ACIDS (NYLON 3)

8.1.1.1. Linear Oligo(amides) of β-Alanine $H[NH(CH_2)_2CO]_nOH$

n	Mol. wt.	m.p. (d) (°C)	Refs.
1	89.1	206	1
2	160.2	212	2,4,96
3	231.2	>255	3,4,96
4	302.3	>260	4,96
5	373.4	>310	5
6	444.5	>320	5

8.1.1.2. Cyclic Oligo(amides) of β-Alanine $\overline{[NH(CH_2)_2CO]_n}$

n	Mol. wt.	m.p (°C)	Refs.
1	71.1	74–74.5	6,104,113
2	142.2	298–299	4,8,9,72,84,114,116
3	213.2	>360	4,10,84,88,93,101,114,116
4	284.3	353	4,10,84,114,116
5	355.4	327	84,114,116
6	426.5	360	114,116
7	497.6	341	114,116
8	568.8	>360	114,116
9	639.7	349	114,116
10	710.8	>350	116
11	781.8	>350	116

8.1.1.3. Linear Oligo(amides) of C-Methyl-β-Alanines
$H[NHCHR_1CHR_2CO]_nOH$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	H	1	103.1	188–189	102
		3	273.3	240–241	92

8.1.1.4. Cyclic Oligo(amides) of C-Methyl-β-Alanines
$\overline{[NHCHR_1CHR_2CO]_n}$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
CH_3	H	1	85.1		100/13	104,105
		3	255.3	300		91
H	CH_3	1	85.1		98–99/20	104
		2	170.2	255		84
		3	255.3	>350		84,85,87
		4	340.4	>350		84
		5	425.5	>350		84
		6	510.6	>350		84
		7	595.7	330–335		84
		8	680.8	338–340		84
		9	765.9	327–330		84
		10	851.0	330		84
		11	936.0	325		84

8.1.1.5. Linear Oligo(amides) of C-Dimethyl-β-Alanines
$H[NHC(R_1)_2C(R_2)_2CO]_nOH$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
H	CH_3	1	117.1	239	106
		3	315.4	209–212	94
		6	612.8	207.5–210.5	94
CH_3	H	1	117.1	217	103
		3	315.4	182–184	95

*8.1.1.6. Cyclic Oligo(amides) of C-Dimethyl-*β-Alanines
$\overline{[NHC(R_1)_2C(R_2)_2CO]_n}$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
H	CH_3	1	99.1		70–73/1.1	107
		3	297.4	255–259.5		84,91
		4	396.5	270		84
		5	495.7	257		84
		6	594.8	310		84,91
		7	693.9	290		84
		8	793.1	256		84
		9	892.3	315		84
		10	991.3	252		84
		11	1090.5	315		84
		12	1189.6	245		84
CH_3	H	1	99.1	16–17	112/20	104,105
		3	297.4	257–258		91

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TABLE 8. OLIGOMERS CONTAINING N IN THE MAIN CHAIN

8.1. OLIGO(AMIDES)

8.1.1. OLIGO(AMIDES) OF β-AMINO ACIDS (NYLON 3)

8.1.1.1. Linear Oligo(amides) of β-Alanine $H[NH(CH_2)_2CO]_nOH$

n	Mol. wt.	m.p. (d) (°C)	Refs.
1	89.1	206	1
2	160.2	212	2,4,96
3	231.2	>255	3,4,96
4	302.3	>260	4,96
5	373.4	>310	5
6	444.5	>320	5

8.1.1.2. Cyclic Oligo(amides) of β-Alanine $\ulcorner[NH(CH_2)_2CO]_n\urcorner$

n	Mol. wt.	m.p (°C)	Refs.
1	71.1	74–74.5	6,104,113
2	142.2	298–299	4,8,9,72,84,114,116
3	213.2	>360	4,10,84,88,93,101,114,116
4	284.3	353	4,10,84,114,116
5	355.4	327	84,114,116
6	426.5	360	114,116
7	497.6	341	114,116
8	568.8	>360	114,116
9	639.7	349	114,116
10	710.8	>350	116
11	781.8	>350	116

8.1.1.3. Linear Oligo(amides) of C-Methyl-β-Alanines $H[NHCHR_1CHR_2CO]_nOH$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	H	1	103.1	188–189	102
		3	273.3	240–241	92

8.1.1.4. Cyclic Oligo(amides) of C-Methyl-β-Alanines $\ulcorner[NHCHR_1CHR_2CO]_n\urcorner$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
CH_3	H	1	85.1		100/13	104,105
		3	255.3	300		91
H	CH_3	1	85.1		98–99/20	104
		2	170.2	255		84
		3	255.3	>350		84,85,87
		4	340.4	>350		84
		5	425.5	>350		84
		6	510.6	>350		84
		7	595.7	330–335		84
		8	680.8	338–340		84
		9	765.9	327–330		84
		10	851.0	330		84
		11	936.0	325		84

8.1.1.5. Linear Oligo(amides) of C-Dimethyl-β-Alanines $H[NHC(R_1)_2C(R_2)_2CO]_nOH$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
H	CH_3	1	117.1	239	106
		3	315.4	209–212	94
		6	612.8	207.5–210.5	94
CH_3	H	1	117.1	217	103
		3	315.4	182–184	95

*8.1.1.6. Cyclic Oligo(amides) of C-Dimethyl-*β-Alanines $\ulcorner[NHC(R_1)_2C(R_2)_2CO]_n\urcorner$

R_1	R_2	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
H	CH_3	1	99.1		70–73/1.1	107
		3	297.4	255–259.5		84,91
		4	396.5	270		84
		5	495.7	257		84
		6	594.8	310		84,91
		7	693.9	290		84
		8	793.1	256		84
		9	892.3	315		84
		10	991.3	252		84
		11	1090.5	315		84
		12	1189.6	245		84
CH_3	H	1	99.1	16–17	112/20	104,105
		3	297.4	257–258		91

8.1.2. OLIGO(AMIDES) OF γ-AMINOBUTYRIC ACID (NYLON 4)

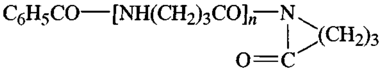
8.1.2.1. Linear Oligo(amides) $H[NH(CH_2)_3CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	103.1	204–205	11
2	188.2	186	4,7,12
3	273.4	198–199	4
4	358.4	202–203	4
6	528.6	196–198	133
8	698.8	206–208	133
10	869.0	199–203	133
12	1039.3	208	133
16	1379.6	207–209	133
20	1719.4	206–208	133

8.1.2.2. Cyclic Oligo(amides) $[NH(CH_2)_3CO]_n$ (cyclic)

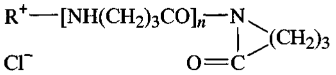
n	Mol. wt.	m.p. (°C)	Refs.
1	85.1	24	13,14
2	170.2	283	4,10,70,71,73
3	255.3	242–243	4,10
4	340.4	255	4,10,70
6	510.6	303	10,135
8	680.9	298	135
10	851.1	312	135
12	1021.3	301	135
14	1191.5	>355	135

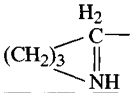
8.1.2.3. Anionic Oligo(amides)



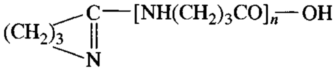
n	Mol. wt.	m.p. (°C)	Refs.
0	189.2	92.5	15
1	274.3	121	16

8.1.2.4. Cationic Oligo(amides)



R	*n*	Mol. wt.	m.p. (°C)	Refs.
H_2	1	206.5	181	71,89,118
	0	188.7	156	89,119
	1	273.5	162	89

8.1.2.5. Amidino-Oligo(aminobutyric Acids)



n	Mol. wt.	m.p. (°C)	Refs.
1	170.2	175–177	89,118,121
2	255.3	175	89
3	340.4	162–163	89

8.1.3. OLIGO(AMIDES) OF-δ-AMINOVALERIC ACID (NYLON 5)

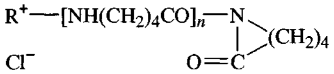
8.1.3.1. Linear Oligo(amides) $H[NH(CH_2)_4CO]_nOH$

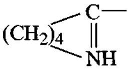
n	Mol. wt.	m.p. (°C)	Refs.
1	117.2	160–162	17
2	216.3	178	18
3	315.4	184–185.5	18
4	414.5	196.5–198.5	18

8.1.3.2. Cyclic Oligo(amides) $[NH(CH_2)_4CO]_n$ (cyclic)

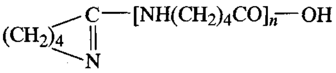
n	Mol. wt.	m.p. (°C)	Refs.
1	98.1	39–40	14,17,19
2	198.3	295–296	8,18
3	297.4	329–331	18
4	396.5	266–267	18

8.1.3.3. Cationic Oligo(amides)



R	*n*	Mol. wt.	m.p. (°C)	Refs.
H_2	1	234.5	114	89
	0	216.5	93–94	89
	1	315.5	138	89

8.1.3.4. Amidino-Oligo(aminovaleric Acids)



n	Mol. wt.	m.p. (°C)	Refs.
1	198.3	166–168	89,118
2	297.4	92–94	89
3	396.5	112	89

8.1.4. OLIGO(AMIDES) OF ε-AMINOCAPROIC ACID (NYLON 6)

8.1.4.1. Linear Oligo(amides) $H[NH(CH_2)_5CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	131.2	206–208	20,21
2	244.3	204–205	22–24,136
3	357.3	208–209	23–25,69,136
4	470.6	220–221	23,24,36
5	583.8	214–215	23,69,136
6	697.0	212–214	23,24,136
7	810.1	210–211	23,69,136
8	923.3	210–211	23
9	1036.5	208–211	26,69
10	1149.6	212–213	26
11	1262.8	209–212	26,69
12	1375.9	211–213	26
13	1489.1	210–211	69
14	1602.3	207–208	136
15	1715.3	207–208	69
17	1941.5	209–211	69

8.1.4.1. cont'd

n	Mol. wt.	m.p. (°C)	Refs.
18	2054.9	206–209	136
21	2394.5	212–213	69
22	2507.5	209–211	136
25	2847.0	212–213.5	69
26	2960.2	209–211	136
30	3412.8	210–213	136
34	3865.5	211–214	136
38	4318.1	214–217	136

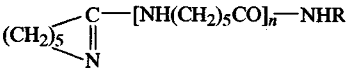
8.1.4.2. Oligo(aminocaproic Amides)
$H_2^+[NH(CH_2)_5CO]_n$-NHR CL$^-$

R	*n*	Mol. wt.	m.p. (°C)	Refs.
n-C_4H_9	1	222.8	143	122
	2	335.9	176	122
	3	449.1	189	122
$CH_2C_6H_5$	1	256.8	164.5	122
	2	369.9	179	122
	3	483.1	194–195	122

8.1.4.3. Amidino-Oligo(aminocaproic Acids)

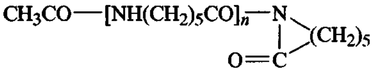
n	Mol. wt.	m.p. (°C)	Refs.
1	226.3	168	120,128
2	339.5	120	120
3	452.6	154	120

8.1.4.4. Amidino-Oligo(aminocaproic Amides)



R	*n*	Mol. wt.	m.p. (°C)	Refs.
n-C_4H_9	0	168.3	53	122
	1	281.4	129	122
	2	394.6	148–150	122
$CH_2C_6H_5$	0	202.3	76–78	122
	1	315.5	135	122
	2	428.6	157	122

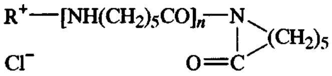
8.1.4.5. Anionic Oligo(amides)

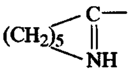


n	Mol. wt.	b.p. (°C/mbar)	n_D^{20}	R_F^a	Refs.
0	155.2	123/21	1.4898		32
1	268.5		1.4992	0.76	33
2	381.5			0.67	33
3	494.7			0.58	33

[a] PC: solvent, tetrahydrofuran/cyclohexane/water (186 : 14 : 10).

8.1.4.6. Cationic Oligo(amides)



R	*n*	Mol. wt.	m.p. (°C)	Refs.
H_2	1	262.8	112	120
	2	375.9	Oil	120
	3	489.1	Oil	120
	0	244.8	137	89,120
	1	357.9	106–108	120

8.1.4.7. End-group Protected Oligo(amides)
C_2H_5CO-$[NH(CH_2)_5CO]_n$-NHC_3H_7

n	Mol. wt.	m.p. (°C)	Refs.
1	228.3	106	31,112
2	341.5	149	31,112
3	454.7	172	31,112
4	567.8	181	31
5	681.0	187	31,112
6	794.2	191	31,112
7	907.3	197	31,112
8	1020.5	200	31,112
9	1133.6	201	31,112
10	1246.8	201	31,112
11	1360.0	204	31
12	1473.1	202	31,112
13	1586.3	200	31
14	1699.3	205	31
15	1812.6	206	31
16	1925.8	206	31

8.1.4.8. Cyclic Oligo(amides)

			R_F		
n[a]	Mol. wt.	m.p. (°C)	TCW[b]	EAW[c]	Refs.
1	113.2	69.5	0.56	0.88	14,17,27,78
2	226.3	348	0.48	0.81	4,24,28,29,45,78,98,110,111,112,148
3	339.5	244	0.34	0.77	4,24,28,29,45,78,98,111,112,147
4	452.6	256–257	0.25	0.69	4,24,28,29,45,78,98,111,112
5	565.8	254	0.16	0.59	4,24,29,78,98,111,112
6	678.9	260	0.10	0.49	4,24,29,60,98,111,112
7	792.1	243	0.08	0.40	29,30,60,98,111
8	905.3	254	0.04		29,30,60,98,111
9	1018.4	245	0.02		29,30,68,138

8.1.4.8. cont'd

n^a	Mol. wt.	m.p. (°C)	R_F TCW[b]	R_F EAW[c]	Refs.
10	1131.8	257			117,137
11	1244.8	249			138
12	1357.9	262			117,137
13	1471.1	249			138
14	1584.3	263			117,137
15	1697.4	256			138
16	1810.6	261			117,137
18	2036.9	263			117,137
20	2263.2	259			117,137
21	2376.4	248			138
22	2489.5	250			117,137
24	2715.9	252			117,137
25	2829.0	249			138
26	2942.2	246			137
27	3055.3	244			138
28	3168.5	247			137
30	3394.8	255			117,137
32	3621.2	248			137
33	3734.3	231			138
34	3847.5	231			137
36	4073.8	228			137
38	4300.1	230			137
40	4526.4	235			137
48	5431.7	234			138
50	5658.1	229			138
55	6223.9	226			138
56	6337.0	229			138
60	6789.7	227			138
64	7242.3	226			138
70	7921.3	225			138
72	8147.6	225			138
80	9052.9	224			138
90	10184.5	222			138
100	11316.1	221			138

[a] $n = 2$–40: HPLC (trifluoroethanol/water mixtures), Ref. 117; $n = 2$–18: FD-MS, Ref. 117; $n = 2$–100: HPLC (trifluoroethanol/water, gradient elution, Ref. 138.
[b] PC, TLC: solvent, tetrahydrofuran/cyclohexane/water (186 : 14 : 10).
[c] PC, TLC: solvent, ethyl acetate/acetone/water (10 : 10 : 2), Refs. 29,134.

8.1.5. OLIGO(AMIDES) OF HIGHER ω-AMINO ACIDS (NYLON 7–12)

8.1.5.1. Linear Oligo(amides) $H[NH(CH_2)_xCO]_nOH$

x	n	Mol. wt.	m.p. (°C)	Refs.
6	1	145.2	195	34,35
	2	272.4	205–208	36
7	1	159.2	188	4,37
	2	300.4	191–192	4,38
8	1	173.3	184	4,34
	2	328.5	184–186	4
10	1	201.3	186–187	34,38,39
	2	384.6	189–190	4,40,140
	3	567.9	183–184	5,40,115,140
	4	751.2	177–179	40,63,115
	5	934.5	177–178	63
	10	1850.8	181–182	63,67
11	1	215.3	186–187	41
	2	412.6	192–193	31

8.1.5.2. Cyclic Oligo(amides) $\overline{[NH(CH_2)_xCO]_n}$

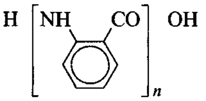
x	n	Mol. wt.	m.p. (°C)	Refs.
6	1	127.2	29–30	14,17,42
	2	254.4	236–237	4,10
	3	381.6	259–261	89
6	4	508.8	215–216	89
	5	636.0	236	89
	6	763.2	244–245	89
	8	1017.5	258–259	89
	10	1271.9	262–263	89
7	1	141.2	72–73	13,14,34,42
	2	282.4	277	4,10,76,77
	3	423.6	217	89
	4	564.8	219	82,89
	5	706.0	215	89
	6	847.2	215	89
8	1	155.3	138–139	14,42
	2	310.5	201	4,10
9	1	169.3	162	14,42
	2	338.4	238	10,144

8.1.5.2. cont'd

x	*n*	Mol. wt.	m.p. (°C)	Refs.
10	1	183.3	155	42,43,75
	2	366.6	188–189	4,10,44,75,98
10	4	741.2	203	140
	5	926.6	204	140
	6	1111.9	217	140
	7	1297.2	205	140
	8	1482.5	221	140
	9	1667.8	201	140
	3	549.9	184	44,60,75,98
11	1	197.3	155	13,14,42,75
	2	394.6	212	60,61,75,98,115
	3	531.9	175	31,75
14	2	478.8	182	139

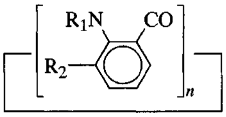
8.1.6. OLIGO(AMIDES) OF AROMATIC AMINO ACIDS

8.1.6.1. Linear Oligo(amides) of o-Aminobenzoic Acid



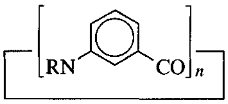
n	Mol. wt.	m.p. (°C)	Refs.
1	137.1	146	46–48
2	256.3	203–204	46,123,124,131
3	375.4	256	46,131
4	494.5	d	46

8.1.6.2. Cyclic Oligo(amides) of o-Aminobenzoic Acids



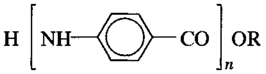
R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Refs.
H	H	2	238.2	335–337	47,125–128,131
CH_3	H	2	266.3	207	47
		3	399.2	>320	131
		4	532.2	>300	130
$C_6H_5CH_2$	H	2	418.2	158–159	131
		3	627.3	260–263	131
	CH_3	3	669.3	260–263	129
CH_3	CH_3	3	441.2	>300	129

8.1.6.3. Cyclic Oligo(amides) of m-Aminobenzoic Acids



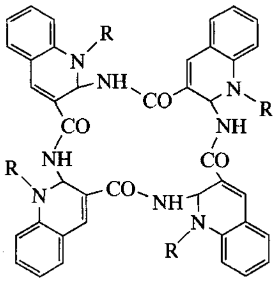
R	*n*	Mol. wt.	m.p. (°C)	Ref.
CH_3	3	399.2	>320	132

8.1.6.4. Linear Oligo(amides) of p-Aminobenzoic Acid



R	*n*	Mol. wt.	m.p. (°C)	Refs.
H	2	256.1	276	86
	3	375.4	>310	86
C_2H_5	2	284.1	176	86
	3	403.2	>266	86
	4	522.2	>330	86

8.1.6.5. Cyclic Oligo(amides) of 4-Amino-2,3-dihydroquinoline-3-Carboxylic Acid



R	*n*	Mol. wt.	m.p. (°C)	Ref.
n-C_3H_7	4	857.0	198	97
$CH_2C_6H_5$	4	1049.2	206	97

8.1.7. CYCLIC DIAMIDES OF ALIPHATIC DICARBOXYLIC ACIDS AND DIAMINES $[NH(CH_2)_xNH-CO(CH_2)_xCO]_n$

x	*n*	Mol. wt.	m.p. (°C)	Refs.
2	1	142.2	201	142
3	1	170.2	238	49,50,74,139
4	1	198.3	304	49,51,139
5	1	226.3	337	49,139
	2	452.6	234	143
	3	679.0	246	143
	4	905.3	244	143
6	1	254.3	238	49,51,139
7	1	282.4	267	49,139
8	1	310.5	209	8,49,139,146
9	1	338.5	228	49,139,147
10	1	366.6	195	8,49,139
11	1	394.6	206	139
12	1	422.7	186	139

8.1.8. OLIGO(AMIDES) OF ADIPIC ACID AND HEXAMETHYLENE DIAMINE (NYLON 6.6)

8.1.8.1. Linear Oligo(amides) $H[NH(CH_2)_6NH-CO(CH_2)_4CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	244.3	193	52,53
2	470.7	221–222	52,53,63
3	696.9	246–248	52,53,63
4	923.3	247–249	31,63,65
5	1149.5	247–250	31,63,65
10	2281.1	250–255	63

8.1.8.2. End-Group Protected Oligo(amides)

8.1.8.2.1. OLIGOMERIC DICARBOXYLIC ACID DIPROPYLAMIDES
$C_3H_7NH-CO(CH_2)_4CO-[NH(CH_2)_6NH-CO(CH_2)_4CO]_n-NHC_3H_7$

n	Mol. wt.	m.p. (°C)	Refs.
1	454.7	229–230	64
2	681.0	239–242	64
3	907.3	248–250	64
4	1133.6	257–260	64
5	1359.9	258–261	64

8.1.8.2.2. OLIGOMERIC DIPROPIONYL DIAMINES
$C_2H_5CO-[NH(CH_2)_6NH-CO(CH_2)_4CO]_n-NH(CH_2)_6NH-COC_2H_5$

n	Mol. wt.	m.p. (°C)	Refs.
1	454.7	202–203	64
2	681.0	226–228	64
3	907.3	229–231	64

8.1.8.3. Oligomeric Diamines
$H_2^+[NH(CH_2)_6NH-CO(CH_2)_4CO]_n-NH(CH_2)_6NH_3^+\ 2Cl^-$

n	Mol. wt.	m.p. (°C)	Refs.
1	415.4	248–250	65
2	641.7	249–251	65
3	868.0	252–254	65
4	1094.4	251–254	65
5	1320.7	252–255	65

8.1.8.4. Oligomeric Dicarboxylic Acids
$HOOC(CH_2)_4CO-[NH(CH_2)_6NH-CO(CH_2)_4CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	372.4	188–189	56
2	598.7	200–205	56,57
3	825.0	210–211	56
4	1051.3	214–219	31

8.1.8.5. Cyclic Oligo(amides) $\ulcorner[NH(CH_2)_6NH-CO(CH_2)_4CO]_n\urcorner$

n[a]	Mol. wt.	m.p. (°C)	TCW[b]	EAW[c]	Refs.
1	226.3	254	0.47	0.51	51,53–55,62,80,81,90,98,108
2	452.6	243–244	0.28	0.38	53–55,62,80,81,90,98,109
3	678.9	235	0.13	0.23	53,55,62,98
4	905.3	273	0.06	0.16	53,60,62,98
5	1131.6	279			149
6	1357.9	279			149
7	1584.3	291			149
8	1810.6	282			149
9	2036.9	280			149
10	2263.2	280			149
12	2715.9	280			149
14	3168.5	292			149
16	3621.2	284			149
18	4073.8	275			149
20	4526.4	270			149

[a] $n = 1$–20: HPLC (trifluoroethanol/water, gradient elution), Ref. 149.
[b] PC, TLC: solvent: tetrahydrofuran/cyclohexane/water (186 : 14 : 10).
[c] PC, TLC: solvent: ethyl acetate/acetone/water .(10 : 10 : 2).

8.1.9. OLIGO(AMIDES) OF SEBACIC ACID AND HEXAMETHYLENEDIAMINE (NYLON 6.10)

8.1.9.1. Linear Oligo(amides) $H[NH(CH_2)_6NH-CO(CH_2)_8CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	300.4	187–188	58
2	582.8	196–199	63,67
3	865.3	208–210	63,67

8.1.9.2. Cyclic Oligo(amides) $\ulcorner[NH(CH_2)_6NH-CO(CH_2)_8CO]_n\urcorner$

n	Mol. wt.	m.p. (°C)	Refs.
1	282.4	232	51,98,145
2	564.8	222	58,60,98,145
3	847.3	221	145

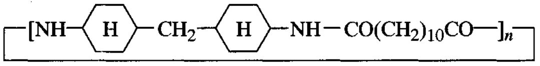
8.1.9.3. Oligomeric Diamines
$H[NH(CH_2)_6NH-CO(CH_2)_8CO]_n-NH(CH_2)_6NH_2$

n	Mol. wt.	m.p. (°C)	Refs.
1	398.6	129–131	57,58
2	681.1	177–179	58
3	963.5	203–210	58

8.1.9.4. Oligomeric Dicarboxylic Acids
$HOOC(CH_2)_8CO-[NH(CH_2)_6NH-CO(CH_2)_8CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	494.6	156–159	57,58
2	767.1	182–184	57,58
3	1049.5	181–185	58

8.1.10. OLIGO(AMIDES) OF DECANE DICARBOXYLIC ACID AND *p,p'*-DIAMINO-DICYCLOHEXYLMETHANE (QIANA TYPE)

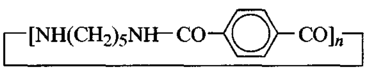


n	Mol. wt.	Config.	m.p. (°C)	Refs.
1	404.6	*trans-trans*	310–314	83
		cis-trans	269–272	83
		cis-cis	254–257	83

8.1.11. OLIGO(AMIDES) OF OXALIC ACID AND HEXAMETHYLENEDIAMINE $-[NH(CH_2)_6NH-COCO]_n-$

n	Mol. wt.	m.p. (°C)	Refs.
1	170.2	232	66
2	340.4	303	66
3	510.6	345	66

8.1.12. OLIGO(AMIDES) OF TEREPHTHALIC ACID AND PENTAMETHYLENEDIAMINE



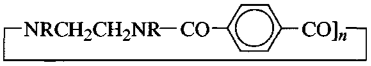
n	Mol. wt.	m.p. (°C)	Refs.
2	464.3	407	59

8.1.13. OLIGO(AMIDES) OF *N,N'*-DIALKYLETHYLENEDIAMINE AND DICARBOXYLIC ACIDS

8.1.13.1. Aliphatic Dicarboxylic Acids $-NRCH_2CH_2NR-CO(CH_2)_xCO]_n-$

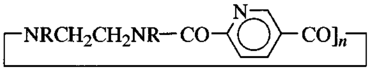
R	*x*	*n*	Mol. wt.	m.p. (°C)	Refs.
$C_6H_5CH_2$	3	2	672.8	231–234	79
	5	2	729.0	199–201	79
	7	2	785.1	199–204	79

8.1.13.2. Terephthalic Acid



R	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	3	654.8	114–123	99
$C_6H_5CH_2$	3	1111.4	255–257	100
	4	1481.8	143–145	100
	6	2222.8	140–144	100

8.1.13.3. Pyridine-2.5-Dicarboxylic Acid



R	*n*	Mol. wt.	m.p. (°C)	Refs.
CH_3	3	663.8	123–129	99
	4	885.0	132–136	99

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8.2. OLIGO(PEPTIDES)

8.2.1. OLIGO(PEPTIDES) OF GLYCINE

8.2.1.1. Linear Oligo(peptides) $H[NHCH_2CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	75.1	233–236	1
2	132.1	210–215	2,7,75
3	189.2	235	3,4,75
4	246.2	240	4,5,75
5	303.3	270	4,5,75,78
6	360.3	>256 d	6

8.2.1.2. Cyclic Oligo(peptides) $\overline{[NHCH_2CO]_n}$

n	Mol. wt.	m.p. (°C)	Refs.
2	114.1	309	2,7,79,131,174,177,184
4	228.2	340	8,9,77,79,80,191,205,206
5	285.3	>330	9,77–80,136
6	342.3	>360	4,8,10,11,77,79,80,131
7	399.4	>280	77,79,131
8	456.4	>350	77,79,131,205
9	513.5	290	77,79,131
10	570.5	290	77,79,131
11	627.6	300	77,79,131

8.2.2. OLIGO(PEPTIDES) OF SARCOSINE

8.2.2.1. Linear Oligo(peptides) $H[N(CH_3)CH_2CO]_nOH$

n	Mol. wt.	m.p. (°C)	Refs.
1	89.1	211–213	1
2	160.2	190–191	13,17,21

8.2.2.2. Cyclic Oligo(peptides) $\overline{[N(CH_3)CH_2CO]_n}$

n	Mol. wt.	m.p. (°C)	Refs.
2	142.2	147	13,27,51,61,177,187,191,204
3	213.3	221	51,191,192,197
4	284.4	>350	51,166,191–195,198
5	355.5	255	51,191–193,199
6	426.5	315	17,51,163,166,191,193,200
7	497.7	296	51,191,193,201
8	568.7	338	51,191,193,196,202
9	639.8	>320	17,163
10	711.0		193,203
12	853.0	>320	17,163

8.2.3. OLIGO(PEPTIDES) OF L-ALANINE

8.2.3.1. Linear Oligo(peptides) $H[NHCH(CH_3)CO]_nOH$

			Specific rotation				
n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
1	89.1		+ 14.5	25	10	6.0 N HCl	1
2	160.2	298	− 38.5	27	0.9	0.2 N HCl	6,12,15,73,85,138,139
3	231.3	257–263	− 85.7	27	0.6	0.2 N HCl	14,15,73,85,138,139
4	302.3	269–272	− 131.0	27	0.6	0.2 N HCl	15,16,73,85,138,139
5	373.4	> 320	− 150.0	27	0.5	0.2 N HCl	15,16,85,138
6	444.5	> 320	− 167.0	27	0.3	0.2 N HCl	15,16,85,138
7	515.6	> 320					15

8.2.3.2. Endgroup Protected Oligo(peptides) $R–[NHCH(CH_3)CO]_n–R'$

					Specific rotation			
R	R′	*n*	Mol. wt.	m.p. (°C)	$[\alpha]_D^{25}$	*c* (%)	Solvent	Refs.
BOC	OMe	2	274.3	110–111	− 71.8[a]		HFIP	86,95,102,103
		3	345.4	193–194	− 84.8[a]		HFIP	86,87,95,102,103
		4	416.5	> 240 d	− 84.0[a]		HFIP	86,87,95,102,103
		5	487.6	> 240 d	− 83.1[a]		HFIP	86,87,95,102,103
		6	558.6	> 240 d	− 82.0[a]		HFIP	86,87,102,103
		7	629.7	> 240 d	− 79.5[a]		HFIP	86,87,102,103
Z[b]	OEt	2	322.4	116	− 51.1	0.5	TFE	81–83
		3	393.4	192	− 73.0	0.5	TFE	14,81–83
		4	464.5	251–253	− 95.1	0.5	TFE	81
		5	535.6	250	− 107.1	0.5	TFE	81–83
		6	606.7	> 275 d	− 119.3	0.25	TFE	81
		7	677.8	> 275 d	− 125.4	0.25	TFE	81
		10	891.0	> 250 d	− 136.9	0.2	TFE	82,83
	Mo	2	363.4	135–136	− 35.4	0.47	TFE	81
		3	434.5	198–200	− 62.5	0.48	TFE	81
		4	505.6	270–271	− 78.0	0.46	TFE	81
		5	576.7	> 275 d	− 92.0	0.45	TFE	81
		6	647.7	> 275 d	− 102.5	0.45	TFE	81
		7	718.8	> 275 d	− 108.1	0.45	TFE	81
		8	789.9	> 275 d	− 1171.1	0.44	TFE	81
		9	861.0	> 275 d	− 121.6	0.20	TFE	81
MEEA	OEt	3	419.5	138–140	− 70.7	0.55	TFE	81
		4	490.6	240–241	− 89.2	0.49	TFE	81
		5	561.6	> 250 d	− 98.5	0.20	TFE	81
		6	632.7	> 250 d	− 108.2	0.45	TFE	81
		7	703.8	> 250 d	− 119.0	0.50	TFE	81
	Mo	3	460.5	110–111	− 49.9	0.44	TFE	81,84
		5	602.7	250 d	− 87.5	0.40	TFE	81,84
		6	673.8	> 275 d	− 94.5	0.21	TFE	81,84
		7	744.9	> 275 d	− 102.3	0.23	TFE	81,84
		8	816.0	> 275 d	− 104.4	0.25	TFE	81,84
		9	887.1	> 275 d	− 110.2	0.22	TFE	81,84

[a] $t = 22°C$.
[b] Z-, $C_6H_5CH_2$–OCO–; BOC-, $(CH_3)_3C$–OCO–; MEEA-, $CH_3OCH_2CH_2OCH_2CH_2OCH_2CO$–; –OMe, $–CH_3$; –OEt, $–OC_2H_5$; –Mo, O(CH₂CH₂)₂N–; TFE, trifluorethanol; HFIP, Hexafluoroisopropanol.

8.2.3.3. Cyclic Oligo(peptides) cyclo-$[NHCH(CH_3)CO]_n$

			Specific rotation				
n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
2	142.2	297	− 29.6	20	1.9	H_2O	6,79,174,183–185
4	284.3	250	− 68	22	0.5	DMF	134,135,195,206
6	426.5	> 310	− 210.4	20	0.02	H_2O	136,137

8.2.3.3. cont'd

			Specific rotation				
n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
7	497.6	302	−60.5	20	2.1	H_2O	79
8	568.6	331	−62.1	20	1.4	H_2O	79
9	639.7	321	−97.1	20	1	H_2O	79
10	710.8	368	−102.7	20	0.1	H_2O	79
11	781.8	289	−133.0	20	0.002	H_2O	79

8.2.4. OLIGO(PEPTIDES) OF α-AMINOISOBUTYRIC ACID $C_6H_5CH_2OCO–[NHC(CH_3)_2CO]_n–OX$

X	*n*	Mol. wt.	m.p. (°C)	Refs.
$C(CH_3)_3$	1	293.4	60–1	88,90,91,94
	2	378.5	134	90,91,94
	3	463.6	166.5–167.5	88,91–94
	4	558.7	178	88,89,91–94
	5	633.8	236	88,89,91–94
	6	718.9	215–218	88,91
	7	804.0	229–230	91
	8	889.1	247–248	91
	9	974.2	262–263	91
$C(CH_3)_3$	10	1059.3	257–258	91
	11	1144.4	271–272	91
	12	1229.5	>300	91
	1	237.2	88–89	90,151,152
	2	322.4	161–162.5	151
	3	407.5	205–206	88,92
	4	482.5	243–244	88,92
	5	577.7	254–256	88,92
	6	662.8	243–245	88

8.2.5. OLIGO(PEPTIDES) OF HYDROPHOBIC AMINO ACIDS (α-AMINOBUTYRIC ACIDS, NORVALINE, VALINE, NORELEUCINE, LEUCINE, ISOLEUCINE, CYCLOHEXYLALANINE, PHENYLALANINE, TRIYPTOPHAN)

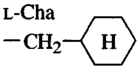
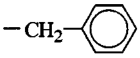
8.2.5.1. Linear Oligo(peptides) $H[NHCHRCO]_nOH$

			Specific rotation				
R	*n*	Mol. wt.	$[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
L-Val	1	117.2	+28.8	20	3.4	6 N HCl	1
$–CH(CH_3)_2$	2	216.3	+10.8	25	2.0	H_2O	18,19
	3	315.4	−41.8	21	2.7	1 N Cl	19
L-Leu	1	131.2	+13.9	25	9.1	4.5 N HCl	1
$–CH_2CH(CH_3)_2$	2	244.3	−13.7	23	1.0	1 N NaOH	18,22–24,74
	3	357.5	−51.4	20	3.1	1 N NaOH	26
	4	470.7	−90.0	20	7.6	1 N NaOH	26
L-Ile	1	131.2	+40.6	20	1	6 N HCl	1
$–CH(CH_3)CH_2CH_3$	2	244.3	+17.1	25	1	H_2O+	20
					1 eq. HCl		

8.2.5.2. Endgroup Protected Oligo(peptides) $(CH_3)_3COCO–[NHCHRCO]_n–OCH_3$

			Specific rotation			
R	*n*	Mol. wt.	m.p. (°C)	$[\alpha]^T$	Solvent	Refs.
L-Abu	2	302.3	108–109	−5.95	HFIP[a]	95
$–CH_2CH_3$	3	387.5	126–127	−10.84	HFIP[a]	95
	4	472.6	228–229	−16.72	HFIP[a]	95
	5	557.7	>250	−20.44	HFIP[a]	95

8.2.5.2. cont'd

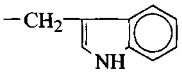
				Specific rotation		
R	*n*	Mol. wt.	m.p. (°C)	$[\alpha]^T$	Solvent	Refs.
	6	642.8	>250	−23.12	HFIP[a]	95
	7	727.8	>250	−27.21	HFIP[a]	95
L-Nva $-CH_2CH_2CH_3$	2	330.4	95–96			98,102,103,105,113,153
	3	429.5	119–120			95,97,98,102,103,105,113,153
	4	528.7	207–208			95,97,98,102,103,105,113,153
	5	627.8	220			95,97,98,102,103,153
	6	726.9	220			97–99,102,103,153
	7	826.1	220			97,98,102,103,153
L-Val	2	330.4	166–167	−48.3	TFE[b]	96,102,103,112,113,115
$-CH(CH_3)_2$				−40.8	HFA[b]	
	3	429.5	170–171	−76.7	TFE[b]	96,102,103,112,113,115
				−77.4	HFA[b]	153
	4	528.7	247–248	−91.0	TFE[b]	96,102,103,112,113,115
				−107.5	HFA[b]	153
	5	627.8	>260	−103.6	TFE[b]	96,102,103,112,115,153
				−126.2	HFA[b]	
	6	726.9	>260	−94.3	TFE[b]	96,102,103,153
				193.0	HFA[b]	
	7	826.1	>260	+37.8	TFE[b]	96,102,103,112,153
				−144.5	HFA[b]	
L-Nle	2	358.5	63–64	−3.88	HFIP[c]	95,106
$-CH_2CH_2CH_2CH_3$	3	471.6	146–147	−6.51	HFIP[c]	95,106
	4	584.8	214–215	−6.42	HFIP[c]	95,106
	5	698.0	>240	−7.74	HFIP[c]	95,106
	6	811.1	>240	−7.26	HFIP[c]	106
	7	924.3	>240	−7.51	HFIP[c]	106
L-Leu	2	358.5	141–142	−46.9	HFA[d]	100,102,104,111
$-CH_2CH(CH_3)_2$	3	471.6	158–159	−75.1	HFA[d]	100,102,104,111,153
	4	584.8	208–209	−92.6	HFA[d]	100,102,104,111,153
	5	698.0	>250	−101.0	HFA[d]	100,102,104,111,153
	6	811.1	>250	−111.1	HFA[d]	100,102,104,111,153
	7	924.3	>250	−120.0	HFA[d]	100,102,104,111,153
L-Ile	2	358.5	158–159	−44.0	TFE[e]	56–58,101,102,112,115,116
$-CH(CH_3)CH_2CH_3$	3	471.6	193–194	−67.6	TFE[e]	56–58,101,102,112,115,116
	4	584.8	245	−83.4	TFE[e]	56,57,101,102,112,115,116
	5	698.0	>250 d	−87.8	TFE[e]	56,57,101,102,112,115,116
	6	811.1	>250 d	−93.9	TFE[e]	56,57,101,102,112,115,116
	7	924.3	>240 d	+13.9	TFE[e]	56,101,102
	8	1037.5	>240 d	+24.6	TFE[e]	56,101
D-aIle	2	358.5	133–134	+30.1	TFE[f]	115,116
$-CH(CH_3)CH_2CH_3$				+39.9	HFIP[g]	
	3	471.6	175–176	+48.1	TFE[f]	115,116
				+58.3	HFIP[g]	
	4	584.8	245	+58.3	TFE[f]	115,116
				+73.5	HFIP[g]	
	5	698.0	>250 d	+55.0	TFE[f]	115,116
				+94.8	HFIP[g]	
	6	811.1	>250 d	+55.3	TFE[f]	115,116
				+101.8	HFIP[g]	
	7	924.3	>250 d	+109.4	HFIP[g]	115
L-Cha	2	438.6	117–118	−43.3	HFIP[h]	110,111,115
	3	591.8	171–172	−54.1	HFIP[h]	110,111
	4	745.1	203–204	−57.7	HFIP[h]	110,111
	5	898.3	>240	−61.2	HFIP[h]	110,111,114
	6	1051.5	>240	−65.6	HFIP[h]	110,111
	7	1204.7	>240	−66.9	HFIP[h]	110,111
L-Phe	2	426.5	121–122	0.00	TFE[i]	102,107–109,111,112
				−8.7	DMF[i]	
	3	573.7	173–174	−15.3	TFE[i]	102,107–109,111,112
				−14.9	DMF[i]	

8.2.5.2. cont'd

R	n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]^T$	Solvent	Refs.
	4	720.8	196–197	−22.2	TFE[i]	102,107–109,111,112
				−16.1	DMF[i]	
	5	868.0	213–214	−28.3	TFE[i]	102,107–109,111,112
				−19.2	DMF[i]	
	6	1015.2	223–226	−25.0	TFE[i]	102,108,109,111
				−21.1	DMF[i]	
	7	1162.3	>235	−22.1	DMF[i]	102,108,109,111
	8	1309.5	>235			108,109
	9	1456.7	>235			108,109

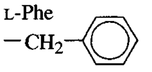
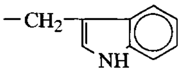
[a] $\lambda = 546$ nm; $T = 20$°C; $c = 5 \times 10^{-4}$ M; $\alpha[(\pi/180)$ rad $\times$ cm^2/g]; HFIP = hexafluoroisopropanol.
[b] $\lambda = 589$ nm; $T = 25$°C; $c = 3 \times 10^{-3}$ M (n = 2–6), 3×10^{-4} M (n = 7); TFE = trifluoroethanol; HFA = hexafluoroacetone sesquihydrate.
[c] $\lambda = 589$ nm; $T = 22$°C; $c = 10^{-3}$ M; HFIP = hexafluoroisopropanol.
[d] $\lambda = 589$ nm; $T = 25$°C; $c = 3 \times 10^{-3}$ M; HFA = hexafluoroacetone sesquihydrate.
[e] $\lambda = 589$ nm; $T = 25$°C; c = 0.025–0.2%; TFE = trifluoroethanol.
[f] $\lambda = 589$ nm; $T = 25$°C; c = 0.6%; TFE = trifluoroethanol.
[g] $\lambda = 589$ nm; $T = 21$°C; c = 0.1%; hexafluoroacetone sesquihydrate.
[h] $\lambda = 589$ nm; $T = 20$°C; c = 0.1–0.2%; HFIP = hexafluoroisopropanol.
[i] $\lambda = 589$ nm; T in TFE = 23°C, in DMF = 18°C; c = 0.2%; TFE = trifluoroethanol.

8.2.5.3. Endgroup Protected Oligo(peptides) of Tryptophan X–[NHCHRCO]$_n$–OCH$_3$

R	X	n	Mol. wt.	Specific rotation m.p. (°C)	$[\alpha]_D^{25}$	c (%)	Solvent	Refs.
	Z[a]	2	538.5	196	−13	1	MeOH	208,225
		3	721.8	85–95				208
	$(CH_3)_2PS$	1	276.3	108–109	−2.4	1.0	MeOH	140
		2	428.4	153–154	−47.6	0.5	MeOH	140
		3	580.6		−66.8	0.5	MeOH	140
		4	732.7		−65.6	0.5	MeOH	140
		5	884.9	151–154	−65.0	0.5	MeOH	140

[a] Z- = Benzyloxycarbonyl-.

8.2.5.4. Cyclic Oligo(peptides) ⌐[NHCHRCO]$_n$¬

R	n	Mol. wt.	Specific rotation m.p. (°C)	$[\alpha]_D$	(°C)	c (%)	Solvent	Refs.
L-Val –CH(CH$_3$)$_2$	2	198.3	269–271	−77.5	18–22	1.0	CH_3COOH	207
L-Leu –CH$_2$CH(CH$_3$)$_2$	2	226.3	277	−46.0	20	0.8	CH_3COOH	22,25,177,184,185, 188,207
	5	565.8	>300	−71	15	1.0	EtOH	132
L-Ile –CH(CH$_3$)CH$_2$CH$_3$	2	226.3	308	−60.0	18–22	1.0	CH_3COOH	131,207
	5	565.8	357					131
L-Phe 	2	294.4	315–316	−100	25–28	0.2	CH_3COOH	177,184,185,188
	5	735.9	250–254	−124.3	25	1.0	DMF	78
	10	1471.8	251.5	−142	20	0.4	MeOH	131
L-Trp 	2	372.4		−14.7	20		CH_3COOH	230,232

8.2.5.5. Endgroup Protected Oligo(Dipeptides) R′[NHCHR$_1$CO–NHCHR$_2$CO]$_n$–R″[a]

R′	R″	R_1	R_2	*n*	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D^{25}$	Specific rotation *c* (%)	Specific rotation Solvent	Refs.
Boc[a]	OMe	D-Val	L-Val	1	300.4	110.7	−23.7	1.02	$CHCl_3$	118
		L-CH(CH$_3$)$_2$	D-CH(CH$_3$)$_2$	2	528.7	209.6	−17.8	1.00	$CHCl_3$	118
				3	727.0	232.7	−21.0	1.02	$CHCl_3$	118
				4	925.2	261.1	−8.9	1.00	$CHCl_3$	117,118
				6	1321.8	d	−6.2	1.12	$CHCl_3$	118
				8	1718.3	d	−11.4	1.05	$CHCl_3$	118
Nps[a]	OEt	L-Leu	L-Ala	2	567.6	110–111	−66.5	2.0	HFIP/TFE[a] (1:2)	119
		–CH$_2$CH(CH$_3$)$_2$	–CH$_3$	3	751.8	203–205	−96.9	2.0	HFIP/TFE (1:2)	119
				4	936.0	257–260 d	−101.3	2.0	HFIP/TFE (1:2)	119
				5	1120.2	>270 d	−84.6	2.0	HFIP/TFE (1:2)	119
				6	1304.4	>270 d	−50.0	2.0	HFIP/TFE (1:2)	119
				8	1672.8	>270 d	−52.6	2.0	HFIP/TFE (1:2)	119

[a] Boc- = *tert*. butyloxycarbonyl-; Nps. = *o*-nitrophenylsulfenyl-; HFIP = hexafluoroisopropanol; TFE = trifluoroethanol.

8.2.6. OLIGO(PEPTIDES) OF L-AND D-PROLINE

8.2.6.1. Linear Oligo(all-L-peptides) H[N—CHCO]$_n$OH

n	Mol. wt.	m.p. (°C)	E_F-Values[a]				$[\alpha]_D^{20}$[b]	Refs.
1	115.2	220–222	1.00				−87	1
2	212.3	144–145	0.84				−175	52,62,69,70,150,171–173
3	309.4	122	0.72				−220	53,62,69,70,150,171–173
4	406.5	170	0.60				−293	62,69,70,150,171–173
5	503.6	189	0.52	1.00			−338	62,69,70,150,172,173
6	600.7	209		0.91			−376	62,69,70,150,172,173
7	697.8	228		0.77			−394	62,69,70,150
8	794.9	>280		0.72			−412	62,69,70,150
9	892.0	>280		0.66			−435	62,69,150
10	989.1	>300		0.60	1.00		−456	62,69,70,150
11	1086.2	>300			0.92		−466	62,69,70,150
12	1183.3	>300			0.83		−472	62,69,70,150
13	1280.4	>300			0.75	1.00	−480	69,70
14	1377.5	>300			0.70	0.94	−491	69
15	1474.6	>300			0.64	0.90	−496	62,69,70
16	1571.7	>300				0.86	−499	69,70
17	1668.8	>300		1.00		0.81	−505	69
18	1765.9	>300		0.95			−509	69,70
19	1863.0	>300		0.90			−513	69
20	1960.1	>300		0.84			−520	69,70
21	2057.3	>300					−521	70
22	2154.5	>300	100				−523	70
25	2445.7	>300	0.93	1.00			−526	70
28	2737.0	>300		0.92	1.00		−528	70
30	2931.3	>300			0.95		−530	70
31	3028.5	>300			0.93	1.00	−532	70
34	3320.1	>300	1.00			0.93–530	70	
37	3611.4	>300	0.93	1.00			−528	70
40	3902.7	>300		0.94			−532	70

[a] Paper electrophoresis; buffer; HCOOH/CH$_3$COOH/H$_2$O (1:1:3), 1000–5000 V, 40–115 mA, 40–240 min.
[b] *c* (%) = 1, H_2O.

8.2.6.2. Endgroup Protected Oligo(peptides)

8.2.6.2.1. *tert*-BUTYLOXYCARBONYL OLIGO(ALL-L-PROLINES) (CH$_3$)$_3$COCO—[N—CHCO]$_n$—OH

n	Mol. wt.	m.p. (°C)	R_F^a	$[\alpha]_D^{20}$[b]	Refs.
1	215.3	137–138	0.84	−105	62,72,169,179
2	312.4	191–193	0.68	−153.5	62,150,167,179,181
3	409.5	219–220	0.60	−173	62,150,167,179
4	506.6	178	0.53	−194	62,150,167

8.2.6.2.1. *cont'd*

n	Mol. wt.	m.p. (°C)	R_F^a	$[\alpha]_D^{20^b}$	Refs.
5	603.7	225	0.47	−220	62,150,167
6	700.8	247	0.41	−239	62,150,167
7	797.9	267	0.37	−247	62,150
8	894.0	>280	0.33	−256	62,150
9	991.1	>280	0.29	−265	62,150
10	1088.2	>280	0.25	−272	62,150
11	1185.3	>300	0.23	−269	62,150
12	1282.4	>300	0.22	−277	62,150
15	1573.7	>300	0.22	−291	62,150

[a] TLC: solvent, *n*-butanol/acetone/acetic acid/ammonia, 1:4/water (9 : 3 : 2 : 2 : 4).
[b] *c* (%) = 1, $CHCl_3$.

8.2.6.2.2. *tert*-Amyloxycarbonyl Oligo(all-l-prolines) $C_5H_{11}OCO-[N-CHCO]_n-OH$

n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
1	229.3	94–95.5	−47.2	21	1.7	EtOH	63–68,170,179
2	326.4	157–159	−113	25	2.0	EtOH	64–68,179
3	423.5	200–201.5	−170	25	2.2	EtOH	64–68,179,182
4	520.6	207.5–208.5	−227	24	2.1	EtOH	64–68
5	617.7	224.5–226	−248	24	2.3	EtOH	64–68
6	714.8	240–242	−291	24	2.1	EtOH	64–68
8	908.0	280	−318	22	0.9	EtOH	64–68

8.2.6.2.3. *tert*-Butyloxycarbonyl d,l-Oligo(diprolines)

$(CH_3)COCO-[N-CHCO-N-CHCO]_n-OH$

n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{22a}$	Refs.
1	312.4	204	−70.1	158,165
2	506.6	188–189	−38.8	158
3	700.8	220–221	−32.4	158,159

[a] *c* (%) = 1, DMF.

8.2.6.2.4. *tert*-Butyloxycarbonyl Oligo(d,l-diproline) Benzyl Esters

$(CH_3)_3COCO-[N-CHCO-N-CHCO]_n-OCH_2C_6H_5$

n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{22a}$	Refs.
2	612.7	64–66	−24.0	164
3	806.9	157–160	−23.2	164
4	1001.2	146–148	−20.4	164

[a] *c* (%) = 1, DMF.

8.2.6.3. Cyclic Oligo(peptides)

8.2.6.3.1. Cyclic Oligo(all-l-prolines) $[N-CHCO]_n$ (cyclic)

n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
2	194.2	146	−151.6	19	0.5	H_2O	54,55,180,185
3	291.3	358	+48.5	25	0.48	CH_3OH	53,154–157,162,163,168,176,189,190

8.2.6.3.2. Cyclic Oligo(l,d-diprolines) $[N-CHCO-N-CHCO]_n$ (cyclic; L, D)

n	Mol. wt.	m.p. (°C)	Refs.
1	194.2	194–199	158,180,185,186
2	388.4	>300 d	158
3	582.6	>310 d	158, 159
4	776.8	>250 d	158
6	1165.2	>280 d	158
9	1747.8	>250 d	158
12	2330.4	>250 d	158

8.2.6.3.3. Cyclic Oligo(d,l,l-triprolines) ⌐[N—CHCO—[N—CHCO—N—CHCO]$_n$¬ (D, L, L)

n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D^{22}$	c (%)	Solvent	Refs.
1	291.2	181–184	+70.7	1	H_2O	159–163
2	582.3	304	−60.9	1	H_2O	159–163
3	873.5	230 d	−114.5	1	H_2O	159–163
4	1164.6	250 d	−72.0	1	H_2O	159–163
5	1455.8	250 d	−101.8	0.5	H_2O	159–163

8.2.7. OLIGO(PEPTIDES) OF L-AZETIDINE-2-CARBOXYLIC ACID

8.2.7.1. Cyclic Oligo(peptides) ⌐[N—CHCO]$_n$¬

n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{578\,a}$	Refs.
2	166.2	207–212	+8.2	175
3	249.3	334–340	+20.8	175
6	498.5	339–350	−352.0	175

[a] c (%) = 0.5, H_2O.

8.2.8. OLIGO(PEPTIDES) OF L-HYDROXY AND L-MERCAPTO AMINO ACIDS

8.2.8.1. Linear Oligo(peptides) H[NHCHRCO]$_n$OH

	n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D$	(°C)	c (%)	Solvent[a]	Refs.
L-Ser	1	105.1		+14.5	25	9.3	N HCl	1
$-CH_2OH$	2	192.2		+14.2	25	7	N HCl	28,35,139
L-Tyr	1	181.2		−7.3	25	4	6.1 N HCl	1
$-CH_2C_6H_4OH$	2	344.4	285–288	+30.1	19	4	H_2O + 1 eq. HCl	29–31
	3	507.6	181–182					31
L-Cys	1	121.1		+7.6	26	12	N HCl	1
$-CH_2SH$1.5 HCl	2	224.2		+35	22	1	0.2 N HCl	37
L-Met	1	149.2		+23.4	20	5	3 N HCl	1
$-CH_2CH_2SCH_3$	2	280.4	229–231	+27.0	24	2	H_2O	32–34
	3	411.6	219–220	−70.0	16	1	H_2O	33

8.2.8.2. Endgroup Protected Oligo(peptides) $(CH_3)_3$COCO–[NHCHRCO]$_n$–OCH_3

R	n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D$	c (%)	Solvent[a]	Refs.
L-Cys(Me)	2	366.5	94–95				102,121,122,133
$-CH_2SCH_3$	3	483.7	104–105				102,121,122,133
	4	600.8	191–192				102,121,122,133
	5	718.0	211–212				102,121,122,133
	6	835.2	>220				102,121,122,133
	7	952.3	>220				102,121,122,133
L-Met	2	394.5	66–67	−29.6	0.003 M	HFIP[a]	102,123,124,127–129
$-CH_2CH_2SCH_3$	3	525.8	92–96	−37.6	0.003 M	HFIP	102,123,124,127–129
	4	656.9	191–194	−41.4	0.03 M	HFIP	102,123,124,127–129
	5	788.1	236 d	−48.1	0.003 M	HFIP	102,123,124,127–129
	6	919.3	245 d	−50.3	0.03 M	HFIP	102,123,124,126 –129
	7	1050.5	>275	−54.8	0.03 M	HFIP	102,123–129

[a] HFIP = hexafluoroisopropanol.

8.2.8.3. Formyl-Oligo(L-Methionines) HCO–[NHCHRCO]$_n$–OH

R	*n*	Mol. wt.	m.p. (°C)	Specific rotation [α]$_D$	*c* (%)	Solvent[a]	Refs.
L-Met	2	308.4	125–126	−44.8	0.5	HFIP	130
$-CH_2CH_2SCH_3$	3	439.6	176–177	−56.7	0.5	HFIP	130
	4	570.8	195–196	−67.2	0.5	HFIP	130
	5	702.0	216–217	−63.3	0.5	HFIP	130
	6	833.2	230–231 d	−81.8	0.5	HFIP	130

8.2.8.4. Cyclic Oligo(peptides) ⌐[NHCHRCO]$_n$¬ (cyclic)

R	*n*	Mol. wt.	m.p. (°C)	Specific rotation [α]$_D$	(°C)	*c* (%)	Solvent[a]	Refs.
$-CH_2OH$	2	174.2	247	67.5	25	2.2	H_2O	35,174,183
$-CH_2C_6H_4OH$	2	326.4	277–280	−223.8	20	2.4	NaOH	36,174

8.2.8.5. Oligo(peptides) of Cystine CyS = [–NHCHCO– with side chain CH_2S–]

R	*n*	m.p. (°C)	Specific rotation [α]$_D$	(°C)	Solvent[a]	Refs.
H–CyS–CyS–OH (cyclic, S–S bridged)	222.3	−29	25	1	N HCl	38
H–CyS–CyS–OH / H–CyS–CyS–OH (S–S bridged)	444.6	−58.7	26	1	N HCl	37,38

[a] HFIP = hexafluoroisopropanol.

8.2.9. OLIGO(PEPTIDES) OF ACIDIC AMINO ACIDS

8.2.9.1. α- and ω-Oligo(peptides) of L-Aspartic Acid and L-Glutamic Acid H[NH–X–CO]$_n$OH

X	*n*	Mol. wt.	Specific rotation [α]$_D$	(°C)	*c* (%)	Solvent	Refs.
Asp	2	248.2	+18.5	20	2	0.5 N HCl	76
$-CH(COOH)CH_2-$	3	363.3	+6.0	20	2	0.5 N HCl	76
	4	478.3	+16.1	20	1	0.5 N HCl	76
	5	593.4	+6.1	20	1	0.5 N HCl	76
	6	708.5	+8.7	20	2	0.5 N HCl	76
Glu	1	147.1	+31.2	22.4	1	6 N HCl	1
$-CH(CH_2CH_2COOH)-$	2	276.3	+18.2	24	1–2	0.5 N HCl	42–44
	3	405.4	−7.2	19	1.4	H_2O	45
Glu	2	276.3	+4.2	24	1–2	0.5 N HCl	43,44,46,47,59,178
$-CH(COOH)CH_2CH_2-$	3	405.4	−7.2	20	2	0.5 N HCl	48,59,178
	4	534.5	−16.0	24	1–2	0.5 N HCl	59,178
	5	663.6	−14.8	20	1–5	0.5 N HCl	59
	6	792.7	−17.2	20	1–5	0.5 N HCl	59
	7	921.8	−19.1	20	1–5	0.5 N HCl	59,71

8.2.9.2. γ-Oligo(peptides) of D*-Glutamic Acid Esters* H[NH–X–CO]$_n$–OC(CH$_3$)$_3$

X	n	Mol. wt.	Specific rotation m.p. (°C)	$[\alpha]_D^{25}$	c (%)	Solvent	Refs.
D-Glu	3	629.8	81–84	+17.9	3	MeOH	59
–CHCH$_2$CH$_2$–	4	815.0	125–127.5	+22.3	3	MeOH	59
|	5	1000.2	126–131	+27.6	3	MeOH	59
COOC(CH$_3$)$_3$	6	1185.4	>58	+29.4	3	MeOH	59

8.2.9.3. α-Oligo(peptides) of γ-Unsubstituted L*-Glutamic Acid Derivatives* CH$_3$CO–[NHCH(CH$_2$CH$_2$COOH)CO]$_n$–NHC$_2$H$_5$

		Specific rotation			
n[a]	Mol. wt.	$[\alpha]_D^{25}$	c (%)	Solvent	Ref.
1	216.2	–23	1	H$_2$O	226
2	345.4	–36	1	H$_2$O	226
3	474.3	–49.5	1	H$_2$O	226

[a] n = 2–12: ion-exchange chromatography, IR, CD, MS, pK values, Refs. 227,228.

8.2.9.4. α-Oligo(peptides) of Benzyloxycarbonyl L*-Aspartic Acid and* L*-Glutamic Acid Ethyl Esters* C$_6$H$_5$CH$_2$OCO–[NHCHRCO]$_{n-1}$–NHCHR′COOC$_2$H$_5$

					Specific rotation			
R	R′	n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{25}$	c (%)	Solvent[a]	Refs.
Asp		2	452.5	80–81	+17.9	3.1	DCA	49,146
–CH$_2$COOCH$_3$	–CH$_2$COOC$_2$H$_5$	3	581.6	127–128	–1.01	3.1	DCA	49,146
		4	710.7	143–144	–13.1	1.1	DCA	49,146
		5	839.8	161–163	–19.1	0.1	DCA	49,146
		6	968.9	175–178	–26.6	0.7	DCA	49
		8	1227.2	207 d	–35.1	0.5	DCA	49,141,146
		11	1614.5	224 d	–42.9	0.45	DCA	49,146
		14	2001.9	233 d	–46.0	0.3	DCA	49,146
Glu		2	480.5	86	–12.4	2	DCA	50,141,146
–CH$_2$CH$_2$COOCH$_3$	–CH$_2$CH$_2$COOC$_2$H$_5$	3	623.6	124	–18.0	2	DCA	50,146
		4	766.8	139	–21.3	2	DCA	50,141,146
		5	910.0	200	–22.7	2	DCA	50,141,146
		6	1053.1	250	–26.7	2	DCA	50,146
		7	1196.3	259	–28.7	2	DCA	50,141,146
		9	1482.5	d	–32.6	2	DCA	50,146
		11	1768.8	d	–35.6	2	DCA	50,146
Glu		2	494.5	104–105	–17.9		TFE	43,120,142–145
–CH$_2$CH$_2$COOC$_2$H$_5$	–CH$_2$CH$_2$COOC$_2$H$_5$	3	651.7	127–128	–27.1	2	TFE	43,120,142–145
		4	808.9	137–139	–30.9		TFE	142–145
		5	966.0	177–178.5	–26.5		TFE	142–145
		7	1280.4	>235	–20.9	1	TFE	142–144
		8	1437.5	>235	–16.5		TFE	142,143,145
		9	1594.7	>235	–7.6	1	TFE	142,143,145

[a] DCA, dichloroacetic acid; TFE, trifluoroethanol.

8.2.9.5. ω-Oligo(peptides) of Benzyloxycarbonyl L*-Aspartic Acid and* L*- and* D*-Glutamic Acid ω-Alkyl Esters* C$_6$H$_5$CH$_2$OCO–[NH–X–CO]$_n$–OR

					Specific rotation				
X	R	n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	c (%)	Solvent[a]	Refs.
L-Asp	C(CH$_3$)$_3$	2	550.7	70–72	–23.0	25	1	DMF	76
–CHCH$_2$–		3	721.9	93–95	–22.1	25	1	DMF	76
|		4	893.1	97–99	–19.3	25	1	DMF	76
COOC(CH$_3$)$_3$		5	1064.3	121–123	–18.7	25	1	DMF	76
		6	1235.4	157–162	–20.0	25	1	DMF	76

8.2.9.5. cont'd

X	R	n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D$	(°C)	c (%)	Solvent[a]	Refs.
L-Glu	CH_3	2	452.5	97–98	−25.2	20	5	DMF	59
$-CHCH_2CH_2-$		3	595.5	135–137	−26.1	20	5	DMF	59
|		4	738.6	135–139	−28.2	20	5	DMF	59
$COOCH_3$		5	881.7	175–179	−30.1	20	5	DMF	59
		6	1024.8	195–198	−31.5	20	5	DMF	59
		7	1153.9	206–213	−32.8	20	5	DMF	59
D-Glu	$C(CH_3)_3$	2	578.7	88.5–91	+27.4	25	3	MeOH	59
$-CHCH_2CH_2-$		3	763.9	77.5–81.5	+30.6	25	3	MeOH	59
|		4	949.1	95–97	+34.5	25	3	MeOH	59
$COOC(CH_3)_3$		5	1134.3	99–102	+36.1	25	3	MeOH	59
		6	1319.6	73–77	+42.4	25	3	MeOH	59
		7	1504.8	74–78	+42.9	25	3	MeOH	59
L-Glu	$C(CH_3)_3$	2	578.7	83–84	−25.4	22	1	MeOH	71
$-CHCH_2CH_2-$		3	763.9	79	−30.2	21	1	MeOH	71
|		4	949.1	87–89	−33.2	22	1	MeOH	71
$COOC(CH_3)_3$		5	1134.3	102–103.5	−36.8	23	1	MeOH	71
		6	1319.6	123–125	−39.9	22.5	1	MeOH	71
		7	1504.8	130–132	−43.7	21	1	MeOH	71

8.2.9.6. α-Oligo(peptides) of Acetyl L-Glutamic Acid Esters $CH_3CO-[NHCH(CH_2CH_2COOC_2H_5)CO]_nOC_2H_5$

n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D^{25}$	c (%)	Solvent[a]	Ref.
2	402.4	94–95	−29.1	0.5–1.5	TFE	142
3	559.6	150–151	−31.2	0.5–1.5	TFE	142
4	716.8	171	−39.3	0.5–1.5	TFE	142
5	873.9	>230	−34.9	0.5–1.5	TFE	142
8	1345.5	>230	−17.3	0.5–1.5	TFE	142

[a] TFE, Trifluoroethanol

8.2.9.7. α-Oligo(peptides) of o-Nitrophenylsulfenyl L-Glutamic Acid Amides and Esters $Nps^a-[NHCH(CH_2CH_2COOCH_2C_6H_5)CO]_n-R$

R	n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D$	(°C)	c(%)	Solvent	Ref.
NHC_2H_5	1	417.5	92–93					147
	2	636.7	147–148					147
	4	1075.2	180–182					147
	6	1513.6	233–234					148
$OCH_2C_6H_5$	2	699.7	65–67	−40.0	20	1.0	$CHCl_3$	149
	4	1138.1	114–115	−26.2	22	1.0	$CHCl_3$	149
	8	2014.9	198–205	−8.2	25	0.9	$CHCl_3$	149
	12	2891.7	236–238	+7.1	26	0.5	$CHCl_3$	149

[a] Nps = *o*-Nitrophenylsulfenyl.

8.2.9.8. Cyclo-γ-Oligo(peptides) of Glutamic Acid cyclo-$[NHCH(COOR)CH_2CH_2CO]_n$

R	n	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_D$	(°C)	c (%)	Solvent	Ref.
H	2	258.2	189–192	+14.0	22	0.5	0.1 N HCl	60
	3	387.3	235–238	+90.0	22	0.5	0.1 N HCl	60
	4	516.5	232–236	+38.5	22	0.45	0.1 N HCl	60
$C(CH_3)_3$	2	370.4	220–222	+23.0	23	1	DMF	60
	3	555.7	203–206	−52.5	23	1	DMF	60
	4	740.9	230–232	−38.0	23	0.5	DMF	60

8.2.10. OLIGO(PEPTIDES) OF BASIC L-AMINO ACIDS (LYSINE, ORNITHINE, ARGININE, HISTIDINE)

8.2.10.1. Linear Oligo(peptides) H[NHCHRCO]$_n$OH

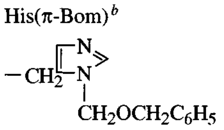
R	*n*	Mol. wt.	R_F[a]	Specific rotation $[\alpha]_D$	(°C)	*c* (%)	Solvent	Refs.
Lys	1	146.2	0.24	+25.7	25	1.6	6 N HCl	1
$-(CH_2)_4NH_2$	2	274.4	0.17	+5.6	25	2	6 N HCl	39,40
	3	402.6	0.12	−2.2	24	2	0.5 N HCl	40,41
	4	530.7	0.09					40
	5	658.9	0.06					40
n = 2–20: Ion-exchange chromatography, Refs. 209–212; *n* = 2–22; ORD, pK values, Ref. 209; *n* = 2–5: CD, Ref. 217.								
Lys(Boc)[b]	1	246.3	237–255	+4.7	26	0.88	2 N NH_3	219
$-(CH_2)_4NH$–Boc	2	474.6	188	+16.4	20	1	MeOH	213,214
	3	702.9	185–187	+7.4	20	1	MeOH	214
Arg	2	330.4	224–226[a]	+1780[c,d]		1.4	N HCl	216
$-(CH_2)_3-NHC(=NH)NH_2$	3	486.6	227–232[b]	+1540[c,d]		3.9	N HCl	126
	4	642.7	238–241[b]	+1030[c,d]		1.8	N HCl	216

[a] TLC in *n*-butanol/acetic acid/water/pyridine (30 : 6 : 24 : 20).
[b] Boc = *tert* butyloxycarbonyl-.
[c] As flavianates.
[d] λ = 224 nm

8.2.10.2. Endgroup Protected Oligo(peptides) X–[NHCHRCO]$_n$–Y

R	X	Y	*n*	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_\lambda$	λ (nm)	(°C)	*c* (%)	Solvent	Refs.
Lys(Boc)[b]	Z	OCH_3	1	394.5	Oil	−10.6	589	26	1.9	Acetone	219
$-(CH_2)_4NH$–Boc			2	622.8	97–98	−5.5	589	20	2.1	Acetone	218–220
			4	1079.4	121	−15.3	589	22	2.1	CH_3COOH	220
			8	2192.6	>260	−16.4	589	22	2.1	CH_3COOH	220
	Z	$OC(CH_3)_3$	2	664.8	82–84	−10.4	578	22	1	DMF	213
			4	1121.4	143–145	−15.5	578	20	1	DMF	213
	Z	$NHCH_3$	2	721.8	129	−14.4	589	22		CH_3COOH	220
			4	1078.3	174	−16.6	589	22		CH_3COOH	220
			8	1991.5	>260	−18.0	589	22		CH_3COOH	220
			16	3817.7	>260	−14.6	589	22		CH_3COOH	220
	Z	OH	1	380.4	Oil	−2.4	589	26	2.0	Acetone	219
			2	790.0	112	−3.1	578	22	1	CH_3COOH	213
			3	837.0	107	−12.2	589	20	1	MeOH	214
	Boc	$OC(CH_3)_3$	7	1773.2	268	−19.0	578	22	1	DMF	213
	Boc	OH	3	802.0	114	−5.5	578	22	1	DMF	213
			4	1031.0	92–95	−15.4	589	20	1	MeOH	214
	H	Suco[a]	*n* = 1,5–8,10,20: TLC, IR, CD								
Lys(Z)[b]	Boc	$OCH_2C_6H_5$	2	732.8	80	−14.0	578		1	DMF	213
$-(CH_2)_4NH$–Z			3	995.1	140	−16.2	578		1	DMF	213
			4	1257.4	156–158	−15.7	578		1	DMF	213
			5	1519.7	170	−16.7	578		1	DMF	213
			7	2044.3	245–248	−13.9	578		1	DMF	213
Lys(Z)	Boc	OH	2	642.7	97–105						215
$-(CH_2)_4NH$–Z			4	1167.3	124–127						215
			8	2216.5	1235–140						215
Orn(Boc)	Z	OCH_3	1	380.4	71	−14.4	589	27	1.08	90% AcOH[b]	221
$-(CH_2)_3NH$–Boc			2	594.7	125	−15.1	589	20	1.34	90% AcOH	221,222
			3	809.0	147	−13.7	589	20	1.1	90% AcOH	222
Orn(Boc)			4	1023.2	152	−17.8	589	20	1	MeOH	221,222
			5	1237.5	165–171	−5.1	589	25	1.05	DMF	222
$Arg(NO_2)$	Z	OCH_3	1	367.4	153–153.5						216
$-(CH_2)_3-NHC(=N-NO_2)NH_2$			3	769.7	133–136						216
			4	970.9	139–140						216

8.2.10.2. cont'd

R	X	Y	*n*	Mol. wt.	m.p. (°C)	Specific rotation $[\alpha]_\lambda$	λ (nm)	(°C)	*c* (%)	Solvent	Refs.
His(π-Bom)[b]	BOc	OCH_3	3	904.1	67–69	– 15.5	589	20	0.49	MeOH	223
			4	1161.4	78–81	– 21.2	589	20	0.49	MeOH	223
			5	1418.7	93–97	– 22.3	589	20	0.48	MeOH	223
			6	1676.0	117–122	– 23.3	589	20	0.52	MeOH	223
			7	1933.3	155–163	– 23.2	589	20	0.52	MeOH	223

[a] Suco = *p*-oxymethylbenzylcholestan-3-β-yl succinate.
[b] Z- = Benzyloxycarbonyl-; Boc- = *tert* butyloxycarbonyl-; π-Bom- = *N*(π)-benzyloxymethyl-; AcOH = acetic acid.

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8.3. OLIGO(IMINES)

8.3.1. LINEAR OLIGO(IMINES)

8.3.1.1. Linear Oligo(ethylene imines) $H[NHCH_2CH_2]_nNH_2$

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_{20}^{20} (g/cm³)	n_D^{25}	Refs.
1	60.1	11.0	116.5/1013	0.8994	1.4536	1,2
2	103.1		207.1/1013	0.9586	1.4810	1–3
3	146.2	12.0	277.9/1013	0.9839	1.4951	1–4
4	189.2		333/1013	0.9994	1.5015	1–3
7	318.5		109–110/11		1.5132	2,5
9	404.7		199–200/1		1.5161	2,5

8.3.1.2. Linear Oligo(alkylene imines) $R{-}[NH(CH_2)_6NH(CH_2)_{10}]_n{-}R'$

R	R′	n	Mol. wt.	m.p. (°C)	Ref.
H	OH	1	272.5	64–67	6
		2	526.9	70–72	6
		3	781.4	85–86	6
$(CH_2)_{10}OH$	OH	1	428.8	99–100	6
		2	683.2	90–93	6
		3	937.7	80–84	6
H	$NH(CH_2)_6NH_2$	1	370.7	70–72	6
		2	625.1	86–88	6
		3	879.6	81–85	6

8.3.2. CYCLIC OLIGO(IMINES) $[NH(CH_2)_x]_n$ (cyclic)

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm³)/°C	Refs.
2	1	43.1		55–56/1013	0.8321/24	2,7,8
	2	86.1	104	145–146/1013		8,9
	4	172.3	35	$110/10^{-4}$		10
3	1	57.1		63/1013	0.8436/20	11
	2	114.2	14–15	186–188/1013		8,11–13
4	1	71.1		88/1013	0.8520/22.5	14
	2	142.2		95/16	0.9020/18	8,13
5	1	85.2	−9	106/1013	0.8606/20	14
	2	170.3		108–110/16	0.9195/13	8
6	1	99.2		138/1013	0.8864/21	8,15,16
	2	198.2	72			13,17,18
	3	297.5	42			17
	4	396.7	59–60			17
	5	495.9	45			17
	6	595.1	67–68			17

8.3.2. *cont'd*

x	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4 (g/cm^3)/°C	Refs.
7	1	113.1	−33	162/1013	0.8895/20	16,19
	2	226.2	26		0.9012/30	19
8	1	127.2		90/32	0.9021/21	16
	2	254.5	55			20
9	1	141.3			0.8982/21	16
	2	282.5	38			19
13	1	197.4	50–51			16
	2	394.7	52			21

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8.4. OLIGO(UREAS)

8.4.1. OLIGO(METHYLENE UREAS) $H[NHCONHCH_2]_nNHCONH_2$

n	Mol. wt.	m.p. (°C)	Refs.
1	132.1	218 d	1,2
2	204.2	227	1
3	276.3	231–233	1,2
5	420.5	236 d	2

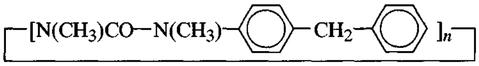
8.4.2. OLIGO(METHYLENE THIOUREAS) $H[NHCSNHCH_2]_nNHCSNH_2$

zn	Mol. wt.	m.p. (°C)	Refs.
1	164.3	198 d	3,4
2	252.4	210 d	3
3	340.5	215 d	3

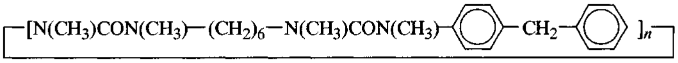
3.4.3. OLIGO(METHYLOL THIOUREAS) $R[NHCSNHCH_2]_nOH$

R	n	Mol. wt.	m.p. (°C)	Refs.
H	1	106.2	104–105	3,4
	2	194.3	190–192 d	3
CH_2OH	1	136.2	92	3
	2	224.3	132	3,4

8.4.4. CYCLIC OLIGO(UREAS)

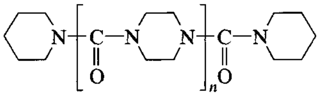


n	Mol. wt.	m.p. (°C)	Refs.
2	504.6	300–301	5



n	Mol. wt.	m.p. (°C)	Refs.
1	422.6	157–158	5
2	845.1	180–181	5

8.4.5. OLIGO(CARBONYLPIPERAZINES)



n	Mol. wt.	m.p. (°C)	Refs.
0	196.3	42–43	6,7
1	308.4	177	7,8
2	420.5	267	7
3	532.7	337	7

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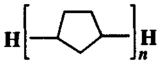
D. CARBON CHAIN OLIGOMERS CONTAINING MAIN CHAIN CYCLIC UNITS

TABLE 9. OLIGO(CYCLOPENTYLENES)



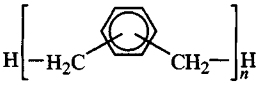
n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4^{20} (g/cm^3)	Refs.
1	70.1	−93.9	42.3/1013	0.7510	
2	138.3		190/1013	0.8646	1,2
3	206.3		293–294/1013	0.9177	1,2
4	274.5		369–370/1013	0.9564	1,2
6	410.7	143–146	235/0.13		1

TABLE 10. OLIGO(SPIRANES)

R	*n*	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
CH_2	5	216.3		78/0.4	3
$(CH_2)_2$	3	244.4		84/0.07	3
	5	324.5	61		3
	7	406.6	107–108		3
$(CH_2)_3$	3	272.5	52.5	120–122/0.07	3
	5	352.6	79.5		3
	7	432.7	103–104		3
	9	512.8	138–140		3

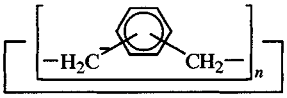
TABLE 11. OLIGO(XYLYLENES)

11.1. LINEAR OLIGO(XYLYLENES)

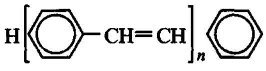


n		Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
o-	1	106.2	−25	144/1013	
	2	210.3	66.5	177–178/127	5–7
m-	1	106.2	−47.4	139/1013	
	2	210.3		296/1013	7,8
p-	1	106.2	13–14	138/1013	
	2	210.3	82	178/24	7,9–12,30
	3	314.5	141–142		10,13

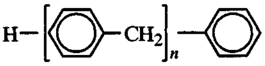
11.2. CYCLIC OLIGO(XYLYLENES)



n		Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
o-	2	208.3	112–112.5		5,6,14
	3	312.5	184.5		5,6
	4	416.6	205		15
m-	2	208.3	132–133	290/1013	10
p-	2	208.3	285–287		8,11–13,19,30
	3	312.5	170–171		10,,13,30
	4	416.6	179–182		13

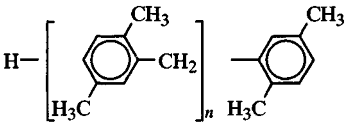
TABLE 12. OLIGO(STILBENES) 

n	Mol. wt.	m.p. (°C)	Refs.
1	180.2	124	17
2	282.4	265	16–18
3	384.5	350–352	17
4	486.5	360–374	16,17
5	588.7	395–400	16,17
6	690.9	415–420	16,17
7	793.0	425	16,17

TABLE 13. OLIGO(BENZYLS) 

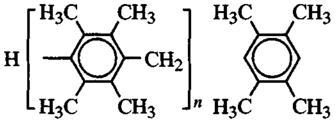
n	Mol. wt.	m.p. (°C)	Refs.
1	168.2	25.1	
2	258.3	82	20,23
3	348.4	90	21,23
4	438.6	120	23
5	528.7	153–156	22,23

TABLE 14. OLIGO-(2,5-DIMETHYL-BENZYLS)



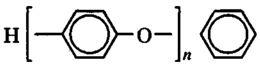
n	Mol. wt.	m.p. (°C)	Refs.
1	224.3	60–61	22,24
2	342.5	153–154	22
4	578.8	234–236	22
6	815.1	262–266	22

TABLE 15. OLIGO(2,3,5,6-TETRAMETHYL-BENZYLS)



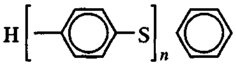
n	Mol. wt.	m.p. (°C)	Refs.
1	280.5	155–156	22,25
2	426.7	263–264	22,26
3	572.9	305–307	22
4	719.1	335–337	22

TABLE 16. OLIGO(*p*-PHENYLENE OXIDES)



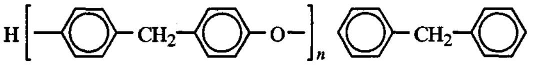
n	Mol. wt.	m.p. (°C)	Refs.
1	170.2	28	
2	262.3	73	23,27
3	354.4	105	23,27
4	446.5	142	23,27

TABLE 17. OLIGO(*p*-PHENYLENE SULFIDES)



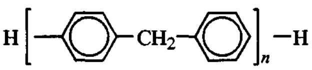
n	Mol. wt.	m.p. (°C)	Refs.
1	186.4	−21.5	
2	294.5	80	23,28
3	402.6	110	23
4	510.7	150	23

TABLE 18. OLIGO(*p*-PHENOXYPHENYLMETHANES)



n	Mol. wt.	m.p. (°C)	Refs.
1	350.4	59	23
2	532.7	101	23

TABLE 19. OLIGO(DIPHENYLMETHANES)



n	Mol. wt.	m.p. (°C)	Refs.
1	168.2	25.1	
2	334.5	115	4,29
3	500.7	180	4
4	666.9	240	4

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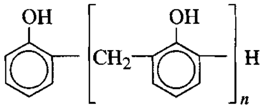
TABLE 20. PHENOL-FORMALDEHYDE AND RELATED OLIGOMERS

20.1. LINEAR PHENOL-FORMALDEHYDE OLIGOMERS

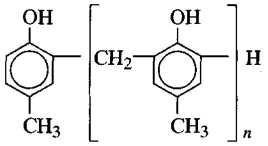
20.1.1. PHENOL-FORMALDEHYDE OLIGOMERS



n	Mol. wt.	m.p. (°C)	Refs.
1	200.2	119–120	1–4
2	306.4	158–159	2–6
3	412.5	161–162	3,4
4	518.6	148–150	4,7
5	624.7	203–204	4
6	730.8	213–214	4

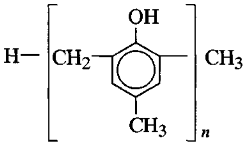
20.1.2. *p*-CRESOL-FORMALDEHYDE OLIGOMERS

20.1.2.1.



n	Mol. wt.	m.p. (°C)	Refs.
	228.3	126	8–10,56–58
2	348.4	214–215	8–11,56–58
3	468.6	173	8,9,56,57
4	588.7	130	12,56,57
5	708.9	215–217	12
6	829.1	225–230	12
7	949.2	167–170	12
8	1069.4	205–210	12
9	1189.5	175–180	12
11	1429.8	245	12

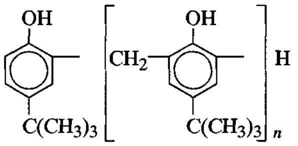
20.1.2.2.



n	Mol. wt.	m.p. (°C)	Refs.
1	136.1	70–72	61
2	256.3	148	11,13–16
3	376.5	183–184	11
4	496.7	204–205	11
5	616.9	152–154	61

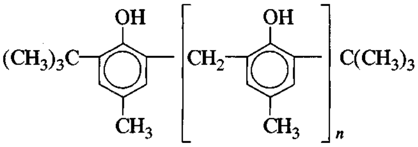
20.1.3. p-tert BUTYLPHENOL-FORMALDEHYDE OLIGOMERS

20.1.3.1.



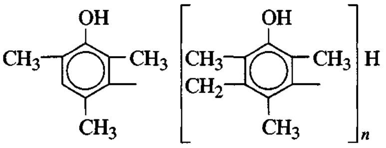
n	Mol. wt.	m.p. (°C)	Refs.
1	312.5	156	17,18,62
2	474.7	218–220	17,18,62
3	636.9	211	17,18,62
4	799.2	216–217	17,18,62
5	961.4	250	17,18,62
6	1123.6	249–250	17,18
7	1285.9	253–256	18
8	1448.1	224–226	17
10	1772.6	140	17

20.1.3.2.



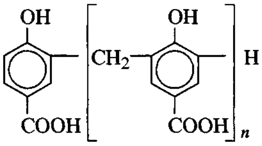
n	Mol. wt.	m.p. (°C)	Refs.
0	220.4	70–71	61
1	340.5	125–130	61
2	460.7	82–84	61
4	701.0	188–190	61

20.1.4. 2,4,6-MESITOL–FORMALDEHYDE OLIGOMERS



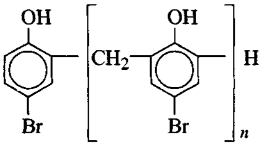
n	Mol. wt.	m.p. (°C)	Refs.
1	284.4	188	19
2	432.6	257	19

20.1.5. 4-CARBOXY-PHENOL–FORMALDEHYDE OLIGOMERS



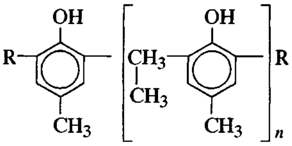
n	Mol. wt.	m.p. (°C)	Refs.
1	288.3	305–307	59
2	438.4	310	59

20.1.6. 4-BROMO-PHENOL–FORMALDEHYDE OLIGOMERS



n	Mol. wt.	m.p. (°C)	Refs.
1	358.1	183–184	1,60
2	543.1	237–238	60

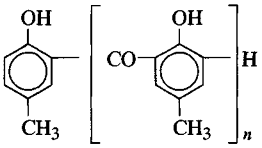
20.1.7. *p*-CRESOL–ACETALDEHYDE OLIGOMERS



R	n	Mol. wt.	m.p. (°C)	Refs.
H	1	241.3	141	20,21
H	2	373.5	214–215	21
CH_3	1	270.4	135–135.5	22
CH_3	2	404.6	154–155	63
CH_3	3	538.7	204–205	63

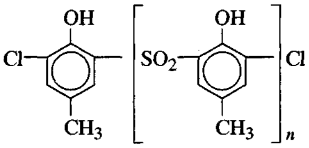
20.1.8. OLIGOMERS WITH CARBONYL AND SULFONYL BRIDGES

20.1.8.1.



n	Mol. wt.	m.p. (°C)	Refs.
1	242.3	106–107	23,24,56–58
2	376.4	122–123	24,56,57

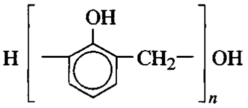
20.1.8.2.



n	Mol. wt.	m.p. (°C)	Refs.
1	347.2	179	25
2	517.4	238–240	25
3	687.6	246–252	25

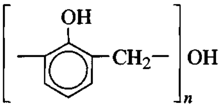
20.2. OLIGOMERIC PHENOL ALCOHOLS

20.2.1. OLIGOMERIC PHENOL ALCOHOLS



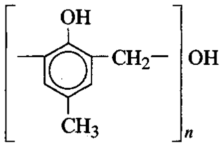
n	Mol. wt.	m.p. (°C)	Refs.
1	124.1	86–87	3,26
2	230.3	121.5–123	3,27,28

20.2.2. PHENOL DIALCOHOLS $HOCH_2$



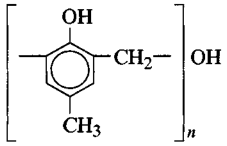
n	Mol. wt.	m.p. (°C)	Refs.
1	154.2	101	29–32
2	260.3	126–127	28

20.2.3. *p*-CRESOL MONOALCOHOLS H



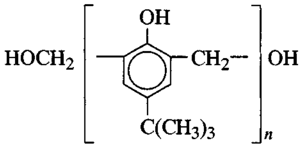
n	Mol. wt.	m.p. (°C)	Refs.
1	138.2	107	8,33,34
2	258.3	148	8,9,35
4	498.6		36

20.2.4. *p*-CRESOL DIALCOHOLS HOCH2



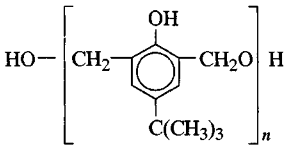
n	Mol. wt.	m.p. (°C)	Refs.
1	168.2	133–134	13,37
2	288.3	151.5	9,35,38,39
3	408.5	203	9,39,40

20.2.5. *p-tert* BUTYLPHENOL DIALCOHOLS



n	Mol. wt.	m.p. (°C)	Refs.
1	210.3	74–75	41
2	372.5	117–118	18

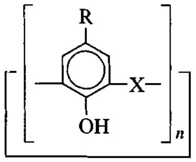
20.2.6. *o*-HYDROXYDIBENZYL ETHERS



n	Mol. wt.	m.p. (°C)	Refs.
2	318.4	85	42

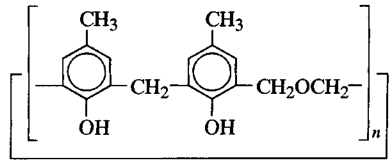
20.3. CYCLIC PHENOL–FORMALDEHYDE OLIGOMERS

20.3.1.



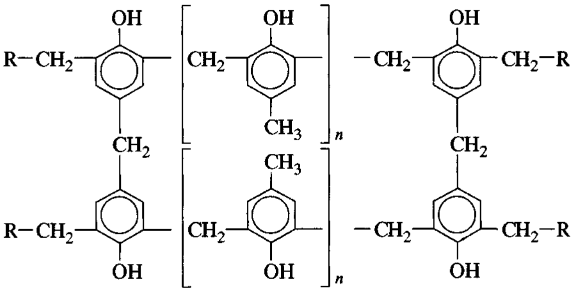
X	R	*n*	Mol. wt.	m.p. (°C)	Refs.
$-CH_2-$	$-CH_3$	4	480.6	300	36,43
	$-C(CH_3)_3$	4	648.9	344–346	18,44, 65,66
		5	811.1	310	68
		6	973.5	380–381	65,66,68
		8	1298.0	411–412	65,66,68
	$-C_6H_5$	4	728.9	407–409	18,66,67
		6	1093.4	408–410	66,67
		8	1457.8	421–423	66,67
	$-C_6H_{11}$	4	753.1	330	18
	$-CH_2C_6H_5$	4	785.0	330	18
	$-C(CH_3)_2CH_2CH_3$	4	705.0	280	18
	$-C(CH_3)_2CH_2C(CH_3)_2$	4	813.2	333	18
$-CH_2OCH_2-$	$-CH_3$	4	600.7	264–266	42
	$-C(CH_3)_3$	3	576-8	245	45

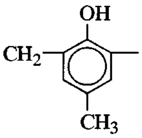
20.3.2.



n	Mol. wt.	m.p. (°C)	Ref.
2	540.7	325–330	46

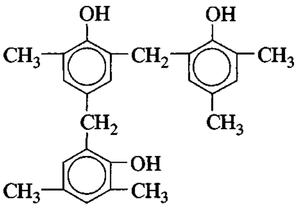
20.3.3.



R	*n*	Mol. wt.	Refs.
H	2	916.2	47
	1	1201.5	43,47

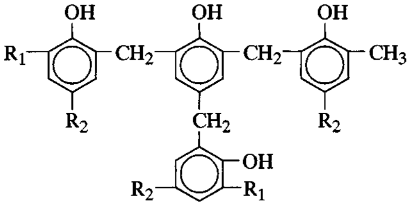
20.4. BRANCHED PHENOL–FORMALDEHYDE OLIGOMERS

20.4.1.



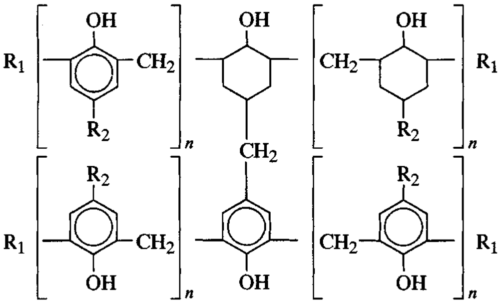
Mol. wt.	m.p. (°C)	Ref.
376.5	158	48

20.4.2.



R_1	R_2	Mol. wt.	m.p. (°C)	Refs.
H	H	411.5		49
H	CH_3	453.6	184–187	30,50
CH_3	CH_3	495.6	185–186	51

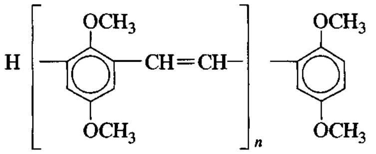
20.4.3.



R_1	R_2	*n*	Mol. w.t	m.p. (°C)	Refs.
H	H	1	624.7	185–187	52,53
CH_3	CH_3	1	737.0	207–208	6,53,54
CH_3	CH_3	2	1217.5	190–191	54

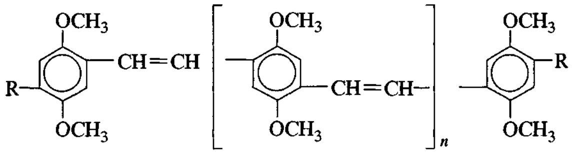
20.5. HYDROQUINONE OLIGOMERS

20.5.1.



n	Mol. wt.	m.p. (°C)	Refs.
1	300.4	97–98	64
2	462.5	146–147	64

20.5.2.



R	*n*	Mol. wt.	m.p. (°C)	Refs.
H	0	300.4	97–98	64
	1	462.5	192–193	64
CH_3	0	328.4	162–163	64
	1	490.6	242–243	64
	2	652.8	283–284	64
	3	815.0	306–307	64
	4	977.2	326–328	64

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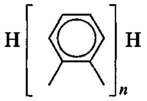
TABLE 21. OLIGO(PHENYLENES)

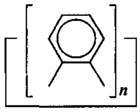
21.1. *o*-OLIGO(PHENYLENES)

21.1.1. LINEAR *o*-OLIGO(PHENYLENES)



n	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
3	230.3	59	332	1,2
4	306.4	119	420	1,3–6
6	458.6	217		3,5
8	610.8	320		5

21.1.2. CYCLIC *o*-OLIGO(PHENYLENES)



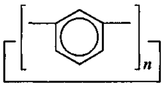
n	Mol. wt.	m.p. (°C)	Refs.
2	152.2	111	4,5,7–9
3	228.3	196.5	10,11
4	304.4	233	4,5
6	456.6	432	5
8	608.8	425	5

21.2. *m*-OLIGO(PHENYLENES)

21.2.1. LINEAR *m*-OLIGO(PHENYLENES)

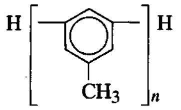
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
3	230.3	89	365	12–14
4	306.4	86.5–87.5	419	3,6,15–17
5	382.5	117–117.5		12,15,16
6	458.6	148		3,15,17,18
8	610.8	129–131		15,17
9	689.9	195–200		18

21.2.2. CYCLIC *m*-OLIGO(PHENYLENES)



n	Mol. wt.	m.p. (°C)	Refs.
6	456.6	509.5–511	19
8	608.8	449–451	19

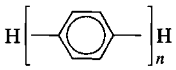
21.2.3. OLIGO(3-METHYL-*m*-PHENYLENES)



n	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
2	182.3	9–9.5	280	20–23
3	272.4	65		12

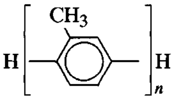
21.3. *p*-OLIGO(PHENYLENES)

21.3.1. *p*-OLIGO(PHENYLENES)



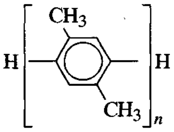
n	Mol. wt.	m.p. (°C)	b.p. (°C/mm)	Solubility (g/L toluene)	Refs.
1	78.1	5.5	80.1	∞	
2	154.2	71	156	430	24
3	230.3	215	376	7.4	3,12,14,25,26
4	306.4	322	428/10	0.12	3,12,16,21,25,26
5	382.5	395		<0.005	12,16,21,25,27,28
6	458.6	465			3,29–31

21.3.2. OLIGO(3-METHYL-*p*-PHENYLENES)



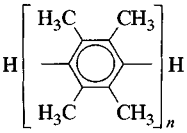
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
1	92.1	−95	110.6	
2	182.3		273–274	22,23,32
3	272.4	43		33

21.3.3. OLIGO(2,5-DIMETHYL-*p*-PHENYLENES)



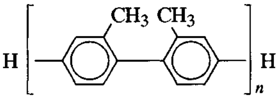
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Solubility (g/L toluene)	Refs.
1	106.2	13.3	138.4	∞	
2	210.3	53–54		700	20,34
3	314.5	182–183		28	34
4	418.6	264–266		1.1	34
5	522.8	307–309		0.24	34

21.3.4. OLIGO(2,3,5,6-TETRAMETHYL-*p*-PHENYLENES)



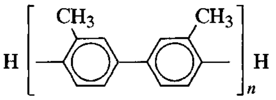
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Solubility (g/L toluene)	Refs.
1	134.2	79.2	196–198	∞	
2	266.4	136–137		365	34,35
3	398.6	270–272		24	34
4	530.8	270–272		3.4	34

21.3.5. OLIGO(2,2′-DIMETHYL-BIPHENYLENES)



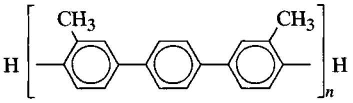
n	Mol. wt.	m.p. (°C)	Solubility (g/L toluene)	Refs.
1	182.3	24		20,23,36
2	362.5	96	490	37

21.3.6. OLIGO(3,3′-DIMETHYL-BIPHENYLENES)



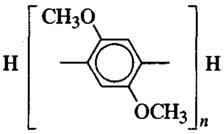
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Solubility (g/L toluene)	Refs.
1	182.3	9–9.5	280	∞	20–23,38
2	362.5	76.5		512	27,37
3	542.8	142		87	39
4	723.0	273		<6.5	39,40
5	903.3	285		~2	39,40
6	1083.5	298		<0.8	39,40

21.3.7. OLIGO(3,3″-DIMETHYL-*p*-TERPHENYLENES)



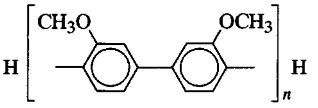
n	Mol. wt.	m.p. (°C)	Solubility (g/L toluene)	Refs.
1	258.4	140–141	4.9	27,37
2	514.7	258	0.4	37

21.3.8. OLIGO(2,5-DIMETHOXY-*p*-PHENYLENES)



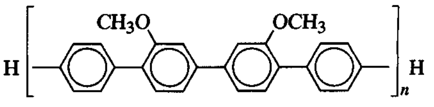
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Refs.
1	138.2	56	212.6	
2	274.3	105		20,41
3	410.5	189		41
4	546.6	246		41

21.3.9. OLIGO(3,3′-DIMETHOXY-BIPHENYLENES)



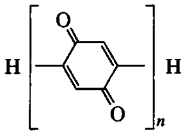
n	Mol. wt.	m.p. (°C)	b.p. (°C)	Solubility (g/L toluene)	Refs.
1	214.3	36	328		42
2	426.5	158		22	38,43

21.3.10. OLIGO(2′,3″-DIMETHOXY-*p*-QUATERPHENYLENES)



n	Mol. wt.	m.p. (°C)	Solubility (g/L toluene)	Refs.
1	366.5	183–184	13	43
2	730.9	276–277	0.2	43

21.4. OLIGO(*p*-QUINONES)



n	Mol. wt.	m.p. (°C)	Refs.
1	108.1	116.5	
2	214.2	194	41
3	320.3	>230	41
4	426.3	230–270	41

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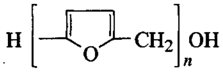
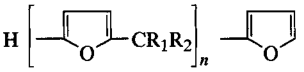
E. OLIGOMERS CONTAINING HETEROCYCLIC RINGS IN THE MAIN CHAIN

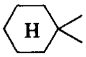
TABLE 22. HETEROCYCLIC OLIGOMERS

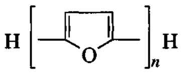
22.1. OLIGO(FURAN)DERIVATIVES

22.1.1. OLIGO(FURFURYL) ALCOHOLS


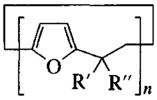
n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
1	98.1		171/1000	1.4868	10,11
2	178.2	− 2.5	141–143/12	1.5290	10–12,14
3	258.3	62–62.5	192.5–295/8		10–12,14

22.1.2. OLIGO(FURFURYL) FURANS


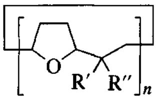
R_1	R_2	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4^{20} (g/cm³)	n_D^{20}	Refs.
H	H	1	148.2		78/16	1.102	1.5048	10,12,14–15,39
		2	228.2		141–146/11		1.5324	10,12
		3	308.3	74–75				10,12,14
		4	388.4	99–101				10,14
H	CH_3	1	162.2		91/28	1.073	1.4993	16,17
		2	256.3		114–116/0.13			17
		3	350.4		165–168/0.04			16,17
CH_3	CH_3	1	176.2	− 12	73–76/7–8	1.043	1.4966	17,18
		2	284.3	47.0/47.5	120–123/1.3			17,18
		3	392.5		163–167/1.3	1.030	1.5172	17,18
		4	500.6	Oil				17
		5	608.7	83–85				17
CH_3	C_2H_5	1	190.2		68–70/3	1.033	1.4970	18
		2	312.4		143–145/1.3	1.045	1.5094	19
		3	434.6		205–210/1.3	1.046	1.5173	19
C_2H_5	C_2H_5	1	204.3	−9 to −8	76–77/3	1.023	1.4978	20
		2	340.4		162–163/2	1.028	1.5089	20
		3	476.6		212–215/2	1.034	1.5199	20
		1	216.3	13–17	94–95/2			21
		2	364.5	86.8–87.6	200–205/2	1.018	1.5221	21

22.1.3. 2,5-OLIGO(FURYLENES)


n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	d_4^{20} (g/cm³)	n_D^{20}	Refs.
1	68.1	− 85.7	31.4/1013	0.9514/20	1.4214/20	
2	134.1		63–64/15		1.5601/22	39–41,42
3	200.2	62–63				32

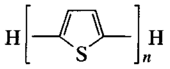
22.1.4. FURANOPHANES 

R′	R″	n	Mol. wt.	m.p. (°C)	Refs.
H	CH_3	4	376.4	140–142	16,17,22
	r-2,c-7,c-12,c-17-			191.0–192.0	22
H	C_2H_5	4	432.5	83–88	22
	r-2,c-7,c-12,c-17-			152.0–153.0	22
CH_3	CH_3	4	432.5	243	18,23,24
CH_3	CH_3	5	540.7	Oil	17
		6	648.8	182	17,18,24
CH_3	C_2H_5	4	488.5	174	18,19,22,24
C_2H_5	C_2H_5	4	544.7	249–250	18,20,24
H		4	592.8	268–269	21,24

22.1.5. TETRAHYDROFURANOPHANES 

n	Mol. wt.	m.p. (°C)	Refs.
4	448.7	204–209	17,18,20,21,23
	r-(1S, 3S, 6R, 8S, 11R, 13R, 16S, 18R)-	218	25
	r-(1S, 3R, 6S, 8R, 11S, 13R, 16S, 18R)-	221	25
5	560.8	Oil	17
6	673.0	75–80	17

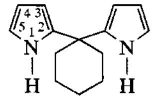
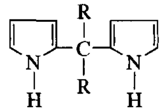
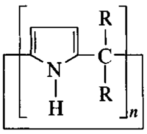
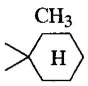
22.2. OLIGO(THIOPHENE) DERIVATIVES

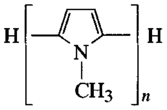
22.2.1. OLIGO(2.5-THIENYLENES) 

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
1	84.1	−38.4	84.2/1013	1.5289	
2	166.3	33–34	125/16		1,27,28,34,41,42,44,49
3	248.4	96–97			1,3,26,28,30–33,42,44,47,49
4	330.5	215–216			1,3,27–29,41,42,44,46,49
5	412.5	257–258			1,3,28,29,42,48
6	494.8	304–305			3,27,28,42,44,46
7	576.9	327–328			3,29,48
8	659.0	364			42,46

22.3. OLIGO(PYRROLE) DERIVATIVES

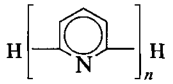
22.3.1. OLIGO(PYRROLE) DERIVATIVES

No.	Oligomers	R	n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
1			2	214.3	105–106		21,43
2		CH_3	2	174.2	59	125–126/4	35
3			4	428.6	291		36,37
			4	588.8	272.0–272.5		21

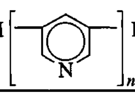
22.3.2. OLIGO[2,5-(*N*-METHYL)PYRROLENES] 

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	Refs.
1	81.1		114–115/99.6	
2	160.2	14–15	77–78/0.5	13,42
4	318.4	134		42
5	397.5	145		42
6	476.6	160		42
8	634.8	178–182		42
16	1267.6	240–256		42

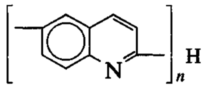
22.4. OLIGO(PYRIDINE) DERIVATIVES

22.4.1. OLIGO(2,6-PYRIDYLENES) 

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
1	79.1	−42	115.5/1013	1.5095	
2	156.2	70.1	273–275/1013		4,5
3	233.3	89–90	370/1013		2,4–6
4	310.4	219–220			5
5	387.5	265			5
6	464.5	350			5

22.4.2. OLIGO(3,5-PYRIDYLENES) H  H

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
1	79.1	− 42	115.5	1.5095	
2	156.2	68	291–292/981		4,9
3	233.3	249–251			9

22.4.3. OLIGO(2,6-QUINOLYLENES) H  H

n	Mol. wt.	m.p. (°C)	b.p. (°C/mbar)	n_D^{20}	Refs.
1	129.2	− 15.6	238.1/1013	1.6268	
2	256.3	144			7,8
3	383.5	267–269			8
4	510.6	348–350			8

22.5. CYCLIC OLIGO(HETEROCYCLICS)

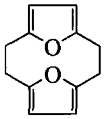
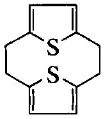
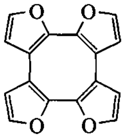
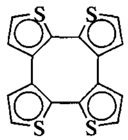
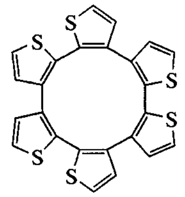
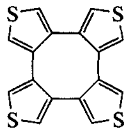
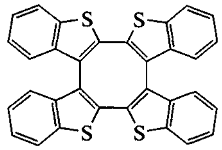
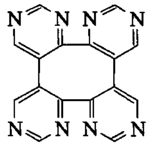
No.		Mol. wt.	m.p. (°C)	Refs.
1		188.2	189–190	38
2		220.3	194.5–196	38
3		264.2	233	42,45
4		328.5	255–256	42,45
5		492.7	420	42,45
6		328.5	300–301	42,45
7		528.7	410	45
8		312.3	355–360	45

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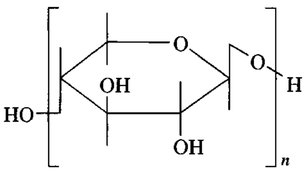
TABLE 23. OLIGO(SACCHARIDES)

23.1. OLIGOMERIC PENTOSES

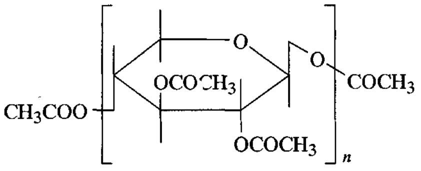
23.1.1. OLIGO(β-XYLOPYRANOSES)[a]



n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{25}$ in H_2O
1	150.1	153	19.2
2	282.2	186–187	−25.6
3	414.4	215–216	−48.1
4	546.5	224–226	−61.9
5	678.6	240–242	−72.9
6	810.7	237–242	−78.5
7	942.8	240–242	−74.0

[a] Refs. 1–3.

23.1.2. OLIGO(β-XYLOPYRANOSE ACETATES)[a]

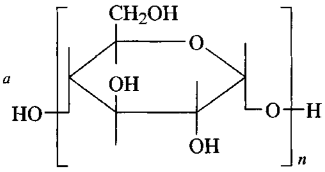


n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{25}$	c in $CHCl_3$
2	534.5	155.5–156	−74.5	0.9
3	750.7	109–110	−84.3	0.6
4	966.9	201–202	−93.7	0.8
5	1183.1	249–250	−97.5	1.1
6	1399.3	260–261	−102.0	1.5

[a] Refs. 1–3.

23.2. OLIGOMERIC HEXOSES

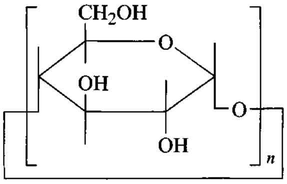
23.2.1. MALTO-OLIGO[a]



n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{15}$ in H_2O
1	180.2	146	52.6
2	342.3	160–165	136.0
3	504.4		160.0
4	666.6		177.0
5	828.7		180.3
6	990.9		184.7
7	1153.0		186.4

[a] Refs. 4–6.

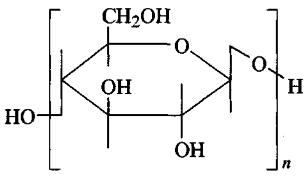
23.2.2. CYCLODEXTRINS[a]



n	Mol. wt.	$[\alpha]_D$ ($c = 1$, H_2O)
6	972.8	149.0
7	1135.0	158.8
8	1297.1	170.0

[a] Refs. 4–6.

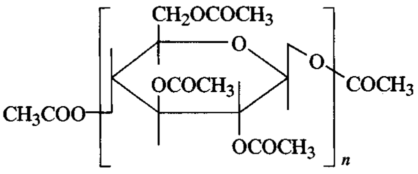
23.2.3. CELLO-OLIGOSES[a]



			Specific rotation		
n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	c in H_2O
1	180.2	150	52.5	20	4
2	342.3	225 d	34.6	20	8
3	504.4	238 d	21.6	26	4
4	666.6	253 d	16.5	23	3.4
5	828.7	267 d	11.0	30	4.1
6	990.9	278 d	10.0	30	1.2
7	1153.0	286 d	7.3	30	0.1

[a] Refs. 7–14.

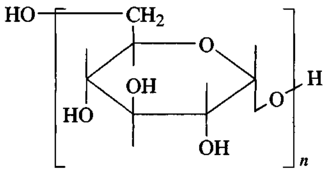
23.2.4. CELLO-OLIGOSE ACETATES[a]



n	Mol. wt.	m.p. (°C)	$[\alpha]_D^{20-25}$ ($c=5$, in $CHCl_3$)
1	390.4	113	101.6
2	678.6	229.5	41.0
3	966.9	223–224	22.6
4	1255.1	230–234	13.4
5	1543.4	240–241	4.2
6	1831.6	252–255	−0.2
7	2119.8	263–266	−4.4

[a] Refs. 7–14.

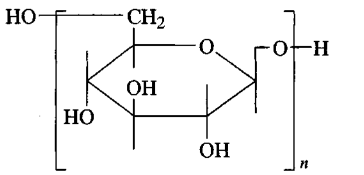
23.2.5. ISOMALTO-OLIGOSES[a]



n	Mol. wt.	m.p. (°C)	$[\alpha]_D$ in H_2O
1	180.2	146	52.6
2	342.3	225 d	
3	504.4		
4	666.6		153
5	828.7		160
6	990.9		163

[a] Ref. 15.

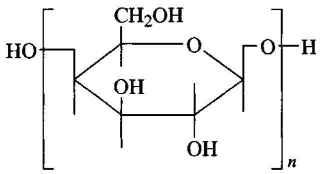
23.2.6. GENTIO-OLIGOSES[a]



n	Mol. wt.	m.p. (°C)	$[\alpha]_D$ in H_2O
1	180.2	150	52.5
2	342.3	190–195	9.6
3	504.4		−10.5
4	666.6		−19.5

[a] Ref. 15.

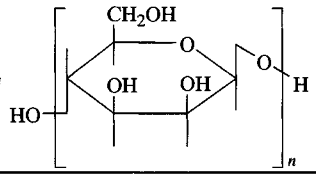
23.2.7. GALACTO-OLIGOSES[a]



n	Mol. wt.	m.p. (°C)	$[\alpha]_D$ in H_2O
1	180.2	167	−52.5
2	342.3	210–211	173
3	504.4	115–120	58
4	666.6		53

[a] Ref. 15.

23.2.8. MANNO-OLIGOSES[a]

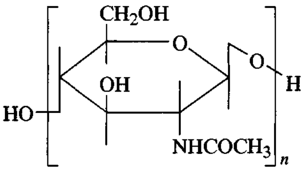


			Specific rotation		
n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	(°C)	c, H_2O
1	180.2	132			
2	342.3	193–194	−7.7	25	0.9
3	504.4	137–137.5	−23.3		1.3
4	666.6	232–234	−31		1.6

[a] Refs. 16,17.

23.3. OLIGOMERIC AMINO SUGARS

23.3.1. *N*-ACETYL CHITO-OLIGOSES[a]



			Specific rotation	
n	Mol. wt.	m.p. (°C)	$[\alpha]_D$	c in H_2O
1	221.2			
2	424.4	260–262 d	17.2	0.5
3	627.6	290–311 d	2.2	0.9
4	830.8	290–300 d	−4.1	1.0
5	1034.0	285–295 d	−9.1	1.0
6	1237.2		−11.4	0.8
7	1440.4		−12.6	0.3

[a] Refs. 18,19.

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SECTION V

PHYSICAL CONSTANTS OF SOME IMPORTANT POLYMERS

Physical Constants of Rubbery Polymers

Isao Furuta, Shin-Ichi Kimura, Masamichi Iwama
Yokkaichi Research Laboratories, Japan Synthetic Rubber Co. Ltd., Yokkaichi Mie, Japan

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A. INTRODUCTION

Where a range is given, there are available several observations which differ. In most cases the differences are thought to be real, arising from differences in the rubber rather than from errors of observation. Where a single value is given, it is either because no other observations are available or because there seems to be no significant disagreement among values within the errors of observation. Where values are not given, data have not been found. Where dashes are shown, either the physical measurement is impossible or the constant in question is not adequately defined under the given conditions. The values shown refer to specific vulcanizates cited in the corresponding references. Other vulcanizates may yield a broader range of values.

The values are expressed in the International System of Units (SI), the modern metric system, described in National Bureau of Standards Special Publication 330, 1981 edition, and in American Society for Testing and Materials Metric Practice Guide E380–85.

Values are given for constants at a temperature of 25°C (273.15 K) and a pressure of 1 normal atmosphere = 101.325 kPa.

B. TABLES

TABLE 1. 1,4-*cis*(96–98%)POLY(BUTADIENE)

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^3			1.01	1
Coefficient of expansion	K^{-1} ($\times 10^6$)	669	2		
Glass transition temperature	°C			−110 to −95	3
Specific heat	J/kg/K ($\times 10^3$)	1.96	4	1.960–1.970	1
Thermal conductivity	W/m/K ($\times 10^{-3}$)			200	5
Thermal diffusivity	m^2/s ($\times 10^{-9}$)				
Solubility parameter	$MPa^{1/2}$	17.0	6		
Polymer–solvent interaction parameter (25–30°C)					
	Solvent				
	n-Heptane	0.51	7		
	n-Hexane	0.53	7		
	Cyclohexane	0.45	8		
	Benzene	0.44	7		
	Toluene	0.36	7		

TABLE 1. *cont'd*

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Equilibrium melting temperature	K (°C)	1.0	10		
		0	11		
Temperature of most rapid crystallization	K (°C)	− 52 to − 57	3		
Heat of fusion of crystal	J/kg ($\times 10^3$)	47	11		
		169	10		
Refractive index	N_D	1.526	12		
Molar polarizability	cm^3 ($\times 10^{-25}$)	71.4	12		
Dielectric constant (50 Hz)		2.3	3		
Dielectric loss factor (50 Hz)		0.8	3		
Compressibility	Pa^{-1} ($\times 10^{-12}$)	500	2		
Young's modulus	Pa ($\times 10^6$)			1.3	9
Shear modulus	Pa ($\times 10^6$)			0.96	9
Storage modulus (1 Hz)	log Pa			5.98	9
Loss modulus	log Pa			4.79	9
Loss tangent				0.065	9

TABLE 2. POLY(BUTADIENE-*co*-ACRYLONITRILE)

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^3			0.95[a] (20%)	3
				1.02 (45%)	3
Glass transition temperature	°C			− 85 + A(20–40%) (A = AN%)	3
Specific heat	J/kg/K ($\times 10^3$)			1.970(40%)	3
Thermal conductivity	W/m/K ($\times 10^{-3}$)			250 (18–35%)	3
Thermal diffusivity	m^2s ($\times 10^{-9}$)				
Solubility parameter	$MPa^{1/2}$	18.5–21.0 (18–39%)	6		
Polymer–solvent interaction parameter (25–30°C)					

Solvent	AN% 18	AN% 30	AN% 39	Refs.
n-Heptane	0.96	1.88	3.6	9
n-Hexane	0.99		2.8	9
Dichloromethane	0.39	0.31	0.32	9
Cyclohexane	0.70	1.42	2.6	9
Benzene	0.39	0.31	0.32	9
Toluene	0.43	0.8	0.6	8

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Refractive index	N_D			1.519 (20%)	3
				1.521 (45%)	3
Dielectric constant (10^6 Hz)				5.5 (27%)	3
				4.8 (40%)	3
Dielectric loss factor (10^6 Hz)				35 (27%)	3
				42 (40%)	3

[a] Bound acrylonitrile content (= AN%)).

TABLE 3. POLY(BUTADIENE-*co*-STYRENE) (23.5–25% BOUND STYRENE CONTENT)

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^3	933	43	980	17
		(932.5–933.5)	43	940–1000	17
Coefficient of expansion	K^{-1} ($\times 10^6$)	660	43	660	17,18,44
Glass transition temperature	°C	−64 to −59	43	−52	21
Specific heat	J/kg/K ($\times 10^3$)	1.89	45	1.83	24
Thermal conductivity	W/m/K ($\times 10^{-3}$)			190–250	46,47
Thermal diffusivity	m^2/s ($\times 10^{-9}$)			90	48
Solubility parameter	$MPa^{1/2}$	17.0	6		
Polymer–solvent interaction parameter (25–30°C)	**Solvent**				
	n-Heptane	0.59	9		
	n-Hexane	0.66	9		
	Dichloromethane	0.47	9		
	Cyclohexane	0.48	9		
	Benzene	0.40	9		
	Toluene	0.31	13		
Heat of combustion	J/kg ($\times 10^6$)	56.5	43		
Refractive index	N_D	1.5345	43		
		(1.534–1.535)	43		
Molar polarizability	cm^3 ($\times 10^{-25}$)				
Dielectric constant (1 kHz)		2.5	33	2.66	33
Dielectric loss factor		0.0009	33	0.0009	33
Electric conductivity	Sm^{-1} ($\times 10^{-15}$)				
Compressibility	Pa^{-1} ($\times 10^{-12}$)	530	49	510	50
Bulk modulus (isothermal)	Pa ($\times 10^6$)	1890	49	1960	49
Young's modulus	Pa ($\times 10^6$)			1.6	21,35
				1.0–2.0	35
Shear modulus	Pa ($\times 10^6$)			0.53	21
				0.3–0.7	35
Shear compliance	Pa^{-1} ($\times 10^{-6}$)			7	21,35
				3–10	21,35
Storage modulus	log Pa	5.82	40	5.88	64
		(5.82–5.85)	40	5.64–6.20	64
Loss modulus	log Pa	4.94	40	4.92	64
		(4.56–4.94)	40	4.73–5.04	64
Loss tangent		0.13	40	0.11	64
		(0.05–0.13)	40		
Tensile strength	MPa			1.4-3.0	19,42
Ultimate elongation	%			400–600	19,42

TABLE 4. POLY(CHLOROPRENE) (CR NEOPRENE)

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^3	1230	43,51,58	1320	17
Coefficient of expansion	K^{-1} ($\times 10^6$)	600	46,58	610–720	17,58,59
Glass transition temperature	°C	−45	60	−45	21,59,60,61
Specific heat	J/kg/K ($\times 10^3$)	2.2–2.2	46	2.1–2.2	46
Thermal conductivity	W/m/K ($\times 10^{-3}$)	192	58	192	58
Thermal diffusivity	m^2/s	10^{-9}			
Solubility parameter	$MPa^{1/2}$	18.5	6		

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TABLE 4. *cont'd*

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Polymer–solvent interaction parameter (25–30°C)	**Solvent**				
	n-Heptane	0.85	9		
	n-Hexane	0.89	9		
	Dicyclomethane	0.53	9		
	Cyclohexane	0.69	9		
	Benzene	0.26	9		
	Toluene	0.70	13		
Equilibrium melting temperature	K (°C)	328–351 (55–78)	62,63		
Temperature of most rapid crystallization	K (°C)	268 (– 5)	65	261 (– 12)	65,66
Heat of fusion of crystal	J/kg (× 10^3)	95	63		
Refractive index	N_D	1.558	20		
Dielectric constant				6.5–8.1	33
Dielectric loss factor				0.03/0.86	33
Electric conductivity	Sm^{-1} (× 10^{-15})			3–1400	33
Compressibility	Pa^{-1} (× 10^{-12})	480	49,50	440	49,50
Bulk modulus (isothermal)	Pa (× 10^6)	2080	50	2270	50
Young's modulus	Pa (× 10^6)			1.6	21,35
Shear modulus	Pa (× 10^6)			0.52	21
Shear compliance	Pa^{-1} (× 10^{-6})			2.0	19,21,35
Poisson's ratio				0.49974	38
Storage modulus	log Pa			5.81	57,59
Loss modulus	log Pa			5.04	57,59
Loss tangent				0.17	57,59
Tensile strength	MPa			25–38	19,42
Ultimate elongation	%			800–1000	19,42

TABLE 5. POLY(ISOBUTENE-*co*-ISOPRENE) BUTYL RUBBER (IIR)

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^{-3}	917	51	933	52
				930–970	17
Coefficient of expansion	K^{-1} (× 10^6)	750	53	560	52,54
Glass transition temperature	°C	– 71	53	– 63	21
Specific heat	J/kg/K (× 10^3)	1.95	23,24,29	1.85	24
Thermal conductivity	W/m/K (× 10^{-3})			130	47
Thermal diffusivity	m^2/s (× 10^{-9})			70	55
Solubility parameter	$MPa^{1/2}$	16.0	6		
Polymer–solvent interaction parameter	**Solvent**				
	n-Heptane	0.48	14		
	n-Hexane	0.52	14		
	Dicyclomethane	0.58	14		
	Cyclohexane	0.44	14		
	Benzene	0.66	14		
	Toluene	0.56	14		
Equilibrium melting temperature	K (°C)	275 (1.5)	53		
Temperature of most rapid crystallization	K (°C)	239 (– 34)	53		
Refractive index	N_D	1.5081	43		
Dielectric constant (1 kHz)		2.38	33	2.42	33
Dielectric loss factor		0.003	33	0.0054	33

TABLE 5. *cont'd*

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Compressibility	Pa^{-1} ($\times 10^{12}$)			508	54
Bulk modulus (isothermal)	Pa ($\times 10^6$)			1970	54
Young's modulus	Pa ($\times 10^6$)			1.0	21,35
Shear modulus	Pa ($\times 10^6$)			0.33	21,35
				0.2–0.5	19,21,35
Shear compliance	Pa^{-1} ($\times 10^{-6}$)			3.1	21
Strage modulus	log Pa	6.50	56	5.64	57
Loss modulus	log Pa	5.98	56	5.48	57
Loss tangent		0.3	56	0.7	57
Tensile strength	MPa			18–21	19,42
Ultimate elongation	%			750–950	19,42

TABLE 6. POLYISOPRENE, NATURAL RUBBER

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^3	913	16	970	17,18
		906–916	16	(920–1000)	19
Coefficient of expansion	K^{-1} ($\times 10^6$)	670	16	660	16
Glass transition temperature	°C	−72	20	−63	21
		(−74 to −69)	20	(−72 to −61)	21
Specific heat	J/kg/K ($\times 10^3$)	1.905	22,23	1.828	24
Thermal conductivity	W/m/K ($\times 10^{-3}$)	134	16	153	25,26
Thermal diffusivity	m^2/s ($\times 10$)			70	27
Solubility parameter	$MPa^{1/2}$	1.7	6		
Polymer–Solvent interaction parameter (25–30°C)	**Solvent**				
	n-Heptane	0.43	9		
	n-Hexane	0.47	9		
	Dichloromethane	0.40	9		
	Cyclohexane	0.53	9		
	Benzene	0.44	9		
	Toluene	0.39	9		
Equilibrium melting temperature	K (°C)	308.6 (35.5)	28	313(40)	29
Temperature of most rapid crystallization	K (°C)	248 (−25)	30		
Heat of fusion of crystal	J/kg ($\times 10^3$)	67.3	31		
Heat of combustion	J/kg ($\times 10^6$)	45.2	16	44.4	16
Refractive index	$N_D K^{-1}$	1.5191(25°C)	32	1.5264	16
Molar polarizability	cm^3 ($\times 10^{-25}$)				
Dielectric constant (1 kHz)		2.37–2.45	16,33	2.68	33
Dielectric loss factor (1 kHz)		0.001–0.003	33	0.002–0.04	33
Electric conductivity	Sm^{-1} ($\times 10^{-15}$)	2.57	16,33	2–100	16,33
Compressibility	Pa^{-1} ($\times 10^{-12}$)	515	34	514	34
Bulk modulus (isothermal)	Pa ($\times 10^6$)	1940	34	1950	34
Young's modulus	Pa ($\times 10^6$)			1.3	35,36
				(1.0–2.0)	19,35
Shear modulus	Pa ($\times 10^6$)			0.43	21,36
				0.3–0.7	21,37
Shear compliance	Pa^{-1} ($\times 10^{-6}$)			2.3	21,36
				(1.5–3.5)	21,37
Poisson's ratio				0.49989	34,38,39
Storage modulus	log Pa	5.61	40	5.61	41
		5.53–5.75		5.49–5.78	
Loss modulus	log Pa	4.46	40	3.80	41
		(4.43–4.65)		3.72–4.48	

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TABLE 6. *cont'd*

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Loss tangent		0.09	40	0.016	41
		0.07–0.13		0.01–0.05	
Tensile strength	MPa			17–25	19,42
Ultimate elongation	%			750–850	19,42

TABLE 7. ETHYLENE–PROPYLENE–DIENE–TERPOLYMER (EPDM)

Property	Units	Unvulcanized	Refs.	Pure-gum vulcanizate	Refs.
Density	kg/m^3			0.85	3
Glass transition temperature	°C			− 60 to − 69	1
Specific heat	J/kg/K (× 10^3)			2340	3
Thermal conductivity	W/m/K (× 10^{-3})				
Thermal diffusivity	m^2/s (× 10^{-9})				
Solubility parameter	MPa$^{1/2}$	16.0–16.5	6		
Polymer–Solvent interaction parameter (25–30°C)	**Solvent**				
	n-Heptane	0.44	15		
	n-Hexane	0.49	16		
	Dichloromethane	0.32	16		
	Cyclohexane	0.35	15		
	Benzene	0.58	15		
	Toluene	0.49	15		
Refractive index	N_D			1.48	3
Young's modulus	Pa (× 10^6)			2.0	13
Shear modulus	Pa (× 10^6)			1.59	13
Storage modulus (1 Hz)	MPa			1.59	13
Loss modulus (1 Hz)	MPa			0.12	13
Loss tangent (1 Hz)				0.077	13

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Physical Constants of Poly(ethylene)*

Lei Zhu, Fang-Chyou Chiu, Qiang Fu, Roderic P. Quirk, Stephen Z. D. Cheng
Maurice Morton Institute of Polymer Science, The University of Akron, Akron, OH 44325-3909, USA

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A. CRYSTALLOGRAPHIC DATA AND CRYSTALLOGRAPHIC MODIFICATIONS[a]

Crystal system	Space group	Lattice constants (nm) *a*	*b*	*c*	α, β, or γ (deg.)	Number of chains per unit cell	Molecular conformation	Crystal density (g/cm^3)	Refs.
Orthorhombic stable form	Pnam-D_{2h}	0.7417	0.4945	0.2547		2	Planar Zigzag (2/1)	1.00	3–7
Monoclinic metastable form	C2/m-C_{2h}	0.809	f.a. = 0.253[b]	0.479	β = 107.9	2	Planar Zigzag (2/1)	0.998	4,8
Hexagonal high-pressure form		0.842	–	f.a.[c]			–	–	9–11

[a] Refs. 1,2.
[b] f.a. indicates fiber axis.
[c] Not determined.

Temperature Dependence of Crystallographic Data for Orthorhombic Poly(ethylene)[a]

Temp. (K)	Lattice constants (nm) *a*	*b*	*c*	Specific volume (cm^3/g)	Refs.
4[b]	0.712	0.485	0.2548	0.945	12
10	0.716	0.486	0.2534	0.947	13
77	0.718	0.488	0.2534	0.953	13
77	0.715	0.490	0.2547	0.959	14
90[b]	0.716	0.487	0.2546	0.953	12
195	0.727	0.491	0.2534	0.971	13
293[c]	0.740	0.495	0.2543	0.999	5
	(0.743)	(0.494)	(0.2543)	(1.003)	5
297	0.742	0.496	0.2534	1.001	13
297	0.740	0.493	0.2534	0.993	3
297	0.736	0.492	0.2534	0.985	15
303	0.741	0.494	0.2547	1.002	14

[a] Ref. 1. Data obtained by X-ray diffraction studies unless otherwise indicated.
[b] Data obtained by neutron diffraction.
[c] The data of nonoriented samples are given without parentheses and those of oriented samples are given with parentheses, both for high-density PE.

* Based on a table in the third edition, by R. P. Quirk and M. A. A. Alsamarraie, The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio.

B. MOLECULAR PARAMETERS AND SOLUTION PROPERTIES

Bond Angle and Bond Length

	Wide angle X-ray[a] (Refs. 3,4,16)	Neutron scattering (Ref. 12)	Temp. (K)
BOND ANGLE (in degrees)			
C–C–C	112.0	107.7	4
		108.1	90
H–C–H	107.0	109.0	4
		110.0	90
BOND LENGTH (nm)			
C–C	0.153	0.158	4
		0.157	90
C–H	0.107	0.106	4
		0.107	90

[a] Measurements taken at room temperature.

Dimensions of Linear Polyethylene Molecules[a]

Temperature (°C)	PEH Matrix $\overline{M}_w$ ($\times 10^3$)	$\overline{M}_w$ ($\times 10^3$)	PED[b] $\langle S^2\rangle_z^{1/2}$† (nm)	PED[b] $\langle S^2\rangle_w^{1/2}/\overline{M}_w^{1/2}$‡ [nm/(g/mole)$^{1/2}$]	State	Refs.
23 (296.2)[c]	78	60	13.3	0.046	Crystalline	17
150 (423.2)	100	140	21.5	0.046	Molten	17
150 (423.2)	80	10	4.38	0.044	Molten	18

[a] Effect of temperature and state, neutron scattering measurements.
[b] Deuterated polyethylene.
[c] Values in parentheses indicate temperature in kelvin.
† $\langle S^2\rangle_z^{1/2}$ is the z-average value of the radius of gyration of the molecule.
‡ $\langle S^2\rangle_w^{1/2}$ is the weight-average value of the radius of gyration of the molecule.

Molecular Dimensions of Linear Poly(ethylene) (Unperturbed)[a]

$\overline{M}_w$ ($\times 10^5$)	$(\langle r_0^2\rangle_w/\overline{M}_w)^{1/2}$ [nm/(g/mole)$^{1/2}$]	$\langle r_0^2\rangle_w/Dr_{max}$
1.25	0.192	7.80
2.69	0.215	9.86
4.65	0.190	7,73

[a] In tetralin at 105°C (378.2 K). $\langle r_0^2\rangle_w$ is the weight-average mean-square end-to-end distance in nm; $\overline{M}_w$ is the weight-average molecular weight; D is the diameter of a spherical segment of the lattice model chain; and r_{max} is the length of the fully extended chain (19); temperature dependence of $\langle r_0^2\rangle$ (in long chain paraffinic hydrocarbon solvents) is given by $-d\ln\langle r_0^2\rangle/dT = 1.2\times 10^{-3}$ (20).

Effect of Molecular Weight on Paraclustering[a]

Molecular weight of tagged molecules	$\frac{\sum_0}{\overline{M}_w} = \frac{\text{Molecular weight (neutrons)}}{\text{Molecular weight (g.p.c.)}}$	$\frac{\langle S^2\rangle_w^{1/2}}{\overline{M}_w^{1/2}}$†
3000	73 ± 7	0.41
12000	7 ± 1	0.18
60000	0.91 ± 0.1	0.049
140000	0.94 ± 0.1	0.042

[a] For deuterated poly(ethylene) in a protonated poly(ethylene) matrix with molecular weight ca. 100000 by neutron scattering measurements (21). All sample solution were blended in ortho-dichlorobenzene, quenched rapidly from the melt and measured at 25°C (298.2 K) (concentration of tagged molecules ≤ 5%).
† $\langle S^2\rangle_w^{1/2}$ the weight-average value of the radius of gyration of the molecule; values are in [nm/(g/mol)$^{1/2}$].

C. CRYSTALLINITY, CRYSTAL SIZE AND CRYSTALLIZATION KINETICS

Crystallinity[a,b]

	Average molecular weight	Density ρ (g/cm^3)	Melting point T (°C)	Degree of branching (CH_3/100C)	Crystallinity (α_ρ)	Crystal thickness l (nm)
Marlex 6015	15.0×10^4	0.980	131 (404.2)[c]	0.05	0.94	23.9
Hostalen GC	5.0	0.969	129 (402.2)	0.10	0.83	19.8
Hostalen GF	12.0	0.968	128 (401.2)	0.64	0.85	18.4
Hoechst PA-190	0.9	0.954	124 (397.2)	0.84	0.76	14.1
Alkathene HD	24.5	0.952	121 (394.2)	0.91	0.76	12.0
Epolene C-11	1.0	0.947	119 (392.2)	1.08	0.74	11.0
Lupolen KR 1051	5.1	0.943	120 (393.2)	1.30	0.70	11.4
BASF a Wachs	1.0	0.933	111 (384.2)	1.84	0.67	8.1
Lupolen KR 1032	5.3	0.931	115 (388.2)	2.50	0.60	9.2
Epolene C-13	1.0	0.919	104 (377.2)	2.80	0.54	6.5
Lupolene 1810 H	5.4	0.928	106 (379.2)	3.00	0.59	6.9
Hoechst PA-130	3.0×10^3	0.957	115 (388.2)	1.58	0.85	9.3
Epolene N-10	2.5	0.925	105 (378.2)	2.25	0.61	6.8
Epolene N-12	1.5	0.941	108 (381.2)	2.27	0.75	7.4
BASF a Wachs	5.6	0.936	106 (379.2)	2.32	0.68	6.9
Epolene N-11	1.5	0.934	104 (377.2)	2.48	0.68	6.6
Hoechst PA-560	6.0	0.914	101 (374.2)	4.10	0.51	6.1
Epolene C-10	7.0	0.919	99 (372.2)	4.19	0.60	5.8
Epolene C-101	3.2	0.936	104 (377.2)	4.42	0.70	6.6
Hoechst PA-520	2.0	0.917	102 (375.2)	4.90	0.54	6.2
Epolene C-12	3.7	0.906	83 (356.2)	6.94	0.50	5.1

[a] Depends upon chain branching; data given are representative values of typical commercial poly(ethylenes) (22).
[b] Crystallization from melt by rapid cooling at ambient temperature; crystallinity estimated from density.
[c] Values in parentheses indicate temperature in kelvin.

Single Crystal Lamella Thickness[a]

Solvent	Cryst. temp. (°C)	Conc. (%)	Long period (nm)	Refs.
HIGH DENSITY, POLY(ETHYLENE) (PHILLIPS MARLEX 50)				
Tetrachloroethylene	50 (323.2)[b]	0.31	11.2	24
	60 (333.2)	0.25	10.8	25
p-Xylene	72 (245.2)	0.46	11.0	26
	78 (351.2)	0.58	14.0	24
Xylene	50 (323.2)	–	9.25	23,26
	60 (333.2)	–	10.2	
	70 (343.2)	–	11.15	
	80 (353.2)		12.05	
	90 (363.2)		15.0	
	75 (348.2)	0.1	11.5	27
	80 (353.2)	0.1	12.5	
	85 (358.2)	0.1	13.3	
Melt	120 (393.2)	100	19.0	28
	125 (398.2)	100	22.3	
	130 (403.2)	100	35.5	
n-Butyl acetate	105 (378.2)	0.45	14.7	25
	110 (383.2)	0.57	16.2	24
Diphenyl ether	120 (393.2)	0.47	20.2	24
	125 (398.2)	0.37	17.3	25
LOW DENSITY POLY(ETHYLENE) (DUPONT ALATHON)				
Butyl stearate	111 (384.2)	0.25	12.6,15.5	23
	113.5 (386.7)	0.25	16.6	
Squalene	155.5 (428.7)	0.25	17.6	
Glycol dipalmitate	155.4 (428.6)	0.25	15.1	
	118 (391.2)	0.25	16.4	
	121 (394.2)	0.25	20.6	
Tripalmitin	121 (394.2)	0.25	18.8	

[a] Long periods from small angle X-ray scattering, effect of crystallization temperature and solvents (23).
[b] Values in parenthesis indicate temperature in kelvin.

Crystallization Kinetic Parameters See table "Rate of Crystallization of Polymer" in this Handbook, and Refs. 29–31.

D. EQUILIBRIUM THERMODYNAMIC PROPERTIES

Entropy of Fusion at Equilibrium Melting Temperature (J/mol/K)

	Value	Refs.
ΔS_u	9.81	32
	9.60	33
	9.91	34
At constant volume $(\Delta S_u)_v$	7.42	33
	7.72	35

Glass Transition Temperature[a,b] (°C)

Value	Refs.
-30 ± 15 (243.2 ± 15)[c]	37,38
-80 ± 10 (193.2 ± 10)	39
-128 ± 5 (145.2 ± 5)	40,41

[a] Ref. 36. See also Transition and Relaxation Temperatures in Section E.
[b] Considerable disagreement exists between different authors on the exact value of the transition which can be identified as the glass transition temperature. See Ref. 36 for a detailed discussion.
[c] Values in parentheses indicate temperature in kelvin.

Glass Transition Activation Energy 46–75 kJ/mol (42).

Heat Capacity, C_p (J/mol/K)[a]

Temperature (K)	Polymer	C_p	Refs.
298.15	Crystalline	21.70	
298.15	Amorphous	30.81	
300	Branched	32.55	43
		32.68	44
		32.86	45
300	Linear	23.93	46
		24.14	47
		24.24	46
400	Molten	34.48	48
		35.22	44,49
		35.36	50
		36.04	48

[a] Ref. 2. For linear, amorphous, crystalline and molten poly(ethylene), (0–600 K), see Table "Heat Capacity of High Polymers" in this Handbook, and also Refs. 2,34.

Heat Capacity in Liquid (2) For molten poly(ethylene) (390–600 K)
$C_p = 4.325 \times 10^{-2} T + 17.919$ [$\pm 1.2\%$ (RMS deviation)]

Heat Capacity in Amorphous Glass (2) The heat capacity of amorphous poly(ethylene) obtained from crystallinity extrapolations was given in J/mol/K.

From 0.5 to 20 K:

$$C_p = \exp[-0.135328(\ln T)^3 + 0.393949(\ln T)^2 + 2.85597(\ln T) - 7.84553]$$
$$[\pm 2.2\% \text{ (RMS deviation)}]$$

From 10 to 260 K:

$$C_p = \sum_{n=0}^{7} A_n T^n \quad [\pm 0.7\% \text{ (RMS deviation)}]$$

$A_0 = 1.0966333$ $A_1 = -0.11209575$
$A_2 = 9.3092851 \times 10^{-3}$ $A_3 = -1.7095906 \times 10^{-4}$
$A_4 = 1.5885817 \times 10^{-6}$ $A_5 = -7.931924 \times 10^{-9}$
$A_6 = 2.0248831 \times 10^{-11}$ $A_7 = -2.0616876 \times 10^{-14}$

Heat Capacity in Crystalline Solid (2) The heat capacity of crystalline poly(ethylene) obtained from extrapolated values was given in J/mol/K.

From 0.4 to 20 K:

$$C_p = \exp[-1.07155 \times 10^{-2}(\ln T)^3 + 4.62622 \times (\ln T)^2 + 2.89948(\ln T) - 9.12864]$$
$$[\pm 5.8\% \text{ (RMS deviation)}]$$

From 10 to 410 K:

$$C_p = \sum_{n=0}^{9} A_n T^n \quad [\pm 1.2\% \text{ (RMS deviation)}]$$

$A_0 = 1.1504009$ $A_1 = -0.19842302$
$A_2 = 1.2786634 \times 10^{-2}$ $A_3 = -2.4474207 \times 10^{-4}$
$A_4 = 2.593176 \times 10^{-6}$ $A_5 = 1.6647891 \times 10^{-8}$
$A_6 = 6.5926585 \times 10^{-11}$ $A_7 = -1.5679761 \times 10^{-13}$
$A_8 = 2.0474114 \times 10^{-16}$ $A_9 = -1.1252521 \times 10^{-19}$

Heat Capacity Change at Glass Transition Temperatures 10.5 J/mol/K at 237 K (2)

Heat of Fusion at Equilibrium Melting Temperature 4.1 ± 0.2 kJ/mol (2,51)

Residual Entropy of the Glassy State at 0 K $S_0 = 3.0$ J/mol/K (2).

E. OTHER GENERAL PHYSICAL PROPERTIES

Coefficient of Thermal Expansion[a]

Temp (°C)	Coefficient of expansion ($\times 10^5$) Linear	Cubical	Specific volume ratio (V_E/V_{25})[b]
−35 (238.2)[c]	10.0	30	0.969
−20 (253.2)	13.7	41	0.975
0 (273.2)	18.3	55	0.986
20 (293.2)	23.7	71	0.997
25 (298.2)	24.8	74	1.000
40 (313.2)	29.0	87	1.012
60 (333.2)	33.7	101	1.031
80 (353.2)	40.3	121	1.055
100 (373.2)	46.6	140	1.094
110 (383.2)	51.0	153	1.130
115 (388.2)	25.0	75	1.140
115–150 (388.2–423.2)	25.0	75	–
150 (423.2)	25.0	75	1.168

[a] Branched polyethylene (52,53); for data on amorphous linear poly(ethylene), see Ref. 40.
[b] V_E is relative excess volume, V_{25} is the volume at 25°C (273.2 K).
[c] Values in parentheses indicate temperature in kelvin.

Density[a] (Mg/m^3) ≡ (g/cm^3)

	Value	Refs.
Amorphous (from extrapolation of data above the melting point)	0.855	54
Commercial high-pressure poly(ethylene)	0.915–0.935	55
Experimental high-pressure poly(ethylene)	0.940–0.970	55
Ziegler process (Refs. 56,57) poly(ethylene)	0.940–0.965	55
Phillips process (Ref. 58) poly(ethylene)	0.960–0.970	55
Crystal density (theoretical)	See "Crystallographic Data and Crystallographic Modifications" in Section A	

[a] Unless otherwise stated, the values given are for 25°C (293.2 K); see also Sections G and H.

Dielectric Constant At 100 kHz and 23°C (296.2 K): 2.3 (59)

Effect of Density on Dielectric Constant[a]

Density (g/cm^3)	Dielectric constant (ASTM D 150)
0.920	2.28
0.925	2.29
0.930	2.30
0.935	2.31
0.940	2.32

[a] Ref. 60. The relationship shown in this table is for pure poly(ethylene). Therefore, considerable divergence from this relationship is caused by the presence of impurities as well as addition of additives such as carbon black or other fillers.

Dielectric Loss tan δ (1×10^{-4}–1×10^{-3}) (61,62). The values of tan δ depend on temperature and structure of poly(ethylene) (61).

Dielectric Strength[a]

Temperature (°C)	Value ($\times 10^6$) (V/cm)[b,c]
− 200 to 0 (73.2–273.2)[d]	7
50 (323.2)	5.3
100 (373.2)	1.8

[a] Ref. 63.
[b] Short-time test value (ASTM D149) is 16000–24000 V/cm, and depends upon sample configuration and impurities (64).
[c] Intrinsic dielectric strength of LDPE is of the order of 8.0×10^5 V/cm, if all chain end, surface and impurity effects are eliminated (64).
[d] Values in parentheses indicate temperature in kelvin.

Electrical Properties See also Section H (65).

Flash Ignition Temperature ASTM Method E136-58T: 340°C (613.2 K) (66).

Frictional Properties[a]

Coefficient of friction (μ)	Steel sliding on polymer		Polymer sliding on steel		Polymer sliding on polymer	
	Polished	Abraded	Polished	Abraded	Polished	Abraded
Static (M_S)	0.60	0.33	0.60	0.33	0.60	0.33
Kinetic (M_K)	0.60	0.33	0.60	0.33	0.60	0.33
	0.50	0.25				

[a] Ref. 67.

Heat of Combustion[a]

Density (Mg/m^3) ≡ (g/cm^3)	Methyl groups per 1000 C atoms	Heat of combustion ΔE (kJ/kg)
0.9391	8.3	− 46,412
0.9220	24.7	− 46,492
0.9053	46.2	− 46,542

[a] Ref. 68.

Heat of Fusion and Melting Temperature From Differential Thermal Analysis Data[a]

Poly(ethylene) type	Melting point (°C)	Heat of fusion (kJ/kg)	Refs.
Marlex 50 (Phillips, linear)	135 (408.2)[a]	245.3	69
Super-Dylan (Ziesler, linear)	130 (403.2)	218.6	69
DYNH			
(Union Carbide, branched)	112 (385.2)	140.6	69
Linear poly(ethylene)			
from dilatometric measurements		280.5	33
from calorimetric measurements		277.1	34,70

[a] Values in parentheses indicate temperature in kelvin.

Ignition Limiting Oxygen Indices (ILOI)[a]

650°C (923.2 K)	600°C (873.2 K)	550°C (823.2 K)
2.8 ± 0.1	3.5 ± 0.1	5.7 ± 0.1

[a] Ref. 71. The method used (ASTM D2863-70) is defined as the minimum volume fraction of oxygen required for ignition to occur.

Infrared Absorption Bands (72–79).
Far Infrared (80).

Intrinsic Viscosity See Section G.

Mechanical Properties See Section H.
Ultra-drawn polyethylene. See Refs. 81–90.

Elastic Compliance See Section G.

Elongation at Break (%) See Section H.

Hardness, Shore D See Section H.

Impact Strength, Izod See Section H.

Low Temperature Brittleness See Section H.

Tensile Modulus See Section H. Also see Ref. 91 for Young's, shear and bulk moduli for more than 1,100 poly(ethylene) samples reported (within density range from 0.90 to 0.98 g/cm^3).

Tensile Strength See Section H.

Melt Index See Section G.

Melt Viscosity See Section G.

Melting Temperature[a,b] (°C)

	Value	Refs.
Poly(methylene)	136.5 ± 0.5 (409.7 ± 0.5)[c]	92
Linear poly(ethylene)	137.5 (410.7)	33
Linear poly(ethylene), high molecular weight fraction	138.5 (411.7)	93
From extrapolation of MP of *n*-Paraffins	141 ± 2.4 (414.2 ± 2.4)	94
T_m^0 (∞ MW)[b]	141.4–145.5 ± 1 (414.6–418.7 ± 1)	30

[a] See also Section G and under Section F (Effect of chain branching on melting temperature).
[b] The estimated melting point of the infinite poly(ethylene) crystal is in dispute (see Refs. 30,95).
[c] Values in parentheses indicate temperature in kelvin.

Molecular Properties of Typical Poly(ethylenes)[a]

Polymer	$\overline{M}_w$ ($\times 10^{-3}$)	Density (g/cm^3)	Groups per 100 carbon atoms				
			CH_3–	–CH_2CH_3	–CH=CH_2	–CH=CH–	=C=CH_2
Ziegler	50–60	0.960	3.6	0.5	0.09	<0.02	0.06
Phillips	50–60	0.965	3.1	0.8	1.58	<0.02	0.08
Solution polymerization	50–60	0.964	3.2	0.5	0.42	<0.02	0.03
Phillips catalyst gas phase	350	0.954	2.8	<0.2	0.65	<0.02	0.04
Low-density PE		0.918–0.928	20–33	6–9	0.08–0.25	<0.02–0.06	0.17–0.33

[a] Ref. 74.

Neutron Scattering Spectra See Refs. 96–98.

Nuclear Magnetic Resonance See Refs. 99–110.
Solid State. See Ref. 111.

Permeability and Diffusion Constants See corresponding table in this Handbook, and also Refs. 112,113.

Permeabilities at 30°C (293.2 K) of Poly(ethylene)[a]

Crystallinity (%)	Permeability $\left[\frac{(cm^3\ STP)\ mm \times 10^{10}}{cm^2\ s\ (cm\ Hg)}\right]$			
	N_2	O_2	CO_2	H_2O[b]
60	1.90×10^{-9}	5.5×10^{-9}	35.2×10^{-9}	80×10^{-9}
90	0.66	2.1	7.4	–
78	0.33	1.1	4.3	–
81	0.27	1.06	3.5	13

[a] Ref. 114.
[b] 90% e.h. at 25°C.

Raman Spectra See Refs. 115–123.

Refractive Index n_D^{25}

	Value	Refs.
LDPE	1.51	124
MDPE	1.52	124
HDPE (melt index above 0.1)	1.54	124
Amorphous, n_{5461}^{25}	1.49	125
Crystal, $\alpha \approx \beta$[a]	1.520	125
γ[a]	1.582	122

[a] α, β and γ are refractive indices along the *a*, *b* and *c* crystallographic directions of the crystal, respectively.

Dependence of Refractive Index on Chain Branching, Crystallinity and Density See Section F (Effect of Chain Branching on Physical Properties).

Specific Refractivity[a]

Temp. (°C)	v (cm^3/g)	n	r
LOW DENSITY POLY(ETHYLENE) (ALATHON-10)			
90 (363.2)[b]	1.159	1.4801	0.3293
100 (373.2)	1.178	1.4693	0.3283
108 (381.2)	1.209	1.4575	0.3297
113 (386.2)	1.239	1.4432	0.3286
118 (391.2)	1.250	1.4392	0.3289
124.4 (397.6)	1.256	1.4368	0.3288
			Av. 0.3290
HIGH DENSITY POLY(ETHYLENE) (MARLEX 50)			
130 (403.2)	1.261	1.4327	0.3273
139.9 (413.1)	1.270	1.4297	0.3297
150.6 (423.8)	1.281	1.4261	0.3283

[a] $r = \nu(n^2 - 1)/(n^2 + 1)$, where ν and n are specific volume and refractive index respectively. Ref. 52.
[b] Values in parentheses indicate temperature in kelvin.

Refractive Index Increment (dn/dc) See corresponding table in this Handbook, and also Refs. 126–133.

Softening Temperature, Vicat See Section H.

Solvent–Nonsolvent Systems for Fractionation

Solvent	Nonsolvent	Refs.
Xylene	Triethylene glycol	134,135
p-Xylene	Ethylene glycol monoethylene ether	136
Tetralin	2-Butoxyethanol	137
	Poly(ethylene oxide) [mol. wt. 200]	138,139

Transition and Relaxation Temperatures[a]

Designation	Temperature range (°C)	Approximate activation energy (kJ/mol)	Refs.
α	60–80 (333.2–353.2)[b]	>420	
β	– 20 to – 30 (253.2–243.2)	160–200	141
γ	– 80 to – 90 (193.2–183.2)[c]	46–75	
	– 120 to – 130 (153.2 –143.2)	32	

[a] There is considerable disagreement in the literature on the phenomena associated with the various transition and relaxation temperatures observed. Transition temperatures and temperatures associated with peaks in dynamic loss are collected together under the above combined heading. The transition and relaxation temperatures associated with amorphous regions of branched and linear poly(ethylenes) are designated as α, β, γ, etc. in the descending temperature order (140).
[b] Values in parentheses indicate temperature in kelvin.
[c] These frequently merge depending upon the crystallinity and frequency of the test method.

Frequency Dependence of Relaxation Temperatures in Dynamic Mechanical Loss Measurements[a]

α		β		γ	
Hz	T (K)	Hz	T (K)	Hz	T (K)
HIGH PRESSURE, BRANCHED POLY(ETHYLENES)					
0.3	340	0.3	268	1.25	140
1.2	327	4.1	268	8.6	166
39	333	150	253	324	158
150	355	540	265	1.2×10^3	165
200	360	520	280	1.15×10^3	165
600	385	6000	320	1.9×10^4	≤200
4×10^4	≥360	4×10^4	275	4×10^4	180
1×10^5	≥320	1×10^5	283	1×10^5	≤190
–	–	1×10^5	285	1×10^5	200
–	–	5×10^5	285	5×10^5	205
2×10^6	360	2×10^6	295	2×10^6	210
–	–	2×10^6	300	2×10^6	210
LOW PRESSURE, LINEAR POLY(ETHYLENES)					
0.3	373	–		1.25	153
0.2	368	8	273	10	173
≤460	≥380	1.1×10^3	295	840 and 1.57×10^3	173
3000	420	–		–	–

[a] Ref. 142.

Viscosity–Molecular Weight Relationship See corresponding table in this Handbook, and Ref. 52.

F. EFFECT OF CHAIN BRANCHING (SHORT) ON PHYSICAL PROPERTIES

Effect on Density and Refractive Index[a]

Methyl groups per 1000 C atoms	Density (Mg/m^3) ≡ (g/cm^3)	Refractive index n_D^{25}
83	0.91	1.5060
48	0.917	1.5168
46	0.925	1.5152
26	0.929	1.5227
16	0.926	1.5260

[a] Refs. 143, 52.

Effect on Expansion Coefficient (Mean) and Specific Volume of Crystalline Phase[a]

Methyl groups per 1000 C atoms	$1/V_{20}$ (– 150 to 100°C)	$(\Delta V/\Delta T)(\times 10^{-4})$ (0–100°C)	V_{20}
0.3	2.47	3.13	1.001
2	2.59	2.95	0.998
17.5	2.61	2.98	1.010
23	2.84	3.42	1.009
37	2.96	3.70	1.017

[a] Ref. 52,144.

Effect on Long Period Spacings and Crystallinity of Completely Annealed Samples[a]

Poly(ethylene)	Methyl groups per 1000 C atoms	Long period spacing (nm)	% crystallinity	Refs.
Branched (high pressure)	60	22.0	21	146
	45	20.0	48	
	35	21.0	50	
	28	22.0	53	
	20	23.0	56	
	15	25.0	59	
	10	26.0	62	
Linear	7	32.0	77	143,144
(Ziegler type catalysts)	5	36.0	79	
Linear	2	42.0	88	58
(Phillips petroleum process)				

[a] Ref. 52,145.

Effect on Melting Point Observed[a]

Methyl groups per 1000 C atoms	Melting point (°C)
87	105 (378.2)[b]
28	113 (386.2)
28	108 (381.2)
8	123 (396.2)
0	132 (405.2)

[a] Both the amount and randomness of branching affect the melting point. Experimental conditions used for the following data were not adequate for equilibrium crystallinity and accuracy of melting points (52).
[b] Values in parentheses indicate temperature in kelvin.

G. PROPERTIES OF A SERIES OF SELECTED POLY(ETHYLENE) SAMPLES

			Infrared functional groups				
				per 200°C			
Sample No.	Optical melting point (°C)	Density[a] (g/cm³)	per 100 C methyl	Vinyl	Trans-unsaturation	Vinylidene	Carbonyl
PE 1	104.2 (377.4)[f]	0.9142	3.68	0.18	0.15	0.79	0.13
PE 2	112.4 (385.6)	0.9225	2.59	0.32	0.11	0.32	0.02
PE 3	112.2 (385.4)	0.9218	2.48	0.10	0.06	0.29	0.05
PE 4	113.7 (386.9)	0.9232	2.55	0.11	0.06	0.29	n.d.
PE 5	114.0 (387.2)	0.9219	2.46	0.11	0.05	0.30	0.01
PE 6	114.5 (387.7)	0.9228	2.31	0.06	0.05	0.26	n.d.
PE 7	113.5 (386.7)	0.9207	2.59	0.11	0.06	0.33	0.02
PE 8	112.0 (385.2)	0.9188	2.54	0.10	0.06	0.31	n.d.
PE 9	121.5 (394.7)	0.9334	1.40	0.04	0.02	0.11	0.87
PE 10	135.8 (409.0)	0.9549	0.1	1.82	0.04	0.15	<0.005
PE 11	–	0.9554	0.165	0.86	–	0.17	–

	Molecular weight					
Sample No.	Weight Av.	Number Av.	Intrinsic viscosity[b] (ml/g)	Melt index[c]	Melt viscosity[d] (Pa s)	Elastic compliance[e] (MPa⁻¹)
PE 1	510000[g]	10700[h]	79.5	1.80	64	63×10^{-6}
PE 2	300000[g]	13300[h]	75.7	1.95	38	46
PE 3	550000[g]	19100[h]	96.1	0.16	620	46
PE 4	225000[i]	(16000)[j]	62	19.9	24	22
PE 5	500000[i]	(18000)[j]	75	3.30	185	36
PE 6	500000[i]	(22000)[j]	82	1.06	73	54
PE 7	300000[i]	(45000)[j]	77	2.94	23	31
PE 8	800000[i]	(55000)[j]	97	0.21	310	54
PE 9	300000[i]	(27000)[j]	73	3.75	153	39×10^{-6}
PE 10	144000[k]	11500[h]	116	2.92	–	–
PE 11	–	–	–	–	–	–

[a] Samples annealed for 1 hour at about 100°C (373.2 K).
[b] α-Chloronaphthalene, 125°C (398.2 K).
[c] ASTM D-1238-57T.
[d] Newtonian melt viscosity at 150°C (423.2 K) and 400 Pa.
[e] Steady-state elastic compliance from creep recovery at 150°C (423.2 K) and 400 Pa.
[f] Values in parentheses indicate temperature in kelvin.
[g] Light scattering after optical clarification by high temperature ultracentrifugation.
[h] Cryoscopy.
[i] Preliminary value, subject to revision.
[j] "Best guess", subject to drastic revision.
[k] Measured by osmometry.

H. PROPERTIES OF TYPICAL POLY(ETHYLENES)[a]

Property	Low density ASTM type I[b]	Medium density ASTM type II[b]	High density ASTM type III[b]
Abrasion resistance, Taber (mg/1000 cycles)	10–15	6–10	2–5
Brittleness, low temperature (°C)	<– 118 (155.2)[c]	<– 118 (155.2)	<– 118 to – 73 (155.2–200.2)
Coefficient of thermal expansion ($\times 10^{-5}$) [D 696][d] (K^{-1})	10	–	13
Density [D 792] (g/cm^3)	0.910–0.925	0.926–0.940	0.941–0.965
Dielectric constant at 1 kHz [D 150]	2.28	–	2.32
Elongation at break [D 638] (%)	150–600	100–150	12–700
Hardness, Shore D [D 1706]	44–48	45–60	55–70
Impact strength, Izod [D 256] (ft/lb/in notch)	> 16	>16	0.8–14
Power factor at 1 kHz [D 150]	< 0.0001	–	< 0.0001
Heat capacity (kJ/kg/K)	1.916	1.916	1.916
Tensile modulus [D 638] (MPa)≡(N/mm^2)	55.1–172	172–379	413–1034
Tensile strength [D 638] (MPa)≡(N/mm^2)	15.2–78.6	12.4–19.3	17.9–33.1
Vicat, softening temp. [D 1525] (°C)	88–100 (361.2–373.2)	99–124 (372.2–39.2)	112–132 (385.2–405.2)
Volume resistivity [D 257] (cm)	6×10^{15}	–	6×10^5

[a] Ref. 52, 147, 148.
[b] ASTM designation D1248-72, "Standard Specification for Polyethylene Plastics Molding and Extrusion Materials."
[c] Values in parentheses indicate temperature in kelvin.
[d] The numbers in square brackets refer to the ASTM Standards, American Society for Testing Materials.

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Physical Constants of Poly(propylene)*

Feng Bai, Fuming Li, Bret H. Calhoun, Roderic P. Quirk, Stephen Z. D. Cheng
The Maurice Morton Institute of Polymer Science, University of Akron, Akron, OH 4325-3909, USA

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A. CRYSTALLOGRAPHIC DATA AND MODIFICATIONS OF ISOTACTIC POLYPROPYLENES

Stereoisomeric form	Crystal system	Space group	Lattice dimensions (nm) a	b	c	α, β, or γ	Number of chains per unit cell	Molecular conformation	Crystal density (g/cm³)	Refs.
Isotactic	Monoclinic α	C2/C	0.665	2.096	0.650	$\beta = 99.33°$	4	Helix(3/1)	0.936	1
	Monoclinic α_1	C2/C	0.666	2.078	0.6495	$\beta = 99.62°$	4		0.946	2–4
	Monoclinic α_2	$P2_1/C$	0.666	2.078	0.6495	$\beta = 99.62°$	4	$(TG)_3$	0.946	2–4
	Hexagonal β		1.274		0.635	$\gamma = 120°$	9	Helix(3/1)	0.921	5,6
	Hexagonal β_1		0.636		0.635	$\gamma = 120°$	9	$(TG)_3$	0.921	7
	Hexagonal β_2		1.908		0.649	$\gamma = 120°$	9		0.922	2,8
	Triclinc γ		0.654	2.14	0.650	$\alpha = 89°$, $\beta = 99.6°$, $\gamma = 99°$	2	Helix(3/1) $(TG)_3$	0.954	9
	Quenched "smectic"							Helix(3/1) $(TG)_3$		1,10–13

B. CRYSTALLOGRAPHIC DATA AND MODIFICATIONS OF SYNDIOTACTIC POLYPROPYLENES

Stereoisomeric form	Crystal system	Space group	Lattice dimensions (nm) a	b	c	α, β, or γ	Number of chains per unit cell	Molecular conformation	Crystal density (g/cm³)	Refs.
Syndiotactic	Orthorhombic observed in fibers	$C222_1$	1.450	0.580 or 0.560	0.740		2	Helix(4/1) $(T_2G_2)_2$	0.90	14–16
	Orthorhombic high temp. form	Ibca	1.450	1.120	0.740		2	Helix(4/1) $(T_2G_2)_2$	0.90	17–19
	Orthorhombic low temp. form		0.522	1.117	0.506		2	Planar Zigzag	0.945	20–22
	Triclinic	P1	0.572	0.764	1.16	$\alpha = 73.1°$, $\beta = 88.8°$, $\gamma = 112.0°$	1	$T_6G_2T_2G_2$	0.939	23

*Based on a table in the third edition, by R. P. Quirk and M. A. A. Alsamarraie, The Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio.

C. DIMENSIONS OF POLY(PROPYLENE) MOLECULES*

Effect of Molecular Weight on Radius of Gyration[a]

Method of Crystallization	PPH matrix $\bar{M}_w$ ($\times 10^3$)	PPD matrix[b]				
		$\bar{M}_w$ ($\times 10^3$)	$\bar{M}_w/\bar{M}_n$	$\langle S^2\rangle_z^{1/2}$† (nm)	$\langle S^2\rangle_w^{1/2}$† (nm)	$\langle S^2\rangle_w^{1/2}/\bar{M}_w^{1/2}$‡
Rapidly quenched	46	34	2.52	18.0	11.3	0.061
	46	140	1.68	18.0	13.9	0.037
	56	340	2.02	25.5	17.9	0.031
	105	575	1.56	32.0	25.6	0.034
	114	1540	1.48	50.3	41.3	0.039
Rapidly quenched from	46	34	2.52	18.0	11.3	0.061
melt and subsequently	46	140	1.68	19.0	14.7	0.039
annealed at	56	340	2.02	26.5	18.6	0.032
137°C (410.2 K)	105	575	1.56	34.7	27.8	0.037
	114	1540	1.48	51.4	42.3	0.040
Isothermally crystallized	46	34	2.52	23.5	14.8	0.080
at 139°C (412.2 K)	46	140	1.68	23.5	18.1	0.048
	56	340	2.02	29.0	21.8	0.037
	105	575	1.56	36.8	29.6	0.039
	114	1540	1.48	58.0	47.7	0.038

[a] Measured by neutron scattering. Polymer >97% isotactic; Ref. 26.
[b] Deutrated poly(propylene).
† $\langle S^2\rangle_z^{1/2}$ and $\langle S^2\rangle_w^{1/2}$ are the z-average and weight-average values, respectively, of the radius of gyration of the molecule.
‡ In nm/(g/mol)$^{1/2}$.

Neutron Scattering Measurements

Method of crystallization	$\langle S^2\rangle_w^{1/2}/\bar{M}_w^{1/2}$†	
	Melt	Crystalline
Rapidly quenched	0.035	0.034
Isothermally crystallized at 139°C (412.2 K)	0.035	0.038
Rapidly quenched from melt and subsequently annealed at 137°C (410.2 K)	0.035	0.036

†$\langle S^2\rangle_w^{1/2}$ is the weight-average value of the radius of gyration of the molecule; values are in nm/(g/mol)$^{1/2}$. For further details and analysis, see Refs. 27–30.

Neutron Scattering See Refs. 24–30.

D. CRYSTALLINITY AND CRYSTALLIZATION KINETICS

Crystallinity and Melting Point of Samples from Multiple Solvent Fractionation[a]

Solubility of fractions in boiling solvents			
Soluble in	Insoluble in	T_m (°C)	Wide angle X-ray crystallinity (%)
–	Trichloroethylene	176 (449.2)[b]	75–85
–	n-Octane	174–175 (447.2–448.2)	65–85
n-Octane	2-Ethylhexane	174–175 (447.2–448.2)	60–66
2-Ethylhexane	n-Heptane	168–170 (441.2–443.2)	52–64
n-Heptane	n-Hexane	147–159 (420.2–432.2)	41–54
n-Hexane	n-Pentane	110–135 (383.2–408.2)	25–37
n-Pentane	Diethyl ether	106–114 (379.2–387.2)	15–27

[a] Refs. 31,32.
[b] Values in parenthesis indicate temperature in kelvin.

* See also corresponding table in this Handbook, and Refs. 24,25.

Crystallinities and Melting Temperatures of Mixtures of Amorphous[a] and Isotactic Poly(propylene)[b,c]

Isotactic fraction (%)	Crystallinity Calculated	Measured	Melting temperature (°C)
100	67.2	67.7	174 (447.2)[d]
87.5	59.3	60.3	173 (446.2)
75.8	51.4	49.8	172–173 (445.3–446.2)
60	40.6	40.2	171–172 (444.2–445.2)

[a] Ether extract.
[b] 2-Ethylhexane extraction residues.
[c] Refs. 33,34.
[d] Values in parenthesis indicate temperature in kelvin.

Crystallinity in Isotactic Poly(propylenes)[a]

Sample	Description and condition	Crystalline weight fraction
1.	Heptane extract of crude polypropylene, "amorphous", highly atactic	0.14
2.	Isotactic, water quenched	0.31
3.	Same as 2, followed by annealing at 105°C for 1 hr	0.43
4.	Same as 2, followed by annealing at 160°C for 1/2 hr	0.65

[a] Ref. 35,36.

Effect of Isotacticity on Crystallinity[a]

Sample	Description and condition	Crystalline weight fraction
1.	$\bar{M}_w = 202000$, $\bar{M}_w/\bar{M}_n = 2.6$, Isotacticity = 0.988	0.42–0.75
2.	$\bar{M}_w = 159000$, $\bar{M}_w/\bar{M}_n = 2.3$, Isotacticity = 0.978	0.40–0.75
3.	$\bar{M}_w = 189000$, $\bar{M}_w/\bar{M}_n = 3.0$, Isotacticity = 0.953	0.38–0.60
4.	$\bar{M}_w = 209000$, $\bar{M}_w/\bar{M}_n = 1.8$, Isotacticity = 0.882	0.30–0.45
5.	$\bar{M}_w = 190000$, $\bar{M}_w/\bar{M}_n = 1.6$, Isotacticity = 0.787	0.20–0.25

[a] Ref. 37.

Crystallization Kinetics See Table "Rate of Crystallization of Polymers" and Refs. 38–49 for isotactic poly(propylene), and Refs. 50–52 for syndiotactic poly(propylene).

E. EQUILIBRIUM THERMODYNAMIC PROPERTIES

Equilibrium Melting Temperature, T_m

Isotactic poly(propylene) 187.5°C (460.7 K) for the crystal with an infinite size [reported data ranging from 183°C–220°C (456–493 K); for a detailed discussion, see Ref. 34]. It is also critically dependent upon the isotacticity in crystalline samples.

Effect of Isotacticity on Equilibrium Melting Temperature[a]

Sample	Description and condition	Equilibrium melting temperature (°C)
1.	$\bar{M}_w = 202000$, $\bar{M}_w/\bar{M}_n = 2.6$, Isotacticity = 0.988	183.8 (457.0)[b]
2.	$\bar{M}_w = 159000$, $\bar{M}_w/\bar{M}_n = 2.3$, Isotacticity = 0.978	182.8 (456.0)
3.	$\bar{M}_w = 189000$, $\bar{M}_w/\bar{M}_n = 3.0$, Isotacticity = 0.953	180.2 (453.4)
4.	$\bar{M}_w = 209000$, $\bar{M}_w/\bar{M}_n = 1.8$, Isotacticity = 0.882	173.0 (446.2)
5.	$\bar{M}_w = 190000$, $\bar{M}_w/\bar{M}_n = 1.6$, Isotacticity = 0.787	163.0 (436.2)

[a] Ref. 37.
[b] Values in parenthesis indicate temperature in kelvin.

Syndiotactic poly(propylene) Equilibrium melting temperature is critically dependent upon the tacticity of the samples. For a sample with 95% of [r], 92% of [rr], and 86% of [rrr], and molecular weight higher than 40000, for example, the equilibrium melting temperature is 160°C (433.2 K) (53,54). For a 99% dyad sample, an actual melting temperature of 163°C (436.2 K) can be observed (55).

Equilibrium Enthalpy of Fusion, ΔH_f

Isotactic poly(propylene) 8.7 ± 1.6 kJ/mol (56) [reported data ranging from 2.65 kJ/mol to 10.94 kJ/mol; for a detailed discussion see Ref. 56].

Syndiotactic poly(propylene) Equilibrium enthalpy of fusion is determined for samples with 95% of [r], 92% of [rr], and 86% of [rrr], and molecular weight higher than 40000, and is 8.0 kJ/mol (53).

Equilibrium Entropy of Fusion, ΔS_f

Isotactic poly(propylene) 18.9 ± 3.5 J/K/mol (56).

Syndiotactic poly(propylene) No data is available.

Glass Transition Temperature, T_g

Isotactic poly(propylene) − 3.2°C (270 K) (56). The agreement of T_g values from various experimental methods [*e.g.*, dilatometry, dynamic mechanical measurements (at low frequency), heat capacity and NMR (narrowing of line width)] is not very good, but ranges from about − 30 to + 20°C. The glass transition temperature depends on thermal history (may also be tacticity) of the sample (57–61). Activation energy, 117–152 kJ/mol (57).

Syndiotactic poly(propylene) May be close to the glass transition temperature of isotactic poly(propylene).

Heat Capacity, C_p (J/K/mol) See "Thermodynamic Properties" in this Handbook, and Ref. 62.

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Isotactic poly(propylene) in the liquid The amorphous liquid heat capacities above T_g are given in J/K/mol [±2.5% (RMS)] $C_p = 0.151291\,T + 42.956$

Isotactic poly(propylene) in the solid The heat capacities in the solid state are separately fitted to 100% crystalline in various temperature ranges, all in J/K/mol:

10–100 K [±0.4% (RMS)]:
$C_p = \exp[0.241028(\ln T)^3 - 3.01364(\ln T)^2 + 13.5529(\ln T) - 18.7621]$
80–250 K [±0.8% (RMS)]:
$C_p = \exp[0.121683(\ln T)^3 - 1.90162(\ln T)^2 + 10.727(\ln T) - 17.6875]$
230–350 K [±1.7% (RMS)]:
$C_p = 1.5912 \times 10^6\,T^2 + 0.3837\,T - 64.551$

The 0% crystalline amorphous state heat capacities in various temperature ranges, all in J/K/mol.

10–60 K [±1.0% (RMS)]:
$C_p = \exp[0.327068(\ln T)^3 - 3.688(\ln T)^2 + 14.7469(\ln T) - 18.4281]$
50–180 K [±0.7% (RMS)]:
$C_p = \exp[0.00742669(\ln T)^3 - 0.189318(\ln T)^2 + 2.10843(\ln T) - 3.0699]$
160–260 K [±1.1% (RMS)]:
$C_p = \exp[0.0727139(\ln T)^3 - 0.711627(\ln T)^2 + 2.31907(\ln T) + 0.77926]$

Syndiotactic poly(propylene) No data is available.

Heat Capacity Data in the Crystalline and Amorphous Isotactic Poly(propylene)

	C_p (J/K/mol)		
Temperature (K)	Crystalline	Amorphous	Refs.
50	13.00	15.22	53
100	26.51	28.21	53
150	37.68	39.53	53
200	47.47	50.53	53
250	56.53	61.95	53
300	70.39	84.11	53
350	82.12	109.2	53

Heat Capacity Changes at Glass Transition Temperatures (J/K/mol)

Isotactic poly(propylene) 19.2 J/K/mol at −3.2°C (270 K) (63).

Syndiotactic poly(propylene) May be close to that of isotactic poly(propylene).

Residual Entropy of the Glassy State at 0 K S_0 (J/K/mol)

Isotactic poly(propylene) 5.2 J/K/mol (58).

Syndiotactic poly(propylene) No data is available.

F. OTHER GENERAL PROPERTIES

Coefficients of Thermal Expansion (ASTM D 696) (K^{-1}) (Refs. 64–66)

From −30°C (243.2 K) to 0°C (273.2 K)	6.5×10^{-5}
From 0°C (273.2 K) to 30°C (303.2 K)	10.5×10^{-5}
From 30°C (303.2 K) to 60°C (333.2 K)	14.5×10^{-3}

Density at 25°C (298.2 K) (Mg/m^3) = (g/cm^3). See also Section G.

Isotactic	Crystalline	0.932–0.943
	Amorphous (from extrapolation of data above melting point)	0.850–0.854
	"Smectic" form	0.916
Syndiotactic	Crystalline	0.989–0.91
	Amorphous (from extrapolation of data above melting point)	0.856

Dielectric Constant See Section G.

Electrical Properties: Conductivity[a]

Electric field (kV/cm)	Crystallinity (%)	Conductivity at 72°C (mhos/cm)	Refs.
8.5	–	1×10^{-18}	67
10.5	75	3.2×10^{-16}	68
	45	7.4×10^{-17}	68
	78	2.3×10^{-18}	69
	50.5	1×10^{-18}	69
24	81.2	2×10^{-16}	70
	39.7	1×10^{-16}	70
	78	2.2×10^{-18}	69
	50.5	1×10^{-18}	69
48	–	3.2×10^{-18}	71
	78	2.3×10^{-18}	69
144	81.2	1×10^{-14}	70
	39.7	1×10^{-14}	70
	78	2.8×10^{-18}	69
	50.5	2×10^{-18}	69

[a] See also Section G.

G Values for Radiation Crosslinking G(c.l.) and Chain Scission G(Breaks)
Maximum and Minimum Values[a]

	G(breaks)		G(c.l.)	
	Maximum	Minimum	Maximum	Minimum
Atactic	0.24	0.10	0.27	0.115
Isotactic film	0.21	0.10	0.14	0.069
Isotactic flake	0.27	0.10	0.18	0.068

[a] Ref. 72.

At Room Temperature and in Vacuum[a]

	G(c.l.)		G(breaks)
Measured by	Solubility	Elasticity	Solubility or viscosity
Atactic	0.12–0.27	0.6–1.3	0.10–0.24
Isotactic	0.07–0.25		0.10–0.24
	0.6		0.9
			5.0

[a] Ref. 72.

G-Values in Terms of Radiolytic Gas Yields[a]

	Gas	Irradiation T (°C)	G (gas)
Atactic	H_2	25	2.34
	CH_4	25	0.095
Isotactic	H_2	− 196	2.55
	CH_4	− 196	0.058
	H_2	25	2.78
	CH_4	25	0.072

[a] Ref. 72.

Ignition Limiting Indices[a]

650°C (923.2 K)	600°C (873.2 K)	550°C (823.3 K)
2.8 ± 0.1	3.5 ± 0.1	5.7 ± 0.1

[a] This method (ASTM D2803-70) is defined as the minimum volume of oxygen required for ignition to occur; Ref. 73.

Infrared Absorption Bands (36,74–85)

Assignment in Infrared Spectrum Used for Crystallinity Measurements[a,b]

Form	Crystalline phase wave numbers (cm^{-1})	Amorphous phase wave numbers (cm^{-1})
Isotactic	809	790
	842	1158
	894	
	997	
Syndiotactic	866	1131
	977	1199
		1230

[a] Used for tacticity measurements: ratio of absorption at 997 cm^{-1} to that at 975 cm^{-1} (80,84,86).
[b] Ref. 36.

Sequence-Sensitive Vibration Band of Propylene Units[a]

Position of band (cm^{-1})	Type of regularity	Classification	n^b
998	Isotactic	Helix band	10–12
973	Isotactic	Regularity band	3–4
841	Isotactic	Helix band	12
977	Syndiotactic	Helix band	
962	Syndiotactic	Regularity band	
867	Syndiotactic	Helix band	
936	–	Band of isolated propylene unit	

[a] Refs. 74,87.
[b] Number of the units in sequence for the bands to appear.

Far Infrared. See Ref. 88.

Mechanical Properties: Elongation at Break See Sections G and H

Hardness, Shore D See Sections G and H.

Impact Strength, Izod See Sections G and H.

Low Temperature Brittleness See Sections G and H.

Melt Index (ASTM Method D 1238-57T)

Molecular weight ($\times 10^3$)	Melt index (230°C, 2.16 kg)
142	22.8
180	7.3
220	3.5
292	1.2
358	0.39

Molecular Parameters of Typical Poly(propylenes) (64)

Number of double bonds per 1000 C atoms	<1
Type of unsaturation	Vinylidene
$\bar{M}_w$	220000–700000
$\bar{M}_n$	38000–60000
$\bar{M}_w/\bar{M}_n$	5–12

Nuclear Magnetic Resonance See Refs. 80,89–94.

Permeability and Diffusion Coefficients See corresponding table in this Handbook and Refs. 95–97.

Permeability of Polypropylene Films to Various Gases[a]

	Permeability[b] (cm^3/24 hr/100 in.^{2}/mil/atm)		
Film	O_2	CO_2	N_2
Unoriented	250	800	40
Oriented	105–150	300–500	10–25

[a] Ref. 98.
[b] At 25°C (298.2 K) adn 50% rh (ASTM D 1434–63).

Properties of Typical Poly(propylenes) See Sections G and H.

Refractive Index $n_D^{25} = 1.49$ (66,99).

Refractive Index Increment (dn/dc) See corresponding table in this Handbook, and Refs. 30,100.

Softening Temperature, Vicat See Sections G and H.

Sound Velocity (m/s) (101–103).

Unoriented:	at 25°C (298.2 K)	2.5×10^3
	at 125°C (398.2 K)	125×10^3

Specific Heat See Heat Capacity.

Specific Volume (cm^3/g)[a]

Form	v_a (Amorphous)	v_b (Crystalline)
Isotactic	1.176–1.172	10.73–1.060
Smectic		1.092
Syndiotactic	1.165	1.114–1.10

[a] Ref. 64.

Tensile Modulus See Sections G and H.

Tensile Strength See Sections G and H.

Transition and Relaxation Temperatures Associated with Peaks in Dynamic Loss[a]

Transition	T (°C)	Assignment and remarks
α	30–80	Difficult to resolve
β (at 0.2 Hz)	0 (273.2)[b]	Insensitive to changes in crystallinity; long chain motion in amorphous portion
γ	− 80 (193.2)	In atactic poly(propylene); hindered movement of C–CH_3 units
δ	< − 200 (< 73.2)	Hindered rotation of CH_3 groups

[a] Designated as α, β, γ, etc. in order of descending temperatures; Ref. 104.
[b] Values in parentheses indicate temperatures in kelvin.

Ultra-Drawn Polypropylene See Refs. 105–108.

Viscosity–Molecular Weight Relationship See corresponding table in this Handbook.

G. PROPERTIES OF TYPICAL MAINLY ISOTACTIC POLY(PROPYLENES)[a,b]

Property	Value
Brittleness [D 746] (°C (K))	25 (298.2)
Deflection temperatures [D 648] (°C (K))	
at 66 lb/in^2 (4.64 kg/cm^2)	96–110 (369.2–383.2)
at 264 lb/in^2 (18.6 kg/cm^2)	57–63 (330.2–336.2)
Density [D 792] (Mg/m^3) = (g/cm^3)	0.90–0.91
Dielectric constant at 1 kHz [D 150]	2.2–2.3
Dielectric strength [D 149] (V/mil)	610 [430 at 120°C (393.2 K)]
(V/cm) × 10^{-3}	240 [170 at 120°C (393.2 K)]
Dissipation factor (60 Hz–100 MHz) [D 510]	3×10^{-4} – 1×10^{-3}
Elongation at break [D 638] (%)	500–900 [30 at − 40°C (233.2 K)]
Environment stress cracking or F_{50} time [D 1693]	Does not stress crack
Flexural modulus [D 790] (MPa) = (N/mm^2)	1172
Hardness, shore D [D 1706]	70–80
Heat capacity (kJ/kg/K)	1.926 (see also Table I)
Izod impact strength [D 256] (ft lb/in of notch)	0.4–6.0 [0.1–0.7 at − 20°C (253.2 K)]
(cm kg/cm notch)	2.2–12 [0.55–3.9 at − 20°C (253.2 K)]
Power factor at 1 kHz	< 0.002–0.001
Solvent resistance to hydrocarbons and chlorinated hydrocarbons	Resistant below about 80°C (353.2 K)
Stiffness in flexure [D 747] (MPa) = (N/mm^2)	1172
Tensile modulus [D 638] (MPa) = (N/mm^2)	1032–1720
Tensile strength [D 638] (MPa) = (N/mm^2)	29.3–38.6
Tensile yield elongation [D 638] (%)	11–15 [11% at − 40°C (233.2 K)]
Thermal conductivity [C 177] (W/m/K)	11.7
Vicat softening temperature [D 1525] (°C (K))	138–155 (411.2–428.2)
Volume resistivity [D 257] (Ω cm)	10^{16}–10^{17}

[a] Properties at ambient room temperature, unless denoted otherwise. The numbers in square brackets in the first column refer to the ASTM (American Society for Testing Materials) Standards.
[b] Refs. 64,66,99.

H. PROPERTIES OF SOME COMMERCIAL POLY(PROPYLENE) GRADES[a]

		Grade			
Property[b]	Method[c]	Pipes and sheets	Films	Injection molding	Cast and tubular film
Melt flow rate (g/10 min)	D 1238L	0.25–0.35	1.5–2.0	5–7	7–10
Intrinsic viscosity at 230°C (dl/g)	ME 15071	2.6–3.0	2.0–2.4	1.8–2.4	1.5–1.9
Density (g/cm^3)	D 1505	0.900–0.905	0.900–0.905		0.900–0.905
Crystallinity by X-ray (%)	ME 149/67	58–59	59–60	61–62	62.5–64.0

Property[b]	Method[c]	Grade: Pipes and sheets	Films	Injection molding	Cast and tubular film
Crystalline mp by dsc[d] (°C (K))	ME 150702	161–163 (434–436)	161–163 (434–436)	162–164 (435–437)	163–165 (435–437)
Isotactic index	ISO 873	>96.0	>96.0	>95.0	>94.0
$\bar{M}_w/\bar{M}_n$ by gpc[e]	ME 15627	8–10	7–9	6–8	5–7
Spiral flow at 230°C, 60 kg/cm (mm)	ME 17544	390–450	525–550	700–750	800–850
Melt tension test					
swelling per 24 s	ME 17115	1.57–1.60	1.60–1.63	1.63–1.64	1.63–1.64
drawing ratio	ME 17115	500–700	1100–1300	1500–1700	≥2000
Linear mold shrinkage (%)		≤1.9	≤1.9	≤1.9	≤1.9
Tensile yield strength at 5 cm/mm (MPa)[f]	D 638	29–31	32–34	33–35	33–35
Tensile yield elongation (%)	D 638	10–12	10–12	8–10	8–10
Flexural modulus (GPa)[g]	D 790	1.1–1.3	1.3–1.4	1.5–1.6	1.6–1.7
Impact, Izod at 23°C (J/m)[h]	D 256	1.5–2.0	0.5–0.7	0.3–0.5	0.2–0.3
Hardness, Rockwell, C scale	D 785B	55–60	55–60	60–65	60–65
Deflection temperature (°C (K))					
at 0.45 MPa[f]	D 648	88–90 (361–363)	90–92 (363–365)	92–94 (365–367)	>94 (>367)
at 1.8 MPa[f]	D 648	50–55 (323–328)	50–55 (323–328)	55–60 (328–333)	55–60 (328–333)
Vicat point at 9.807 MPa[f] (°C (K))	D 1525	≥150 (≥423)	≥150 (≥423)	≥150 (≥423)	≥150 (≥423)
Yellow index on pellets (%)	D 1925	8–15	4–8	3–6	3–6
Gloss on plate (%)	D 523	48–50	48–50	49–51	49–51
Luminosity on plate	D 1635	68–70	≥70	≥70	≥70
Coefficient of linear thermal expansion ($\times 10^{-5}$)					
from −30°C (243.2 K) to 0°C (273.2 K)		6.5	6.5	6.5	6.5
from 0°C (273.2 K) to 30°C (303.2 K)		10.5	10.5	10.5	10.5
from 30°C (303.2 K) to 60°C (333.2 K)		14.0	14.0	14.0	14.0
Water absorption at 24 h immersion (%)	D 570	0.03	0.03	0.03	0.03
Environmental stress cracking[i]	D 1693	Does not break	Does not break	Does not break	Does not break
Dielectric constant	D 1531				
at 10 kHz		2.2–2.6	2.2–2.6	2.2–2.6	2.2–2.6
at 1 MHz		2.2–2.6	2.2–2.6	2.2–2.6	2.2–2.6
at 1 GHz		2.2–2.6	2.2–2.6	2.2–2.6	2.2–2.6
Dissipation factor, *h*					
at 10 kHz		<0.0005	0.0005	0.0005	0.0005
at 1 MHz		<0.0005	0.0005	0.0005	0.0005
at 1 GHz		<0.0005–0.0018	0.0005–0.0018	0.0005–0.0018	0.0005–0.0018
Arc resistance, *s*	D 495	136–185	136–185	136–185	136–185

[a] Ref. 65.
[b] Determined on Montedison Moplen poly(propylene).
[c] D = ASTM; ME = Montedison.
[d] Differential scanning calorimetry.
[e] Gel-permeation chromatography.
[f] To convert MPa to psi, multiply by 145.
[g] To convert GPa to psi, multiply by 145,000.
[h] To convert J/m to ft-lb/in., divide by 53.38.
[i] Igepal = 100%.

I. MECHANICAL PROPERTIES OF POLY(PROPYLENE) HOMOPOLYMERS[a]

Type	Melt flow rates [ASTM: D 1238] (g/10 min)	Flexural modulus [D 790] (MPa)	Izod impact [D 256] (J/m)	Heat deflection temp. 66 psi [D 648] (°C)	Hardness [D 785] (Rockwell R)
Compr. mold, pipe extrusion	0.5	1585 (230)[b]	160 (3.0)[c]	93 (366.2)[d]	95
Sheet, strapping extrusion	1.5	1480 (215)	70 (1.3)	87 (360.2)	–
High clarity, stiffness	2	1790 (260)	140 (2.6)	110 (383.2)	100
General purpose injection molding	4	1720 (250)	43 (0.8)	97 (370.2)	99
Rapid cycle injection molding	12	1655 (240)	27 (0.5)	99 (372.2)	97
Rapid cycle, high stiffness	12	1895 (295)	32 (0.6)	118 (391.2)	105
Thin wall injection molding	20	1720 (250)	32 (0.6)	100 (373.2)	104
Thin wall, high stiffness	20	2000 (290)	32 (0.6)	124 (397.2)	104
Multi-cavity molding	35	1310 (190)	32 (0.6)	90 (363.2)	98
Extrusion coating	40	1895 (275)	32 (0.6)	121 (394.2)	100
Coextrusion	70	1515 (220)		90 (363.2)	
Fibers	100	1585 (230)			

[a] Ref. 109.
[b] Values in parenthesis in this column indicate Flexural modulus in K psi.
[c] Values in parenthesis in this column indicate Izod impact in ft-lb/in.
[d] Values in parenthesis in this column indicate temperature in kelvin.

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J. MECHANICAL PROPERTIES OF POLY(PROPYLENE) RANDOM COPOLYMERS[a]

Type	Melt flow rates [ASTM: D 1238] (g/10 min)	Flexural modulus [D 790] (MPa)	Izod impact [D 256] (J/m)	Heat deflection temp. 66 psi [D 648] (°C)	Hardness [D 785] (Rockwell R)
Sheet extrusion	1	965 (140)[b]	80 (1.5)[c]	90 (363.2)[d]	80
Sheet extrusion	2.5	690 (100)	85 (1.6)	70 (343.2)	65
Sheet extrusion	3	1515 (220)	37 (7)	102 (375.2)	95
Film extrusion	3	260 (38)			
Inj. molding, film, coextrusion	6	825 (120)	48 (0.9)	85 (358.2)	80
Film extrusion	6	495 (72)			
Inj. molding, film, coextrusion	7	585 (85)	80 (1.5)	65 (338.2)	65
Inj. molding, film, coextrusion	10	860 (125)	37 (0.7)	85 (358.2)	80
Inj. molding, film, coextrusion	10	1135 (165)	54 (1.0)	91 (364.2)	88
Rapid injection molding	25	895 (130)	37 (0.7)	85 (358.2)	80
Rapid injection molding	25	1135 (165)		98 (371.2)	94
Rapid injection molding	35	1135 (165)	43 (0.8)	87 (360.2)	80

[a] Ref. 109.
[b] Values in parenthesis in this column indicate Flexural modulus in K psi.
[c] Values in parenthesis in this column indicate Izod impact in ft-lb/in.
[d] Values in parenthesis in this column indicate temperature in kelvin.

K. MECHANICAL PROPERTIES OF POLY(PROPYLENE) IMPACT COPOLYMERS[a]

Type	Melt flow rates [ASTM: D 1238] (g/10 min)	Flexural modulus [D 790] (MPa)	Izod impact [D 256] (J/m)	Heat deflection temp. 66 psi [D 648] (°C)	Hardness [D 785] (Rockwell R)
Compr. Mold, pipe extrusion	0.5	1240 (180)[b]	540 (10)[c]	90 (363.2)[d]	75
Sheet extrusion	1	860 (125)	650 (12)	79 (352.2)	55
Sheet extrusion	2	965 (140)	650 (12)	72 (345.2)	61
General purpose inj. molding	4	1310 (190)	135 (2.5)	81 (354.2)	82
General purpose inj. molding	4	1035 (150)	540 (10)	75 (348.2)	65
General purpose inj. molding	6	930 (135)	650 (12)	90 (363.2)	70
Blush resist., inj. molding	11	1000 (145)	135 (2.5)	77 (350.2)	72
Blush resist., inj. molding	16	860 (125)	650 (12)	80 (353.2)	40
Blush resist., rapid inj. molding	20	965 (140)	185 (3.4)	77 (350.2)	67
Blush resist., rapid inj. molding	20	790 (115)	540 (10)	85 (358.2)	65
Blush resist., rapid inj. molding	30	965 (140)	55 (1.0)	80 (353.2)	80
Blush resist., rapid inj. molding	35	1310 (190)	70 (1.3)	90 (363.2)	85
Blush resist., rapid inj. molding	50	1170 (170)	55 (1.0)	117 (390.2)	90

[a] Ref. 109.
[b] Values in parenthesis in this column indicate Flexural modulus in K psi.
[c] Values in parenthesis in this column indicate Izod impact in ft-lb/in.
[d] Values in parenthesis in this column indicate temperature in kelvin.

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Physical Constants of Fluoropolymers

Dewey L. Kerbow
DuPont Fluoroproducts, Wilmington, DE 19880, USA

Carleton A. Sperati
Chemical Engineering Department, Ohio University, Athens, OH, USA

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A. INTRODUCTION

Fluoropolymers are divided into two sub-classes: (a) Fluorocarbon polymers, i.e., those that are made from perfluoromonomers, and (b) All the others that are made from monomers or comonomer systems that contain hydrogen, chlorine, or both, along with enough fluorine so that it contributes significantly to the properties and performance of the polymer. At times, the term fluorocarbon or fluorocarbon polymers, are used improperly to include all of the fluorine-containing polymers.

The commercially important fluorocarbon polymers are poly(tetrafluoroethylene) (PTFE), poly(tetrafluoroethylene-*co*-hexafluoropropylene) (FEP), poly[tetrafluoroethylene-*co*-(perfluoroalkylvinyl ether)] (PFA), and amorphous fluoropolymer (AF), typically copolymers of tetrafluoroethylene and fluorinated dioxole. The second group of fluoropolymers includes modified poly(tetrafluoroethylene-*co*-ethylene) (ETFE), poly(vinylidene fluoride) (PVDF) (sometimes referred to as PVF2), and copolymers of vinylidene fluoride, poly(chlorotrifluoroethylene) (PCTFE), poly(chlorotrifluorethylene-*co*-ethylene) (E/CTFE) and poly(vinyl fluoride) PVF.

The wide range of fluorine content in the various fluoropolymers (from 76 down to 39 weight percent fluorine), details of crystallinity, conformation, molecular weight, and other aspects of structure result in ranges of properties so wide that a single table listing all the materials and their properties is very cumbersome to use. Tables on the various materials are separated, therefore, with a short general comment on each material or class, at the beginning of each table. Each table has its own notes and list of references.

B. PHYSICAL CONSTANTS OF POLY(TETRAFLUOROETHYLENE) $-(CF_2CF_2)-$

Polytetrafluoroethylene (PTFE) was the first fluorocarbon polymer to be made and still retains the major part of the total business. The extremely high melt viscosity of PTFE having a molecular weight high enough for most applications precludes use of conventional methods of processing that require molten polymer. As a result, innovative procedures, quite different but not difficult, were devised to prepare useful objects. Some properties of PTFE reflect the unusual methods of processing.

Property*	Units	ASTM or other methods	Value	Remarks	Refs.
Abrasion Resistance			See Wear Factor		
ASTM Standards				See Note 2	
Material					
Granular products		D4894			
Coagulated dispersion products		D4895			
Dispersion		D4441			
Film and sheeting		D2686, D3293, D3308, D3369			
Rods, tubes, and pipe lining		D1675, D1710, D2902, D3295			
Molded basic shapes		D3294,D3297			
ISO Standards					
Plastics – Fluoropolymer dispersions and molding and extrusion materials Part 1: Designation system and basis for specifications		ISO 12086–1			
Plastics – Polytetrafluoroethylene (PTFE) Semi-finished products Part 1: Requirements and designations		ISO 13000–1			
Bond Angle, C–C	Deg.		See Conformation		
F–C–F			108		70
Bond Energies	kJ/mol				
C–F			482		70
C–C			290–335		16
Bond Length, C–F	Å		1.3–1.32		70
Bulk Density of Molding Powder	g/l	D1457	350–900	See Note 3	
Chemical Resistance			See Solvents		
Coefficient of Friction		D1894	$0.224\,W^{0.163}$	W is the load in grams, calculated from Ref. 2	
Coefficient of Thermal Expansion		D696			
Linear expansion	K^{-1}		99×10^{-6}		77
Average values for temperature range indicated					
25 to −190°C			86		38
25 to −150°C			96		
25 to −100°C			112		
25 to −50°C			135		
25–0°C			200		
25–50°C			124		
25–100°C			124		
25–150°C			135		
25–200°C			151		
25–250°C			174		
25–300°C			218		
Cohesive Energy Density			12.5 (est.); see also Solvent Absorption		79
Compressibility (calculated)	MPa^{-1}		28.8×10^{-17}		8
Compressive Strength Properties					
Stress at 1% deformation	MPa	D695	4.2		30
	MPa		$47094 - 231295(\%C) + 0.040(\%C)^2 - 0.0391(\%C)^3$		77
Stress at 1% offset	MPa	D695	7		30
Yield strength	MPa		190.4–0.862 (K)	From 4 to 180 K	
At −251°C	MPa	D695	224		52
At −196°C	MPa	D695	145		52
At 23°C	MPa	D695	11.7		52
At 55°C	MPa	D695	9		52
At 100°C	MPa	D695	4.8		52

* See note 1.

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Conformation					
Energy barrier to rotation					
Gauche–*trans* energy difference	kJ/mol		5.9 ± 1.7	C–C bond angle is at its minimum energy at 162°C	6
trans–trans Energy difference	kJ/mol		4.6 ± 2.9		
Contact Angle					
Advancing	Deg.		116		34
Receding	Deg.		92		
Continuous Use Temperature			See Service Temperature		
Creep					
Compressive creep modulus	Mpa	D695	186	After 100 h at 0.6895 MPa at 23°C	42,59
Flexural creep modulus	MPa		$2814 - 158.5(\%C) + 2.919(\%C)^2 - 0.1638(\%C)^3$	6.895 MPa for 100 h %C from 45 to 90	76
Tensile creep modulus				See Note 1	59
	MPa		61	After 100 h at 6.895 MPa and 23°C	
Critical Shear Rate for Melt Fracture	s^{-1}		10^{-5}	At 380°C	97
Critical Surface Tension	mN/m		18.6		29
Crystal Structure Change			See Figure 1 and Transitions		
Crystalline Content	wt.% C		762.25 – (1524.5/Density)	Calc from Ref.	77
Crystallographic Data					
Phase I			See Figure 1	Hexagonal structure similar to Phase IV, but little or no lateral congruence	
Separation of chain axis	Å		$S = 3.68 \times 10^{-2}\ T + 5888$	T from 40 to 220°C	
Phase II: Triclinic structure Repeat distance for 13 CF_2 groups	Å		16.9		13,25,61,100
Separation of chain axis	Å		5.62		13
Phase III: High pressure form					
Planar zig-zag structure					27
Monoclinic space group			$B2/m$		
Density	g/cm^3		2.74 at 12 bar		
	Å		$a = 9.59$		
	Å		$b = 5.05$		
	Å		$c = 2.62$		
	Deg.		$\gamma = 105.5$		
Phase IV: Hexagonal structure					16,61
Repeat distance for 15 CF_2 groups	Å		19.5		
Separation of chain axis	Å		5.55		
Deformation Under Load	% Def.	D621	$12.93 - 0.3303\ (\%C) - 0.002372\ (\%C)^3$	1000 psi for 24 h at 23°C; %C from 50 to 90	76
Density	g/cm^3		Depends on crystalline and void contents	See Note 1	
Completely amorphous (never observed)			2.0 at 23°C	See Note 5	77
Crystalline (from X-ray and IR data)					
Phase II (triclinic at < 19°C)			2.344		100
Phase IV (hexagonal at 20–40°C)			2.302 at 23°C		67
As polymerized			2.280–2.290 at 23°C		77
After melting and recrystallization (void free polymer)			1524.5/(762.25 – %C)	See Note 1	77
Melt (380°C)			1.46		49

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Depolymerization Rate			See Thermal Degradation		
Diffusion			See Permeability		
Electrical Properties					20
Dielectric constant					
At 60 Hz	ε	D150	$(1+0.238D)/(1-0.119D)$, D is density		24
At 60 Hz to 2 GHz			2.1		30
Dielectric Strength	kV/mm	D149	The exact value depends on the thickness of the test specimen as well as other test variables		
	MV/m		15.7–19.7		77
	V/mil		400–500		
Dissipation factor		D150		See Note 6	
60 Hz to 2 GHz			$<3\times10^{-4}$		30
Surface arc resistance	s	D495	700	See Note 7	77
Surface resistivity, 100% RH	ohms/sq	D257	3.6×10^{6}		77
Volume resistivity, dry at 50% RH	ohmcm	D257	1019		77
Entanglement MW	g/mol		3.7×10^{3}		49
End Groups				See Note 8	9
Entropy of Fusion			See Melting		
Equation of State			$(P+a)(V-b)=B(T-c)$ $a=405.2$ bar; $b=0.500\,cm^3/g$ $c=114°C$; $B=0.310\,cm^3/g/K$		48,87
Flammability		UL94	VE-O	See Note 9	
Also see limiting oxygen index					
Flexural Modulus		D790			76
At 23°C	MPa		29(°C) − 1127	°C from 40 to 90	
At −251°C	GPa		5.2		52
At −196°C	GPa		5		52
At −101°C	GPa		3.2		52
At 23°C	GPa		0.62		52
At 55°C,	GPa		0.4		52
At 100°C	GPa		0.19		52
Flexural Strength		D790	No break in flexure		
Fuel Value			See Heat of Combustion		
Glass Transition Temperature	°C	DSC	−73		45
Glass-I transition			See Transitions, Alpha		
Glass-II transition			See Transitions, Gamma		
Hardness					
Durometer	Scale value	D2240	$D=42+0.2(°C)$		76
Rockwell	Scale value	D785	$J=114.6-0.433(°C)$		
Scleroscope			$S=133-1.3(°C)$		
Heat Capacity	kJ/kg/K		$0.9324+1.05\times10^{-3}\,T$		69,103
		DSC	Crystalline Amorphous	See Note 10	44
At 10.0°K	J/mol/K		1.228 (1.228)		
100.0 K			19.37 19.37		
200.0 K			34.47 (35.59)		
300.0 K			45.09 51.42		
400.0 K			53.81 59.24		
500.0 K			61.62 66.05		
600.0 K			67.58 69.37		
605.0 K (T_m)			67.88 69.54		
700.0 K			73.300 72.69		
Heat Deflection Temperature	°C	D648			77
At 0.455 MPa (66 psi)			132		
At 1.82 MPa (264 psi)			60		

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Heat of Combustion	MJ/kg		5.1		35
Heat of Crystallization			See Melting – latent heat of fusion		
Heat of Formation	kJ/mol		813		10,22
Heat of Fusion			See Melting – latent heat of fusion		
Ignition Temperature	°C		494		49
Impact Strength			See Toughness		
Intrinsic Viscosity	ml/g		300–2000	Also see Solvents	71,74
Infrared Spectra			See Table 1	See Note 1	17,51,56 91,105
Lamellar Thickness	μm		0.02(%C) – 0.9	Calc. from	26,57,80
Lattice Energy					
(per recurrent unit; calculated)	kJ/mol		8.5 ± 2.5		8
Limiting Oxygen Index	% Oxygen	D2863	> 95		20
Mechanical Loss		D2236		See Note 11	87
Melt Viscosity					
By capillary rheometer		D2116		See Note 12	
	Pa s		1.62×10^{-14} $M^{3.4}$		75,78
By melt creep,	Pa s		4 to 20×10^{10} at 360°C		1,58
Energy of activation for melt flow	kJ/mol		63–84		1,74
Melting					
Melting peak temperature					
Initial (irreversible)	°C		335–345	See Note 13	52
Second and subsequent (reversible)	°C		327		64
Equilibrium melting temperature	°C		331.7		45,85
For porous, expanded PTFE	°C		385		32,33
Entropy of melting	J/K/mol		477		88
Corrected to constant volume	J/K/mol		33.18		
Volume expansion during melting			29%		
Increase of melting point with pressure	K cm^2/kg		0.095		89
Heat of fusion	kJ/kg	D4591	82	See Note 14	44
Molecular Weight				See Note 15	
			$\log M_w = 27.5345 - 12.1405D$	D is Density	18,40,77
			$\log M_w = 10.3068 - 5.1318 \log(4.184H)$	H is Heat of Crystallization in J/g	94
Particle Size (Average calculated diameter) μm					
Dispersion polymer		D1457	0.22		47
Coagulated dispersion polymer		D1457	350–650		
Granular polymer		D1457			
ASTM Type I			600–800		
ASTM Type IV			< 100		
Permeability to Gases	m^3(STP) m/s/m^2/Pa ($\times 10^{15}$)				104
Helium			$\log P_{He} = 3.505 - 0.037(\%C)$		76
Carbon dioxide			$\log P_{CO_2} = 2.605 - 0.037(\%C)$		76
Nitrogen			$\log P_{N_2} = 2.44203 - 0.037(\%C)$		76
Hydrogen			7.35		60
Energy of activation for diffusion	kJ/mol		27.6		60
Energy of activation for permeability	kJ/mol		19.7		60
Phase Diagram			See Fig. 1		27,77,102
Processing Temperature	°C		350–400		
PV Limit	Pa m/s		50–250		46
Radiation, Effects of degradation in air	Radicals/10^6 C atoms		$3.7 \times 10^{-5} D^{0.89}$	Derived from Ref.; D is dose in rads	37
Recovery after deformation	%	D1147	% Recovery = 111 – 0.87(%C); % C from 40 to 90	1/4 inch penetrator; 5 lb preload; 250 lb major load	96

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Property	Units	ASTM or other methods	Value	Remarks	Refs.
Refractive Index	n_D^{25}	D542	1.376		7
Resistivity			See Electrical Properties		
Service Temperature			– 269 to 260°C	See Note 16	21,95,96
Solid Viscosity	Pa s		10^4 – 10^6	At 300°C, shear rate 0.1–10 s^{-1}	54,81
Solution Viscosity			See Intrinsic Viscosity		
Solvent Absorption				See Note 17	
			% wt. gain = 24.85 – 2.456 HSP	HSP is Hildebrand solubility parameter	66
Perchloroethylene	% wt. increase		2	1000 h in boiling liquid, 60% cryst.	
Methylene chloride	% wt. increase		0.7	1000 h in boiling liquid, 60% cryst.	
Solvents				See Note 18	
Specific Gravity			See Density		
Specific Heat			See Heat Capacity		
Speed of Sound		1 MHz, 25°C			
Longitudinal	m/sec		1410		49
Shear	m/sec		730		49
Standard Specific Gravity					
(Relative molecular weight)		D1457	Also see Molecular Weight	See Note 15	18
Surface Tension at 293 K	mN/m		25.6		49
Tensile Strength Properties		D638			
Modulus					
At – 251°C	GPa		4.1		52
At – 196°C	GPa		3.4		52
At – 129°C	GPa		2.5		52
At – 73°C	GPa		1.8		52
At 23°C	MPa		340		52
At 100°C	MPa		69		52
Yield Stress,					
At – 251°C	MPa		131		52
At – 196°C	MPa		110		52
At – 129°C	MPa		79		52
At – 73°C	MPa		53		52
At – 55°C	MPa		26		52
At 0°C	MPa		12		52
At 23°C	MPa		10		52
At 158°C	MPa		5.5		52
At 250°C	MPa		3.4		52
Tensile strength					
At 23°C	MPa		270 – 0.39(%C) – 99.3 *D*	*D* from 2.170 to 2.280 Mg/m^3; %C from 30 to 90	
At 23°C,	MPa		17–34	See Note 5	52
Elongation at break					
At – 251°C	%		2		52
At – 196°C	%		6		52
At – 129°C	%		90		52
At – 73°C	%		160		52
At 23°C	%		200–400	See Note 5	52
Plateau modulus, 380°C	MPa		1.7		49
Thermal Conductivity	W/m/K	C177	$K = 4.86 \times 10^{-4}\ T + 0.253$		69
25°C	W/m/K		0.25		49
72°C			0.34		49
Thermal Degradation					
Enthalpy of depolymerization			ΔH = 156000 – 27.9 (*T*–360) J/mol		69
Rate of depolymerization			See Ref. for details		73
Kinetic chain length (CL)			log CL = 8320/*T* – 9.958	*T* in kelvin	28,98

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Toughness					
Izod impact strength, notched	J/m	D256			21
−57°C			107		52
23°C			187		52
77°C			320		52
Tensile impact strength	kPa/m^2	D1822	TIS = 3 379 − 45.1 (%C)	See Note 1	75
Transitions	°C			See Note 19	23
Alpha (Glass I)			126	At 1 Hz	53
Beta I (Crystalline transition, crystal disordering relaxation)			19		
Change with pressure	K/bar		0.0128		
Latent heat	kJ/kg		13.4		
Volume expansion	l/kg		0.0058		
Kinetics of the transition				See Note 20	
Beta II			30		57
Beta I + Beta II					
Entropy change, overall (19 + 30)	kJ/kg/K		0.0452		
Due to volume change (corrected to constant volume)	kJ/kg/K		0.028		
Gamma (Glass II)			−80 at 1 Hz		53
Change of frequency (in Hz) of loss peak with temp.					23
Alpha (Glass I)			$\log F = 48.3759 - 368$ kJ/(2.303*RT*)		
Beta (crystalline relaxation)			$\log F = 24.97 - 142$ kJ/(2.303*RT*)		
Gamma (glass II)			$\log F = 22.37 - 75$ kJ/(2.303 *RT*)		
Effect of temperature on transition pressure					50
Transition between phases IV and I	Pa		$P = (-91 - 57.8T + 1.99T^2) \times 10^5$		
Transition between phases II and IV	Pa		$P = (-820 + 26.9T + 0.68T^2) \times 10^5$		
Triple Point			See Figure 1, Crystallographic Data, and Transitions		
Unit Cell			See Crystallographic Data		
Viscosity			See Melt Viscosity		
			See Solid Viscosity		
			See Solution Viscosity		
Water Absorption	%	D570	0		77
Wear Factor	Pa^{-1}		3000×10^{-17}	See Note 21	46
Weatherability			Excellent	See Note 22	

NOTES

1. Many of the properties of PTFE are not constant but change systematically with crytalline content, molecular weight, void content, temperature, pressure, or some other independent variable. Where available, these inter-relationships are shown even though they are usually empirical rather than fundamental. Throughout the table, %C indicates percent crystallinity by weight.
2. American Society for Testing and Materials (ASTM) standards on the fluoropolymers provide a convenient source for information on details of the nature of a particular fluoropolymer, typical properties, methods of testing, and the like. For this reason, pertinent Standard numbers are included in the tables for each polymer. The fluoropolymer standards are the responsibility of the Fluoropolymers Section of the Materials Subcommittee of the Technical Committee on Plastics. The numerical designation is D-20.15.12. More recently, the International Organization for Standardization (ISO) has issued materials standards which incorporate various aspects of the ASTM standards.
3. The exact value depends on the particular type or grade of polymer that is being used.
4. Equations based on time–temperature superposition are given in Ref. 42 for PTFE with a crystalline content of approximately 58%. These relationships permit calculation of tensile creep modulus at any stress, time, or temperature in the temperature range of 35–100°C and stress levels below the elastic limit. Ref. 41 provides similar data over a wider range of conditions.

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5. Reference 83 gives a value of 2.060 for the amorphous density of PTFE. Internal inconsistencies in this paper, however, need clarification before this writer can accept the value given.
6. Precise measurements of dielectric loss (Ref. 71) show peaks that correspond to the gamma transition. The measured values of tan delta, however, were all less than 300×10^{-6} with some as low as 20×10^{-6}.
7. No carbon track is formed.
8. Infrared methods show presence of carboxylic acid monomer and dimer, perfluorovinyl, and acid fluoride end groups in low molecular weight products (Ref. 9). The methods currently available are not sufficiently sensitive for quantitative work in polymers of commercially useful molecular weights, but the acid monomer and dimer ends have been found in commercial materials using FTIR procedures (Ref. 93).
9. This numerical rating for flame spread is not intended to reflect hazards presented by this or any other material under actual fire conditions.
10. The values given are selected from extensive tables and plots of data in Ref. 44.
11. The mechanical loss factor is related to the transition behavior. The value depends on temperature and frequency of the dynamic mechanical stress, values of the logarithmic decrement up to 0.55 have been observed (see Ref. 53).
12. This relationship is applicable only to PTFE, with molecular weights well below that required for the applications of plastics (see Ref. 78).
13. The temperature observed for the first (irreversible) melting point decreases with rate of heating. It also differs with the type of polymer. Evidence in Refs. 39 and 72 suggests that details of DSC scan for a first melting reflect aspects of molecular weight and molecular weight distribution.
14. Inconsistencies in the results from various laboratories for the heat of fusion of PTFE and FEP have not been resolved. Some aspects are discussed in Refs. 86, 89, and 90.
15. Standard Specific Gravity (SSG), described in ASTM D4894, D4895 and ISO 12086-1 (see Ref. 18 and 77), is a useful inverse measure of relative molecular weight for homopolymers of TFE. Many commercial polymers today, however, contain very small amounts of modifiers that affect the rate and extent of crystallization. With these materials, therefore, SSG is meaningful as a measure of relative molecular weight only within a given family of PTFE resins. Estimating actual values of the molecular weight of the highest molecular weight commercial polymers has, to date, involved assumptions and extrapolation. These relationships, therefore, are, at best, a first approximation. In addition, some references, such as Refs. 11 and 40, give relationships for molecular weight as a function of SSG with little or no documented basis for the equation.
16. The recommended maximum service temperature is 260°C (Ref. 21). There are, however, examples of satisfactory use at higher temperatures. Gaskets in totally enclosed systems, for instance, are used repeatedly at 500°C and 15 000 psi (103 MPa) (see Ref. 19). PTFE also performs well at low temperatures. In compressive strength tests at 4 K, for example, the polymer has been shown to have ductile rather than brittle failure (Ref. 95).
17. Weight gain is noted with some chlorinated and fluorinated liquids that contain no hydrogen (Ref. 82). The weight increase decreases with increasing crystallinity (Ref. 78).
18. PTFE is inert to essentially all common chemicals (see Refs. 64 and 65). It is, however, attacked by molten alkali metals, elemental fluorine, and pure oxygen at elevated temperatures, it can also react under some conditions with alkaline earth oxides and finely divided metals such as aluminum or magnesium at elevated temperature. Sorption of solvents is mentioned in Note 13. Solutions containing 0.1–2% PTFE were obtained in perfluorokerosene $C_{21}F_{44}$(FCX-412) in the temperature range 290–310°C (see Refs. 71 and 74).
19. Clear evidence for a crystalline transition at about 90°C is presented in a series of papers by Araki, Refs. 3–5. He also presents evidence for doublets in the transitions Ref. 4, and points out that the alpha and gamma transitions follow the so called 2/3 (Trouton) rule when compared with the first order crystalline transitions at 19 and 327°C, Ref. 3. See also evidence for a doublet in the freezing-point plot shown in Ref. 65.
20. Data on the kinetics of the transitions not amenable to presentation in tabular form are available in Ref. 57.
21. Incorporation of finely divided fillers decreases wear factor by as much as 500 to 1000 fold (Ref. 46).
22. No change in appearance or properties has been observed after more than twenty years exposure in Florida (see Ref. 21).

INFRARED ABSORPTION SPECTRUM OF POLY(TETRAFLUOROETHYLENE)

(cm^{-1})	(μm)	Intensity[a]
3670	2.72	VW
3570	2.80	VW
3450	2.90	VW
3090	3.24	VW
2925	3.42	VW
2620	3.82	VW
2590	3.86	VW

(cm^{-1})	(μm)	Intensity[a]
2530	3.95	VW
2450	4.08	VW
2367	4.22	M
2300	4.35	VW
1974	5.07	VW
1935	5.17	W
1883	5.31	W
1859	5.38	W
1792	5.58	M
1703	5.87	W
1545	6.47	M
1451	6.90	M
1420	7.04	M
1242	8.05	VS

(cm^{-1})	(μm)	Intensity[a]
1213	8.24	VS
1152	8.68	VS
932	10.73	M
850	11.76	Amorphous
778	12.85	Amorphous
738	13.55	Amorphous
718	13.98	Amorphous
703	14.22	Amorphous
638	15.67	S
553	18.08	S
553	18.08	S
516	19.38	VS
384	26.04	Amorphous

[a] VS, very strong; S, strong; M, medium; W, weak; VW, very weak.

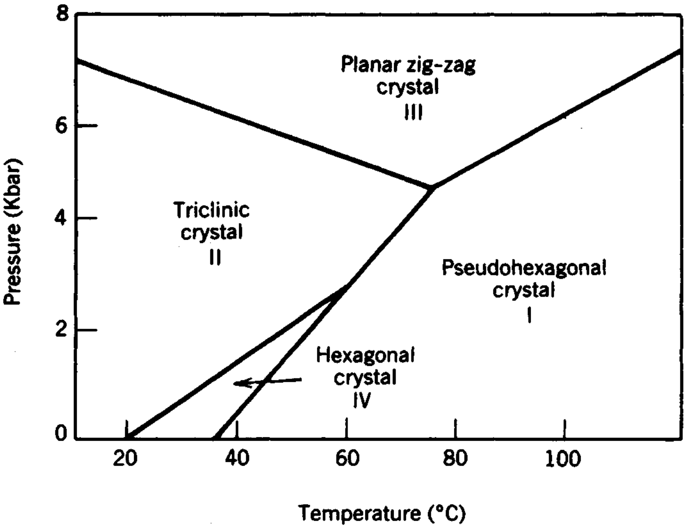

Figure 1. Phase diagram for poly(tetrafluoroethylene).

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C. PHYSICAL CONSTANTS OF MELT PROCESSIBLE FLUOROCARBON POLYMERS PFA AND FEP

PFA: $-[(CF_2CF_2)_n(CF_2\underset{OR_F}{CF})]_m-$

FEP: $-[(CF_2CF_2)_n(CF_2\underset{CF_3}{CF})]_m-$

Unlike poly(tetrafluoroethylene), copolymers of tetrafluoroethylene with perfluoro comonomers are made as relatively low molecular weight (i.e., low melt viscosity) products that can be processed by conventional melt procedures and still have properties in the solid state that are similar or superior to those of poly(tetrafluoroethylene). Both PFA, poly[tetrafluoroethylene-*co*-perfluoro(alkoxy vinyl ether)], and FEP, poly(tetrafluoroethylene-*co*-hexafluoropropylene), are included in this table. Various perfluoro(alkoxy vinyl ethers) can be used for PFA. It has been reported that one often used is perfluoro(propylvinyl ether) (14).

Data available for PFA and FEP are not as extensive as for PTFE. In many respects, however, the properties of solid FEP and, especially, PFA, are very similar to those of PTFE. The values given in the table for PTFE, therefore, can often provide useful guidance for the properties of non-molten PFA or FEP for which no values are included in this table.

Property	Units	ASTM or other methods	PFA Value	PFA Remarks	PFA Refs.	FEP Value	FEP Remarks	FEP Refs.
Abrasion Resistance						See Taber Abrasion		
ASTM or ISO Standards				See Note 1			See Note 1	
Material								
Molding and extrusion powders		D3307, ISO12086-1				D2116		
Film and sheeting						D3368		
Rods, tubes, and pipe lining		F781				D3296,F546		
Bond Energies								
C–C adjoining pendant group	kJ/mol		335	See Note 2		167	See Note 2	
Bulk Density of molding powder	g/l		1250	See Note 3		1230–1250	See Note 3	7
Chemical Resistance			Excellent	See Note 4	15	Excellent	See Note 4	15
Coefficient of Friction		D1894	0.25		7	0.27–0.67		5,7,15
Coefficient of Thermal Expansion		D696						
Linear expansion	K^{-1}							
Average values for temperature indicated								
<23						5.7×10^{-5}		9
>23						9.3×10^{-5}		9
20–100			12×10^{-5}		11			
100–150			17×10^{-5}		11			
150–210			20×10^{-5}		11			
Cohesive Energy Density						36		24
Comonomer Content	wt.%	IR				10–15	See Note 4	11,10
Compressive Strength Properties								
Modulus	MPa		23.7–25.8	See Note 3	7			
Strength	MPa	D 695						

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Property	Units	ASTM or other methods	PFA Value	PFA Remarks	PFA Refs.	FEP Value	FEP Remarks	FEP Refs.
−251°C						251		9
−196°C			414		11			
−160°C						207		9
23°C						15		9
55°C						11		9
100°C						3.4		9
Continuous Use Temperature			See Service Temperature					
Creep								
Tensile creep modulus	MPa							
25°C			270		11			
250°C			41		11			
Critical Shear Rate for Melt Fracture	s^{-1}		3–50	See Note 3	6	2–20	See Note 3	6
Critical Surface Tension						17.8–18.6	See Note 3	15
Deformation Under Load	% Def.	D621	0.36–0.41	See Note 2	7	0.5		8
Density	$g/cm^3 = Mg/m^3$		2.12–2.17		11	2.12–2.17		9
Depolymerization Rate			See Thermal Degradation					
Electrical Properties								
Dielectric constant	ε	D150						
At 60 Hz to 2 GHz						2.1		9
At 1 kHz to 1 GHz			2.06		11			
At 240 GHz			2.049		11			
Dielectric strength	kV/mm	D149	78.8 (on 0.25 mm film)		11	13–100	See Note 6	15
	V/mil		2 000		11	500–4000		
Dissipation factor		D150						
60 Hz to 1 MHz						<0.0001		
At 1 kHz			0.000027		11	<0.0001		
At 100 kHz						0.00025		15
At 1 MHz			0.00008		11			
At 10 MHz						0.0005		15
At 1 GHz			0.00115		11	0.0011		
At 3 GHz						0.0012		15
At 10 GHz						0.0007		15
At 240 GHz			0.00124		11			
Surface arc resistance	s	D495	>300	See Note 7		>300	See Note 7	9
Surface resistivity, 100% RH	ohms/sq	D257	$>10^{17}$		10	10^{16}		9
Volume resistivity, dry								
At 50% RH	ohm cm	D257	10^{14}		10	$>10^{18}$		9
Flammability								
Also see limiting oxygen index		UL94	VE-O	See Note 8	11	VE-O	See Note 8	6
Flexural Modulus		D790						
At −268°C	GPa					5.31		15
At −196°C	GPa					4.69		
At −101°C	GPa					3.24		
At 23°C	MPa		655–690		11	655		
At 55°C	MPa					345		
At 100°C	MPa					110		
At 200°C	MPa		55–69		11	41.4		
Flex Life	Flexes	MIT	50000–500000	See Note 9	11	5000–30000	See Note 9	2
Flexural Strength		D790	No break			No break		
Fuel Value			See Heat of Combustion					
Hardness								
Durometer	Scale value	D2240	D63–65		10	D55–66		10,9
Rockwell	Scale value	D785	J 60			R25		
Heat Capacity			See Specific Heat					

Property	Units	ASTM or other methods	PFA Value	PFA Remarks	PFA Refs.	FEP Value	FEP Remarks	FEP Refs.
Heat Deflection Temperature		D 648						
At 0.455 MPa (66 psi)	°C		63–80	See Note 3	7	70–77		9,7
At 1.82 MPa (264 psi)	°C		48–50	See Note 3	7	51–57		9,7
Heat of Combustion	MJ/kg		5.4		11			
Heat of Fusion				See Melting				
Impact Strength				See Toughness				
Lamellar Thickness	nm					33–53	See Note 3	3
Limiting Oxygen Index	% Oxygen	D2863	>95		11	95		
Melt Viscosity								
By capillary rheometer	kPa s	D2116				$1.62 \times 10^{-13} M^{-3.4}$		18
			4–27	See Note 3	6	8–50	See Note 3	6
Melt flow rate	dg/min	D3307	1–18	See Note 3	11			
		D2116				0.8–18	See Note 3	6,1,12
Energy of activation for melt flow	kJ/mol		43.1	See Note 10	6	46	See Note 10	6
Melting								
Melting point							See Note 11	3
	°C		302–306	See Note 3	11	253–282	See Note 3	9
Volume expansion during melting	%					8		9
Increase of melting point with pressure	K/bar					0.725 to 1.74°C per MPa	See Note 12	9
Latent heat of fusion	kJ/kg	DSC	21–26		7	24.3	See Note 13	20
Molecular Weight			Also see Melt Viscosity					
			200000–450000		17	250000–600000	See Note 3	17
Particle Size (average diameter)	μm							
Dispersion Polymer			0.1			0.1		
Permeability to Gases	ng cm/m^2-s							
Carbon dioxide						273		9
Oxygen						637		9
Nitrogen						91		9
Phase Diagram								22
Processing Temperature	°C		370–395		6	320–380		6
PV Limit	Pam-s							
	psi ft/min		5000		11			
Radiation, Effects of degradation in air			Maintains Tensile properties better than does PTFE		10	10 to 100 times better than PTFE	See Note 14	15
Refractive Index	n_D^{25}	D542	1.35		11	1.344		11
Resistivity			See Electrical Properties					
Service Temperature	°C		−200 to 260		11,7	−250 to 206		9,7
Solvents			None	See Note 4	10	None	See Note 4	15
Specific Gravity			See Density					
Specific Heat	kJ/kg/K	DSC						
20°C						1.09		9
25°C								
100°C						1.17		9
150°C								
260°C						1.3		9
Taber Abrasion	g/MHz	CS-17 wheel; 100 g load				7.5		9
Tensile Strength Properties		D638						
Modulus	MPa							
At 23°C						4	See Note 3	9
Yield stress	MPa							
At 23°C			13–15	See Note 3	11	12	See Note 3	9
At 250°C			3.5–4	See Note 3	11			

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Property	Units	ASTM or other methods	PFA Value	PFA Remarks	PFA Refs.	FEP Value	FEP Remarks	FEP Refs.
Tensile strength	MPa							
At − 196°C			129		11			
At 23°C			28–31	See Note 3	11	14.5–21	See Note 3	9
At 250°C			12–14	See Note 15	11			
Elongation at break	%							
At − 196°C			8		11			
At 23°C			260–300		11	240–300	See Note 3	9
At 250°C			480–500		11			
Thermal Conductivity	W/m/K	Cenco Fitch						
− 253°C						1.4		9
− 129 to 182°C						2.4		9
23°C		C177				0.209		7
Thermal Degradation								
Enthalpy of depolymerization			Similar to PTFE					
Rate of depolymerization	%/hr					log(%/h) = 10.08 − 131 kJ/(2.303*RT*)	See Note 16	9
Toughness								
Izod impact strength, notched		D256						
− 196°C	J/m		64		11			
− 54°C						2.9		15
23°C			No break		11	No break		9
Transitions	°C							
Alpha (Glass I)						70–126, 0–15 mol% HFP	See Note 3	16
Beta						− 70 to − 10	See Note 3	16
Gamma (Glass II)						− 90		16
Activation energy for change of frequency (in Hz) of loss peak with temp								
Alpha (Glass I)						80		8
Beta (crystalline relaxation)								
Gamma (Glass II)						18		8
Effect of temperature on the frequency of peak loss								
Gamma (Glass II)						log F = 22.43–76 kJ/(2.303 *RT*)	calc from data in Ref.	8
Unit Cell						Phase II is similar to PTFE		23
Viscosity			See Melt Viscosity					
Water Absorption	% incr. in wt.	D570	0.004		7	<0.1		9
Wear Factor	in^{3}min/ft/lb/hr		700–1800		10			
Weatherability			Excellent		10	Excellent		9

NOTES

1. Comments on ASTM and ISO standards for fluoropolymers are in Note 2 for the table on PTFE.
2. The values are estimated based on high-spot work on degradation of the polymers.
3. The exact value depends on the type or grade of polymer that is being used.
4. PFA and FEP are insoluble in all common solvents and are highly resistant to essentially all common chemicals (see Ref. 1, 2, and 15). They are however, attacked by molten alkali metals, elemental fluorine, and pure oxygen at elevated temperatures. Also, they can react, under some conditions, with alkaline earth oxides and finely divided metals such as aluminum or magnesium at elevated temperature. Solutions containing 0.1 to 2% FEP were obtained in perfluorokerosene

$C_{21}F_{44}$ (FCX-412) in the temperature range 290–310°C.

5. Determined by 3.0 × IR Ratio. The IR ratio is the absorbance at 980 cm^{-1} (10.2 μm)/absorbance at 2350 cm^{-1} (4.23 μm) (see Ref. 1, 2).
6. Thickness is from 0.025 to 2.5 mm. The value decreases with increasing thickness.
7. No carbon track is formed (see Ref. 7).
8. This numerical rating for flame spread is not intended to reflect hazards presented by this or any other material under actual fire conditions.
9. The MIT flex test is run with a thickness of 0.254 mm.
10. Calculated from data in Ref. 6. The melt flow rate was determined using standard conditions at 372°C.
11. Ref. 3 gives melting temperature, T_m, as a function of wt.% comonomer, X, and lamellar thickness, L. The equation is

$$1/T_m = 1.622 \times 10^{-3} + 2.52 \times 10^{-3}X(1+X) + (1.92 \times 10^{-10}/L)$$

12. The rate of increase of the melting point decreases with increasing pressure.
13. Inconsistencies in the results from various laboratories on heat of fusion of PTFE and FEP have not yet been resolved. This value is for a sample of FEP with a density of 2.148 Mg/m^3.
14. Moderate crosslinking can occur to offset degradation (see Ref. 15).
15. Mechanical properties of PFA at elevated temperature but below its melting point generally are superior to those of PTFE at the same temperature.
16. Calculated from data in Ref. 9.

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D. PHYSICAL CONSTANTS OF MODIFIED POLY(ETHYLENE-*co*-TETRAFLUOROETHYLENE) $-[CH_2-CH_2-CF_2-CF_2]-$

Commercially useful copolymers of ethylene and tetrafluoroethylene became feasible when it was discovered that the use of a small amount of a modifier, often a termonomer, resulted in polymers with properties suitable for long term use (Ref. 7). One key requirement, for example, is the ability to withstand exposure at high temperature without rapid embrittlement. The amount of modifier is very low and the exact amount

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and nature of a modifier has been kept proprietary by each manufacturer, and may be different for different grades within a product line.

The commercial modified poly (ETFE) materials are essentially alternating copolymers (Ref. 10). In molecular formula, they are isomeric with poly(vinylidene fluoride)(PVDF), and can be considered equivalent to a PVDF that has a head to head, tail to tail structure. Many important physical properties of modified ETFE copolymers, however, are very different from and superior to those of available PVDF materials. (These properties do not include the remarkable piezoelectric and pyroelectric performance of PVDF.)

Property	Units	ASTM or other methods	Value	Remarks	Refs.
ASTM or ISO Standards					
Molding and extrusion powders		D3159, ISO12086-1		See Note 1	
Chemical Resistance			Excellent	See Note 2	1,2,4
Coefficient of Friction		D1894	0.4		5
Coefficient of Thermal Expansion		D696			
Linear Expansion (average values for temperature indicated)	K^{-1}				
20–30°C			9×10^{-5}		5
50–90°C			9.3×10^{-5}		5
140–180°C			14×10^{-5}		5
Compressive Strength Properties					
Modulus	MPa		860		
Strength	MPa	D695	50		5
Stress at 1% deformation	MPa		10.3		1
Yield strength	MPa		19.3		1
Continuous Use Temperature			See Service Temperature		
Creep					
Flexural creep modulus	GPa	D674	5.5 after 100 h		1
Critical Shear Rate For melt fracture	s^{-1}		200–10000	See Note 3	3
Deformation Under Load	%	D621	4.11	See Note 4	5
Density	g/cm^3				
Crystalline (from X-ray and IR data)			1.9		5
After melting and recrystallization			1.7		6
Melt at processing temp.			1.3		3
Dielectric Constant			See Electrical Properties		
Dielectric Strength			See Electrical Properties		
Dissipation Factor			See Electrical Properties		
Electrical Properties					
Dielectric constant	ε	D150			
At 60 Hz to 1 MHz			2.5		3
At 1 kHz			2.6		5
Dielectric strength		D149			
	kv/mm		59 at 0.25 mm thickness		3
	kv/mm		16 to 80	See Note 5	4
	v/mil		400 to >2000	See Note 5	4
Dissipation factor		D150			
At 1 kHz			0.0008		5
Surface arc resistance	s	D495	75–110	See Note 3	1
Surface resistivity, 100% RH	ohms/sq	D257	$>10^{14}$		4
Volume resistivity, dry					
At 50% RH	ohm cm	D 257	$>10^{16}$		5

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Flame Rating					
Also see Limiting Oxygen Index		UL94	V–O	See Note 6	3
Flex Life	flexes	MIT	5500–12000	See Note 7	4
Flexural Modulus		D790			
At 23°C	MPa		827–1380		1,3
Hardness					
Durometer	Scale value	D2240	D70		3
Rockwell	Scale value	D785	R20		5
Heat Deflection Temperature		D 648			
At 0.455 MPa (66 psi)	°C		104		5
At 1.82 MPa (264 psi)	°C		74		5
Heat of Combustion	MJ/kg		13.7		5
Heat of Fusion			See Melting		
Impact Strength			See Toughness		
Limiting Oxygen Index	% Oxygen	D2863	30		5
Low Temperature Embrittlement	°C	D746	< – 100		4
Melt Viscosity					
By capillary rheometer	Pa s	D3159	$(0.7–10) \times 10^3$	See Note 3	3
Melt flow rate	dg/min	D3159	3.7–16	See Note 3	3
Melting					
Melting point	°C	DSC	225–270		6
Heat of fusion	kJ/kg		46.1		2
Molecular Weight			$(5–12) \times 10^5$	See Note 8	10
Permeability to Gases	m^3(STP) m/s/m^2/Pa ($\times 10^{15}$)				
Helium			405		5
Carbon dioxide			113		5
Oxygen			45		5
Nitrogen			14		5
Gas transmission rate	ng cm/m^2/s				
Water vapor		E96	752		5
Processing Temperature	°C		325–345		3
PV Limit	Pa m/s		< 70000		1
Radiation, Effects of				See Note 9	6
Refractive Index	n_D^{25}	D542	1.403		2
Resistivity		See Electrical Properties			
Service Temperature	°C		< – 100 to 150		6,5,8
Specific Gravity		See Density			
Specific Heat	kJ/kg/K		1.9–2.0		5
Tensile Strength Properties		D638			
Modulus					
At 23°C	MPa		830		5
Yield stress					
At 23°C	MPa		21.5		
Tensile strength					
At 23°C	MPa		38–48	See Note 10	3,6
Elongation at break	%				
At 23°C			100–350	See Note 10	3,6
Thermal Conductivity	W/m/K	C177	0.238		6
Toughness					
Izod impact strength (notched)	N	D256			
– 54°C			106–190	See Note 10	6
23°C	J/m		No break		6

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Property	Units	ASTM or other methods	Value	Remarks	Refs.
Transitions					
Alpha	°C		145 at 100 Hz		10
Gamma	°C		– 120 at 1 Hz		10
Unit Cell					
a	A		9.6	See Note 11	5
b	A		9.25		
c	A		5.0		
γ	Degrees		96		
Viscosity		See Melt Viscosity			
Water Absorption	% increase in wt.	D 570	<0.02		3
Wear Factor	Pa^{-1}				
	in^3 min/ft/lb/hr		6000×10^{-10}	See Note 12	5
Weatherability			Excellent		1

NOTES

1. See additional comments in Note 2 for the table on PTFE.
2. Extensive tables with data on the resistance to a wide variety of chemicals are given in the references.
3. The exact value depends on the particular type or grade of polymer that is being used.
4. Tested at 13.8 MPa and 50°C.
5. The value decreases with increasing thickness.
6. This numerical rating for flame spread is not intended to reflect hazards presented by this or any other material under actual fire conditions.
7. The film tested is 0.25 mm thick.
8. In dibutyl adipate at 250°C.
9. Poly(ETFE) can be crosslinked by ionizing radiation.
10. The exact value depends on the particular type or grade of resin used as well as the method used to prepare the test specimen.
11. The unit cell is believed to be either orthorhombic or orthoclinic.
12. Wear factor is decreased to 16×10^{10} by use of glass fiber filled polymer.

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E. PHYSICAL CONSTANTS OF POLY(VINYLIDENE FLUORIDE) $-(CH_2CF_2)-$

Poly(vinylidene fluoride), PVDF, has been used since the early 1960s because of its chemical resistance combined with very good mechanical properties. In addition, it is now known that PVDF has very unusual and valuable piezoelectric and pyroelectric properties (see Ref. 12).

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Abrasion Resistance					
Sand	μm^{-1}	D968	4.0		9
Tabor	mg/1000 cycles	CS-17 wheel	6–12; 7.0–9.0		8,9
ASTM Standards					
Material					
Molding and extrusion powders		D3222		See Note 1	
Rods, tubes, and pipe lining		F491			
Chemical Resistance			Generally excellent	See Note 2	
Coefficient of Friction		D1894	0.48; 0.14–0.17		6,9
Coefficient of Thermal Expansion		D696			
Linear expansion	K^{-1}				
25 to 50			$(7.9–14.1) \times 10^{-5}$		9
Compressive Strength Properties					
Modulus	MPa		1000–1400		12
Strength	MPa		55–100		12
Conformation				See Note 3	12
α-form (also termed Type II)			*Trans*-gauche-*trans*-gauche		
β-form (also termed Type I)			All *trans*, i.e. "planar zig-zag"		
γ-form (also termed Type III)					
δ-form					
Continuous Use Temperature	°C		See Service Temperature		
Crystal Forms			See Conformation		
Density	$g/cm^3 = Mg/m^3$		1.75–1.78		12
Dielectric Constant			See Electrical Properties		
Dielectric Strength			See Electrical Properties		
Dissipation Factor			See Electrical Properties		
Electrical Properties					
Dielectric constant	ϵ	D150			
At 60 Hz			8.4–13.5		12
At 1 kHz			7.46–13.2		12
At 1 MHz			6.0–7.6		12
At 1 GHz			2.9		5
Dielectric strength	kV/mm	D149	260–950	See Note 4	9
Dissipation factor		D150			
60 Hz			0.049, 0.012–0.019		9,12
At 1 kHz			0.013–0.019		12
At 1 MHz			0.15–0.22		12
At 1 GHz			0.110		9
Surface arc resistance	s	D495	50–60		9
Volume resistivity, dry					
At 50% RH	ohm cm	D257	2×10^{14}		9
Flammability		UL94	VO	See Note 5	1
Also see Limiting Oxygen Index					
Flexural Modulus		D790			
At 23°C	MPa		1200–1800		9
Flexural Strength		D790	59–75	See Note 6	9
Fuel Value			See Heat of Combustion		
Hardness					
Durometer	Scale value	D2240	70–80		9
Rockwell	Scale value	D785			

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Property	Units	ASTM or other methods	Value	Remarks	Refs.
Heat Capacity	J/kg/K				13
100 K			443.5		
150 K			618.5		
230 K			891.8		
250 K			785.6		
Heat Deflection Temperature		D648			
At 0.455 MPa	°C		112–140, 150		9,12
At 66 psi	°C		112–140, 150		
At 1.82 MPa	°C		80–90, 100		9,12
At 264 psi	°C		80–90, 100		
Heat of Combustion	MJ/kg		14.9		7
	Btu/lb		6400		7
Heat of Fusion			See Melting		
Impact Strength			See Toughness		
Infrared Spectra				See Note 7	
Limiting Oxygen Index	% oxygen	D2863	44		9,7
Melt Viscosity				See Note 8	
Melt flow rate	dg/min	D1238	5–180 at 265°C		12
Melting					
Melting point	°C	D3418	154–184		5
Piezoelectric Coefficient	pC/N		$d(31) = 21-28$ $d(32) = 2.3$ $d(33) = -32$		12
Polymorphic Phases See also Conformation			Four documented, others suspected		12
Processing Temperature	°C		200–300		12
Pyroelectric Coefficient	$\mu C/K/m^2$		27–40		5,12
Radiation, Effects of			Exceptionally resistant to degradation	See Note 9	5,12
Refractive Index	n_D^{25}	D542	1.42		2
Resistivity			See Electrical Properties		
Service Temperature	°C		150		2
Solution Viscosity					
Intrinsic viscosity	dl/g		0.9–1.6 in DMF at 125°C		12
			3.03×10^{-5} $MW^{0.70}$, calc. from Ref.	See Note 10	7
			1.93×10^{-4} $MW^{0.68}$, in dimethyl acetamide		5
Solvent Absorption				See Notes 8 and 11	
Solvents			Soluble in selected solvents; swells in acetone	See Note 8	2,15
Specific Gravity		D792	1.75–1.80		
Specific Heat	kJ/kg/K	DSC	1.26–1.42		5
10 K			0.85	See Note 12	11
100 K			28.4		
200 K			50.3		
300 K			80.6		
340 K			93.1		
Speed of Sound	m/s				
Longitudinal			1930		13
Shear			775		13

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Tensile Strength Properties		D638			
Modulus	MPa				
At 23°C			1340–2000	See Note 6	5
Yield stress					
At 23°C	MPa		36–59	See Note 6	5
At 100°C	MPa		19–23	See Note 6	5
Tensile strength					
At 23°C	MPa		36–56	See Note 6	5
At 100°C	MPa		19–23	See Note 6	
Elongation at break	%				
At 23°C			25–500	See Note 6	5
At 100°C			400–600	See Note 6	9
Thermal Conductivity	W/m/K	C177	100–0.126		9
	W/m/K		0.1–0.13		5
Toughness					
Izod impact strength (notched)		D 256			
23°C	J/m		160–530		8
Izod impact strength (unnotched)	N/m		1 700–3 100		5
Transitions					
α	°C		130 at 100 kHz		14
β	°C		0 at 100 kHz		14
γ (T_g)	°C	Dilatometry	−40		5
			−30 at 100 kHz		14
Viscosity			See Melt Viscosity and Solution Viscosity		
Water Absorption	% increase in wt.	D570	0.03–0.06		12
Weatherability			Superb		12

NOTES

1. Comments on ASTM and ISO standards for fluoropolymers are in Note 2 for the table on PTFE.
2. PVDF is resistant to most inorganic and organic chemicals at room temperature. It is, however, especially sensitive to attack by amines (Ref. 3). References (6), (14), and (15) have many pages of tables with information on the specific effect of different chemicals.
3. Many of the useful properties of PVDF stem from its existence in various conformations. The topic is not amenable for detailed presentation in tabular form, but it is discussed in depth in Ref. (12).
4. The value decreases with increasing thickness of the specimen being tested.
5. This numerical rating for flame spread is not intended to reflect hazards presented by this or any other material under actual fire conditions.
6. The exact value depends on the particular type or grade of resin used as well as the details used to make the test specimen.
7. Each conformation has its characteristic infrared spectra. See Ref. (9) for a general spectra and Ref. (12) for a discussion and references to the extensive literature.
8. Good solvents are dimethyl acetamide, dimethyl formamide, hexamethyl phosphoramide, and dimethyl sulfoxide. Some highly polar solvents such as ketones and ethers, are absorbed.
9. PVDF can be crosslinked by ionizing radiation resulting in an increase in high temperature modulus and very little degradation.
10. Calculated from data in Ref. (12) at page 200.
11. Reference (14) has 23 pages of Tables with information on the effect of many different chemicals.
12. Reference (11) has extensive tables for PVDF at temperatures from 10 to 340 K.

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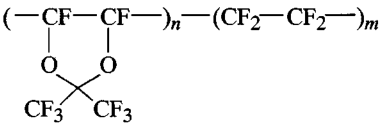
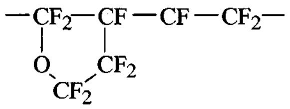
F. PHYSICAL CONSTANTS OF AMORPHOUS FLUOROPOLYMERS

Two major families of amorphous fluoropolymers have been developed. Both rely on in-chain rings to reduce crystallinity in the homopolymer and in copolymers with α-olefins such as tetrafluoroethylene and chlorotrifluoroethylene. One incorporates 2,2-bis-trifluoromethyl-4,5-difluoro-1,3-dioxole (PDD) in copolymers with tetrafluoroethylene or chlorotrifluoroethylene (TEFLON® AF) and the other is based on monomers such as 5-oxaperfluoro-1,6-heptadiene, which when polymerized, produce the structure below (CYTOP®). Amorphous fluoropolymers are soluble in a variety of fluorinated solvents and can be cast into thin films as well as conventionally melt processed. Optical properties are a significant market utility. Cost is a major consideration, however, compared to crystalline fluoropolymers.

TEFLON® AF



CYTOP®



Property	Units	ASTM or other methods	TEFLON® AF Value 1600 grade	TEFLON® AF Value 2400 grade	TEFLON® AF Remarks	TEFLON® AF Refs.	CYTOP® Value	CYTOP® Refs.
Melt viscosity	Pa s	D3835				10		
250°C			2650					
350°C				540				
Chemical Properties								
Water absorptivity	%	D570	<0.01	<0.01		4	<0.01	5
Chemical resistance					See Note 1	4		
Solubility					See Note 2	11		
Contact angle, water	Deg		104	105		3,10	110	4
Critical surface energy	dynes/cm		15.6–15.7	15.6–15.7		10		
Critical surface tension						3		
γ_c	mN/M		12.1	11.9				
γ_{GGF}	mN/M		13.9	13.8				
Density	g/cm^3	D792	1.78	1.67		1	2.03	2
Electrical Properties								
Dielectric strength	kv/(0.1 mm)	D149	2.1	1.9		10		
	kv/mm						19	2
Dielectric constant			1.93	1.89		4,9	2.1–2.2	2
1 MHz		D150	1.934	1.904		1		
1 GHz			1.93	1.897		1		
13.6 GHz			1.927	1.89		1		

Property	Units	ASTM or other methods	TEFLON® AF Value 1600 grade	TEFLON® AF Value 2400 grade	TEFLON® AF Remarks	TEFLON® AF Refs.	CYTOP® Value	CYTOP® Refs.
Dissipation factor			$(8\text{–}20) \times 10^{-5}$	$(8\text{–}30) \times 10^{-5}$		4	7×10^{-4}	
1 MHz		D150	0.00012	0.00012		1		
1 GHz			0.00018	0.00024		1		
13.6 GHz			0.0002	0.00035		1		
Surface arc resistivity	s	D495					180	2
Volume resistivity	ohm cm	D257					$> 10^{17}$	2
Flammability, limiting oxygen index	$\%O_2$		95	95		4		
Fractional free volume				0.327		8		
Hardness								
Rockwell		D785	103	97.5		10		
Durometer		D1706				10		
23°C			77	75				
150°C			70					
220°C				65				
Optical Properties								
Refractive index	n_D^{25}	D542	1.31	1.29		4	1.34	2
d*n*/d*t*	$°C^{-1}$ $(\times 10^{-6})$					1		
Below T_g			−77	−78				
Above T_g			−329	−378				
Weatherability			Excellent	Excellent			Excellent	
Optical transmission	%	D1003	>95	>95	See Note 3	4,6		
Stress optical coefficient	B		4.5		See Note 4	4		
Infrared spectra					See Note 5	7		
Abbe number			92	113	See Note 6	4	90	4
Permeability coefficients	cB				See Note 7	4,8	34 000	4
Oxygen			34000	99 000				
Nitrogen			130000	49 000				
Carbon dioxide				280 000				
Water vapor			117000	410 000				
Helium				270 000				
Hydrogen				220 000				
Methane				340 000				
Ethane				180 000				
Ethylene				350 000				
Tensile Properties								
Tensile strength, at break	MPa	D638				10	35	2
23°C			27	26				
150°C			8					
220°C				4				
Elongation, at break	%	D638				10		
23°C			17	8				
150°C			89					
220°C				8				
Tensile Modulus	MPa	D638	1550	1540		4	1200	2
Compressive strength	MPa						70	2
Compressive modulus	MPa						2000	2
Tensile strength at yield	psi		3900	3600		16		
Flexural modulus	MPa	D790				10		
23°C			1800	1600				
200°C			1000					
220°C				700				
Thermal Properties								
Transition temperatures	°C							
T_g γ			160	240	See Note 8	1	108	2
β		At 10^2 Hz	88			9		
δ			−203			9		
Thermal stability	°C			360		4	>400	2

Notes page V-54; References page V-54

Property	Units	ASTM or other methods	TEFLON® AF Value 1600 grade	TEFLON® AF Value 2400 grade	TEFLON® AF Remarks	TEFLON® AF Refs.	CYTOP® Value	CYTOP® Refs.
Upper use temperature	°C			285				
Thermal expansion								
Linear	$°C^{-1}$ ($\times 10^{-6}$)		74	81		4		
Volume	$°C^{-1}$ ($\times 10^{-6}$)		260	301		10		
Weight loss in air								
after 1 hour at temp. 260°C	%			None				
360°C	%			0.29				
380°C	%			0.53				
400°C	%			1.94				
420°C	%			8.83				
Thermal conductivity	W/m/K	295 K	0.116			1		
Deflection temperature		D648				10		
66 psi			156	200				
264 psi			154	174				
Specific volume						1		
Below T_g	cm^3/g		$0.548 + (1.22 \times 10^{-4})T$	$0.570 + (1.37 \times 10^{-4})T$				
Above T_g	cm^3/g		$0.476 + (5.64 \times 10^{-4})T$	$0.428 + (7.75 \times 10^{-4})T$				
Radiation effects					See Note 9	5		
Charge storage effects					See Note 10			

NOTES

1. See Refs. (2,3) for data on chemical resistance and physical property performance in various solvents.
2. See Ref. (15) for types of solvents and degree of solubility of amorphous fluoropolymers.
3. See Ref. (8) for optical transparency data.
4. Brewster $= 10^{-13}\,cm^2/dyn$.
5. See Ref. (10) for infrared spectral interpretation.
6. Abbe Number = (refractive index at sodium D line minus 1)/(refractive index at hydrogen F line minus refractive index at hydrogen C line).
7. centiBarrier $= 10^{-8} \times (cm^3(STP)\ cm/s/cm\ Hg/cm^2$.
8. T_g of 2,2-bis(trifluoromethyl)-4,5-difluoro-1,3-dioxole homopolymer is 330°C. Glass transition temperature is a strong function of comonomer content.
9. See Ref. (5) for a discussion of radiation effects on optical and physical properties.
10. See Ref. (12) for charge storage data of amorphous fluoropolymers.

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G. PHYSICAL CONSTANTS OF POLY(CHLOROTRIFLUOROETHYLENE)

Poly(chlorotrifluoroethylene) (PCTFE) was the first of the fluoropolymers to be made (Ref. 3). It was not until the work of W. T. Miller and his colleagues during the research for the Manhattan (atom bomb) project (Ref. 8), however, that materials with molecular weight suitable for plastics applications became available.

$$-[CFCl-CF_2]-$$

Property	Units	ASTM or other methods	Value	Remarks	Refs.
ASTM and ISO Standards					
Material					
Molding and extrusion powders		D1430,12086^{-1}		See Note 1	
Film and sheeting		D3595			
Chemical Resistance				See Note 2	
Coefficient of Thermal Expansion					
Linear expansion	K^{-1}	D696			
(average values for temperature indicated)					
− 80 to 20°C			4.5×10^{-5}		4
20–50°C			7×10^{-5}		
Compressive Strength		D695			
Properties					
Modulus	MPa		1 350		6
Strength	MPa		380		6
Stress at 1% deformation	MPa		13.8	See Note 3	
Continuous Use Temperature	°C		See Service Temperature		
Creep			Very low Creep		10
Deformation Under Load	% Def.	D621	6.86		8
Density	g/cm^3	D792			
			2.10 Amorphous		10
			2.12 Crystalline		10
			2.15		16
Electrical Properties					
Dielectric constant	ε	D150			
At 60 Hz, − 40°C			2.2		4
At 60 Hz, 25°C			2.6		4
At 60 Hz, 170°C			3.2		4
At 100 kHz			2.9		4
At 100 MHz			2.5		4
Dielectric strength	kV/mm	D149	15–200	See Note 4	4
Dissipation factor		D150			
100 Hz			0.02–0.06	See Note 8	7
At 1 kHz			0.025–0.027	See Note 8	7
Surface arc resistance	s	D 495	360		6
Surface resistivity, 100% RH [megohms],	ohms/sq	D 257	10^{15}		6
Volume resistivity, dry	ohmcm	D 257			
At 50% RH			1.2×10^{18}		6
Flammability	UL94		VEO	See Note 5	6
Also see Limiting Oxygen Index					
Flexural Modulus		D790			
At 23°C	MPa		1250		
At 23°C	psi		180000		6
At 100°C	MPa		14420		

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Flexural Strength	MPa	D790	73.8		1
	psi		10 700		
Hardness					
Durometer	Scale value	D2240	D 75–80		6
Rockwell	Scale value	D785	S 85		1
Heat Capacity	J/kg/K	DSC	900		6
80 K			278.7		8
200			625.7		8
300			859.5		8
320			906.7		8
Heat Deflection Temperature		D648			
At 0.455 MPa (66 psi)	°C		130		6
At 1.82 MPa (264 psi)			70		6
Heat of Fusion			See Melting		
Impact Strength			See Toughness		
Intrinsic Viscosity	ml/g		0.9–1.7	See Note 11	4
Limiting Oxygen Index	% Oxygen	D2863	100		6
Melt Viscosity					
By capillary rheometer	Pa s		1–10 at 230°C	See Note 6	4
Melting					
Melting point	°C	DTA	210–215		6
Latent heat of fusion	kJ/kg	DSC	1.2		6
	cal/g		3.6–8.4	See Note 7	4
Molecular Weight					
See also Zero Strength Time			50000–100000	See Note 8	5
			150000–190000		7
Permeability to Gases	m^3(STP) m/s/m^2/Pa × 10^{15}			See Note 9	6
Helium			21.7		6
Carbon dioxide			1.4		
Oxygen			0.4		
Nitrogen			0.05		
Hydrogen			9.8		
Processing Temperature	°C		280–305		10
Radiation, Effects of			Little effect	See Note 10	6
Refractive Index	η_D^{25}	D542	1.435		6
Resistivity				See Electrical Properties	
Service Temperature	°C		−200 to 200		6,10
Solution Viscosity			See Intrinsic Viscosity		
Solvent Absorption			Generally low	See Note 2	6,7,10
Solvents			None at room temperature	See Note 11	4
Specific Gravity			See Density		
Specific Heat					
0°C	kJ/kg/K		0.84		4
211°C	kJ/kg/K		1.7–4.6	See Note 7	4
240°C	kJ/kg/K		4.2		4

Property	Units	ASTM or other methods	Value	Remarks	Refs.
Tensile Strength Properties		D 638			
Modulus					
At 25°C	MPa		14000		6
Tensile strength					
At 23°C	MPa		40		
At 125°C	MPa		4		
Elongation at break					
At 23°C	%		150		
At 125°C	%		400		
Thermal Conductivity	W/m/K	C177			
At 3.5°C			3.09×10^{-4}		4
At 60.8°C			3.23×10^{-4}		4
Thermal Degradation			Degrades at temperatures above 260°C	See Note 12	4
Toughness					
Izod impact strength, notched					
24°C	J/m	D256	267		6
Transitions	°C				
α			150 at 1 Hz	See Note 13	1
β			90 at 1 Hz	See Note 13	1
γ			− 37 at 1 Hz	See Note 13	1
Transmittance Properties					
Luminous transmittance	%	D1003	>90	See Note 14	6
Haze	%	D1003	<4		
Viscosity				See Melt Viscosity and Solution Viscosity	
Water Absorption	% Increase in wt.	D570	0.00		2
Weatherability			Excellent		
Zero Strength Time (ZST)	s	D 1430	200–750	See Note 6 and Note 8	6,10

NOTES

1. Comments on ASTM and ISO standards for fluoropolymers are in Note 2 for the table on PTFE.
2. PCTFE is resistant to most inorganic and organic chemicals at room temperature and to most inorganic chemicals such as strong oxidizing agents over a wide range of temperature. It is especially useful in liquid oxygen service. References (4), (6), and (10) have many pages of tables with information on the specific effect of different chemicals.
3. The value is the stress at 0.3% deformation after 24 h.
4. The value decreases with increasing thickness of the test specimen.
5. This numerical rating for flame spread is not intended to reflect hazards presented by this or any other material under actual fire conditions.
6. The exact value depends on the particular type or grade of resin used.
7. The value increases with increasing crystallinity.
8. ZST is a measure of relative molecular weight of PCTFE.
9. PCTFE is noteworthy for its very low permeability.
10. PCTFE generally maintains properties when exposed up to about 18 Mrad of ionizing radiation. Further improvement in resistance can be obtained by incorporating small concentrations of vinylidene fluoride during polymerization.
11. Soluble at 100°C in 2,5-dichlorobenzotrifluoride. Another solvent is 1,2,3,4-tetrafluorohexachlorobutane.
12. The degradation involves random scission rather than "unzippering".
13. Specimens were 80% crystalline.
14. For amorphous polymers.

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Physical Constants of Poly(acrylonitrile)*

Siegfried Korte
Bayer AG, Leverkusen, FR Germany

A. Tables of Physical Constants V-59
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A. TABLES OF PHYSICAL CONSTANTS

TABLE 1. CRYSTALLINITY/CRYSTALLIZATION BEHAVIOR

Property	Value	Remarks	Refs.
Crystallographic data Unit cell dimensions[a]	See table See also corresponding chapter of this Handbook	With molecular modelling calculations of PAN References are made to unit cell parameter, crystal system, density, melting point, heat of fusion	1

	Axis				
Tacticity	*a* (Å)	*b* (Å)	*c* (Å)	System	Refs.
Syndio	5.99	5.99	–	Hexagonal	2
Syndio	21.18	11.60	5.1	Orthorhombic	3
Syndio	10.6	11.60	5.04	Orthorhombic	4
Syndio	10.2	6.10	5.10	Orthorhombic	5
Syndio	10.55	5.8	5.08	Orthorhombic	6
Syndio	21.0	11.9	5.04	Orthorhombic	7
Syndio	10.7	12.1	5.1	Orthorhombic	8
Iso	4.74	4.74	2.55	Tetragonal	9

Property	Value	Remarks	Refs.
Crystallinity (%)	See table	Samples: gel spun PAN-fibers. The role of macromolecular entanglements is discussed	
Crystal size L_{100} (Å)	See table		10

Molecular weight $\bar{M}_w$(g/mol)	Draw ratio (fiber)	Crystallinity (%)	Crystal size L_{100} (Å)
6×10^4	2.0–7.0	18.5–32.0	43.5–66.0
12×10^6	2.0–6.0	27.5–39.5	45.5–78.0

Property	Value	Remarks	Refs.
	See Ref.	Degree of PAN-crystallinity as a function of crystallite thickness and polymer tacticity	11

*Based on a similar table in the third edition, by W. Fester, Hoechst AG, FR Germany.

Property	Value	Remarks	Refs.
Crystallization temperature $T_c{}^b$ (°C)	95–100	Determined in propylene carbonate	12,13
	153.6	Crystallization from PAN/H_2O – melt under pressure	14
Density (g/cm^3)	1.15–1.18	Sample: flakes and films	12,16,17
	1.17–1.19	Sample: fiber	18
Orientation factor	See Ref.	Sample: stretched films	
		X-ray diffraction studies	
		Chain-orientation factors were measured by IR-dichroism.	15

[a]The reported unit cell dimensions, especially the c-dimension along the chain axis, can only be regarded as estimated because of the diffuse meridian and polar reflections in the X-ray diffraction studies.
[b]The dissolution and crystallization temperatures given here are obtained from a free radical poly(acrylonitrile). They are sensitive to chain irregularities in the polymer. Samples of poly(acrylonitrile) obtained from different sources show marked differences in the dissolution and crystallization temperatures, although they have similar IR-spectra, X-ray diffraction patterns and densities.

TABLE 2. ELECTRIC AND ELECTRONIC PROPERTIES

Property	Value	Remarks	Refs.
Dielectric Constant			
ε	4.2–6.5 (60–10^6 Hz)	Sample: film	19,20
ε_{RT}	5.68 ± 0.84 (293 K)	Sample: film	
ε_{He}	3.29 ± 0.17 (3.8 K)	Temperature dependence: Arrhenius type behavior	21
ε ($T > 373$ K)	See Ref.	Sample: discs from powder	
		Variation of ε with temperature at various frequencies	22,23
Dissipation factor			
$\tan\delta = \frac{\varepsilon''}{\varepsilon'}$			
	0.033–0.113 (60–10^6 Hz)	Sample: film	
		(ε'', ε' loss and storage dielectric constants)	19,20
	See Ref.	Comparison of the mechanical and dielectric values	
		of tan δ as function of temperature (10^2 Hz)	24
$\tan\delta$ ($T > 373$ K)	See Ref.	Sample: discs from powder	
		Variation of tan δ with temperature at various frequencies	22
Piezoelectric constants			
Driver constant d_{31} (C/N)	1.5×10^{-12}		
Generator constant g_{31} (V m/N)	30.8×10^{-3}		17,25
McGinnies parameter χ	0.963		
Conductivity (S/cm)	4.8×10^{-14} (293 K)	Sample: film (sandwich)	
	8.4×10^{-12} (373 K)	Data from the current–voltage characteristics at various temperatures	26,31
Radiation induced conductivity	See Ref.	Sample: film (40 μm) sandwich	27
Dipole moments in solution	See corresponding chapter of this Handbook		
Magnetic susceptibility (e m n/g)	See Ref.	Sample: PAN-foam	28
Photoelectric properties	See Ref.	Sample: thin film (plasma-polymerized)	29
Photocurrent (A/cm^2)			
Electronic properties			
Ionization potential (eV)	8.2	Sample: thin film (plasma-polymerized)	30
Electron affinity (eV)	3.9		
Surface work function (eV)	5.8		

TABLE 3. FIBER PROPERTIES

Property		Conventional acrylic fibers (≥ 85% AN)[a] (Refs. 18, 32–36)	PAN-fiber Dralon T (100% AN) (Ref. 35)	High strength acrylic fibers[b] (Refs. 38,39)	Acrylic fibers from isotactic PAN[c] (Ref. 40)
Fiber fineness (dtex)		0.6–19.0	3.3–17.0	1.0–4.0	
Density (g/cm^3)		1.14–1.19	1.17–1.19		
Tenacity [21°C/65% RH] (cN/dtex)		1.8–4.5	3.5–6.0	10–20	8.0–20.0
Tenacity [wet/dry ratio] (%)		75–95	80–100		
Elongation ε [21°C/65% RH] (%)		30–60	25–40	7–10	
Elongation [wet/dry ratio] (%)		100–120	≈ 100		
Initial modulus [(Elongation $\varepsilon \rightarrow 0$)] (cN/dtex)		30–100	95–160	140–270	
Modulus in hot water [90°C] (cN/dtex)		1.0–5.5 (Ref. 37)			15.0–21.0
Relative knot tenacity	(%)	70–90	≈ 70	4.5–6.5 (cN/dtex)	
Relative loop tenacity	(%)	30–80	≈ 60		

[a]The properties of acrylic fibers manufactured by conventional processes of wet or dry spinning are dependent on spinning conditions and the monomer content in the polymer itself. Some trade names of acrylic fibers: Acrilan, Cashmilon, Courtelle, Dolan, Dralon, Euracryl, Leacryl.
[b]Polyacrylonitrile fibers with high tensile strength are prepared under special conditions: Use of polyacrylonitriles with high molecular weight ($\bar{M}_w > 5.0 \times 10^5$ g/mol), wet or dryjet/wet spinning and forming a fiber with a gel structure, afterwards stretching to high degrees (draw ratios 15–30).
[c]Fibers are made from polyacrylonitriles with highly isotactic content (mm > 0.40). They are prepared by anionic polymerization with a special catalyst.

TABLE 4. FURTHER PROPERTIES OF ACRYLIC FIBERS

Property	Value[a]	Remarks	Refs.
Elastic recovery [(1-$\varepsilon_r/\varepsilon$) × 100] (%)		*Effects of acids and alkalis*	36,42
ε = 2.0%	90–95	Good to excellent resistance to mineral acids,	
ε = 5.0%	50–90	fair to good resistance to weak alkali, and	
		moderate resistance to strong cold solutions of alkali	
Torsion modulus (cN/dtex)	10–17		
Fiber shrinkage [in water, 95°C] (%)		*Effects of bleaches and solvents*	
Drawn fiber	14–22	Good resistance to strong bleaches and common solvents;	
Thermoset fiber	≈ 1.0	Unaffected by dry cleaning solvents;	
Water absorption [(21°C/65% RH)] (%)	1.0–1.5	Can be bleached with sodium chlorite	
Water retention (%)	4.0–12.0[b]	*Resistance to mildew, aging, sunlight, abrasion*	41
Glass transition temperature (°C)		Not attacked by mildew;	
Dry	85–95	Good resistance to aging, sunlight and abrasion	
Wet	50–60		
Melting/decomposition temperature (°C)	250–320		
Heat resistance in air (°C)	140		
Fire limiting oxygen index (LOI) (°C)	18		

[a] Refs. 18, 21–36. [b] Ref. 41.

TABLE 5. OPTICAL PROPERTIES

Property	Value	Remarks	Refs.
Birefringence[a]			
$\Delta_n = n_{\parallel} - n_{\perp}$	− 0.005	Sample: PAN-fiber	32
	− 0.0017 (skin)	Sample: PAN-fiber (kidney-shaped)	44
	− 0.0047 (core)		
Refractive index			
n_d^{25}	1.158		45
$n_{\parallel}$	1.50–1.53	Sample: PAN-fiber	19,32,44
$n_{\perp}$	1.51–1.53		
	See also corresponding chapter of this Handbook		
Refractive index increments	See Ref.	Measured and calculated for different solvents	46
	See also corresponding chapter of this Handbook	(λ = 546 nm)	
Polarizability			
$P_{\parallel}$	0.0735		
$P_{\perp}$	0.074		
Optical anisotropy in solution	See corresponding chapter of this Handbook		44

[a]$n_{\perp}$ and $n_{\parallel}$ are refractive indices measured with incident light having the vibration vector perpendicular and parallel to the fiber axis, respectively.

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TABLE 6. POLYMERIZATION: KINETIC AND THERMODYNAMIC DATA

Property	Value	Remarks	Ref.
Heat of polymerization (KJ/mol)	-72.4 ± 2.2		43
Rate constants of free radical polymerization (propagation, termination and transfer constants)	See corresponding chapter of this Handbook		
Heats and entropies of polymerization	See corresponding chapter of this Handbook		
Activation energies of polymerization	See corresponding chapter of this Handbook		
Activation enthalpies and entropies of stereo-control in free radical polymerization	See corresponding chapter of this Handbook		
Stereoregularity[a]	See table		

Polymerization	$[\eta]_{DMF}$ (dl/g)	$\bar{M}_{V(DMSO)}$ (g/mol)	Triad tacticity (%)† Iso	Hetero	Syndio	Refs.
Radical	1.97–6.87		25–29	47–51	22–27	47
Anionic	2.17–2.26		30–31	43–46	23–27	47,48
Anionic		5.3×10^4	26.7	48.8	24,524	40
Anionic		0.2×10^4–5.1×10^6	47–72	21–36	10–20	49,50,51
Urea clathrate						
UV-irradiation	0.22–1.56		56–71	22–32	7–12	52
γ-irradiation (post)	0.79–3.05		69–87	10–23	3–8	48
γ-irradiation (in source)	1.81–4.96		48–65	25–36	9–16	53

† Tacticity of PAN was determined by ^{1}H-NMR, ^{2}H-NMR and ^{13}C-NMR, computing the spectra, and by decoupling techniques.

Property	Value	Remarks	Ref.
Spectral data[a]			
Nuclear magnetic resonance spectrum			
^{1}H-NMR, ^{2}H-NMR	See Refs.	Configuration of PAN	54–58
^{13}C-NMR	See Refs.	Stereoregularity of PAN	48,53,59–61
Solid-state NMR	See Refs.	Chain conformation and phase structure of PAN	62–64
Infrared spectrum	See Refs.		65–72

[a] Stereoregularity and spectral data were properly provided with separate generic terms..

TABLE 7. SOLUBILITY/SOLUTION PROPERTIES

Property	Value	Remarks	Refs.
Solvents	Dimethylformamide, dimethyl sulfoxide, dimethylacetamide, ethylene carbonate, propylene carbonate, malononitrile, succinonitrile, adiponitrile, γ-butyrolactone, conc. sulfuric and nitric acid, conc. salt solutions: LiBr, NaCNS, $ZnCl_2$;	See also corresponding chapter of this Handbook Solvents and Nonsolvents	73,74
Solubility			
Hildebrand parameter δ_2 $[J/cm^3]^{1/2}$	31.5 (exp.); ~26.0 (estim.) See also corresponding chapter of this Handbook	Estimated values from empirical formulae of Hildebrand/Scott and Askadskii	75
Dissolution of highly isotactic PAN	See Ref.	Solution temperature as function of isotacticity and molecular weight	76
Intrinsic viscosity (η)			77,78
Solvent dependence	See Ref.	Data and factors which convert $[\eta]$-values from one solvent into another	79

Property	Value	Remarks	Ref.
Temperature dependence	See table		

Solvent	T (°C)	Huggins' coefficients	$-(d \ln[\eta]/dT)$
N,N-Dimethyl-formamide	25 35	34 33	0.14–0.19
N,N-Dimethylacetamide			0.27
Dimethyl sulfoxide			0.08
60% HNO_3			0.05
γ-Butyrolactone			0.14 0.13–0.17
Hydroxyacetonitrile acetonitrile			0.07

Property	Value	Remarks	Ref.
Viscosity–molecular weight relationship	See corresponding chapter in this Handbook	Mark–Houwink–Sakurada equation	
Dilute solution properties			
Unperturbed dimensions of linear chain molecules	See corresponding chapter in this Handbook		
Partial specific volume	See corresponding chapter in this Handbook		
Huggins and Schulz–Blaschke coefficients		See corresponding chapter in this Handbook	
Sedimentation and diffusion coefficients	See corresponding chapter in this Handbook		
Parameters of isotactic PAN	See Ref.	Effects of stereoregularity on Mark–Houwink–Sakurada equation for different solvents, further on the radius of gyration $\langle S^2 \rangle$, the second virial coefficient A_2 and the conformation parameter	80
Parameters of ultrahigh molecular weight PAN	See Ref.	Dependence of molecular weight on radius of gyration $\langle S^2 \rangle$, second virial coefficient A_2 and intrinsic viscosity $[\eta]$	81
Viscosity and related parameters	See Ref.	η-values, activation parameters of viscous flow, voluminosity and shape factor at different temperatures (Solvent: DMF)	82
Flexibility parameter (λ) (Theta conditions)	7.20–7.68	Solvent: DMF λ is defined by Kratky–Porod for random-coiled polymers	83
Dissolution temperature[a] (°C)	125–130	In propylene carbonate	12,13

[a] The dissolution and crystallization temperatures given here are obtained from a free radical poly(acrylonitrile). They are sensitive to chain irregularities in the polymer. Samples of poly(acrylonitrile) obtained from different sources show marked differences in the dissolution and crystallization temperatures, although they have similar IR-spectra, X-ray diffraction patterns and densities.

TABLE 8. SPECIAL SOLID STATE PROPERTIES

Property	Value	Remarks	Refs.
Gas permeability (P) $\left[\frac{g \times cm}{cm^2 \times s \times bar}\right]$			
O_2 (film, 25°C) (film, 25°C/65% RH)	2.15×10^{-15} $150–195 \times 10^{-15}$	Relationship between published and CGS permeability units	84,85,86
CO_2 (film, 25°C)	11.8×10^{-15}	$1 \frac{g \times cm}{s \times cm^2 \times bar} = \frac{298.82}{M} \frac{cm^3(STP) \times cm}{s \times cm^2 \times cmHg}$	
H_2O (film, 25°C)	18.4×10^{-10}	Where M is the molecular weight of the penetrant gas	
Polymer surface energy δ (m N/m)	58.8 49.9/54.1	Calculated from cohesion parameters and refractometric data	87 88
Critical surface tension γ_c (dyn/cm)	See corresponding chapter of this Handbook		
Vickers microhardness H_V (kg/mm^2)	11–24	H_V is a function of load L ($L = 20–60$ g) Sample: film	89

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TABLE 9. THERMAL AND THERMODYNAMIC DATA

Property	Value	Remarks	Refs.
Heat capacity C_P Enthalpy function $H_T - H_O$ Entropy function $S_T - S_O$	See table See also corresponding chapter of this Handbook	C_P-data based on measurements in the solid state Enthalpy and entropy functions are calculated	90

T (K)	C_P (J/mol/K)	$H_T - H_O$ (J/mol)	$S_T - S_O$ (J/mol/K)
50	13.77	244.7	7.546
100	30.23	1388	22.73
150	40.44	3167	37.02
200	49.77	5410	49.87
250	58.48	8101	61.84
300	68.84	11277	73.40
350	80.83	15012	84.89
370	86.18	16681	89.53

Property	Value	Remarks	Refs.
Heat capacity C_P ($T > T_g$)	See Ref.	Calculated heat capacity data for states above the Glass transition temperature	91
Specific heat of combustion Δh_c (KJ/g)	30.6 (expt.) 31.5 (calc.)	Δh_c is related to other parameters, such as oxygen index and char residue	92
Thermal decomposition temperature[a] (°C)	250–310		33
Initial decomposition temperature (°C)	248		
Exotherm decomposition range (°C)	238–299	Data from DSC and thermogravimetry analysis	93
Heat of oligomerization ΔH (J/g)	530.9		
	See Ref.	Ranges of decomposition and activation energies for the thermal degradation in air and nitrogen	94
Thermal decomposition activation energies and products	See also corresponding chapter of this Handbook		
Glass transition temperature T_g (°C)	85–104	Various data cited in the 3/e of Polymer Handbook	95
	110	Sample: film Method: fluorescence probe technique	96
	65/105	Existence of two transition temperatures in thermomechanical analysis	97
	See Ref.	Effects of solvents and thermal treatment on T_g	97
	See Ref.	Chain-length dependence of T_g	98
	See also corresponding chapter of this Handbook		
Melting point T_m (°C)	~320	Normally PAN decomposes before melting	99,100
T_m (H_2O) (°C)	184.7	Melting temperature in the wet state under self generated pressure	14
	See also corresponding chapter of this Handbook		
Thermal conductivity κ (mW/cm/K)	0.022 (5 K) 0.440 (20 K) 1.600 (100 K)	Sample: discs from powder	101
Coefficient of expansion (K^{-1})			
Volume (1/V) × $(dV/dT)_P$	2.8×10^{-4}–3.8×10^{-4} (above T_g) 1.4×10^{-4}–1.6×10^{-4} (below T_g)		45,102,103
Linear (1/V) × $(dV/dT)_P$	1.6×10^{-4}–2.0×10^{-4} (above T_g) 1.0×10^{-4} (below T_g)		104,105

[a]The thermal decomposition temperature determined by thermogravimetric analysis ranges from 250°C for a PAN-sample prepared with an ionic catalyst, to 310°C for a commercial fiber. Pyrolysis of poly(acrylonitrile) carried out in the absence of oxygen at 500–800°C yields HCN and low molecular weight nitriles such as monomer, dimer and methacrylonitrile leaving a residue with a condensed ring structure.

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Physical Constants of Poly(vinyl chloride)*

E. A. Collins
Consultant, Avon Lake, OH, USA

C. A. Daniels
The Geon Company, Avon Lake, OH, USA

D. E. Witenhafer
Consultant, Dublin, OH, USA

Birefringence See Stress Optical Coefficient.

Branching

Branching Content (Branches per 1000 Monomer Units (C_2)) as a Function of Polymerization Temperature

T_{polym} (°C)	-CH- | CH_2Cl	-CCl- | CH_2CH_2Cl	-CCl- | $CH_2CHClCH_2CH_2Cl$	H/Cl | -C-C-C- | C	Refs.
45	3.9	< 0.1	0.5	< 0.1	1[a]
55	4.2	0.2	0.6	0.2	1[a]
65	4.6	0.2	0.8	0.3	1[a]
80	4.9	0.3	1.3	0.3	1[a]
100	5.0	1.4	2.1	0.8	2[b]

All data from ^{13}C-NMR.
[a]Extrapolated to 0 subsaturation, reduced with Bu_3Sn as per Ref. 3.
[b]Reduced with Bu_3Sn as per Ref. 4.

Brittle to Ductile Transition Pressure (kbar) Value of 0.2 kbar, measured under tensile deformation of 10% per minute at 25°C. (5)

Coefficient of Thermal Expansion (K^{-1})

$< T_g$ before annealing, 6.6–7.3 × 10^{-5} (6)
after annealing, 6.9 × 10^{-5}
$>T_g$ 17.0–17.5 × 10^{-5}
With plasticizer. (7)

Coefficient of Friction

PVC on Steel (8)

Plasticizer[a] (%)	Static	Dynamic
25.9	0.350	0.719
31	0.495	0.787
35.5	0.645	0.857
39.4	0.797	0.925

[a]Di-2-ethylhexyl phthalate (DOP), di-iso-decyl phthalate (DIDP), *n*-octyl-*n*-decyl phthalate (DNODP). A value of 0.45–60 for unplasticized PVC with steel has been reported (9). For further data see Ref. (10).

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Compressibility (MPa^{-1}) (×10^6) (11)

Uniaxially Stretched PVC

Elongation (%)	$\gamma_{\parallel}$	$\gamma_{\perp}$
85	4.88	8.0
125	4.25	8.45
160	3.57	8.75

See also Refs. 12,13, and 36.

Creep (14,15)

Crystallinity (%)
From Density Measurements (16)

T_{polym} (°C)	Crystallinity (%)
90	11.3[a]
55–60	11.3
50	13.2
20	15.0
−15	57.3
−75	84.2

[a]Assumes amorphous density equals 1.385 g/cm^3 and crystalline density equals 1.44 g/cm^3 (19). Since the crystalline density for highly crystalline (e.g., single crystal) PVC is considerably greater than 1.44 g/cm^3; as shown in the table on crystallographic data, the above % crystallinity values for the low temperature polymerized PVCs are greatly overestimated. As pointed out by Kostyuchenko and co-workers (20), if a crystalline density of 1.497 g/cm^3 or greater is used, the calculated percent crystallinity values agree better with X-ray diffraction measurements.

Crystallinity cont'd
From X-Ray Diffraction Measurements

T_{polym} (°C)	Crystallinity[a] (%) (17)	T_{polym}	Crystallinity[b] (%) (18,40)
90 frac. 1	10.4	50	13[c]
frac. 3	5.4	− 20	17
53 frac. 1	10.4	− 40	20.5,20
A	6.5	− 60	23,25
B	8.2		
25	12.2	polym. in propionaldehyde	33[c]
− 60	23.7		
	34.7[c]	polym. in *n*-butyraldehyde	

[a] Values obtained using the X-ray diffraction method of Hermans and Weidinger (21) and a double hump amorphous curve.
[b] X-ray diffraction method with Lorentz-polarization and atomic scattering factor corrections.
[c] Using a single hump amorphous X-ray curve and the method of Hermans and Weidinger (21), Lebedev and co-workers (22) (see also Ref. 17) report several commercial PVC crystallinites in the range 20–27%. In general, their method gives higher values than that of D'Amato and Strella (17).

From IR Measurements
Crystallinity from IR measurements deemed (by the authors) to be less accurate than NMR are in references 42, 44–46 and 56.

From Calorimetric Measurements (Unfractionated Polymers) (23)

M_n	T_{polym} (°C)	Crystallinity (%)
23,200	75	18.4
38,700	65	15.5
53,500	52	15.3
66,700	52	14.4
136,000	25	11.9
155,000	25	11.8

Crystallographic Data See under Unit Cell.

Density (g/cm^3)
Function of Polymerization Temperatures (16)

T_{polym} (°C)	M_n	Density (20°C)
90	23,750	1.391
55–60	75,000	1.391
50	91,250	1.392
20	172,250	1.393
− 15	106,300	1.416
− 75	105,300	1.431

Dependence on Thermal History (24)

History	Density (20°C)
Original state	1.3743
Quenched from 200°C in ice water	1.3656
Quenched from 130 to − 70°C	1.3716
Quenched from 130 to − 70°C and kept at RT for 6.5 h	1.3743
Annealed at 65°C for 136 h	1.3745
Annealed at 90°C for 136 h and slowly cooled	1.3834
Annealed at 90°C for 136 h and quenched to − 20°C	1.3817

Effect of Temperature on Density (25,38)

T (°C)	Density
20	1.392
51	1.383
82	1.368
90.6	1.362
97	1.357

Dielectric Properties (26)
Dielectric Constant (ε′)

	T (°C)								
	25	40	60	80	90	100	110	120	140
60 Hz	3.50	3.51	3.70	4.25	6.30	10.30	11.89	12.05	11.76
1 kHz	3.39	3.40	3.61	4.09	5.05	7.77	10.21	11.30	11.27
10 kHz	3.29	3.34	3.45	3.89	4.45	5.77	8.50	9.96	10.94

Dielectric Loss Factor (ε″)

	T (°C)								
	25	40	60	80	90	100	110	120	140
60 Hz	0.110	0.116	0.125	0.172	0.410	1.20	0.675	0.481	1.65
1 kHz	0.081	0.081	0.080	0.120	0.500	1.415	1.645	0.630	0.319
10 kHz	0.058	0.058	0.050	0.110	0.920	1.37	1.35	1.22	0.490

T_{polym} = 50°C; $[\eta]$ = 1.17; M_n = 66,700; M_w = 162,000. See also Ref. 27.

Dynamic Viscosity (122,134)

Elongation at Break (%) (28)

T_{polym} (°C)	Test temp. (°C)	$[\eta]^a$	Strain rate (s^{-1}) 0.0026	0.020	0.20	2.0	20	200
70	25	68	171.5	18.5	13.5	16.5	17.0	13.3
65	25	75	194.5	20.0	14.2	21.0	19.5	16.0
56	25	91.3	196.7	21.0	18.0	21.0	19.5	16.0
50	25	116.9	210.7	23.0	16.5	17.0	18.5	17.0
70	60	68		71.6	20.0	20.0	16.5	24.0
65	60	75.0		160	23.8	22.5	22.5	27.5
56	60	91.3		207	26.0	25.0	22.0	30.0
50	60	116.9		243	27.0	26.5	22.5	35.0
70	80	68			168	82	60	41
70	100	68				240	168	157

[a]Intrinsic viscosity (ml/g) in cyclohexanone, 30°C.

Enthalpy Entropy as a function of pressure and temperature. (29)

Fatigue (135,136)

First Normal Stress Difference (118,119,145)

Flory–Huggins Parameter See Polymer–Solvent Interaction Parameter.

Flow Activation Energy ΔE_γ (kJ/mol) (30,31,32,33,34)

Dependence on Temperature and Molecular Weight

T_{polym} (°C)	LVN[a]	ΔE_γ (kJ/mol) $10\,s^{-1}$	$100\,s^{-1}$	$1000\,s^{-1}$
5	0.131	–	150.7	134.9
5	0.693	92.1	119.7	60.2
5	0.909	165.5	103.1	54.2
5	1.750	43.4	30.5	30.4
40	0.640	178.4	102.8	54.0
40	0.682	157.4	105.2	45.0
40	1.225	108.6	57.7	34.6
70	0.495	147.7	97.0	52.4
70	0.680	126.9	84.3	43.6

[a]Limiting viscosity number in cyclohexanone, 30°C.

Dependence on Shear Rate

Shear rate (s^{-1})	>220°C	190–220°C	<190°C
0.3	95.6	363.7	152.4
3	–	244.8	145.7
30	–	159.6	121.7

Glass Transition Temperature See also corresponding chapter in this Handbook.

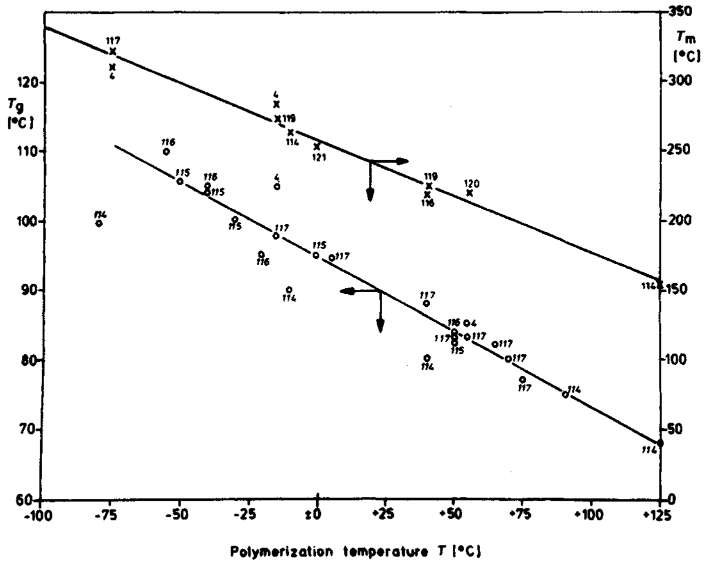
Effect of Pressure: dT_g/dP (°C/atm) 0.013 (35–38)

Effect on Molecular Weight and Polymerization Temperature (39)

T_{polym} (°C)	Intrinsic viscosity $[\eta]^a$ 50	75	100	125	150
70	78.5	82	83	83.5[b]	84.5[b]
50	80	84	85	86	86.5
40	81	85	87	88.5	89
30	84	87	89	89	90
20	85	88	90	90.5	91
5	86	91	93	94.5	95.5
– 15	92	87	100	101.5	102[b]

[a]In cyclohexanone, 30°C (ml/g).
[b]Extrapolated from experimental data.

Effect of Polymerization Temperature on T_g and T_m (numbers give Refs.).



The lines through the data points represent the best least squares fit of the collective authors' data.

Glass Transition Temperature cont'd
Dependence on Polymerization Temperature (47)

		T_g (°C)	
T_{polym} (°C)	[η] (ml/g)[a]	Initial	Final[b]
90		80	78
50	80	85	83
0	108	97	88
−20	103	100	90
−30	125	100	91
−40		101	90
−50		105	91
−60	90	107	95

[a] [η] measured at 25°C in cyclohexanone.
[b] After thermal cycling to 230°C. See also Ref. 48.

Heat Capacity See corresponding table in this Handbook and Refs. 49–52.

Effect of Thermal Cycle on C_P (47)

		ΔC_P (×10²) (J/g/°C)	
T_{polym} (°C)	[η] (ml/g)[a]	Initial	Final[b]
90		28.9	29.3
50	80	27.2	27.6
0	108	24.3	25.1
−20	103	15.1	22.2
−30	125	10.9	20.9
−40		10.5	20.1
−50			18.0
−60	90	6.3	16.3

[a] [η] measured at 25°C in cyclohexanone. [b] After heating to 140°C.

Heat of Combustion (kJ/kg) − 19000. (53)

Heat of Fusion (kJ/mol)

11.3	(41)
12.65	(54)
2.76	(55)
3.28 (most probable value according to Ref. 56)	(16)
3.56	(57)
3.91	(58)

Heat of Dilution 30°C PVC-tetrahydrofuran, PVC-cyclohexanone (23)

Heat of Polymerization (kJ/mol) −96 to −109 (59–61)

Huggins Coefficient (62)

Intrinsic Viscosity – Molecular Weight Relationship See corresponding chapter in this Handbook and Refs. 63–89.

Mark–Houwink Parameters for PVC as a Function of Temperature (115)

Solvent	Temp. range (°C)	*a*	*K* (ml/g)
Cyclohexanone	20–60	0.803	$1.847 \times 10^{-2} - 4.85 \times 10^{-5}\ T$
Cyclopentanone	20–60	0.861	$9.086 \times 10^{-5} - 1.55 \times 10^{-5}\ T$
THF	20–50	0.851	$1.087 \times 10^{-2} - 1.67 \times 10^{-5}\ T$

k-values can be calculated for any temperature *T* (°C) within the temperature range given.

Melt Viscosity See Appendix 1 and Refs. 31–34,118, 119,144.

Permeability See chapter "Permeability Coefficients, Diffusion Constants, and Solubility Coefficients of Polymers" in this Handbook, and Refs. 24,92,93–99.

Diffusion Constants in PVC

Gas	$\log_{10}D$ (cm²/s)	E_D (kJ/mol)
(A) GASES, AT 25°C (92)		
He	−5.5	20.7
H_2	−6.3	34.5
Ne	−6.6	31.5
N_2	−8.4	62.0
Ar	−8.9	51.5
O_2	−7.9	54.4
CO_2	−8.6	64.5
CH_4	−8.9	70.3
H_2O	−7.6	41.8
Kr	−9.4	62.8
(B) ORGANIC VAPORS, AT 30°C, LOW ACTIVITY (90)		
n-C_4H_{10}	−13.6	
n-C_5H_{12}	−13.9	81.6
n-C_6H_{14}	−14.9	
C_6H_6	−13.7	
CH_3OH	−10.4	
C_2H_5OH	−12.4	
n-C_3H_7OH	−13.2	
n-C_4H_9OH	−13.9	
CH_3Cl	−11.3	59.9
CCl_4	−17.1	108.4
C_2H_3Cl	−11.7	71.2
$(CH_3)_2CO$	−12.8	
SF_6	−16.1	100.0

Poisson Ratio 0.38. (100)

Polymer–Solvent Interaction Parameter See corresponding chapter in this Handbook and Refs. 68,101–114.

Refractive Index PVC ($\rho = 1.384\,g/cm^3$) (14)

Wave length (nm)	Refractive index
486.1	1.54806
589.3	1.54151
656.3	1.53843

Reciprocal dispersive power V_d	59.3
Critical angle ($\lambda = 589.3\,nm$)	56.23
Temperature coefficient of refractive index	0.0001142°/°C.

Specific Heat Capacity See chapter "Heat Capacity" in this Handbook, and Refs. 49,50.

Second Virial Coefficient See corresponding chapter in this Handbook and Refs. 43,77,84,116,117.

Shear Modulus (120–122,134)

Dynamic Test Results for Rigid PVC Formulation at Frequencies = 0.06–600 (rad/s) and at Temperatures 140–220°C[a]

	220°C		210°C		200°C		190°C	
ω (rad/s)	G' (Pa)	G'' (Pa)	G' (Pa)	G'' (Pa)	G' (Pa)	G'' (Pa)	G' (Pa)	G'' (Pa)
5.9749 E−2	3.669 E3	3.442 E3	1.256 E4	9.933 E3	3.205 E4	1.684 E4	6.882 E4	2.711 E4
9.4700 E−2	4.775 E3	4.472 E3	1.493 E4	1.096 E4	3.586 E4	1.827 E4	7.470 E4	2.782 E4
1.5008 E−1	6.028 E3	5.736 E3	1.813 E4	1.285 E4	4.153 E4	1.998 E4	7.971 E4	2.941 E4
2.3787 E−1	7.644 E3	7.047 E3	2.201 E4	1.468 E4	4.727 E4	2.245 E4	8.955 E4	3.137 E4
3.7700 E−1	1.012 E4	8.847 E3	2.732 E4	1.706 E4	5.594 E4	2.530 E4	1.011 E5	3.389 E4
5.9749 E−1	1.272 E4	1.096 E4	3.177 E4	1.999 E4	6.340 E4	2.771 E4	1.111 E4	3.598 E4
9.4700 E−1	1.606 E4	1.302 E4	3.859 E4	2.283 E4	7.154 E4	3.031 E4	1.238 E5	3.772 E4
1.5008 E0	1.976 E4	1.684 E4	4.488 E4	2.758 E4	7.935 E4	3.448 E4	1.304 E5	4.199 E4
2.3787 E0	2.506 E4	2.060 E4	5.404 E4	3.205 E4	9.033 E4	3.805 E4	1.440 E5	4.517 E4
3.7700 E0	3.109E4	2.477 E4	6.340 E4	3.645 E4	9.976 E4	4.147 E4	1.510 E5	4.817 E4
5.9749 E0	3.859 E4	3.031 E4	7.374 E4	4.309 E4	1.102 E5	4.859 E4	1.625 E5	5.432 E4
9.4700 E0	4.652 E4	3.645 E4	8.515 E4	4.838 E4	1.218 E5	5.204 E4	1.751 E5	5.526 E4
1.5008 E1	5.650 E4	4.001 E4	9.692 E4	5.166 E4	1.369 E5	5.391 E4	1.876 E5	5.885 E4
2.3787 E1	6.862 E4	4.549 E4	1.103 E5	5.638 E4	1.512 E5	5.885 E4	2.050 E5	6.013 E4
3.7700 E1	8.120 E4	5.219 E4	1.261 E5	6.142 E4	1.663 E5	6.413 E4	2.173 E5	6.552 E4
5.9749 E1	9.904 E4	5.885 E4	1.473 E5	6.810 E4	1.893 E5	7.108 E4	2.431 E5	7.293 E4
9.4700 E1	1.177 E5	6.552 E4	1.684 E5	7.139 E4	2.136 E5	7.618 E4	2.616 E5	7.957 E4
1.5008 E2	1.461 E5	7.293 E5	1.934 E5	7.947 E4	2.400 E5	8.587 E4	2.852 E5	8.369 E4
2.3787 E2	1.699 E5	8.475 E4	2.249 E5	9.039 E4	2.673 E5	9.435 E4	3.136 E5	9.848 E4
3.7700 E2	2.136 E5	9.848 E4	2.560 E5	1.028 E5	3.109 E5	1.073 E5	3.539 E5	1.120 E5
5.9749 E2	2.673 E5	1.189 E5	3.109 E5	1.236 E5	3.696 E5	1.444 E5	4.081 E5	1.594 E5

	178°C		170°C		160°C		140°C	
ω (rad/s)	G' (Pa)	G'' (Pa)	G' (Pa)	G'' (Pa)	G' (Pa)	G'' (Pa)	G' (Pa)	G'' (Pa)
5.9749 E−2	1.055 E5	3.137 E4	1.484 E5	3.724 E4	1.802 E5	3.971 E4	2.613 E5	4.236 E4
9.4700 E−2	1.150 E5	3.360 E4	1.625 E5	3.756 E4	1.850 E5	4.006 E4	2.658 E5	4.272 E4
1.5008 E−1	1.201 E5	3.507 E4	1.697 E5	3.821 E4	1.949 E5	4.058 E4	2.693 E5	4.291 E4
2.3787 E−1	1.352 E5	3.645 E4	1.834 E5	3.904 E4	2.124 E5	4.128 E4	2.751 E5	4.349 E4
3.7700 E−1	1.471 E5	3.821 E4	1.965 E5	4.075 E4	2.256 E5	4.291 E4	2.873 E5	4.537 E4
5.9749 E−1	1.570 E5	4.058 E4	2.078 E5	4.327 E4	2.386 E5	4.517 E4	3.000 E5	4.716 E4
9.4700 E−1	1.675 E5	4.199 E4	2.198 E5	4.365 E4	2.449 E5	4.615 E4	3.039 E5	4.903 E4
1.5008 E0	1.842 E5	4.615 E4	2.295 E5	4.817 E4	2.524 E5	5.051 E4	3.118 E5	5.283 E4
2.3787 E0	1.948 E5	4.817 E4	2.417 E5	5.029 E4	2.751 E5	5.386 E4	3.242 E5	5.621 E4
3.7700 E0	2.025 E5	5.226 E4	2.524 E5	5.456 E4	2.873 E5	5.744 E4	3.356 E5	5.940 E4
5.9749 E0	2.198 E5	5.769 E4	2.635 E5	6.021 E4	2.987 E5	6.205 E4	3.459 E5	6.357 E4
9.4700 E0	2.328 E5	5.844 E4	2.711 E5	6.506 E4	3.073 E5	6.703 E4	3.468 E5	6.829 E4
1.5008 E1	2.452 E5	6.217 E4	2.816 E5	6.523 E4	3.177 E5	6.865 E4	3.601 E5	6.939 E4
2.3787 E1	2.662 E5	6.552 E4	3.030 E5	6.987 E4	3.361 E5	7.169 E4	3.809 E5	7.293 E4
3.7700 E1	2.791 E5	7.139 E4	3.177 E5	7.452 E4	3.434 E5	7.712 E4	3.943 E5	7.959 E4
5.9749 E1	3.069 E5	7.613 E4	3.434 E5	7.947 E4	3.776 E5	8.293 E4	4.170 E5	8.587 E4
9.4700 E1	3.177 E5	8.296 E4	3.617 E5	8.585 E4	4.029 E5	9.049 E4	4.488 E5	9.354 E4
1.5008 E2	3.464 E5	8.848 E4	3.977 E5	9.039 E4	4.298 E5	9.517 E4	4.893 E5	9.899 E4
2.3787 E2	3.744 E5	1.015 E5	4.261 E5	1.028 E5	4.606 E5	1.079 E5	5.321 E5	1.111 E5
3.7700 E2	4.117 E5	1.144 E5	4.586 E5	1.199 E5	–	–	–	–
5.9749 E2	–	–	–	–	–	–	–	–

[a]Storage, G', and Loss, G'', are in Pascal. Data from L. A. Utracki, SPE Techn. Papers **31**, 1024 (1985); J. Vinyl. Technol. **7** (4), 150 (1985). M_w of PVC tested is 90.700 (GPC in THF), LVN 30°C in 93 ml/g cyclohexanone.

Specific Refractive Index Increment See corresponding chapter in this Handbook.

Specific Volume
As a function of temperature and pressure. (29)

Spectral Data
a. Infrared absorption bands. (123)
b. Nuclear magnetic resonance (high resolution spectra). (124–126)
c. Carbon-13 magnetic resonance (chemical shift assignment) (127–129)

Stress Optical Coefficient (soc)
−200 to +50 −6.5 (132,133)

The value of the SOC becomes positive at T_g, but there is some arbitrariness associated with it because above T_g the plots of birefringence change with stress and have an S shape.

Tacticity (Fraction of syndiotactic dyads)
Dependence on Polymerization Temperature[a]

T_{polym} (°C)	Tacticity[b]	Refs.
55	0.55	130
50	0.55[c]	129
25	0.57	130
0	0.60	130
−30	0.64	130
−50	0.66	130
−76	0.68	130

[a]Data based on ^{13}C NMR measurements.
[b]High tacticity data may be low due to insolubility during measurement as discussed in Ref. 131.
[c]Bernoullian order.

Tensile Modulus (MPa) = (N/mm^2)

T (°C)	Value	Refs.
−196°C	7584	137[a]
−120°C	5171	137
−75°C	3861	137
20°C	2964	137
30°C	3000	14[b]
40°C	2930	14
50°C	2427	14
60°C	1551	14
70°C	276	14

[a]Stress–Strain measurements at strain rate of 0.00250 s^{-1}.
[b]Measured in creep (100 s, 0.2% strain).

Thermal Conductivity (W/m/K) (138,140)

T (°C)	Thermal conductivity
−170	0.129
−150	0.134
−125	0.139
−100	0.144
−75	0.148
−50	0.152
−25	0.155
0	0.158
20	0.160
30	0.161
40	0.162
50	0.163
60	0.164
70	0.164
80	0.165
90	0.165
100	0.165

Thermal conductivity of system PVC/di-2-ethylhexyl phthalte (see Ref. 139).

Molecular weight, sample polymerization temperature and syndiotactivity do not influence the thermal conductivity of polymers appreciably, except in the case where tacticity leads to crystallization.

Thermal Diffusivity (140)

T (K)	Density (g/cm^3)	Thermal diffusivity (×10^{-4}) (cm^2/s)
200	1.417	14.40
220	1.415	13.95
240	1.413	13.46
260	1.409	12.96
273	1.407	12.60
280	1.405	12.42
293	1.402	11.92
300	1.400	11.83
320	1.393	11.13
340	1.385	10.14
352	1.379	9.22
360	1.374	8.41
380	1.334	7.65
400	1.306	7.30
420	–	7.13
440	–	7.04
460	–	6.99
480	–	7.06

Unit Cell

PVC sample type	Crystal system	Space group	Unit cell parameters (Å) a	b	c	Monomers per unit cell	Calc. density (g/cm^3)	Refs.
Commercial, polymerized at 50–60°C	Orthorhombic	Pacm	10.6	5.40	5.10	2	1.44	19
Solution blended high molecular weight, low crystallinity commercial polymer and low molecular weight, high crystallinity polymer	Orthorhombic	Pacm	10.4	5.30	5.10	2	1.48	141
Single crystals, polymerized at −75°C	Orthorhombic		10.32[a]	5.32[a]	–	–	(1.49)[b]	142
Single crystals, low molecular weight, polymer made in *n*-butyraldehyde	Orthorhombic	Pacm	10.24	5.24	5.08	2	1.53	143

[a]Calculated from published *d*-spacings of major diffraction peaks.
[b]Calculated density assuming $c = 5.10$ (Å) and 2 monomers per unit cell.

Unperturbed Dimensions See corresponding chapter in this Handbook.

Viscosity–Molecular Weight Relationship See Intrinsic Viscosity.

Zero Shear Viscosity (34)

APPENDIX 1: APPARENT MELT VISCOSITY OF UNMODIFIED PVC[a] PREPARED AT VARIOUS POLYMERIZATION TEMPERATURES[b] (PAS) ($\times 10^4$)

T_{polym} (°C)	L.V.N.[c] (ml/g)	Melt temp. (°C)	Shear rate (s^{-1}) 2.95	7.37	14.7	29.5	73.7	147	295	737	1470	2950
110	30.5	190	–	–	–	1.18	0.72	0.82	0.77	0.61	0.52	0.40
110	30.5	205	–	–	–	0.63	0.39	0.48	0.30	0.22	0.21	0.20
70[d]	40.1	140	1128.3	573.1	340.7	202	97.85	54.6	30.0	13.3	6.41	3.08
70	40.1	150	639.83	332.2	200.6	120.8	60.5	35.6	20.44	9.45	4.91	2.47
70	40.1	160	281.4	153.9	97.1	62.4	34.4	21.8	13.41	6.56	3.74	20.4
70	40.1	170	100.9	62.08	42.2	28.7	16.9	11.35	7.65	4.37	2.72	1.62
70	40.1	180	32.12	21.2	15.5	11.42	7.85	5.78	4.38	2.80	1.94	1.27
70	40.1	190	11.95	7.22	5.94	5.15	4.03	3.24	2.65	1.87	1.35	0.95
70	40.1	200	9.03	3.82	2.02	1.86	2.02	1.92	1.4	1.21	0.95	0.68
70	40.1	210	–	5.31	2.71	1.38	0.89	1.02	0.935	0.775	0.65	0.504
70[e]	49.5	140	2336.4	1209.8	721.6	423.5	191.6	102.1	51.11	20.2	9.29	4.24
70	49.5	150	1433.6	711.03	424.5	223.0	119.92	64.7	34.5	15.2	7.43	3.50
70	49.5	160	839.9	431.9	258.9	155.3	76.6	43.8	24.2	10.72	5.47	2.71
70	49.5	170	398.4	231.5	142.9	89.6	47.8	29.1	17.2	8.14	4.43	2.32
70	49.5	180	146.6	91.9	58.7	43.2	26.1	17.3	11.2	5.92	3.49	1.98
70	49.5	190	55.34	34.3	25.5	19.4	13.4	9.75	6.58	3.99	2.56	1.52
70	49.5	200	22.1	13.7	11.3	9.5	7.36	5.87	4.48	2.95	2.02	1.33
70	49.5	210	12.7	7.53	5.54	4.54	3.99	3.43	2.82	2.06	1.5	1.04
70	54.8	210	16.23	8.66	8.12	7.31	6.71	5.74	4.71	2.94	20.3	1.31
70	54.8	220	–	–	–	5.26	4.29	3.82	3.24	2.39	1.72	1.18
70	68	160	2464.2	1172.2	705.5	389.9	173.66	89.55	45.76	17.69	8.47	4.01
70	68	170	1196.9	599.14	359.27	218.53	113.21	64.04	34.39	14.44	7.16	3.49
70	68	180	562.8	320.5	205.9	125.6	64.7	37.7	21.8	10.3	5.52	2.92
70	68	190	244.2	144.9	100.8	69.8	40.1	25.5	15.5	7.75	4.40	2.44
70	68	200	94.2	62.1	46.6	35.0	23.7	16.6	11.0	5.94	3.55	2.07
70	68	210	48.1	29.5	23.5	19.6	14.6	11.1	8.02	4.68	2.92	1.73
70	68	220	19.4	15.5	13.2	11.7	9.34	7.51	5.71	3.62	2.51	1.57
65	75.4	180	976.7	522.7	318.4	195.6	103.5	58.7	31.26	13.3	6.87	3.46
65	75.4	190	545.1	254.7	158.9	101	53.6	31.9	19.0	9.25	5.01	2.63
65	75.4	200	271.1	128.5	85.3	59.8	36.3	23.1	14.2	7.2	4.15	2.32
65	75.4	210	95.6	56.7	43.7	33.1	22.1	15.7	10.5	5.53	3.36	2.02
65	75.4	220	52.6	33.2	25.9	21.4	14.9	10.96	7.75	4.49	2.73	1.64
65	86	180	930	448.5	273.3	198	84	45.1	23.22	9.77	4.92	2.46
65	86	190	686.2	381	243.6	148	82	48.1	25.5	11.1	5.7	2.93

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T_{polym} (°C)	L.V.N.[c] (ml/g)	Melt temp. (°C)	Shear rate (s^{-1}) 2.95	7.37	14.7	29.5	73.7	147	295	737	1470	2950
65	86	200	229.5	138.7	100.6	67.75	38.75	34.02	13.67	6.77	3.77	2.01
65	86	210	163.9	94.96	71.05	53.3	33.1	21.4	13.5	7.23	4.37	2.47
65	86	220	–	–	–	26.25	17.13	11.8	7.88	4.22	2.56	1.56
65	91.3	180	1898.2	902.1	573.1	292.0	124.2	65.3	35.7	14.86	7.43	3.66
56	91.3	190	1139.9	584.7	373.8	250.4	113.5	60.1	31.5	13.5	6.87	3.53
56	91.3	200	857.7	350	207.1	130	74	43.3	23.4	10.2	5.45	2.85
56	91.3	210	286.9	155.0	112.0	79.2	45.7	28.5	18.7	9.08	4.81	2.54
56	91.3	220	154.9	90.8	55.9	49.5	31.3	18.5	13.1	7.21	4.27	2.37
56	91.3	230	92.7	60.5	48.7	37.7	24.6	17.0	11.1	6.0	3.98	2.48
56	91.3	240	82.3	11.9	54.7	44.6	31.0	24.1	20.1	10.0	6.367	3.611
50	116.9	180	1884	933.9	562.5	304	126.3	67.12	36.11	14.86	7.32	3.39
50	116.9	185	1452.2	730.1	464.3	284.1	126.8	66.1	34.25	14.22	7.0	3.4
50	116.9	190	1062	633.6	398	251.7	116.2	59.96	30.8	13.16	6.58	3.24
50	116.9	200	783.2	410.7	257.4	177.9	87.02	45.1	24.03	10.61	5.57	2.92
50	116.9	205	584.1	318.4	209.6	131.4	78.9	43.5	22.83	9.87	5.25	2.79
50	116.9	210	424.8	226.0	156.0	105.1	59.43	39.3	21.64	9.29	4.93	2.60
50	116.9	220	265.5	147.5	106.12	75.4	44.4	28.02	18.8	8.49	4.62	2.51
50	116.9	230	–	132.9	79.7	58.1	36.0	23.2	14.7	8.34	4.67	2.57
42	147.2	190	1878.6	897.0	537.1	276.7	113.5	58.4	31.8	13.3	6.36	3.04
42	147.2	200	1626.9	703.2	420.8	252.1	108.5	55.9	28.2	12.3	6.15	3.07
42	147.2	210	1352.7	567.6	319.7	206.3	93.3	48.9	25.3	10.7	5.52	2.77
42	147.2	220	968.4	415.3	231.5	142.5	73.5	39.9	21.2	9.19	4.93	2.85
42	147.2	230	–	299	164.5	106.2	60.2	35.2	19.0	8.44	4.55	2.48
42	147.2	240	–	243.6	199.3	157.7	89.7	53.2	33.5	–	–	–
40	122.5	190	2041.3	867.8	511.0	285.6	117.9	58.5	29.2	12.7	6.45	3.14
40	122.5	200	1162	–	323	–	80.8	41.5	21.0	9.09	–	–
40	122.5	205	445.4	244.5	170.5	111.5	64.4	36.6	19.4	8.35	4.37	2.25
40	122.5	210	–	–	–	98.4	53.5	28.7	14.76	6.28	3.28	1.72
40	122.5	215	338.8	185.6	133.4	94.0	53	35.7	20.2	8.73	4.56	2.39
28	208	190	2050.0	916.5	543.5	284.9	117.8	63.7	33.55	14.92	7.25	3.35
28	208	200	1658.7	740.6	452.3	239.6	102.8	52.2	27.4	11.94	6.07	2.87
28	208	210	1104.9	493.4	282.4	167.7	85.5	46.9	25.03	10.44	5.33	2.66
28	208	220	665.6	332.5	214.7	138.4	69.3	39.5	22.1	9.96	5.33	2.73
25	240.5	200	1513.3	647.4	387.4	223.0	94.98	49.08	26.55	11.67	5.84	2.81
25	240.5	210	1503	603	343	200	90.2	46.6	23.5	10.4	5.4	2.7
25	240.5	215	1340.7	562.5	311.5	180	80.44	41.76	21.4	9.49	5.2	2.6
25	240.5	220	1355.7	572.6	332.2	190.9	83.3	43.9	22.5	9.63	5.07	2.57
25	240.5	225	958.4	421.3	250.9	159.3	75.35	40.33	21.03	9.23	4.92	2.60
25	240.5	230	–	409.8	222.0	136.1	67.7	37.5	19.7	8.86	4.62	2.46
25	240.5	240	–	426.4	223.2	132.3	64.2	36.5	20.2	8.53	4.52	2.53

[a]Ref. original data, E. A. Collins, unpublished.
[b]Melt viscosity data obtained using a capillary having a 90° entrance angle, length 1.0 in and diameter 0.05 in. No correction applied to the data. All samples contained 2.5 parts dibutyltin dioctylthioglycolate stabilizer per 100 parts resin.
[c]Limiting viscosity number, determined in cyclohexanone 30°C.
[d]Modified with 5 parts trichloroethylene/100 parts vinyl chloride monomer.
[e]Modified with 3 parts trichloroethylene/100 parts vinyl chloride monomer.

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Physical Constants of Poly(vinyl acetate)

M. K. Lindemann
Consultant, Greenville, SC, USA

Property	Value	Remarks	Refs.
Absorption of Water (%)	Approx. 3–6	At 20°C for 24 to 144 h	26
	4	At 23°C	65,66
	6	At 70°C	
Adhesive Strength			
Lap shear (Mpa)	3.9	Aluminum	130
Peel strength (N/cm)	1.9	Aluminum	
Chain Dimensions and Entanglement Spacings	See Refs.		144–146
Cohesive Energy (J/mol)	26000–36000		52
Cohesive Energy Density (J/cm^3)	3.69×10^2		58
Compressibility ($cm^3/g/atm$)	1.8×10^{-5}	In the glassy state	1
Isothermal (bar^{-1}) ($\times 10^{-5}$)			
At 80°C	6.2		113
At 100°C	6.6		
At 120°C	7.1		
Decomposition Temperature (°C)	150		15
Degradation, Thermal	$T^{1/2} = 269°C$; $E_{act} = 71$ kJ/mol; monomer yield: none	Temperature at which the polymer loses 50% of its weight, if heated in vacuum for 30 min	52
Density (Mg/m^3) $\equiv$ (g/cm^3)			
At 20°C	1.191		16,24,26
At 25°C	1.19		
At 50°C	1.17		
At 120°C	1.11		
At 200°C	1.05		
At the melting point	1.28		58
At $T = 35$–$100°C$	$1.2124 - 8.62 \times 10^{-4}\, T + 0.223 \times 10^{-6}\, T^2$		113
At $T = -30$ to $+20°C$	$1.196 - 3.37 \times 10^{-4}\, T$		113
As a function of pressure	See Refs.		113,114,115
Dielectric Constant	3.5	At 50°C and 2×10^3 kHz	34
	8.3	At 150°C and 2×10^3 kHz	
Of oligo PVAC	See Ref.		59
As a function of MW	See Ref.		96
Dielectric Dissipation Factor ($\tan \delta$)	1.5×10^2	At 50°C and 2×10^3 kHz	34
	26×10^2	At 120°C and 2×10^3 kHz	
Dielectric Loss Versus Frequency	See Ref.	At various temperatures	95
Dielectric Strength (V/cm) ($\times 10^{-3}$)	394	At 30°C	16
	307	At 60°C	

Property	Value	Remarks	Refs.
Dielectric Relaxation Parameters	See Refs.		121–129
Dipole Moment (ESU (per monomer unit))	2.3×10^{-18}	At 20°C	22,23
	1.77×10^{-18}	At 150°C	
(debye units)	4.8 D	For oligo PVAC, $n = 5$	59
Dynamic Mechanical Loss Peak (°C)	70	At 100 Hz	33
Elongation At Break (%)	10–20	At 20°C, %RH	27
Gas Diffusivity	See Ref.	For N_2, O_2, CO_2, H_2	52
Gas Permeability	See Refs.	Diffusion and sorption of CO_2 (below and above T_g)	53,94
N_2 for PVAC below T_g(cm^2/s/bar)	6×10^{-10}		52
N_2 for PVAC above T_g	5×10^{-10}		
O_2, 73°dry film	2.7×10^{-9}		100
Gas Solubility (cm^3(STP)/cm^3 bar)	N_2 0.02	At 298 K	52
	O_2 0.04		
	H_2 0.023		
Gel Permeation Chromatography	See Refs.	Universal calibration	90,91,92
Gel Properties			
Swelling pressure, elastic modulus and shear modulus parameters of PVAC networks in toluene and acetone	See Ref.		166
Glass Transition Temperature (°C)	28–31		25
	25.8	Isotactic PVAC $M_n \sim 10^5$	63
	31.4	Atactic PVAC $M_n \sim 1.66 \times 10^5$	
	23.6	Atactic PVAC $M_n \sim 3922$	
	34–39	Dry	65
	<30	Wet	
	11	PVAC containing 4.20% water	66
Pressure dependence (K/bar)	0.022		18
As a function of MW	See Refs.		62,64
Activation energy for the glass transition (J/mol)	$\Delta H_a = 1.8 \times 10^5$		60
Hardness (Shore units)	L 80–85	At 20°C	27
Heat Capacity (kJ/kg)	1.465	At 30°C	21
	$C_{p(liquid)} = 1.77$	At $T_g = 304$ K	67
	$C_{p(glass)} = 1.27$		
	0.116	$\Delta C_p = C_{p(liquid)} - C_{p(glass)}$	68
	$C_{v(liquid)} = 1.51$	At $T_g = 304$ K	
	$C_{v(glass)} = 1.20$		
At $T = 320$ K	$C_{p(liquid)} = 1.8409$ (kJ/kg); 158.48 (J/mol/K)		14,147
At $T = 370$ K	$C_{p(liquid)} = 1.898$ (kJ/kg); 163.37 (J/mol/K)		
At $T = 80$ K	$C_{p(glass)} = 0.323$ (kJ/kg); 27.81 (J/mol/K); 53.7 (ΔC_p, J/mol/K)		
At $T = 300$ K	$C_{p(glass)} = 1.183$ (kJ/kg); 101.86(J/mol/K)		
Heat Conductivity (J/s/m/K)	0.159		52
Heat Distortion Point (°C)	50		16
Heat of Polymerization (kJ/mol)	87.5		31,32
Index of Refraction (n_D)			28
At 20°C	1.5013	At 6563 Å	104,105
At 20°C	1.5100	At 4861 Å	
At 20°C	1.5174		
At 20°C, medium acetate type	1.4903		
At 20°C, low acetate type	1.523–1.57		

Property	Value	Remarks	Refs.
At 20°C, molding compound	1.4685		
At 20.7°C	1.4669		
At 30.8°C	1.4657		
At 52.1°C	1.4600		
At 52.1°C	1.4600		
At 80°C	1.4480		
At 142°C	1.4317		
Spec. refraction index increment in various solvents	See Ref.	(d_n/d_c)	52
Infrared Spectrum	Important bands (cm^{-1}): 606, 950, 1025, 1250, 1740, 2850, 2865, 2923, 2932, 2950		39,102,131,132 133
Temperature dependence of IR bands at 100–20°C	See Ref.		69
At very low temperature	See Ref.		70
Interfacial Tension (mN/m)	$\gamma_c = 37$		120
	14.5	At 20°C, with polyethylene	9
	8.4	At 20°C, with poly(dimethylsiloxane)	11
	9.9	At 20°C, with polyisobutene	9
	4.2	At 20°C, with polystyrene	11
	10.5	With polyethylene	101
	11.0	Linear PVAC with polyethylene	101
	9.8	Branched PVAC with polyethylene	101
Internal Pressure (J/m)			
At 0 °C	2.554×10^8		6,29,30
At 20 °C	2.847×10^8		
At 28 °C	3.978×10^8		
At 40 °C	4.313×10^8		
At 60 °C	4.187×10^8		
Intrinsic Viscosity – Molecular Weight Relationship	See corresponding table in this Handbook and also Refs.		40–51,77 136–139
From moderately conc. solutions	See Ref.		73
In 6-methyl-3-heptanone, at 66°C	$[\eta] = 0.078 \times M^{1/2}$		74
In 3-heptanone, at 26.8°C	$[\eta] = 0.082 \times M^{1/2}$		
At Θ temperature, methanol, 6°C	$[\eta] = 0.101 \times M^{1/2}$		134,135
Mechanical Properties			
Modulus of elasticity (MPa) ≡ (N/mm^2)	1274–2255	ASTM-D256	27
Rubbery shear modulus (N/mm^2)	13		52
Notched impact strength (cm kg/cm^2)	>100		27
Molar Volume At 25°C (cm^3/mol)	74.25		99
Nuclear Magnetic Resonance Spectra	See Refs.		36,81,82
Shift with Eu and Pr reagents, improved resolution	See Ref.		78
Solvent and temperature effects	See Ref.		79
Conformational information	See Ref.	Syndiotactic PVAC	80
Optical Configuration Parameters ($\Delta\alpha$) ($Å^3$)			
Acetone	−20	Wavelength of 6328 Å	106
Benzene	4.0–5.9		107
Bromobenzene	9.4		108
Bromoform	−20		106
Carbon tetrachloride	−16		107
Carbon tetrachloride	−26		109
Chlorobenzene	14		107
Chloroform	−34.9		109
Chloroform	−24		107
Cyclohexane	−23		107
Dichloroethane	−36		107
Dichloroethane	−39		107
Tetrabromoethane	−25		107

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Property	Value	Remarks	Refs.
Tetrabromoethane	− 33		106
Toluene	10		107
Toluene	13.5		112
Toluene	19		109
o-Xylene	2.0		107
Chloroform	81		107
Chloroform	− 2.68	Temp. 50°C; $v^2 = 1.0^a$	110,111
1,3,5-Triethylbenzene	− 1.90	Temp. 50°C ; $v^2 = 0.6^a$	110,111
λ-Radiation Effect			
Yields of crosslinking	0.3	Oxygen atmosphere	164
	0.15	Nitrogen atmosphere	
Yields of scission	0.07	Oxygen atmosphere	165
	0.06	Nitrogen atmosphere	
Raman Spectra	See Ref.		37
Softening Temperature (°C)	35–50		7
Solubility	See Ref.	Solvent–polymer activity in ethyl acetate, acetone, benzene	93
	See Refs.	In many solvents	54,57
Solubility Parameter (δ(MPa)$^{1/2}$)	18.6–19.9		2,3,4,5
At 25°C	21.07		56, 140
At 50°C	19.4		55
At 125°C	17.9		57
δ_d	19.0	Dispersion forces contribution	52,141
δ_p	10.2	Polar forces contribution	
δ_h	8.2	Hydrogen bonding contribution	
δ	23.1	Total $\delta^2 = \delta_d^2 + \delta_p^2 + \delta_h^2$	
Solution Properties	See Ref.		35
Unperturbed radius of gyration (Å^2 mol/g)	$Q = 0.107$	Linear PVAC	83
Viscosity	Log $\eta_0 = \log K + \alpha \log c = \beta \log M$, where $\log K = -28.518$, $\alpha = 5.599$, and $\beta = 3.411$	Diethyl phthalate solution	84
η_{spec} in various solvents	See Ref.	At $c = 5$–$40g/100$ cc	89
Huggins constant, K_H	Acetone 0.37		52
	Chlorobenzene 0.41		
	Chloroform 0.34		
	Methanol 0.47		
	Toluene 0.50		
	Benzene 0.37		
	Dioxane 0.34		

Solvent Interaction Parameters

Solvent	Temp. (°C)	Volume fraction, ϕ_2	Interaction parameter, χ	Refs.
Acetaldehyde	125–140	1	0.35–0.32	150
Acetone	25–29	0	0.40	151–153
	30–40	0.8	0.34	154
	30–50	1	0.31–0.39	154
	100–140	1	0.32–0.21	148,150
Acetonitrile	125–140	1	0.54–0.49	150
Allyl chloride	40	1	0.27	154
Benzene	5	0.2	0.46	155
	20	0	0.42	162
	30	0.4–0.8	0.45–0.29	156
	35–62	0	0.51–0.42	157
	30–50	1	0.30–0.26	154
	80–140	1	0.44–0.25	148,150,158
	125–145	1	0.37–0.32	149,159,160
n-Butane	100	1	1.97	148
2-Butanol	135	1	0.31	159
2-Butanone	10–45	0	0.43	151
	100–140	1	0.34–0.20	148,150

Solvent	Temp. (°C)	Volume fraction, ϕ_2	Interaction parameter, χ	Refs.
Butyl acetate	100	1	0.51	148
Butylbenzene	125–145	1	0.95–0.88	160
Butylcyclohexane	125–145	1	1.90–1.75	160
Carbon tetrachloride	90–135	1	0.85–0.63	148,149,158
Chlorobenzene	100–135	1	0.28–0.33	148,149
1-Chlorobutane	100–135	1	0.73–0.66	148,149
Chloroform	80–135	1	20.17–20.09	148,149,158
Chloromethane	100	1	0.25	148
1-Chloropentane	100	1	0.82	148
1-Chloropropane	40	1	0.75	154
Cycloheptane	100	1	1.63	148
Cyclohexane	100–140	1	1.65–1.16	148,149,150,158,160
Cyclohexene	100	1	1.18	148
Cyclohexanol	135	1	0.44	149,159
Cyclooctane	100	1	1.67	148
Cyclopentane	100	1	1.53	148
cis-Decahydronaphthalene	125–145	1	1.65–1.50	160
n-Decane	100–145	1	2.5–2.01	148,149,159,160
1-Decanol	135	1	0.81	159
1,1-Dichloroethane	100	1	0.19	148
1,2-Dichloroethane	100–140	1	20.04–0.00	148,150
Dichloromethane	100	1	20.14	148
Dimethylphthalate	25	0	0.400	151
1,4-Dioxane	25	0	0.407	151
	100–140	1	0.17–0.03	148,150
n-Dodecane	125–145	1	2.48–2.27	159,160
Ethanol	50	0	0.47	157
	100	1	0.80	148
Ethyl acetate	20	0	0.415	162
	100	1	0.36	148
Ethylbenzene	100–135	1	0.66–0.58	148,159
n-Heptane	100–120	1	2.14–1.63	148,150,158
1-Heptanol	135	1	0.55	159
n-Hexadecane	135	1	2.99	159
n-Hexane	100–120	1	2.06–1.71	148,158
1-Hexanol	135	1	0.49	159
Isopropylamine	40	1	0.66	154
Methanol	125–140	1	0.77–0.73	150
Methyl acetate	100	1	0.30	148
2-Methyl-2-propanol	135	1	0.30	159
Nitroethane	125–140	1	0.14–0.19	150
n-Nonane	100–145	1	2.38–1.88	148,149,159,160
n-Octane	90–120	1	2.3–1.94	148,158
1-Octanol	135	1	0.65	159
1-Octene	135	1	1.55	149
n-Pentane	100	1	2.06	148
1-Pentanol	100–135	1	0.59–0.41	148,159
2-Pentanone	135	1	0.38	149
Propane	100	1	3.2	148
1-Propanol	30–50	1	1.3–1.0	154
	100–135	1	0.64–0.38	148,159
2-Propanol	125–140	1	0.44–0.35	150,159
Propyl acetate	100	1	0.42	148
Propylamine	40	1	0.61	154
n-Tetradecane	135	1	2.70	159
Tetrahydrofuran	100–140	1	0.30–0.14	148,150
1,2,3,4-Tetrahydronaphthalene	125–145	1	0.83–0.77	160
3,3,4,4-Tetramethylhexane	125–145	1	1.72–1.56	160
Toluene	80–140	1	0.56–0.40	148,150,158,159
1,1,1-Trichloroethane	100	1	0.49	148
Trichloroethylene	100	1	0.40	148
1,2,3-Trichloropropane	15–50	0	0.38	151
2,2,4-Trimethylpentane	100–120	1	2.17–1.86	158
n-Undecane	100–145	1	2.7–2.14	148,159,160
Vinyl acetate	30	0.4–0.8	0.41–0.22	156
Water	40	1	2.5	161

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Property	Value	Remarks	Refs.
Specific Heat	See also Heat Capacity		
Conformational (dE_{cont}/dT)	1.3	Syndiotactic	85
	1.8	Isotactic	
Softening Point			
As a function of MW	See Refs.		116,117,118
Specific Volume (l/kg)	$0.823 + 6.4 \times 10^{-4} \times T$	$T = 100–200°C$	9,13
	0.84	At T_g	19,61
	1.073	Monomer	77
	0.841	Polymer	
(l/mol)	0.08774	One mole repeating unit	103
Stress Relaxation Curves	See Ref.	22–61.8°C	20,97
Surface Resistance (Ω/cm)	5×10^{-11}		15
Surface Tension (mN/m)			9,10,11,12,86
At 20°C	36.5		
At 140°C	28.6		
At 180°C	25.9		
At 150°C	27.9		58,87,101
	$-d_\gamma/dT = 0.066$ (mN/m)		58,119
	$\gamma_{ds} = 27.4 \pm 0.1$	Dispersive	85
	$\gamma_{ds} = 15.4 \pm 0.7$	Polar	
	$\gamma_{solid} = 42.85 \pm 0.8$	Total	
Tensile Strength (MPa) ≡ (N/mm^2)	29.4–49.0	At 20°C	16
	See Table in Ref.		96
Thermal Conductivity (W/m/K)	0.159		16
Pressure and temperature dependence	See Ref.		88
	0.159		116
Thermal Expansion Coefficient (K^{-1})			
At 0 °C	2.8×10^{-4}		113
At 20 °C	2.8×10^{-4}		
At 40 °C	7.13×10^{-4}		
At 60 °C	7.17×10^{-4}		
At 80 °C	7.20×10^{-4}		
At 100 °C	7.23×10^{-4}		
Cubic	6.7×10^{-4}		15,25
Linear above T_g	22×10^{-5}		17,27
Below T_g	7×10^{-5}		

Theta Temperatures

Polymer	M_w ($\times 10^{-4}$)	Dispersity	Solvent (M_w/M_n)	Θ Temp. (°C)	K_Θ ($\times 10^4$) [dl/g (g mol wt)$^{-1/2}$]	Refs.
Poly(vinyl acetate) Linear	87–346		Methyl isopropyl ketone/n-heptane (73.2/26.8)	25		151
	2.7–126.8	2.0	n-heptane/methyl isopropyl ketone (27.3/72.7)	30	9.2	152
	4.1–83		Ethyl n-butyl ketone	29	9.29	153
			Ethyl isoamyl ketone	66	8.20	
	0.35–150	1.02–1.05	Methanol	6	10.1	154
	3.0–32		Ethyl n-butyl ketone	29	9.55	155
			Carbon tetrachloride	46.4		
			Ethanol	19		163
			3-Heptanone	29		
	0.8–130		Cetyl alcohol	123	5.37	156
Branched			Ethanol	12–15		163
			3-Heptanone	26		

Property	Value	Remarks	Refs.
Ultraviolet Radiation λ(nm)			
Absorption, cut-off	240		142
Quantum yields (mol/Einstein)			
(in air) at $\lambda = 254$			143
Acetic acid formation	0.01		
Carbon dioxide formation	0.0065		
Carbon monoxide formation	0.0069		
Methane formation	0.0038		
Chain scission	0.05 (in air), 0.066 (in nitrogen)		
Crosslinking	0.0025 (in air), 0.047 (in nitrogen)		
Ultraviolet Spectra	See Ref.		30,38
Young's Modulus (MPa) ≡ (N/mm^2)	600	At 25°C and 50% RH	8
Viscoelastic Response	See Refs.		167–171
X-Ray Diffraction	See Ref.	Wide angle	98

[a] Polymer volume fraction.

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Physical Constants of Poly(methyl methacrylate)*

W. Wunderlich
RÖHM GmbH, Darmstadt, FR Germany

Property	Value	Remarks	Refs.
Birefringence $(\alpha_1 - \alpha_2)$ (cm^3)			
Segmental anisotropy	2×10^{-25}	Benzene	1
	20×10^{-25}	Benzene, isotactic	
Ceiling Temperature (K)	478		47
Coefficient of Thermal Expansion (K^{-1})			
Linear	7×10^{-5}	0–50°C	2
Volume	2.60×10^{-4}	$<T_g$	3
	2.55×10^{-4}	$<T_g$	4
	2.72×10^{-4}	$<T_g$	5
	2.25×10^{-4}	$<T_g$	6
	5.80×10^{-4}	$>T_g$	3
	5.60×10^{-4}	$>T_g$	4
	5.80×10^{-4}	$>T_g$	5
	5.75×10^{-4}	$>T_g$	6
Compressibility (MPa^{-1}) ($\times10^6$)			
	245	$T = 20°C$	7
	290	60°C	7
	355	100°C	7
	390	109.3°C	7
	500	119.8°C	7
	530	129.7°C	7
	561	150°C	8
	644	200°C	8
Density (mg/m^3) ≡ (g/cm^3)	1.195	0°C	9
	1.190	20°C	10
	1.188	25°C	11
	1.150	T_g	12
Diffusion O_2 in PMMA (cm^2/s) ($\times 10^8$)	0.5	0.21 bar, 25°C	13
	1.0	0.4 bar, 25°C	13
	1.4	1 bar, 25°C	13
	3.8	1 bar, 20°C	14
H_2O in PMMA (g cm/cm^2/h)	5.2	Permeability	15
Dielectric Constant	3.6	50 Hz, 25°C	16
	3.0	1 KHz, 25°C	16
	2.6	1 MHz, 25°C	16
	2.57	30 GHz, 25°C	17,18
	2.59	138 GHz, 25°C	18
Dissipation Factor (tan δ)	0.062	50 Hz, 25°C	16
	0.055	1 KHz, 25°C	16
	0.014	1 MHz, 25°C	16
	0.007	30 GHz, 25°C	17,18
	0.010	138 GHz, 25°C	18
Elongation at Break (%)	4	$10^5 \leq M_w \leq 2\times10^5$	48
	5.5	$2\times10^6 \leq M_w$	48

*Data are valid for normal radical polymerized PMMA if no tacticities are given.

Property	Value	Remarks	Refs.
Entanglement Molecular Weight	7000		49
Entropy of Polymerization (kJ/mol/K)*	– 117	25 °C to solid polymer	19
	– 40.3	– 63 °C	19,20
Extinction Modulus (mm^{-1}) ($\times 10^4$)	5.5	647 nm	21
	5	633 nm	2
	1.9	514 nm	21
	1	400 nm	2
Flexural Strength (MPa) ≡ (N/mm^2)	145	DIN 53452	48
Glass Transition Temperature T_g (K)	378	Dilatometric	6,12
	377		5
Dependence on Tacticity			

T_g (°C)	Tacticity (triad analysis): Iso	Hetero	Syn	Refs.
41.5	0.95	0.05	0.00	
54.3	0.73	0.16	0.11	22
61.6	0.62	0.20	0.18	22
104.0	0.06	0.37	0.56	5
114.2	0.10	0.31	0.59	22
119.0	0.04	0.37	0.59	49
120.0	0.10	0.20	0.70	5
125.6	0.09	0.36	0.64	22
134.0	0.01	0.18	0.81	49

Property	Value	Remarks	Refs.
Hardness (MPa) ≡ (N/mm^2)	195	DIN 53456	48
Heat Capacity (kJ/kg/K)	0.585	– 173 °C	23
	0.878	– 100 °C	23
	1.255	0 °C	23
	1.42	25 °C	23
	1.72	100 °C	23
	2.05	120 °C	23
	2.38	180 °C	23
	2.35	240 °C	24
	2.50	300 °C	24
Heat Conductivity (W/m/K)	0.19		50
Heat of Combustion (kJ/kg)	– 26.2		25
Heat of Polymerization (kJ/mol)	– 57.8	To solid polymer	19
Impact Strength, Sharpy (kJ/m^2)	20	ISO 179/1 fU	51
Modulus of Elasticity (MPa) ≡ (N/mm^2)	3300	25 °C	2
Modulus of Shear (MPa) ≡ (N/mm^2)		Dynamic	
	1700	25 °C, 10 Hz	2
Mechanical Loss Factor (tan δ)	0.08	25 °C, 10 Hz	26
Optical Absorption (dB/km)	84	514.5 nm	52
Partial Specific Volume (cm^3/g)	0.812	20 °C in monomer	10
	0.819	20 °C in monomer	27
	0.833	70 °C in monomer	10
Rate Constants of Polymerization			
Contraction constant ε	$-\varepsilon = 0.2256 + 4.81 \times 10^{-4}t + 4.1 \times 10^{-2}t^2$	$0 \leq T \leq 100°C$	28
Monomer density d (g/cm^3)	$d = 0.9659 - 1.2129 \times 10^{-3}t$		
	$+1.6813 \times 10^{-6}t^2 - 1.0164 \times 10^{-8}t^3$	$0 = T = 130°C$	31
Chain propagation k_p (l/mol/s)	$\ln k_p = 17.68 - 3762/T$	$313 \leq T \leq 353$ K	29
Chain termination k_t (l/mol/s)	$\ln k_t = 24.91 - 2536/T$	$313 \leq T \leq 353$ K	29
k_p^2/k_t value	$\ln k_p^2/k_t = 10.45 - 4988/T$		29
Termination mode			
Relative contribution of combination π_c	$\ln \pi_c = -4.1 + 1160/T$	$313 \leq T \leq 353$ K	34
Thermal initiation rate $R_{i,th}$ (mol/l/s)	$\ln R_{i,th} = 1.7 - 13100/T$		31
Transfer to monomer C_M	$\ln C_M = -2.60 - 2855/T$	$313 \leq T \leq 353$ K	31
Transfer to polymer C_P	$1.5 - 2.5 \times 10^{-4}$	$313 \leq T \leq 353$ K	30

*mol: monomer unit.

Property	Value	Remarks	Refs.
Pressure dependence of			
polymerization rate	– 23.6	20°C	32
activation volume ΔV_{pol} (cm^3/mol)	– 19.0	30°C	33
Refractive Index			
n_D	1.492	= 589 nm	2
n_e	1.494	= 546 nm	2,10
n_g	1.502	= 436 nm	22,10
$-dn_D/dT$ (K^{-1})	1.2×10^{-4}	$< T_g$	53
	3.1×10^{-4}	$> T_g$	53
Abbé's number (r_n)	57.8		50
Resistivity (ohm cm)	$>10^{15}$		2
Solvents		See chapter on Solvents–Nonsolvents in this Handbook	
Thermal Conductivity (W/m/K)	0.160	– 20°C	35
	0.193	0–50°C	36,37
	0.250	100°C	38
Theta Solvents and Temperatures			
Acetonitrile	$\theta = 30.0$°C		39
Heptanone-4	$\theta = 40.4$°C		40
Isoamyl acetate	$\theta = 57.4$°C		40
n-Butyl chloride	$\theta = 35.0$°C	Syndiotactic	40,41
	$\theta = 26.5$°C	Isotactic	41
Heptanone-3	$\theta = 30.0$°C	Syndiotactic	42
	$\theta = 40.0$°C	Isotactic	42
n-Propanol	$\theta = 75.9$°C	Syndiotactic	42
	$\theta = 84.4$°C	Isotactic	42
Unit Cell		See corresponding chapter in this Handbook	
Unperturbed Dimensions			
$K_\theta = r_\theta^2/M$ (cm^2mol/g)	5.2×10^{-18}	See also corresponding chapter in this Handbook	43,44
Velocity of Sound (m/s)	2700	2 MHz, 25°C	45
	2850	5 MHz, – 40°C	46
Vicat Temperature (K)	385	$M_w = 1.2 \times 10^5$	50
	393	$M_w \geq 5 \times 10^6$	50
Viscosity–Molecular Weight Relationship* $[\eta] = KM^a$ (cm^3/g)		See also chapter "Viscosity–Molecular Weight Relationship" in this Handbook	

Solvent	*T* (°C)	*K* ($\times 10^3$)	*a*	Refs.
Acetone	20	10	0.68	43
Benzene	30	5.2	0.76	54
THF	25	10.4	0.70	54
n-Butyl chloride	$35 = \theta$	50	0.50	43
Chloroform	25	4.8	0.80	54

Property	Value	Remarks	Refs.
Water Absorption (%)	2.0	Saturation $T = 23$°C	55

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Physical Constants of Poly(styrene)

David Schrader
Designed Thermoplastics Research, The Dow Chemical Company, Midland, MI, USA

Property	Value	Remarks	Refs.
Birefringence Dispersion			
$\frac{\Delta n(\lambda)}{\Delta n\ (546\,\text{nm})}$	$A + B/\lambda^2 + C/\lambda^4$	$A = 0.8905$ $B = 0.275 \times 10^{-9}\,\text{cm}^2$ $C = 0.153 \times 10^{-18}\,\text{cm}^4$	21
Coefficient of Thermal Expansion (K^{-1})			
Linear	$6\text{–}8 \times 10^{-5}$	$<T_g$ (unoriented)	3
Volume	$1.7\text{–}2.1 \times 10^{-4}$	$<T_g$	7a
	$5.1\text{–}6.0 \times 10^{-4}$	$>T_g$	7a
Coefficient of Friction	0.515	20–80°C	7b,7c
	0.744	100°C	7b
	>2	120°C	7b
	0.25	100°C	7c
	2.65	110–120°C	7c
Cohesive Energy Density	See solubility parameter		
Common Solvents	Toluene, perchloroethylene, carbon tetrachloride, carbon disulfide, tetralin, dioxane, MEK, pyridine, cyclohexanone, ethyl acetate		34
Compressibility (MPa^{-1})	220×10^{-6}		3
Compressive Modulus (MPa) ≡ (N/mm^2)	3000	Unoriented	18a
Creep/Stress Relaxation	See Ref.		35

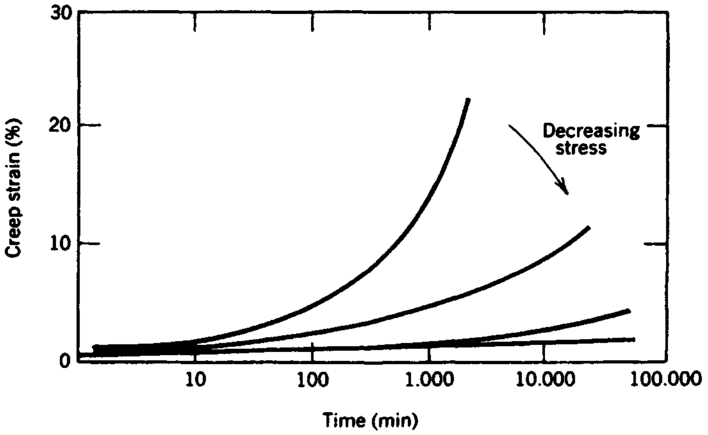

Figure 1. Typical creep behavior for rubber-modified styrene polymers.

Property	Value	Remarks	Refs.
Crystallographic Data	See under Unit Cell		
Density (mg/m^3)			
Amorphous	1.04–1.065		3,4
Crystalline	1.111		2
	1.12		1,5
d_ρ/dT ($g/cm^3/K$)	-2.65×10^{-4}	$<T_g$	6
d_ρ/dT ($g/cm^3/K$)	-6.05×10^{-4}	$>T_g$	6

Property	Value	Remarks	Refs.
Dielectric Constant (ε)			
Amorphous	2.49–2.55	at 1 kHz (curve flat to 1 GHz)	3
Crystalline	2.61	at 1 kHz (curve flat to 1 GHz)	16a
Dissipation Factor			
Amorphous	15×10^{-4}	at 1 kHz (curve flat to 1 GHz)	3
Crystalline	3×10^{-4}	at 1 kHz (curve flat to 1 GHz)	16a
Dynamic Mechanical Loss Peaks			
1 Hz	$T_{\beta} = 300$ K		16b
	$T_{\gamma} = 138$ K		16b
7 kHz	$T_{\delta}^{\gamma} = 48$ K		16c
Entanglement Molecular Weight	19100		43
Glass Transition Temperature, T_g (°C)	80		6
	90	T_g (K) = 373 − $(1.0 \times 10^5/M_v)$	8
	(100)		9
Heat Capacity, C_P (kJ/kg/K)	1.185 (1.139)	0°C	3,12
	1.256 (1.394)	50°C	3,12
	1.838 (1.821)	100°C	3,12
dC_P/dT (kJ/(kg K^2))	4.04×10^{-3}	50°C	3
Heat Capacity vs. Temperature	See Fig. 2		36–37

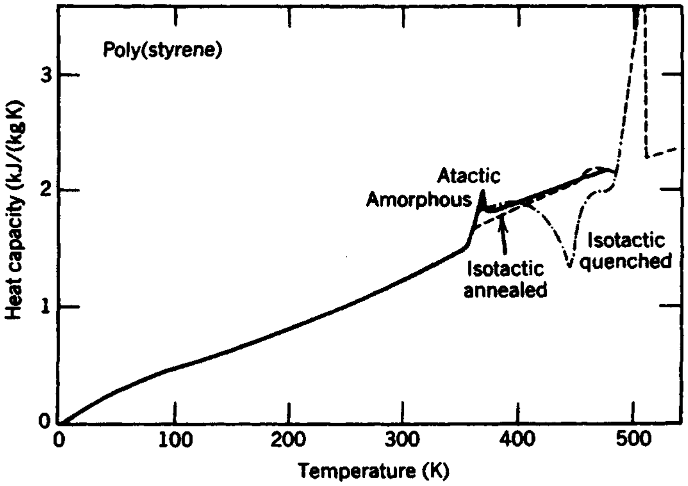

Figure 2. Heat capacity vs. temperature curves for amorphous, atactic, and isotactic poly(styrenes).

Property	Value	Remarks	Refs.
Heat of Combustion (kJ/mol)[a]	-4.33×10^3		13a,14
Heat of Fusion (kJ/mol)[a]	8.37 ± 0.08		10
Crystalline	9.00		2
Heat of Polymerization (kJ/mol)[a]	−67.4	To solid polymer	15
	−69.9	To solid polymer	13a
Heat of Solution (kJ/mol)[a]	−3.60	In monomer	13a
Infrared Spectrum		See Ref.	13b
Intrinsic Viscosity vs. MW	Various solvents	See Ref.	38
Limiting Oxygen Index (%)	18.1		44
Melting Point T_M (°C)	240		10
	(250)		11
Melt Viscosity – Molecular Weight Relationship	$\log \eta_r = 3.4 \log M - k$		

	T (°C)	*M* range	*k*	Refs.
Atactic	217	$\geq 38{,}000$	13.04	31
Isotactic	281	100000–600000	14.42	32a
				39

[a]mol: Monomer unit.

Property	Value	Remarks	Refs.
MW Distribution Curves			
(For representative poly(styrenes))			32b

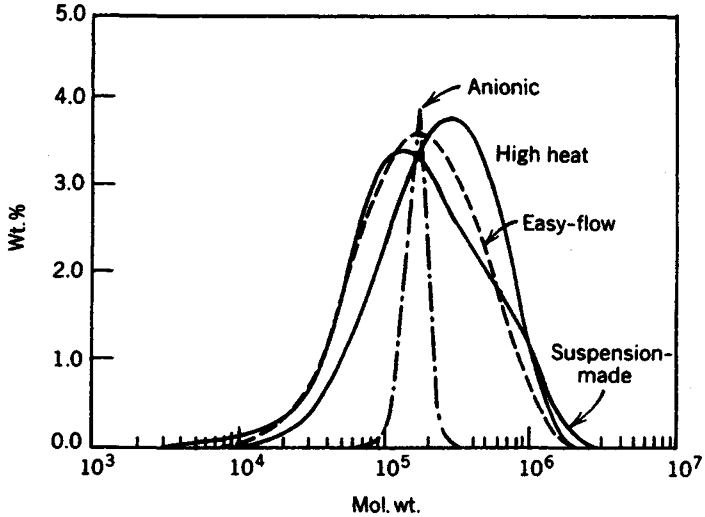

Figure 3. Molecular weight distribution curves for representative poly(styrenes).

Nuclear Magnetic Resonance — **Line width** (gauss)

T (°C)	Value
0	6.7
50	6.5
100	5.0
150	1.0

Property	Value	Remarks	Refs.
	peaks (ppm) at 3.0, 3.5 (aromatic), 8.4 (CH_2)	Referred to tetramethylsilane as + 10.0	32c
Optical Dispersion, $\eta_F - \eta_C$	1.92×10^{-2}	$\lambda = 486.1$ nm	3
		$\lambda = 656.3$ nm	3
Poisson's Ratio	0.325		3
	0.33		20
Refractive Index, n_D	1.59–1.60	$\lambda = 589.3$ nm	3
dn_D/dT (K^{-1})	-1.42×10^{-4}		3
Resistivity (Ohm cm)	10^{20}–10^{22}		17a
Solubility Parameter $(J/m^3)^{1/2} \times 10^{-3}$	16.6–20.2 (8.1–9.9 $(cal/cm^3)^{1/2}$)		40
Sonic velocity (m/s)	2100		3
Specific Gravity	1.04–1.06		41
Stress–Optical Coefficient (brewsters)	10.1	Monofilament	22
	9.5	Extruded sheet	22
	8.3,8.7	Compression molded	22
Stress–Strain Curves	See Figs. 4–6 (next page)		42
Surface tension, 293 K, mN/m (≡ dyn/cm) (Ps/air)	40.7		45
syndiotactic			47
Tensile Modulus, E (MPa) ≡ (N/mm^2)	3200	Unoriented	19
	3400		18a
	4200	Oriented monofilament	18b,18c
dE/dT (N/mm^2/K) ≡ (MPa/K)	−4.48		19
Thermal Conductivity (W/m/K)	0.105	0°C	3
	0.116	50°C	3
	0.128	100°C	3
Thermogravimetric Analysis			17b
In vacuo (10°C min^{-1})			

Wt. loss (%)	*T* (°C)	Wt. loss (%)	*T* (°C)
0	275	40	390
5	330	60	408
10	343	80	422
20	360	100	450

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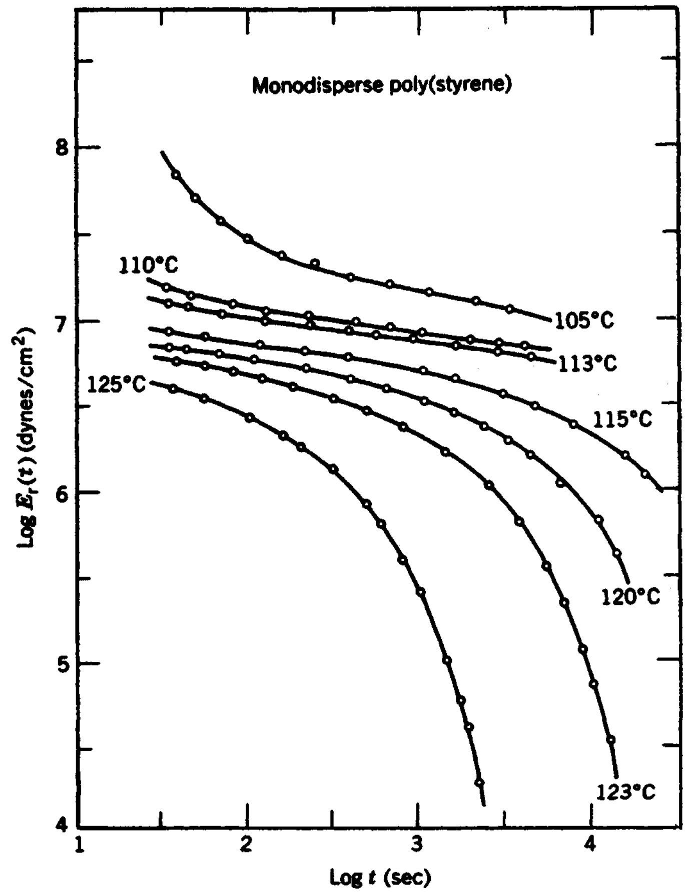

Figure 4. Stress relaxation curves for monodisperse poly(styrene).

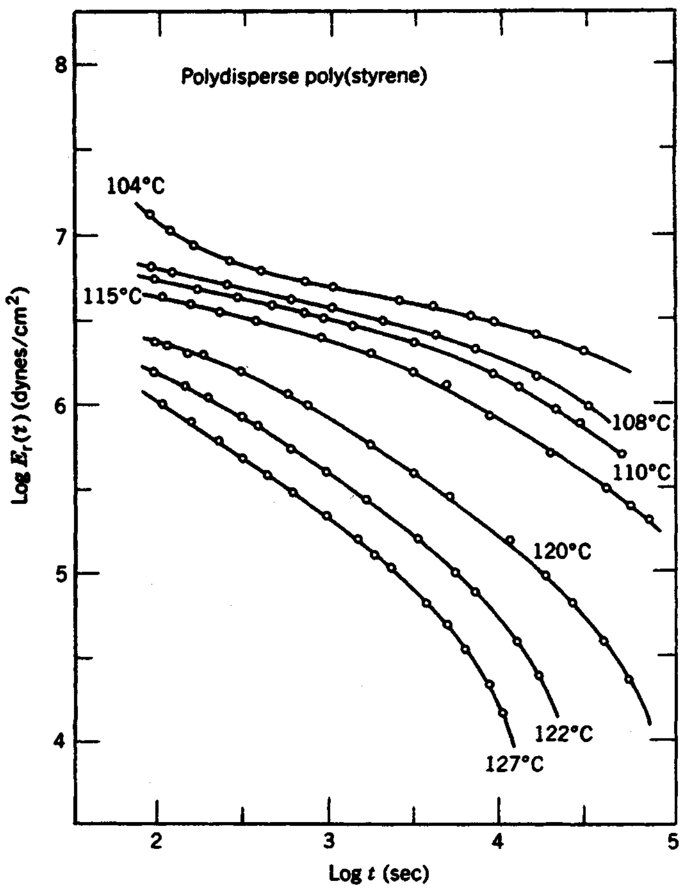

Figure 5. Stress relaxation curves for polydisperse poly(styrene).

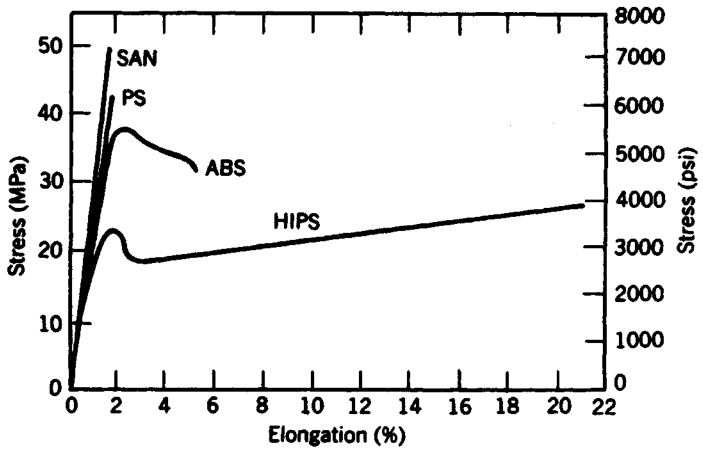

Figure 6. Stress–strain curves for styrene-based polymers.

Property	Value	Remarks	Refs.
Unit Cell (Å)		Rhombohedral system; 18 monomer units in cell	
a_0	21.9		1
	22.08		2
b_0	21.9		1
	22.08		2
c_0	6.63		1
	6.626		2

Property	Value	Remarks	Refs.
Ultraviolet Spectrum (in vacuo)	Absorption bands at 260, 194 and 80 nm		
Viscosity – Molecular Weight Relationship	See also corresponding chapter in this Handbook		33
Water Absorption at Equilibrium (23°C, 50% RH)	0.05%		46

[η]		M				
Solvent	**T (°C)**	**Solvent**	**Method**	**K (× 10³)**	**a**	**Refs.**
ATACTIC						
Benzene	30	Benzene	Osmotic	9.7	0.74	23
Benzene	25	Toluene	Osmotic	11.3	0.73	24
Toluene	25	Butanone	Osmotic	13.4	0.71	
Toluene	25	Butanone	Light scattering	17	0.69	25
Toluene	30	Butanone–isopropyl Alcohol	Light scattering	9.23	0.72	26
Benzene	30	Toluene	Osmotic	10.6	0.735	27
Toluene	30	Toluene	Osmotic	11.0	0.725	
Toluene	25	Cyclohexanone	Sedimentation velocity	9.77	0.73	28
ISOTACTIC						
Benzene	30	Toluene	Osmotic	10.6	0.735	27
Toluene	30	Toluene	Osmotic	11.0	0.725	
Benzene	RT	Toluene	Osmotic	9.5	0.77	29
Benzene	25	Toluene	Osmotic	9.79	0.744	30
Toluene	25	Butanone	Light scattering	17	0.69	25

Constants determined by the method and solvent given in these columns; $[\eta] = KM^a$, in ml/g.

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Physical Constants of Poly(oxymethylene)

K.-F. Mück
Ticona, Kelsterbach, FR Germany

Property	Value	Refs.
Absorption		
Homopolymer (density 1.418–1.419 g/cm^3)		
Equilibrium concentration, 60°C		
Aniline (wt.%)	9.60	1
m-Cresol (wt.%)	16.48	1
Dimethylformamide (wt.%)	5.73	1
Water (DIN 53 472, after 96 h), (mg)	20 –30	3
(wt.%)	~0.14–0.21	
Gain in volume, 60°C (vol.%)		
Aniline	13.7	1
m-Cresol	23.0	1
Dimethylformamide	8.6	1
Average sorption coefficient, 25°C		
Water	See Ref.	2
Activation Energy of Polymerization (kJ/mol)		
Of radiation induced trioxane		
In source polymerization	~21; 121	72
Post polymerization >50°C	167	72
<50°C	287	72
44–55°C	126	72
45–55°C	165; 174	72
Of cationic polymerization of trioxane		
In ethylene dichloride	79.5	81
In the solid state	36	81
Anisotropy of Solid State Extruded POM	See Ref.	127
Arc Resistance (s) (ASTM D495)		
Homopolymer	129 (burns)	73
Copolymer	240 (burns)	73
DIN 53484, VDE 0303, part 5		
Copolymer	L4	
Ceiling Temperature (°C)		
Polymerization of formaldehyde (gas) → poly(oxymethylene) (solid)		
At 1 bar	119	66
	127	25
	116	9
	120	22
	137	90
	126	94
	133	95
At different pressures calculated from Ref. 66	(see table below)	67

p (bar)	t_c (°C)
0.36	100
0.62	110
1.06	120
1.75	130
2.81	140
4.44	150
6.85	160
10.36	170

Polymerization of trioxane (gas) → poly(oxymethylene) (solid)	36	94

Property	Value		Refs.
Chemical Resistance	See Refs.		73,79
Coefficient of Linear Thermal Expansion (K^{-1})			
20–100°C (VDE 0304)	$1.0–1.4 \times 10^{-4}$		3
Amorphous > T_g (ASTM D 696)	7.2×10^{-4}		6
Copolymer	0.85×10^{-4}		73
Homopolymer DIN 52328, ASTM 696	0.81×10^{-4}		73
Copolymer	1.1×10^{-4}		
Cohesive Energy, 25°C (kJ/mol)	9.88		4
Cohesive Energy Density $(J/m^3)^{1/2}$ ($\times 10^{-3}$)			
25°C	22.8		1
Liquid, 25°C, theroretical value	20.9		4
Comonomer Distribution by Pyrolysis/GC			107
Comparative Figure of Tracking	600		138
Crystallinity (%)			
Homopolymer			
20°C, from density-data	64–69		5
25°C, from X-ray-data	77		6
135°C, from X-ray-data	75		6
140°C, from X-ray-data	73.0		70
145°C, from X-ray-data	73.1		70
150°C, from X-ray-data	75.4		70
155°C, from X-ray-data	76.9		70
157°C, from X-ray-data	67		6
160°C, from X-ray-data	80.0		70
177°C, from X-ray-data	95.5		70
Delrin 150, 20°C, from density data	64.0		5
Delrin 550, 20°C, from density data	68.7		5
Copolymer			
20°C	56–59		5
Hostaform C2520, M_w 80000			
20°C from density data	56.6		5
Hostaform C9020, M_w 58000			
20°C from density data	58.7		5
Homo- and copolymers, from density data	See Ref.		56
Trioxane/dioxolane copolymers with different comonomer content	See Ref.		71
Dependence on irradiation	See Ref.		98
Crystallographic Data			
Poly(oxymethylene)			
Crystal system	Trig	Orth	61
Space group	P3 or P32	P222	
Mol. helix	2* 9/5	2* 2/1	
Unit cell axes (Å)	4.471	4.767	
	4.471	7.660	
	17.39	3.563	
No. of units	9	4	
Pc ($Mg\,m^{-3}$)	1.491	1.533	
Packing density	0.65		99
Phase transition			
Transition energy	See Ref.		115
Orth → Trig (kJ/mol) ($-OCH_2$)	+0.6		100
Orth, two forms			101
Cryst. packing density	0.78	0.81	60,61
Pa (Mg/m^3)	1.25	–	
Amorphous packing density	0.65	–	
Heat of fusion (kJ/mol)	9.79	–	61
Glass transition temperature (K)	191	–	

Property	Value	Refs.
For trioxane-1,3-dioxolane copolymers	See Ref.	71
Crystal structure of radiation induced polytrioxane and tetroxane	See Ref.	105
Deformation Under Load (%)		
(ASTM D621, 13.8 Mpa at 50°C, 24 hr)		
Homopolymer	0.5	73
Copolymer	1.0	73
Entanglement in Solid State	See Refs.	128,129
Density (10^{-3} kg/m^3) ≡ (g/cm^3)		
Homopolymer		
Delrin 500	1.420 ± 0.005	7
After annealing	1.434 ± 0.004	7
Delrin 150, 20°C	1.427	5
Delrin 550, 20°C	1.435	5
Copolymer, 20°C		
Hostaform C2520, M_w 80000	1.412	5
Hostaform C9020, M_w 58000	1.416	5
Copolymers, 20°C; after annealing; mol fraction of dioxolane comonomer		71
0.075	1.412	
0.15	1.388	
0.18	1.380	
0.25	1.363	
0.30	1.358	
0.34	1.346 (average values)	
Poly(oxymethylene)		
Trigonal, amorphous	1.25	61
Crystalline	1.491	61
Orthorhombic, crystalline	1.533	61
Degradation (initial) Under N_2		121
Homopolymer (°C)	318	
Copolymer (°C)	324	
Depolymerization, Energy of Activation (kJ/mol)		
Poly(oxymethylene)diol thermal depolymerization 90–150°C	42	53
100–120°C	113	9
130–150°C	82.9 ± 12.6	8
135–190°C	83.8	11
170–285°C	109	10
172–188°C	71 ± 10	88
Cationic depolymerization − 30 to + 33°C	80.0 ± 9.6	12
130–150°C	87.5 ± 12.6	8
Anionic depolymerization 130–150°C	27.2 ± 6.3	8
135–170°C	62.0 ± 7.5	13
Poly(oxymethylene)diacetate and dimethyl ether		
Thermal degradation,		
240–340°C	234	11
280–350°C	134	10
199–331°C	117	53
Autoxidative degradation, 160°C	117,121	52
Thermooxidative degradation, 145–160°C	61	53
Depolymerization Rate (min^{-1})	See Ref.	51
Poly(oxymethylene)diol		
$V_{depol} = K_{therm}$ (POM) $+ k_{bas}$ (POM) (Amine)		

T (°C)	K_{therm} (×10^3)	k_{bas} (×10^3)
135	1.6 ± 0.2	4.1 ± 0.2
150	3.5 ± 0.1	7.7 ± 0.5
160	5.0 ± 0.5	11.6 ± 1.0
170	7.4 ± 1.0	17.0 ± 2.0

Property	Value	Refs.
Dielectric Absorption (Homopolymer)		
α-Absorption	Near 10 Hz at about 140°C	49
β-Absorption	1 kHz–1 MHz at 60–100°C	
γ-Absorption	1 GHz	
Dielectric Constant (10^3 Hz)		
DIN 53 483, ASTM D 150–59 T	3.6–4.0	3,73
Dielectric Loss, $\tan\delta$ (10^3 Hz)	$(15–50) \times 10^{-4}$; See also Ref.	3
DIN 53 493, ASTM D 150–59 T		7,14,15,16,138
Dielectric Strength (kV/mm)		
DIN 53 481 (50 Hz, 0.5 kV/s, film 0.2 mm)	50–70	3
Homopolymer	33	138
Copolymer	35	138
Diffusion (films)		
Water		
Activation energy, apparent (kJ/mol)		
Copolymer 0–80°C	41.5	18
Copolymer, branched, 50°C	44.4	2
Diffusion coefficient, average, 25°C (cm^2/s)		
Copolymer	2.7×10^{-8}	17
Copolymer, branched	7.0×10^{-8}	17
Copolymer, linear and branched	See Ref.	2
Carbon dioxide		
Activation energy (kJ/mol)		
Copolymer	48.9	17
Copolymer, branched	38.5	17
Diffusion coefficient (cm^2/s)		
Copolymer	1.4×10^{-9}	17
Copolymer, branched	4.4×10^{-9}	17
Formaldehyde		
Diffusion coefficient (dc) (cm^2/s)		135

T (°C)	dc (cm^2/s)
60	2.14×10^{-9}
40	1.34×10^{-9}
21	1.0×10^{-9}

Property	Value	Refs.
Dissipation Factor		
At 10^3 Hz (ASTM D150)		
Homopolymer	3×10^{-3}	73
Copolymer	4×10^{-3}	73
Elastic Modulus (N/mm^2)		
DIN 53457 (1 mm/min)	2600–3400	63
Elongation at Break (%)		
DIN 53455 (50 mm/min)		
Low molecular mass	20–40	63
High molecular mass	35–70	63
ASTM D638 (5 mm/min)		
Homopolymer	15–75	73
Copolymer	50–75	73
Elongation at Yield (%)		
Homopolymer	12	138
Copolymer	7	138

Property	Value	Refs.
Enthalpy (kJ/kg)		
Homopolymer 0 K	0	19
50 K	6.909	19
100 K	29.69	19
200 K	102.6	19
300 K	222.5	19
Copolymer 0 K	0	19
50 K	6.948	19
100 K	29.40	19
200 K	100.9	19
300 K	211.4	19
Entropy (kJ/kg/K)		
Homopolymer 0 K	0	19
50 K	0.2097	19
100 K	0.5167	19
200 K	1.007	19
300 K	1.487	19
Copolymer 0 K	0	19
50 K	0.2123	19
100 K	0.5153	19
200 K	0.9974	19
300 K	1.439	19
Entropy of Fusion (kJ/mol/K)		
Of homopolymer at constant pressure	8.21×10^{-3}	20
Of homopolymer at constant volume	4.98×10^{-3}	20
Poly(oxymethylene), equilibrium value	10.70×10^{-3}	57
Entropy of Polymerization (J/mol/K)		
Formaldehyde (gas, 1 bar, 298 K) → poly(oxymethylene) (solid)		
From heat capacity data	-175 ± 0.8	19
From equilibrium pressure data	-169.5 ± 2.9	66
	-128.4 ± 0.9	25
	−175	9
	−129	19
	−183	21
	$-13\,6 \pm 17$	90
Formaldehyde (liquid, 298 K) → poly(oxymethylene) (solid)	86.7	96,94
Trioxane → poly(oxymethylene) at 298 K		
Gas → solid	−156	22
	−155	96,94
Gas → liquid	−106	96,94
Liquid → liquid	0	96,94
Liquid → solid	−49.0	96,94
Solid → solid	−6.7	96,94
	$+18 \pm 16$	66
	See Ref.	65
At 323 K in dichloroethane	−41	92
Tetraoxane (solid) → poly(oxymethylene) (solid) at 298 K	3.41 ± 0.06	66
Entropy of Trimerization (J/K/mol trioxane)		
Formaldehyde (gas) → trioxane (cryst.) at 298 K	-526 ± 13	91
Formaldehyde (gas) → trioxane (gas) at 298 K	-375 ± 12	91
Fatigue Behavior		
Of acetal homopolymer	See Ref.	54
Flammability		126

Radiant heat flux (kW/m^2)	Ignition time (s)	T_{Ig} (°C)
21	248	277
25	184	278
28	138	282
34	79	288

Property	Value	Refs.
Flammability UL 94		138
(1.5 mm sheet)		
Yellow card	2060	
Class	HB	
Flexural Modulus (N/mm^2)		
ASTM D790 at 23°C		
Homopolymer	2830	73
Copolymer	2590	73
Flexural Strength at Yield (N/mm^2)		
ASTM D790		
Homopolymer	97	73
Copolymer	90	73
Flexural Stress at Conventional Deflection		
MPa ≡ (N/mm^2)		
DIN 53452	105–120	3
Flow Temperature (°C)		
ASTM 569		
Homopolymer	184	73
Copolymer	174	73
Formaldehyde		
Melting point (°C)	−118	73,76
Boiling point (°C)	−19	73,76
Heat of vaporization at bp (kJ/mol)	700	73,76
Heat of combustion at 23°C (gas) (kJ/mol)	−562	73,76
	−570.77 ± 0.42	83
Density of liquid (g/cm^3) at −20°C	0.815	73,76
at −80°C	0.917	73,76
Explosive limits, % by vol. in air	7–72	73
Standard enthalpy		
Formation of formaldehyde (kJ/mol)	−104.9 ± 1.4	66
	−116	82
	−108.57	83
	−97.1	93
Free Energy of Polymerization (kJ/mol)		
Formaldehyde (gas, 298 K) → poly(oxymethylene) (solid)	−2.9	19,94
	−3.9	68
	−17	93
Trioxane (298 K) → poly(oxymethylene)	−1.8	82,65
Gas → solid	−17.6	96,94
Gas → liquid	−6.07	96,94
Liquid → liquid	−0.4	96,94
Liquid → solid	−3.8	96,94
Solid → solid	−6.3	96,94
	−9.9	66
	See Ref.	65
In dichloroethane at 323 K	−5.4	92,94
Tetraoxane (solid, 298 K) → poly(oxymethylene) (solid)	−4.4	66
Friction Coefficient		
Against rotating steel shaft, dry (roughness height ~2 μm, loading pressure $p = 0.05\ N/mm^2$, sliding speed 100 mm/min)		
Dynamic	0.15–0.25	63
Static	0.20–0.30	63
GPC of Macrocyclic POM	See Ref.	114
Glass Transition Temperature (K)	See Second-Order Transition Point	
Hardness Ball Indentation (MPa) ≡ (N/mm^2)		
DIN 53456 E/ISO 2039 after 30 s	130–160	3

Property	Value	Refs.
Heat Capacity (J/mol/K)		
Homopolymer 0 K	0	19,37
50 K	9.94	
100 K	16.69	
200 K	28.82	
300 K	42.79	
Copolymer 0 K	0	
50 K	9.97	
100 K	16.40	
200 K	26.56	
300 K	41.11	
Molten poly(oxymethylene)		
190.0 K (T_g)	53.58	58
200.0 K	53.95	
273.15 K	56.67	
298.15 K	57.60	
300.0 K	57.67	
400.0 K	61.39	
457.0 K (T_m)	63.51	
500.0 K	65.11	
600.0 K	68.83	
Crystalline poly(oxymethylene)		
0 K	0	61
50 K	10.10	
100 K	16.68	
200 K	27.15	
273.15 K	34.94	
298.15 K	38.26	
300 K	38.52	
390 K	54.00	
For the temperature range $T = 25-140°C$		85
At mole fractions of oxyethylene units $X_2 < 0.16$	$Cp(X_2, T) = 36.75 + 0.1425\ (T - 25) + 80X_2$	
For detailed information, see Ref. and corresponding table in this Handbook		55,56,68 61,71
For the temperature range $T = 205$ K to melting point	See Refs.	102,103,104
Heat Deflection Temperature Under Load (°C)		
Martens method (DIN 53 458)	65–70	63
Heat Distortion		
A (ISO R 75)	120–130	63
B (DIN 53 461)	160–170	63
(ASTM D648)		
Homopolymer	124	73
Copolymer	110	73
Heat of Combustion (kJ/mol)		
Poly(oxymethylene)	– 508.78 ± 10	68
	– 511.6 ± 1.7	25
Heat of Degradation (kJ/mol)		
Needle-like poly(oxymethylene) crystals	55.05	62
Heat of Formation (kJ/mol)		
Homopolymer, 25°C (standard enthalpy)	– 171.4	68
Heat of Fusion (kJ/kg)		
Poly(oxymethylene), theoretical value for 100% crystallinity	181–192	15
Homopolymer (acetyl end groups)	236	70
	390	119
Copolymer (trioxane/2% ethylene oxide)	315 –336	15
Poly(oxymethylene), at equilibrium	166	57
Poly(oxymethylene), needle like crystals	315	62
Poly(oxymethylene), extended chain crystals	310	87
Poly(oxymethylene), fibrillar products	252	62

Property	Value	Refs.
From solid state polymerization	264	84
	234	16
Heat of Polymerization (kJ/mol)		
Formaldehyde (gas, 1 bar, 298 K) → poly(oxymethylene) (solid)		
Values obtained from equilibrium data	– 66.4 ± 1.0	59,66
	– 51.3 ± 0.3	25
	– 54.4	25
	– 59.8	26
	69.9	59
	– 71.1	21
	– 72.0	22
	– 55.7 ± 6.3	90
353 K	– 68.2	27
Value from combustion data	– 55.4	68
Value from calorimetric data	– 66.2	80
Trioxane → poly(oxymethylene) at 298 K		
Gas → solid	– 63.6	94
	– 48.1	65
Gas → liquid	– 41.5	59,94
Liquid → liquid	– 0.4	59,94
Liquid → solid	– 22.6	59,94
Solid → solid	– 8.4	59,94
	– 4.6 ± 3.9	66
	See Ref.	65
Tetraoxane → poly(oxymethylene)		
Solid → solid	–3.32 ± 0.16	86
In dichloroethane		
At 329–333 K	– 26.25 ± 0.25	80
At 323 K	– 17.6	92
Heat of Solution (kJ/mol)		
Water in branched copolymer, 50°C	19.3	2
Heat of Sublimation	See Lattice Energy	
Heat of Trimerization (kJ/(mol trioxane))		
Formaldehyde (gas) → trioxane (gas), at 298 K	– 139.2 ± 2.1	91
Formaldehyde (gas) → trioxane (solid), at 298 K	– 194.0 ± 2.5	91
	– 188	69
	– 187	80
Huggins Coefficient	See Viscosity – Molecular Weight Relationship	
Impact Strength (charpy) (kJ/m^2)		
+ 23°C	180	138
– 30°C	160	138
Impact Strength (charpy) (notched) (kJ/m^2)		
Homopolymer + 23°C	9	138
Homopolymer – 30°C	7	138
Copolymer + 23°C	6.5	138
Copolymer – 30°C	6.5	138
Infrared Spectra	See Refs.	28,51,101, 110,136
IR Spectra	937 cm^{-1}	97
Macrocyclic POM	See Ref.	110
Interchain Distance (Å)		
Poly(oxymethylene)	4.47	71
Poly(1,3-dioxolane)	4.54	71
Lattice Energy (kJ/mol)		
Heat of sublimation of poly(oxymethylene) at 0 K (theoretical value)	15.9 ± 1.7	4
Mechanical Properties		
Impact modified poly(oxymethylene)		
Homopolymer	See Ref.	50
Copolymer	See Ref.	77

Property	Value	Refs.
Melt Index (MI) – Molecular Weight (M_w) Relationship (dg/min)		
M_w = 6200–129000; 190°C	$MI = 1.30 \times 10^{18} \times M_w^{-3.55}$	29
Melting Data		
At equilibrium	See Ref.	57
Melting Point (°C)		
Homopolymer		
Delrin 150	181	5
Extended chain fibers	182.5 ± 0.5	30
Folded chain spherulites	174	30
As a function of crystallization temperature	See Ref.	31
From solution polymerization of trioxane, ionically initiated		
Fibrous product	186–187	30
Powdery product	178–180	30
From vacuum sublimation of trioxane	195–200	30
Poly(oxymethylene) dimethylethers		
Monomer	– 105.0	4
Dimer	– 69.7	4
Trimer	– 42.5	4
Tetramer	– 9.8	4
Pentamer	18.3	4
Copolymer		
Hostaform C2520, M_w = 80000	167	5
Hostaform C9020, M_w = 58000	170	5
Various kinds and contents of comonomers	See Ref.	32
Copolymers with 0/2/4/6/7 mol% dioxolane	See Ref.	32
Trioxane-1,3-dioxolane copolymers (average values)		71
Mole fraction of 1,3-Dioxolane		
0.075	166	
0.15	156	
0.18	154	
0.25	147.5	
0.30	141.5	
0.34	134	
Poly(oxymethylene), homopolymer		
Equilibrium melting temperature	184 ± 2	57
	186.4	70
	189.2	70
Modulus, Tensile (1 mm/min) (MPa) ≡ (N/mm^2)		
DIN 53 457	2600–3400	3
Morphology	See Ref.	78
Mould Shrinkage (cm/cm)		
ASTM D 95		
Homopolymer	0.021	73
Copolymer	0.020	73
	See Refs.	79
NMR-Spectra	See Refs.	33,34,114
2D Dipolar ^{13}C	See Refs.	106,112,116, 122
Crystalline ^{13}C	See Refs.	111,113,117,120
Oligomers $R{-}(OCH_2)_n{-}R$		
Boiling points R = $-OCH_3$ (°C)		
$n = 2$	105.0	4
$n = 3$	155.9	4
$n = 4$	201.9	4
$n = 5$	242.3	4
Density R = $-OOC{-}CH_3$, 25°C (g/cm^3)		
$n = 1$	1.1283	35
$n = 2$	1.1610	35
$n = 3$	1.1823	35
Poly(oxymethylene), liquid, 25°C, theoretical value	1.328	4

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Property	Value	Refs.
Heat of vaporization	See Ref.	4
Infrared data $R = -OOCCH_3$		35

	Wave number (cm^{-1})	Absorption ($cm^{-1} \times mol^{-1}$)
$n = 1$	1760	395
$n = 2$	1755	330
$n = 3$	1755	330

Property	Value	Refs.
Melting points		
Oligo (oxymethylene) dimethyl ether $n = 2–5$	See Ref.	4
Vapor pressure		
Oligo (oxymethylene) dimethyl ether $n = 2–5$	See Ref.	4
Permeability	See Refs. and corresponding chapter in this Handbook	73,79
Permeability, Apparent Activation Energy (kJ/mol)		
Water		
Homopolymer, melt index 2.3; 50°C	23.0	2
Copolymer, linear, melt index 2.5; 50°C	29.7	2
Copolymer, branched, melt index 3.9; 50°C	25.1	2
Copolymer, 25°C	13.0	17
Copolymer, branched, 25°C	6.3	17
Carbon dioxide		
Copolymer, 25°C	31.4	17
Copolymer, branched	25.1	17
Photoradical Ageing	See Ref.	134
Radiolysis (Gamma)	See Ref.	133
Raman Spectra	See Refs.	110,136
Powder/single crystal (cm^{-1})	909	97
Refractive Index (n_D)		
Extended chain crystals (fibers), different samples		
n	1.545–1.553	30
n_1	1.489	30
Poly(oxymethylene) at 25°C DIN 53491	1.48	63
Rockwell Hardness		
Homopolymer	M94, R120	73
Copolymer	M80	73
Rupture Behavior (Creep) for Medical Application	See Ref.	137
Schulz–Blaschke Coefficient	See Viscosity – Molecular Weight Relationship	
Second-Order Transition Point	See Ref.	55
Glass Transition Temperature (K)	191	61
Homopolymer	198	6
	188	23
	190	23
	199	24
α-Relaxation, activation energy (kJ/mol)		
For POM single crystal		
$T < 40°C$	155	36
$40°C < T < 90°C$	105	36
$T > 90°C$	159	36

Property	Value	Refs.
Shear Strength (N/mm^2) ASTM D732		
Homopolymer	66	73
Copolymer	53	73
Shear Modulus (GPa)		118
5 K	5.0	
77 K	4.7	
293 K	1.5	
Shrinkage of Fibers	See Ref.	109
Solvents		

Solvent	Dissolving temp. (°C)	Gel temp. (°C)	Refs.
Phenol	109	58	1
o-Chlorophenol	–	70	1
Aniline	130	102	1
Cyclopentanone	–	112	1
Ethylene carbonate	145	117	1
Cyclohexanone	–	119	1
Benzyl alcohol	132	119	1
Acetic anhydride	–	120	1
Formamide	150	135	1

Property	Value	Refs.
Specific Volumes (cm^3/g)		
Homopolymer		
Delrin 150, at 20°C	0.7008	5
Delrin 550, at 20°C	0.6968	5
Crystalline phase		
Varying temperatures, *t* (°C)	$V_c = 0.669 + 7.85 \times 10^{-5}\, t + 5.93 \times 10^{-7}\, t^{-2}$	38
	$V_c = 6.64 \times 10^{-1} + 2.16 \times 10^{-4}\, t$	71
Amorphous phase	$V_a = 0.792 + 3.07 \times 10^{-4}\, t$	38
Varying temperatures, *t* (°C)	$V_a = 0.7553 + 5.78 \times 10^{-4}\, (t - 20)$	5
Copolymer		
Hostaform C2520	0.7082	5
Hostaform C9020	0.7064	5
Amorphous, phase (varying amount (*X*)) of copolymer, wt.% dioxolane, 20°C	$V_a^{20} = 0.7553 + 0.08674\, X$	5
Amorphous phase (varying temperatures, *t* (°C))	$V_a = 0.7578 + 5.78 \times 10^{-4}\, (t - 20)$	5
	$V_a = 0.7437 + 5.78 \times 10^{-4}\, t$	57
Stress–Strain Curves	See Ref.	39
Surface Resistivity (ohm)		
Homopolymer (ASTM D257)	2×10^{13}	73
Surface Tension, max (dyn/cm)	46.5	130
Taber Abrasion		
ASTM D1044, 1000 g load, CS-17 wheel, mg per 1000 cycles		
Homopolymer	20	73
Copolymer	14	73
Tensile Modulus (MPa)		
DIN 53457	2600–3400	63
Homopolymer	3200	138
Copolymer	2900	138
Ultra high tensile moduli tubes from a tensile drawing process under dielectrical heating	63000	49
Dependence on molecular weight	See Ref.	123
Tensile Creep Modulus (MPa)		
Homopolymer, 1 h	2800	138
Homopolymer, 1000 h	1500	138

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Property	Value	Refs.
Copolymer 1 h (MPa)	2500	139
Copolymer 1000 h (MPa)	1300	139
Tensile Strength at Break (N/mm^2)		
ASTM D638		
Homopolymer	69	73
Copolymer	59	73
Fibers	See Ref.	108
Dependence on molecular weight	See Ref.	131
Thermal Conductivity at 20°C (W/m/K)		
VDE 0304	0.292	3,63
Thermal Expansion	See Ref.	98
Dependent on irradiation		
Thermal Expansion	See Refs.	131,132
Dependent on structure		
Thermo-Acoustic Properties		
At 298 K		124,125
α ($10^{1-3}K^{-1}$)	0.243	
S_o^*	1.114	
B*	1.020	
A*	1.034	
Thermodynamic Data		
Poly(oxymethylene), recommended values	See Refs.	58,61
Tracking Resistance		
DIN 53480	KA 3 b	63
VDE 303	KC >500	63
Trioxane		
Boiling point (°C)	114.5	64
Boiling point of azeotrope, 30% water, 70% trioxane (°C)	91.3	64
Density, 65°C (g/cm^3)	1.17	40
Dielectric constant, 20°C, 1.6 MHz	3.2–3.4	40
Dipole moment	2.18×10^{18}	64
Enthalpy (kJ/kg)		
0 K	0	22
50 K	7.97	
100 K	32.29	
200 K	104.9	
273.16 K	178.2	
298.16 K	208.0	
Entropy (kJ/kg/K)		
0 K	0	22
50 K	0.244	
100 K	0.573	
200 K	1.064	
273.16 K	1.373	
298.16 K	1.477	
298.16 K (gas, 1 bar)	3.165 ± 0.038	22
	3.207 ± 0.001	65
Explosive mixtures with air (vol.%)	3.5–28.7	64
Flash point (°C)	45	64
Heat of combustion, 23°C (kJ/mol)	1492	73,89
Heat of sublimation (kJ/mol)	56.6	73
	55.39	65
Heat of solution in dichloroethane at 50°C: trioxane (cryst.) → trioxane (soln.) (kJ/mol)	15.0 ± 0.1	80
Heat of vaporization at b.p. (kJ/mol)	41.5	73
	40.6	65
Melting point (°C)	62–64	38

* Acoustic parameters.

Property	Value	Refs.
Molecular weight	90.08	40
Solubility in different solvents	See Ref.	75
Solvents	Water, alcohols and ethers	
Specific heat (kJ/kg/K)		
0 K	0	22
50 K	0.372	
100 K	0.5767	
200 K	0.8783	
273.16 K	1.138	
298.16 K	1.237	
Vapor pressure at 25°C (k Pa)	1.7	73
Standard enthalpy, formation of trioxane (kJ/mol)	− 509 ± 5	66
	− 521 ± 4	81
Thermodynamic data, others	See Ref.	65

Unit Cell Spacings See Crystallographic Data

Vicat Softening Point (°C)		
DIN 53 460/ASTM D1525-65 T	160–170	3
ASTM D1525		
Homopolymer	157	138
Copolymer	151	138
	162	73

Viscosity – Molecular Weight Relationships

$[\eta] = K \times M^{\alpha}$ (ml/g) See also corresponding chapter in this Handbook

Solvent	t (°C)	K (×10³)	α	No. of samples: FR[a]	No. of samples: WP[b]	Molecular weight range (× 10⁻³)	Method[c]	Refs.
p-Chlorophenol, 2% α-pinene	130	54.3	0.66	?	?	?	OS cited in Ref.	41
	60	41.3[d]	0.724	–	4	62–129	LS	29
1H, 1H, 5H-octafluoropentanol-1	110	13.3	0.81	–	4	62–129	LS	29
Phenol-tetrachloroethane (25–75 wt.), 2% α-pinene	90	12.16	0.64	8	–	1.1–92	EG	42
Phenol	90	11.3	0.76	?	–	?	OS cited in Ref.	43
Dimethylformamide	150	44.0	0.66	–	4	89–285	LS	74
	130	22.4	0.71	7	–	1.5–15	EG	45
Hexafluoroacetone sesquihydrate + triethylamine	25	46.0	0.74	7	–	1.5–15	EG	45

[a]Fractionated.
[b]Polymer unfractionated.
[c]OS – Osmotic measurement; LS – Light scattering; EG – Viscosity measurement.
[d]$[\eta]_{inh}$.

Property	Value	Refs.
Huggins coefficient k_H, $\eta_{sp/c} = \eta + k_H \eta^2 c$		
Hexafluoroacetone hydrate 25°C	0.41	44
Hexafluoroacetone–water mixtures	See. Ref.	44
Hexafluoroacetone–sesquihydrate + triethylamine, 25°C	0.31	45
Hexafluoroacetone–water (1 : 1.7 mol) + triethylamine, 25°C	0.30 ± 0.02	46
p-Chlorophenol/2% α-pinene (60°C)	0.40	47
Schulz–Blaschke coefficient K_{SB}, $\eta_{sp/c} = K_{SB}[\eta] \times \eta_{hsp} + [\eta]$		
Hexafluoroacetone hydrate, 25°C	0.29	44
Hexafluoroacetone–water mixtures, 25°C	See Ref.	44
Phenol–tetrachloroethane, 1 : 3 (per weight), 90°C	0.23	43
	0.21	48

Volume Resistivity (ohm cm)		
Film 0.2 mm, DIN 53 482/ASTM D257-61	>10^{15}	3

Water Absorption		
DIN 53472 (mg)		
After 96 h immersion	20–30	63

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Property	Value	Refs.
ASTM D570 (%)		
After 24 h immersion		
Homopolymer	0.25	73
Copolymer	0.22	73
Equilibrium, (50% r.h.)		
Homopolymer	0.2	73
Copolymer	0.16	73
Yield Stress (MPa)		
Homopolymer	71	138
Copolymer	66	138

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Physical Constants of Poly(oxyethylene-oxyterephthaloyl) (Poly(ethylene terephthalate))

Mark Rule
1 Coca Cola Plaza NW, TEC 147, Atlanta, GA, USA

Properties of films are given for Mylar® Type A (DuPont) biaxially oriented and crystalline films. Properties of filaments are given for various products.

Property	Value	Refs.
Birefringence of Filaments (sodium light)*		1
Draw Ratio		
2.0	0.040	
3.0	0.092	
4.0	0.167	
5.0	0.193	
Bursting Strength (g/cm^2)		
1 mil film, 23°C	46×10^2	2,3
Brillouin Light Scattering	See Ref. 4	
Coefficient of Friction (film)		
Kinetic, film to film	0.45	2,3
film to steel	0.14	6
Coefficient of Thermal Conductivity (film) (W/m/s/K) (See also Thermal Conductivity)		
100°C	37.5×10^{-3}	2,3
Coefficient of Thermal Expansion (film) (K^{-1})		
20°C–50°C	1.7×10^{-5}	2,3
Melt	6.55×10^{-4}	5
Coefficient of Volume Expansion (K^{-1})		7
Crystalline, below T_g	1.7×10^{-4}	
Crystalline, above T_g	3.94×10^{-4}	
Compressibility (melt) (MPa) ($\times 10^6$)	6.99	5
Conductivity for Direct Current See Fig. 1 overleaf		
Crystallographic Data See Unit cell		
Density (Mg/m^3) ≡ (g/cm^3)		
0% Crystalline	1.333	81
100% Crystalline	1.455	82
Amorphous, non-oriented	1.335	9
Partly cryst., non-oriented	1.385	9
Partly cryst., oriented	1.390	9
Highly cryst., non-oriented	1.420	10
Calculated, crystal	1.515	11
	(1.501)	12
Dielectric Strength (film) (V/cm)		2,3
23°C, 60 Hz	2.95×10^6	
150°C, 60 Hz	2.75×10^6	
Dielectric Constant (film)		2,3
23°C, 60 Hz	3.30	
23°C, 1 kHz	3.25	
23°C, 1 MHz	3.0	
23°C, 1 GHz	2.8	
150°C, 60 Hz	3.7	
Dissipation Factor (film)		2,3
23°C, 60 Hz	0.0025	
23°C, 1 kHz	0.0050	
23°C, 1 MHz	0.016	
23°C, 1 GHz	0.003	
150°C, 60 Hz	0.00040	
Elastic Constants (filaments) (Pa^{-1})		13
Oriented		
S_{11} transverse	16×10^{-10}	
S_{33} longitudinal	0.71×10^{-10}	
S_{44} torsional	14×10^{-10}	
S_{12}	-5.8×10^{-10}	
S_{13}	-0.31×10^{-10}	
Unoriented		
S_{11} or S_{33} extensional	4.4×10^{-10}	
S_{44} torsional	11×10^{-10}	
Enthalpy of Fusion (kJ/mol)	2.69	10
Entropy of Fusion (J/mol/K)	48.6	10
Folding Endurance (film) (cycles)		
23°C	300 000	2,3

*Value sensitive to semicrystalline morphology.

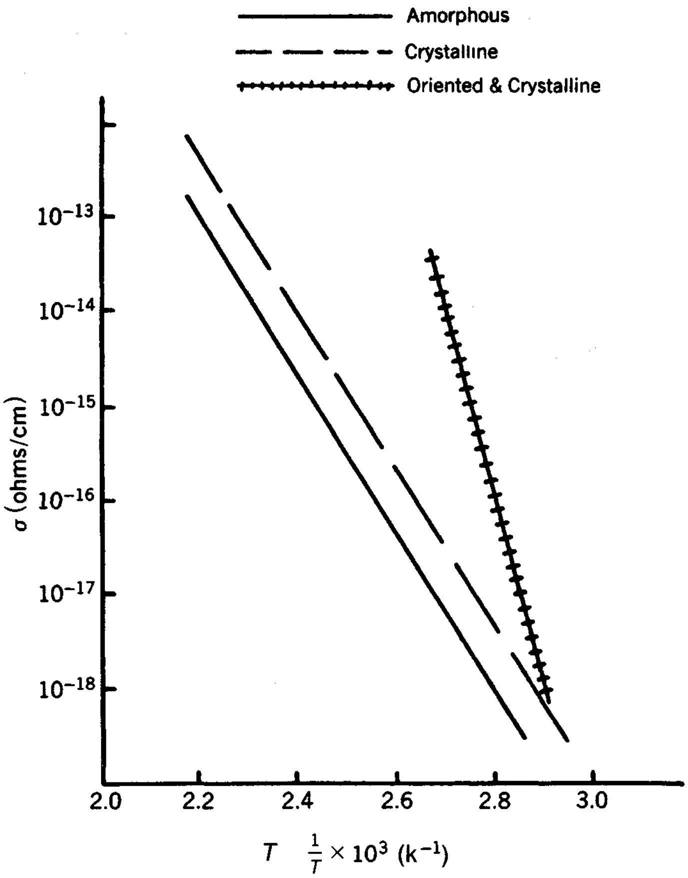


Figure 1. Direct current conductivity at various temperatures and degrees of orientation and crystallinity (8).

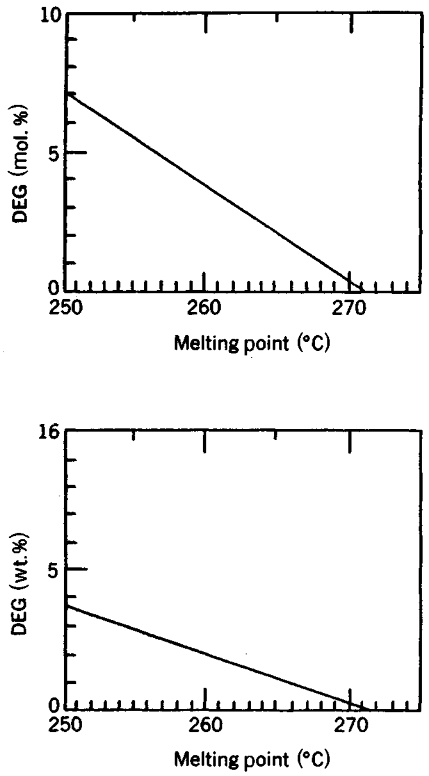


Figure 2. Effect of diethylene glycol (DEG) content on melting point. Melting point (°C) = 271–273 (2,29).

Property	Value	Refs.
Glass Transition Temperature* (°C)		
Amorphous	67	7,14
Crystalline	81	14
Crystalline and oriented	125	15
Heat capacity See Specific heat		
Heat of Combustion (kJ/kg)	-2.16×10^4	16
Heat of Sorption (film) (kJ/kg/mol)		
Carbon dioxide	-3.1×10^4	17
Methane	-2.3×10^4	
Solubility of Carbon Dioxide		
25–115°C, 0–20 atm		83
Hygroscopic Coefficient of Expansion (film) (cm/cm%/RH)		
20–92% RH,	1.1×10^{-5}	2,3
Impact Strength (film) (J/m)		
23°C	2.4×10^2	2,3
Infrared Spectra See Refs. 18–25		
Insulation Resistance (film) (Mohm mfds)		
100°C	5000	26,27,28
130°C	400	
150°C	100	

*Value sensitive to semicrystalline morphology.

Property	Value	Refs.
Melting Point (°C)		
Equilibrium	280 (310)	11(12)
Commercial PET (metastable crystallites)	250–265	2,3
Effect of diethylene glycol content	See Fig. 2	29

Melt Viscosity vs. Intrinsic Viscosity

Melt viscosity (Pa s) at 280°C[a]	Intrinsic viscosity (ml/g), 30°C in *s*-tetrachloroethane/phenol (40/60)
0.45	10
4.5	20
25.0	30
95.0	40
115.0	50
145.0	60
800.0	70
1180.0	80
20000.0	90

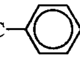
[a] Taken from Fig. 14 of Ref. 2.

Property	Value	Refs.
Moisture Absorption (%)		
Immersion in water at 25°C for 1 w	0.8	27,28

Nuclear Magnetic Resonance Spectrum See Refs. 13,30,31

Oligomers – acyclic

Structure	Molecular weight	Melting point (°C)	Refs.
$H(GA)_1OH^a$	210.2	178	32
$H(GA)_2OH$	402.4	200–205	32
$H(GA)_3OH$	594.6	219–223	32
		179–183	33
		186	34
$H(GA)_1$–G–H	254.2	109–110	32
$H(GA)_2$–G–H	446.4	173–174	32
$H(GA)_3$–G–H	638.6	200–205	32
$H(GA)_4$–G–H	830.8	213–216	32
$H(GA)_5$–G–H	1023.0	218–220	32
HO–A–$(GA)_1OH$	358.3	>360	32
HO–A–$(GA)_2OH$	550.5	280–281	32
HO–A–$(GA)_3OH$	742.7	268–270	32
HO–A–$(GA)_4OH$	934.9	252–255	32
HO–A–$(GA)_5OH$	1127.1	233–236	32

[a] G = $-OCH_2CH_2O-$; A = —OC——CO—

Property	Value	Refs.
Oligomers – cyclic		
CYCLIC DIMER		
Melting point (°C)	175, 224	33
	229	35
Unit cell (nm)	$a = 0.858$	35
	$b = 1.275$	
	$c = 0.801$	
	$\beta = 90.7°$	
CYCLIC TRIMER (B-TYPE CRYSTAL)		
Melting point (°C)	319	33
	317 –320	36
	321	37
Crystalline transition (°C)	199	37
(A-type → B-type)	195	38
CYCLIC TETRAMER		
Melting point (°C)	326	33
CYCLIC PENTAMER		
Melting point (°C)	256	33
Oligomers – Isolation See Ref. 39		
Optical Haze* (ASTM D1003-61) See Ref.		40
Permeability (film) See corresponding chapter in this Handbook.		
Water (cm^2/s) $(2.11–9.97) \times 10^{-9}$		84
Photoacoustic Spectroscopy See Ref. 41		
Poisson's Ratio (Oriented filament)		
Extensional	0.44	13
Transverse	0.37	
Raman Spectra		21,42–46
Frequency (cm^{-1})	1730	
	1618	
	1096	
	857	
	632	
	278	

*Value sensitive to semicrystalline morphology.

Property	Value	Refs.
Refractive Index (film), (Na Light)		2
Amorphous, 25°C	1.5760	
Crystalline and biaxially oriented, 23°C	1.64	
80,90,100°C		85
Refractive Index Increment (specific) (cm^3/g) (in hexafluoroisopropanol solution)		
	0.257 ± 0.004	47
Resistivity		2,3
Surface (ohm/cm^2)		
23°C, 30% RH	2×10^{15}	
23°C, 80% RH	2×10^{11}	
Volume (ohm cm)		
23°C	10^{18}	
150°C	10^{14}	
Rheological Spectrum See Refs. 48,49		
Service Temperature (°C)		2,3
	-60 to $+150$	
Shrinkage (film) (%)	2–3	3
150°C, 30 min.		
Solubility Constants (film) (cm^3/STP cm^3/Pa) ($\times 10^7$)		17
3 mil, 25°C Nitrogen	4.3	
Oxygen	7.5	
Methane	19.7	
Argon	0.8	

Solvents See chapter "Solvents-Nonsolvents" in this Handbook

Solvent–Nonsolvent for Fractionation

Solvent	Nonsolvent	
o-Chlorophenol	Hexane	50
Phenol/tetrachloroethane (1 : 1)	Gasoline	51
Phenol/chlorobenzene (1 : 1)	Gasoline	52
Phenol/dichlorobenzene (2 : 3)	Benzene	53
Phenol	Cyclohexane	54
Phenol	Ethanol	55

Property	Value	Refs.
Sonic Velocity (filaments) (m/s)		56
10 kHz unoriented	1400	
Highly oriented	5900	

Specific Heat (kJ/kg/K) $C_p = 4.184\,(A + (B \times T))$ 57

Condition of polymer	A	B ($\times 10^4$)	Effective temperature T (°C)
Molten polymer	0.3243	5.65	270 to 290
Flake	0.2502	9.40	– 20 to 60
Yarn (undrawn)	0.2469	10.07	– 5 to 60
Yarn (drawn)	0.2482	9.89	– 10 to 55
Yarn (drawn + annealed)	0.2431	9.23	– 10 to 80
	0.2502	9.31	100 to 200

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Property	Value	Refs.
1.2–40 K	See Ref.	58
Below 1 K	See Ref.	59
Stick Point Temperature (°C)	230–240	4
Stress–Strain Curves for Filaments See Refs.		60,61
Surface Tension (mN/m) ≡ (dyn/cm)		
Solid/liquids, 25°C	39.5	62
	42.1	63
Molten, 290°C	27 ± 3	64
Tear Strength (film (g/m)		
Initial, 23°C	23.6×10^6	2,3
Propagating, 23°C	0.59×10^6	
Tensile Strength (film) (Mpa) ≡ (N/mm^2)		
23°C,	172	2,3
Thermal Conductivity (film) (W/m/K)		
33°C	0.147	65
1.2–40 K	See Ref.	58
Below 1 K	See Ref.	59
Thermal Diffusivity (film) (cm^2 s)		
33°C	9.29×10^{-4}	65
Torsional Modulus (MPa) ≡ (N/mm^2)		
Oriented filament	720	13

Property	Value	Refs.
Transition Temperatures (°C)		
From second moment (NMR) measurements on fibers		
Unoriented	120 ± 5	13,31
Oriented	140 ± 10	
Unit Cell (nm)		66,11,12

	Previously accepted (Ref. 66)	Corrected (Ref. 11)	Corrected (Ref. 12)
X-RAY DIFFRACTION (291 K)			
a	0.456	0.448	0.450
b	0.594	0.585	0.590
c	1.075	1.075	1.076
α	98.5°	99.5°	100.3°
β	118°	118.4°	118.6°
γ	112°	111.2°	110.8°
ELECTRON DIFFRACTION (Ref. 67)			
a	0.452		67
b	0.598		
c	1.077		
α	101°		
β	118°		
γ	111°		

Property	Value	Refs.
Viscocity–Molecular Weight Relationship See Sections I, II		
Young's Modulus (MPa) ≡ (N/mm^2)		
Oriented Filament – extensional	1.41×10^4	13
– transverse	0.063×10^4	
Zero Strength Temperature (film) (°C)	248	68

Intrinsic Viscosity – Molecular Weight Relationships (Unfractionated)[a]

Solvent	*T* (°C)	*K* ($\times 10^4$)	*a*	Molecular weight range ($\times 10^{-3}$)	Method	Refs.
Trifluoroacetic acid	30	4.33	0.68	26–118	Light scattering	69
Tetrachloroethane/phenol (5 : 3)	30	2.29	0.73	26–118	Light scattering	69
o-Chlorophenol	25	6.56	0.73	12–25	Osmometry	70
o-Chlorophenol	25	3.0	0.77	13–28	End group	71
Tetrachloroethane/phenol (1 : 1)	25	2.1	0.82	5–25	End group	72
Tetrachloroethane/phenol (1 : 1)	20	1.27	0.86	5–21	End group	73
Tetrachloroethane/phenol (1 : 1)	20	7.55	0.685	3–30	End group	54
Phenol/2,4,6-trichlorophenol (10 : 7)	29.8	2.10	0.80	1–8	End group	74
o-Chlorophenol	25	6.31	0.658	6–70	Size exclusion chromatography	
					Light scattering	75
Phenol/Tetrachloroethane (3 : 2)	25	7.44	0.648	6–70	Light scattering	75
Hexafluoroisopropanol	25	5.20	0.695	6–70	Light scattering	75
Pentafluorophenol	25	3.85	0.723	6–70	Light scattering	75
Hexafluoroisopropanol/pentafluorophenol (1 : 1)	25	4.50	0.705	6–70	Light scattering	75
Methylene chloride/hexafluoroisopropanol (7 : 3)	–	4.03	0.691	–	Size exclusion chromatography	76
o-Chlorophenol/chloroform (1 : 3)	25	1.49	0.56	9–100	Chromatography	77

[a] $(\eta) = K \times M^a$.

Intrinsic Viscosity – Molecular Weight Relationships (Fractionated)[a]

Solvent	T (°C)	K (× 10^4)	a	Molecular weight range (× 10^{-3})	Method	Refs.
o-Chlorophenol	25	1.9	0.81	15–38	End group	78
Dichloroacetic acid	25	67	0.47	15–38	End group	78
Trifluoroacetic acid	25	14	0.64	15–38	End group	78
Phenol/tetrachloroethane (2 : 3)	25	14	0.64	15–38	End group	78
o-Chlorophenol	25	4.25	0.69	20–200	Sedimentation diffusion	79
Tetrachloroethane/phenol (1 : 1)	20	0.9	0.87	5–21	End group	73
Phenol/dichloroethane (2 : 3)	20	0.92	0.85	8–30	End group	53
o-Chlorophenol/chloroform (1 : 9)	25	0.584	0.91	4–30	Size exclusion chromatography	80

[a] $(\eta) = K \times M^a$.

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Physical Constants of Poly(oxytetramethylene-oxyterephthaloyl) and Copolymers with Tetramethylene Oxide Thermoplastic Elastomers*

K. B. Wagener
Department of Chemistry and Center for Macromolecular Science & Engineering, University of Florida, Gainesville, FL, USA

The literature gives different chemical abbreviations for this segmented polyester/polyether copolymer, such as PBT/PTMO, PBT/PTHF (where PTHF abbreviates polytetrahydrofuran), and PBT/POTM (where POTM abbreviates polyoxy-tetramethylene). Occasionally, components of the abbreviation are reversed (as in PTHF/PBT). All these abbreviations represent the same copolymer, which is available with different weight percentages of polyether being present.

	Weight percentage polyether in copolymer[a]					
Property	0%[b]	10%	25%	35%	50%	60%
Hardness, shore D	80	74	63	55	45	38
Density (mg/m^3)	1.30	1.27	1.23	1.20	1.16	1.12
Coefficient of expansion (vol/K)						
@ − 20°C	210×10^{-6}	240×10^{-6}	360×10^{-6}	300×10^{-6}		
20°C	210×10^{-6}	330×10^{-6}	420×10^{-6}	450×10^{-6}	480×10^{-6}	660×10^{-6}
80°C		510×10^{-6}	540×10^{-6}	600×10^{-6}		
THERMAL PROPERTIES						
Glass transition temp. (°C)	55 /48[c]	44 /24[c]	2 /− 28[c]	− 23 /− 46[c]	− 50	− 60
Heat capacity, C_p (kJ kg/K) @ 100°C	1.35	1.61	1.72	1.78	1.95	2.01
Melting temperature (°C)	223	221	210	202	183	192
Heat of fusion (kJ/kg)	54	60	41	38	29	25
ELECTRICAL PROPERTIES						
Dielectric constant (1 kHz)	3.0	3.35	4.1	4.3	4.5	4.5
Dissipation factor (1 kHz)	0.002	0.037	0.017	0.012	0.006	0.005
Volume resistivity (ohm m)	5.10×10^{14}	8.8×10^{13}	1.2×10^{11}	2.5×10^{10}		
MECHANICAL PROPERTIES						
Ultimate elongation (%) (ASTM D 412)	200	360	540	570	700	650
Tensile strength (MPa) (DIN 53504)	52	45	38	32	21	17
Initial slope of stress–strain curve, Young's modulus (MPa)	2600	830	300	170	90	53
Storage modulus G′ (log MPa)	2.74	2.70	2.17	1.94	1.60	1.25
Loss modulus G″ (log MPa)	0.78	1.58	0.96	0.48	0.08	− 0.27
Loss tangent G″/G′	0.011	0.076	0.062	0.035	0.03	0.03
Resilience (rebound) (%)			40	53	60	65

[a] $\bar{M}_n = 1000$ for the polyether except for the 60 wt.% copolymer, in which $\bar{M}_n = 2000$.
[b] 0% refers to the properties for pure poly(oxytetramethylene-oxyterephthaloyl) (poly(butylene terephthalate)).
[c] Two different measurement values are given, top tan ∂/top G″, 1 Hz.
[d] Top of highest peak.

* All data are unpublished results from the Akzo Fibers and Polymers Research Laboratories, Arnhem, The Netherlands.

Physical Constants of Various Polyamides: Poly[imino(1-oxohexamethylene)], (Polyamide 6) Poly(iminoadipoyl-iminohexamethylene), (Polyamide 66) Poly(iminohexamethylene-iminosebacoyl), (Polyamide 610) Poly[imino(1-oxododecamethylene)], (Polyamide 12)*

Rakesh H. Mehta
E.I. DuPont de Nemours & Co., DuPont Nylon, Chattanooga, Tennessee, USA

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Abrasion	See Wear Resistance				13
Absorption (%)					
Water, moldings 20–90°C, saturation	9.5 ± 0.5	8.5 ± 0.5	3.3 ± 0.3	1.6 ± 0.2	
Ethanol, moldings 20°C, saturation	9–17	9–12	8–13	9	
Butanol, moldings 20°C, saturation	5–9	4–8	8–12	–	
Glycol, moldings 20°C, saturation	6–13	2–10	2–4	–	
Methanol, moldings 20°C, saturation	12–16	9–14	16	8,5	
Propanol, moldings 20°C, saturation	9–13	9–12	10	–	
Adhesive Bond Strength, tensile (MPa) ≡ (N/mm^2)					
PA-aluminium		68			39
PA-steel		70			39
PA-copper		76			39
Birefringence, (Δ_n)					51
$n_{\parallel}$	1.580	1.582			51
$n_{\perp}$	1.530	1.519			55

* This table includes data compiled by R. Pflüger for the third edition of Polymer Handbook.

Brittleness Temperature, ASTM D746 (°C) 57–59

PA-6		PA-66		PA-610		PA-12	
DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
–	–	– 80	– 65 [$M_n = 18000$]	– 90	– 62	–	–
–	–	– 100	– 85 [$M_n = 34000$]	–	–	–	–

	PA-6	PA-66	PA-610	PA-12	Refs.
Bulk Modulus B (N/mm^2) (Crystalline rods, dry)	4400	3300	2300	4000	
Chemical Resistance of Nylons at 23°C					57,59
Acetic acid (10%)	3[a]	3	–	2[b]	
Acetaldehyde (40%)	2	2	–	1[c]	
Acetone (100%)	1	1	–	1	
Butanol (100%)	1	1	–	1	
Carbon tetrachloride (100%)	1	1	–	2	
Diesel oil (100%)	1	1	–	1	
Ethanol (96%)	1	1	–	1	
Formic acid (3%)	3	3	–	1	
(10%)	4[d]	4	–	–	
Gasoline unleaded (100%)	1	1	–	1	
Heptane (100%)	1	1	–	1	
Hydrogen peroxide (2%)	4	4	–	2	
Dichloromethane (100%)	2	2	–	3	
Perchloroethylene (100%)	1	1	–	2	
Phenol (75%)	3	3	–	3	
Potassium hydroxide (10%)	1	1	–	1	
Sulfuric acid (10%)	4	4	–	2	
Toluene (100%)	1	1	–	1	
Transformer oil (100%)	1	1		1	

[a] Considerable absorption and/or attack; limited product life.
[b] Limited resistance, absorption causing dimensional changes and slight reduction in properties.
[c] Resistant, little or no absorption.
[d] Material is soluble or decomposes in short time.

	PA-6	PA-66	PA-610	PA-12	Refs.
Coefficient of Friction (dry)					
(a) Average depth of roughness R_z in (μm)*					
0.1	0.35	0.5		0.55	13
0.5	0.33	0.43		0.45	
1.0	0.32	0.38		0.38	
2.0	0.32	0.35		0.35	
4.0	0.36	0.38		0.37	
6.0	0.43	0.46		0.40	
(b) Average surface pressure in (MPa) ≡ (N/mm^2)					
R_z Optimal	R_z 1.5–3 μm	R_z 1.5–3 μm		R_z 0.5–1 μm	
0.02	0.40	0.40		0.40	13
0.05	0.36	0.36		0.36	
0.1	0.35	0.35	0.4	0.35	
0.15	0.38	0.38		0.38	
0.2			0.32		
0.3			0.29		
0.4			0.26		
0.5			0.24		
0.6			0.23		
0.7			0.22		
0.8			0.21		
1.0	0.43	0.44	0.19	0.44	
1.2			0.18		
5.0	0.48	0.50		0.50	
15.0	0.48	0.51		0.51	
$R_z < 0.3$ μm	Stick-slip-motion	Stick-slip-motion		Stick-slip-motion	13

*Average surface pressure 0.1 MPa; surface temperature < 40°C.

Coefficient of Thermal Expansion (K^{-1}) (× 10^4)

Coefficient of Linear Thermal Expansion, ASTM D696 (10^{-5} mm/mm°C) 57,59

PA-6		PA-66		PA-610		PA-12	
DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
–	–	8.1	–	9	14.9	–	–

		PA-6	PA-66	PA-610	PA-12	Ref.
(a) Linear crystalline	20°C	7–10	7–10	8–10	11	
	100°C	10–14	10–14		20–23	
Monoclinic	α a	6.2				52
	α c	23.4				
	α b	−4.5				
Triclinic	α a		2.1			52
	α c		22.0			
(b) Volume, 20°C, cryst. (K^{-1}) ($\times 10^4$)		2.7	2.8	3.8	2.9	55

Cohesive Energy See Solubility Parameter 51

Compressibility (MPa)

(a) Dependence on temperature and pressure (calc. from *PVT*)

°C	MPa	PA-6	PA-66	PA-610	PA-12
20 (°C)	50 (MPa)		62×10^{-6} (50)		200×10^{-6}
	100		58		
	150		54		
	300		50		
120	50		125		320×10^{-6}
	100		115		
	150		95		
	300		75		
200	>100		– >300 (17)		

(b) Dependence on water content

	PA-6	PA-66	PA-610	PA-12
<1.5%		137×10^{-6} (48)		200×10^{-6}
>–2%		226×10^{-6} (48)		
melt	335×10^{-6}	280×10^{-6}		650×10^{-6}

Compressive Strength (MPa) ≡ (N/mm^2)

Compressive Stress, 1% Deformation, ASTM D695 (MPa) 57–59

		PA-6	PA-66	PA-610	PA-12
		20	34	21	13
Temperature 20°C	strain: 1%		14		
(molded; 2.5% H_2O)	strain: 2%		28		
	strain: 4%		56		
	strain: 6%		70		

Compressive Modulus, ASTM D695 (MPa) 58

PA-6	PA-66	PA-610	PA-12
2410	2830	2070	–

Compressive Yield Stress, 1% Offset, ASTM D695 (MPa) 58

PA-6	PA-66	PA-610	PA-12
83	91	73	–

Crystallographic Data See also Unit Cell Dimension

Effect of Crystallinity on Solvent Absorption (% Weight Gain) 59

	PA-6		PA-66		PA-610		PA-12	
Agent	b	c	b	c	b	c	b	c
Water	11	9	10	7.5	4	3	–	–
Methanol	19	3	14	9	16	9	–	–
Ethanol	17	3	12	3	13	8	–	–
Benzene	1	0	1	0	1	1	–	–
Toluene	1	0	1	1	3	1	–	–
Acetone	4	3	2	1	5	1	–	–
Benzoyl alcohol	55	11	38	3	40	11	–	–
Dichloromethane	20	8	16	10	24	13	–	–
Chloroform	34	19	27	5	40	21	–	–

b: low crystalline material.
c: high crystalline material.

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Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Crystallization					
Crystalline Density, X-ray (g/cm^3)	1.23	1.24	1.16	–	65
Max. linear growth rate of crystals v_{max} (μm/s)	3.3	20			51
Activation energy E_a(kJ/mol)	56.5	64.5	53.6		51
Density (Mg/m^3) ≡ (g/cm^3)					
Crystalline α, monoclinic	1.24 (53)				
γ, hexagonal	1.13				
γ, monoclinic	1.17			1.034 (9)	
γ, pseudohexagonal	1.155 (42)				
α, triclinic		1.220 (47)	1.156 (8)		
α, triclinic		1.24			
β, triclinic		1.248			
Melt 270°C, 1 bar	0.960	0.989	0.913	0.840	
Moldings, amorphous	1.09	1.09	1.05	1.01	36
crystalline	1.12–1.14	1.13–1.145	1.09	1.04 (15)	36
Correlation with crystallinity (moldings)	$\alpha = 950 - \frac{1040}{\text{density}}$	$830 - \frac{900}{\text{density}}$	$990 - \frac{1030}{\text{density}}$		36
Deformation Under Load, ASTM D621 (%)					58,59
14 MPa	1.6	1.4	–	–	
28 MPa	1.8	1.5	–	–	

Dielectric Constant ε, Dielectric Loss, tan δ **(× 10⁴)**[a]

Frequency (s^{-1})		10^2		10^3		10^4		10^5		10^6		10^7		10^8		10^9	
PA	(°C)	ε_r	tan δ	ε_r	tan δ	ε_r	tan δ	ε_r	tan δ	ε_r	tan δ	ε_r	tan δ	ε_r	tan δ	ε_r	tan δ
6	−30	3.1	140	3.1	100	3.0	100	3.0	160	3.0	200	3.0	180	3.0	120	3.0	55
	0	3.2	120	3.2	120	3.2	140	3.2	170	3.1	220	3.1	230	3.1	160	3.0	100
	30	3.5	65	3.5	100	3.4	140	3.4	190	3.3	240	3.2	300	3.2	300	3.1	200
	60	5.2	840	4.6	600	4.2	520	3.8	540	3.6	550	3.4	550	3.3	480	3.2	260
	90	15.9	2900	11.5	1650	8.8	1500	7.1	1900	5.7	2100	4.4	1900	3.7	1250	3.4	550
	23°/50% RH[b]	10.9	1450	7.3	1400	5.6	1450	4.5	1300	3.8	920	3.5	550	3.3	320	3.2	190
66	−30	3.1	120	3.1	105	3.1	105	3.0	130	3.0	165	3.0	160	3.0	100	3.0	49
	0	3.3	110	3.3	120	3.2	135	3.2	160	3.1	200	3.0	200	3.0	160	3.0	81
	30	3.6	85	3.5	125	3.4	180	3.4	215	3.2	250	3.1	255	3.1	220	3.0	135
	60	5.0	810	4.6	590	4.3	460	4.0	390	3.7	370	3.5	360	3.3	320	3.1	240
	90	10	2000	8.9	1450	7.6	1300	6.2	1450	5.0	1600	4.0	1300	3.4	810	3.2	440
	23°/50%RH[b]	7.5	1100	5.9	1020	4.8	1000	4.1	900	3.7	700	3.4	450	3.3	280	3.2	170
610	−30	3.0	120	3.0	110	3.0	100	3.0	110	3.0	150	3.0	130	3.0	80	3.0	55
	0	3.0	130	3.0	130	3.0	130	3.0	140	3.0	170	3.0	190	3.0	160	3.0	100
	+30	3.2	100	3.2	150	3.1	170	3.0	200	3.0	210	3.0	210	3.0	170	3.0	130
	+60	4.6	900	4.2	650	3.9	570	3.5	540	3.4	540	3.3	500	3.1	360	3.0	250
	+90	13	2500	10.5	1700	8.5	1700	6.5	1900	5.2	1900	4.0	1500	3.5	800	3.1	350
	20°/65%RH[b]	6.5	2000	5.4	1500	4.5	1300	4.0	1000	3.5	800	3.2	550	3.1	350	3.0	200
12	−30	30	170	3.0	160	2.9	100	2.9	50								
	0	3.1	200	3.1	200	3.0	190	3.0	130								
	30	4.0	700	3.5	500	3.3	450	3.1	350								
	60	11.5	2300	8.5	2000	6	2300	4.5	1300								
	90	>20	>5000	15	2000	13	1600	10	2600								

[a] Ref. 5.
[b] Saturated

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Dielectric Strength (V/cm) (× 10^{-4})					
(VDE 0303, part 2; IEC-243, electrode K20/P50)					
Dry	100	120	100	90	
Dry 100°C	40	40	–	25	
Moist ISO-1110	60	80	60	–	

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Diffusion See also table "Permeability Constants" in this Handbook					
Coefficient D H_2O, 20°C	0.4	0.2	0.1	0.3 (16)	
$(cm^2/s) \times 10^8$ 60°C	5.5	3.5	1.5	7 (16)	
100°C	55	35	30	85 (16)	
Activation energy H_2O E_D(kJ/mol)	46	58	65	71 (16)	
Elongation (ISO R527) ultimate (%)					
Molded ($s = 3$ mm), dry	>50	40	>50	>50	
Molded ($s = 3$ mm), moist	>50	>50	>50	>50	
ISO-1110					
Molded at yield	10	6		8	
Dry film, NK 23/50, $s = 25$ μm					
Longitudinal	300				
Transverse	330				
Biaxially oriented					
Longitudinal	70				
Transverse	50				
Enthalpy (kJ/kg)					
Temperature T (°C) (Ref. to 20°C)					
60	60	85	80	80	
100	135	170	160	165	
200	380	420	400	500	
250	585	590	580	650	
300	750	850	700	800	
Pressure (MPa) ≡ (N/mm^2)					
($T = 25$°C)					
100		70			17
200		140			17
($T = 150$°C)					
0		250			17
100		340			17
200		420			17
Entropy of Fusion (J/mol/K)					
Crystalline	44–47.5	83–86	110–114		51
Equation of State* (melt)					
$(p + \pi)(v - \omega) = RT/M_u$ π (bar)	2040 (27), 2890 (18)	4590 (18)	540 (51)	3640 (18)	51
ω (cm^3/g)	0.817 (27), 0.778 (18)	0.735 (18)	0.77 (51)	0.837 (18)	
M_u	105 (27), 59 (18)	35.4 (18)		35.3 (18)	

Flexural Strength, ASTM D790 (MPa) 57,59

	PA-6		PA-66		PA-610		PA-12	
Temp. (°C)	DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
−40	145	–	–	–	–	–	–	–
−30	–	–	–	–	–	–	86	–
23	–	–	117	42	–	–	55–57	37–44
24	113	40	–	–	–	–	17	–
80	23–20	–	–	–	–	–	–	–

*Spencer and Gilmore; $R = 82.06$ $(cm^3 bar/mol/K)$; v = specific volume (cm^3/g) (51).

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Glass Transition Temperature, T_g (°C) 57–59,61–63,67–69

	DAM				50%RH		100%RH	
	A	B	C	D	C	D	C	D
PA-6	56	65,67	59,65,75	41,60	20	3	−22	−32
PA-66	82	65,67	66,78,80	46,48	35	16	−15	−37
PA-610	56	46,50	65,67,70	42,51	40	–	10	–
PA-12	29	25,32	54,62,–	42,–	–	–	42	–

A: Estimated from melting temperature: $T_g = 2/3 \times T_m$; 9,10.
B: Calculated from group contribution, 9,10.
C: Dynamic measurements with torsion pendulum; 9,10,11,12.
D: Static Measurement: DSC inflexion point of mechanical property versus temperature or method not identified; 9–18.

Grüneisen Parameter γ_G^{**}	0.58	0.49	0.45	0.64	51,55

Hardness

Rockwell Hardness, ASTM D785 57–59

PA-6		PA-66		PA-610		PA-12	
DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
R116–119	R97–101	R118–121	R108	R110–111	–	R106–110	–

Dry, 23°C	*M* 100	*M* 105	*R* 75	*R* 110	
Moist ISO-1110, 23°C	*M* 70	*M* 95	*M* 60		
Ball Indentation Hardness H358/30 (MPa) ≡ (N/mm^2) (DIN 53 456), (ISO-2039)					
Dry, 23°C	150	160	120	98	
Dry, nucleated, 23°C	160	170			
Moist ISO-1110, 23°C	70	100–110	80		
Heat Capacity See also corresponding table in this Handbook					
20°C, crystalline (J/mol/K)	204	374	502	354	55
Heat of Combustion (kJ/kg)	−31.400	−31.400			51
Heat of Crystallization (kJ/kg)	−46.5	−54			25

Heat Distortion Temperature

ASTM D648 (°C) 57,59

Load MPa	PA-6 DAM	PA-6 50%RH	PA-66 DAM	PA-66 50%RH	PA-610 DAM	PA-610 50%RH	PA-12 DAM	PA-12 50%RH
0.5	–	–	235	–	175	160	120	–
1.8	55–75	–	90	–	66	60	50	250

(ISO-R 75) (°C)					
Molded, dry, 0.45(N/mm^2) ≡ (MPa) method B	>160	>200	>160	150	
Molded, dry, 1.8(N/mm^2) method A	55–90	100–110	65–85	55	
Heat of Formation See Enthalpy					
Heat of Fusion (kJ/kg)					
Crystalline from ΔH_m	190 (25)	196 (25)	215	95 (15)	
Crystalline from ΔH_m for α-structure	230–278				
	240–260 (24)				
Amorphous, annealed 8 h at 50°C	45			45 (15)	
Heat of Sorption (J/mol)					
H_2O < 150°C	-45.6×10^3 (43)				
Melt	-76.8×10^3 (14)		-58.5×10^3 (37)		

** $\gamma_G = (\alpha B V_m / C_p$ (55) where α is the coefficient of expansion (K^{-1}), B is the bulk modulus (N/mm^2), V_m is the molar volume (cm^3/mol), C_p is the specific heat capacity (mJ/K/mol).

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Ignition Temperatures (ASTM D1929–1977) (°C)					
Flash-ignition temperature	400	390	415		
Self-ignition temperature	440				
Impact Strength, Izod, notched, ASTM D256 (J/m)					57–59,62–64

Temp. (°C)	PA-6 DAM	PA-6 50%RH	PA-66 DAM	PA-66 50%RH	PA-610 DAM	PA-610 50%RH	PA-12 DAM	PA-12 50%RH
−40	48	–	43	–	43	–	55	–
23	53	267	53	107	53	85	60	64

Tensile Impact Strength, ASTM D1822 (KJ/m^2) 57–59

	PA-6 DAM	PA-6 50%RH	PA-66 DAM	PA-66 50%RH	PA-610 DAM	PA-610 50%RH	PA-12 DAM	PA-12 50%RH
Short	147–250	–	158 [$M_n = 18000$]	231	168–200	–	–	–
Long	–	Not broken	504 [$M_n = 18000$]	1470	–	–	–	–
			535 [$M_n = 34000$]	Not broken				

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Notched, Charpy, DIN 53453 (MPa)					57–59
DAM (20°C)	3–6	2–3	4–10	–	
Conditioned 4 months, 20°C and 65% RH	Not broken	12–30	13–15	–	
Izod (ISO-180, method 1A) (J/m)					
Dry, 23°C	50–100	40–60	50	50–200	
Dry, −40°C	30–50	30–50	35	–	
Moist, ISO-1110, 23°C	120	110	75		
Infrared Spectrum See Ref. 21 and DIN 53746 (draft)					
Magnetic Susceptibility (cm^3/g) ($\times 10^6$)		0.76/0.63			51
Mechanical Loss, $\tan\delta$ (ISO 537)					
($\gamma = 0.1$–10 Hz) dry 20°	0.016	0.016	0.016	0.01	
dry 40°	0.048	0.026	0.10	0.048	
dry 60°	0.175	0.083	0.17	0.16	
dry 80°	0.127	0.127	0.10	0.08	
dry 100°	0.064	0.064	0.055	0.048	
($< 10^4$ Hz) dry 23°		<0.02 (68)			
(10^3 Hz) 0.72% H_2O		0.12 (68)			
(10^3 Hz) 120°		0.2 (68)			
Melting Point (ISO 3146, method C) (moldings) (°C)	220	262	220	178	57,59
Equilibrium melting point	231 (32)			187 (15)	
α-Crystalline	260	270			
Pressure dependence	See Ref. (27)	See Ref. (45)			
Melt Viscosity					
Flow activation energy* E_0 (kJ/mol)	60	60	60	60	31
Coefficient K of zero-shear-rate-melt viscosity** (Pa s)	9.5×10^{-14} (250°C)	7.2×10^{-14} (280°C)			31

$^{*}\eta = \eta_0(T_0)\exp\left[-\frac{E_0}{R}\left(\frac{1}{T}-\frac{1}{T_0}\right)\right]$

$^{**}\eta_0(\bar{M}_w) = K\left(\frac{\bar{M}_w}{g\,mol}\right)^{3.4}$

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Modulus (MPa) ≡ (N/mm)					
Bulk modulus – See Compressibility and Bulk Modulus B					
Loss modulus G'' See Mechanical Loss					
Elasticity modulus (Young) (ISO-R527)					
23°, dry	3000	3300	2400	1400	
23°, moist ISO-1110	1500	1700	1500	1200	
100°, dry	500	600	400	200	

Flexural modulus, ASTM D790 (MPa) 57–59

Temp. (°C)	PA-6			PA-66			PA-610			PA-12		
	DAM	50% RH	100% RH	DAM	50% RH	100% RH	DAM	50% RH	100% RH	DAM	50% RH	100% RH
– 40	3010	3650	3650	3240	3450	–	2240	2520	–	1790	–	–
23	2720	970	410	2830	1210	480	1970	1100	690	1410	1030	–
77	520	340	240	690	570	–	480	–	–	–	–	–

Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
Shear modulus G (ISO 537)					
Dry, 23°C	1100	1300	800	500	
Dry, nucleated	1500	1700			
Dry, 100°C	200	300	120	100	
Dry, 200°C	80	150			
Apparent creep modulus (ISO-899)					
Ec/1000/20 (23°C, 50% RH)	230	400	400	300	
Nucleated	440	450			
Mold Shrinkage, (ASTM-D955) (%) (mold temp. 60°C; 80 × 10 × 4 mm)	1.4	1.6	1.2	1.1	
Moisture Absorption See Absorption					
Molecular Weight, (repeat unit)	113.2	226.3	282.4	197.3	
Oxygen Index (ASTM-D2863) (%)					
Dry	25–27	28–29	24	26	
Permeability See table "Permeability Coefficients" in this Handbook					
Poisson Ratio					
(a) Moldings, 20°C	0.33	0.3–0.4	0.3–0.4	0.3–0.4	
(b) Extruded rod; room temp.					
compressive axial strain 0.1		0.1–0.25			29
0.2		0.3–0.36			29
0.4		0.40–0.44			29
0.6		0.43–0.45			29
		0.38			51
(c) Power factor at 10^3 Hz, dry	0.02–0.06	0.04	0.02	–	64
(d) vs. temperature: 100°C	0.46	0.44 (51)	0.47		
Melt	0.50	0.50	0.50	0.50	
(e) Limiting pressure velocity of nylon against steel (kPa × 0.5 m/s)	70	85	70	–	60
Refractive Index, η_D					
Single crystals					
α, calc.		1.475 (8)	1.475		
β, calc.		1.565 (8)	1.525		
γ, obs.		1.58 (8)	1.565		
Moldings	1.53	1.53	1.53		
Resistance to Tracking (IEC-Publ. 112)					
Method CTI	CTI 600	CTI 600	CTI 600	CTI 600	
CTI-M	CTI-M 600	CTI-M 600	CTI-M 600		

Shear Strength, ASTM D732 (MPa) 57–59

PA-6		PA-66		PA-610		PA-12	
DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
59	–	66	57	58	–	34	–

Shrinkage See Mold Shrinkage

Property	PA-6	PA-66	PA-610	PA-12	Reference
Solubility Parameter $(J/cm^3)^{1/2}$					
Amorphous, 25°C	27.8	27.8	26		51
Solvents See table "Solvents–Nonsolvents" in this Handbook					
Sonic Velocity, 20°C (m/s)	1400–2300 (fibers)(26)	2770 (mouldings) (40)			
Specific Heat (J/g-K)	1.7	1.7	1.7	1.26	57,59
Effect of temperature (°C)					58,59
0	1.38	1.30	1.38	–	
40	1.67	1.55	1.76	–	
80	1.97	1.97	2.13	–	
120	2.30	2.30	2.22	–	
160	2.68	2.68	2.47	–	
200	–	2.72	2.89	–	
220	–	2.76	8.16	–	
240	–	3.35	3.10	–	
260	–	11.51	2.64	–	
280	–	3.14	2.68	–	
Specific Volume, at varying pressures (MPa) and temperatures (cm^3/g)					61
At 25°C					
Atm	0.875	0.880	1.005	0.985	
50	0.865	0.875	0.985	0.975	
100	0.860	0.865	0.970	0.960	
200	0.850	0.855	0.950	0.945	
At 100°C					
Atm	0.895	0.905	1.045	1.020	
50	0.885	0.890	1.020	1.000	
100	0.875	0.880	1.000	0.985	
200	0.860	0.865	0.970	0.960	
At 200°C					
Atm	0.945	0.950	1.125	1.130	
50	0.925	0.935	1.085	1.095	
100	0.910	0.920	1.060	1.070	
200	0.890	0.895	1.020	1.030	
At 300°C					
Atm	1.055	1.050	1.210	1.210	
50	1.020	1.020	1.150	1.150	
100	0.995	0.995	1.110	1.110	
200	0.960	0.955	1.060	1.070	
Surface Tension, critical (mN/m)					
23°C	40–47; 43	40; 44		31	38,51
Melt, 265°C	36	36	37	25	22
Taber Abrasion, D1044 (mg loss/1000 cycles); CS-17 wheel, 1000 g load					57,59
	5	7 $[M_n = 18000]$	5–6	–	
	–	4 $[M_n = 34000]$			
Temperature Index/Thermal Endurance Profile: Typical Values (°C)					57,59
Not stabilized					
5000 h	85	85	–	–	
20000 h	70	70	–	–	
Heat stabilized					
5000	130	130	–	–	
20000	120	120	–	100	

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Tensile Strength 57–59

Temp. (°C)	PA-6 DAM	PA-6 50%RH	PA-66 DAM	PA-66 50%RH	PA-610 DAM	PA-610 50%RH	PA-12 DAM	PA-12 50%RH
ASTM D638 (MPa)								
−40	120	–	108	103	83	83	–	–
23	81	69	83	77	59	49	55	52
77	68	59	62	41	37	37	–	–
Tensile Strength at Yield, ASTM D638 (MPa)								
−40	120	119	108	103	83	83	79	–
23	81	50	83	59	59	49	52	41
77	30	28	62	41	29	–	24	–
Tensile Elongation at Yield, ASTM D638 (%)								
−40	–	–	4	6	10	13	–	–
23	9	–	5	20	10	30	10	20
77	–	–	30	30	30	–	–	–
Tensile Elongation at Break ASTM D638 (%)								
−40	8	4	20	20	20	30	–	–
23	150	300	60	>200	100	220	250	250
77	310	325	340	350	300	–	–	–

(ISO-R 527) (MPa) ≡ (N/mm^2)					
Dry, 23°C	80, 90 (nucleated)	90	70	50	
Dry, 100°C	30	40	20	17	
Moist, 23°C (% water)	50 (2%)	60 (2%)	50 (1%)	30 (0.9%)	
Moist, 23°C (saturated in H_2O)	22	35			
Monofilaments 23°C, 50% RH					
draw ratio 4.3 : 1	475–550	575–600			
5.0 : 1	675–775	650–850			
Thermal Conductivity (W/m/K)					
Moldings	0.23	0.23	0.23	0.25	
Crystalline (moist) 30°C	0.43	0.43			19
Amorphous (moist) 30°C	0.36	0.36	0.35		19
Melt 250°C	0.21 (33)	0.15			12
25°C, dependence on pressure $\frac{\lambda\,(25\,\text{kbar})}{\lambda_0}$	1.89	1.83	1.90	2.03	2
Relative thermal index for 3 mm thickness					57–59
Not stabilized					
Electrical	125	125	–	65	
Mechanical					
with impact	75	75	–	65	
without impact	85	85	–	65	
Heat stabilized					
Electrical	130	130	–	110	
Mechanical					
with impact	105	105	–	75	
without impact	110	110	–	95	
Thermal Diffusivity (cm^2/s)		1.8×10^{-3}		1.4×10^{-3}	12
100°C		1.4×10^{-3}			
Melt 250°C		0.65×10^{-3}			

Unit Cell Dimensions

PA	Crystal system	Space group	Unit cell parameters (Å) a	b	c	Angles α	β	γ	Units in cell	Density (Mg/m^3) ≡ (g/cm^3)	Refs.
6	α-Monoclinic	C_2^2	9.56	8.01	17.24			67.5	8	1.23	20
	α-Monoclinic	C_2^2	4.81	7.61	17.1			79.5	4	1.21	
	α-Monoclinic		9.65	8.11	17.2			66.3			
	β-Monoclinic		4.8	3.6–4.1							41

PA	Crystal system	Space group	Unit cell parameters (Å) a	b	c	Angles α	β	γ	Units in cell	Density (Mg/m³) ≡ (g/cm³)	Refs.
	γ-Monoclinic		9.14	4.84	16.68			121	4	1.188	24
66	α-Triclinic	C_i^1	4.9	5.4	17.2	48.5	77	63.5	1	1.24	8,10
	β-Triclinic	C_i^1	4.9	8.0	17.2	90	77	67.5	2	1.248	8
	Pseudohexagonal							60	(> 160°C)		7,44
610	α-Triclinic		4.95	5.4	22.4	49	76.5	63.5	1	1.157	8
	β-Triclinic		4.9	8.0	22.4	90	77	67.5	2		8
12	Monoclinic (Pseudohexagonal)	$P2_1/c$	4.79	31.9 (fiber axis)	9.58	120		4	1.034	9	

Melt Viscosity Coefficient K of Zero Shear Rate Melt-Viscosity (Pa s) $\eta_0(M_w) = K(M_w/\text{g mol})^{3.4}$ 70,71

9.5×10^{-4} (250°C) 7.2×10^{-4} (280°C) – –

Viscosity – Molecular-Weight Relationships 71–75

Nylon	Solvent	K (× 10³) (mol/g)	a	M (× 10⁴)	Refs.
PA-6	HCOOH (88% vol.)	22.6	0.820	0.6–12.0	1
	H_2SO_4 (40% vol.)	59.2	0.690	0.3–1.3	1
	Trifluoroethanol	53.6	0.750	1.3–10.0	1
PA-6,6	*m*-cresol	240.0	0.610	1.4–5.0	0
	HCOOH (90% vol.)	35.3	0.786	0.6–6.5	0
	H_2SO_4 (96% vol.)	115.0	0.670	1.4–5.0	0
	o-Chlorophenol	168.0	0.620	1.4–5.0	0
PA-6,10	*m*-cresol	13.5	0.960	0.8–2.4	3
PA-12	*m*-cresol	46.3	0.750	1.3–13.0	2
	H_2SO_4 (96% vol.)	69.4	0.640	1.0–13.0	2

Polyamide viscosity: $\eta = K \times M^a$; see Melt Viscosity, and corresponding table in this Handbook.

Volume, Specific (cm³/g)					
20°C, Amorphous	0.917	0.917	0.95	0.99	36
270°C, Melt	1.032	1.018	1.095		
20°C	0.813 α-monoclinic	0.82 (47) α-triclinic	0.865 (8)	0.966 (9) γ-monoclinic	
Change on melting	0.02–0.03	0.02–0.03	0.02–0.03	0.03	
Melt, 270°C, 1 bar	1.040	1.010		1.19	
Volume, Molar (cm³/mol)					
20°C, Crystalline (rods)	100	198	260	195	55
20°C, Amorphous	103	207.5	271	199.5	36
20°C, Amorphous, calcd. from group contribution	104.2	208.3			
Volume Resistivity (Ohm cm)					
Relative humidity 0% (dry)	1×10^{15}	1×10^{15}	1×10^{15}	10^{15}	
Saturated at 50% RH, 20°C	2×10^{11}	3×10^{11}	2×10^{12}	10^{14}	
20°C (saturated) 100% RH	4×10^{8}	1×10^{9}	3×10^{10}	10^{13}	
Temperature 60°C, dry	8×10^{11}	6×10^{11}	5×10^{11}	10^{17}	
Dry, 100°C	3×10^{9}	3×10^{9}	5×10^{8}	10^{9}	
Dry, 150°C		1079			
At 50% RH, 100°C		4×10^{7}			
Wear Resistance (μm/km)					
R_z (μm) average roughness height[a]					
0.1	0.30	0.28		0.20	13
0.5	0.32	0.30		0.25	
1.0	0.35	0.35		0.60	
2.0	0.57	0.48		1.00	
4.0	0.80	0.52		2.50	
6.0	1.00	0.55		3.90	
P (N/mm²) average surface pressure (R_z optimum, see also Coefficient of Friction)					
0.02	0.11	0.10		0.12	13
0.05	0.29	0.24		0.30	
0.10	0.57	0.48		0.60	
0.25	1.40	1.20		1.50	

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Property	Polyamide 6	Polyamide 66	Polyamide 610	Polyamide 12	Ref.
1.00	5.70	4.80		6.00	
5.00	28.00	24.00		30.00	
15.00	86.00	72.00		90.00	

[a]Average surface pressure: 0.1 N/mm^2; surface temperature: <40°C

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   PA66: ®Maranyl A100 (ICI), ®Zytel 101 (DuPont). ®Ultramid A3K (BASF). Designation: ISO-1874-PA66, MR(H), 14-030.
   PA6: ®Capron 8200 (Allied Chemical), ®Durethan B31F (Bayer), ®Ultramid B3K (BASF). Designation: ISO-1874-PA6. MRH, 14-030.
   PA610: ®Ultramid S3K (BASF). Designation: ISO-1874-PA610, MRH, 14-020.
   PA12: ®Grilamid L20 (Ems-Chemie). ®Vestamid L1901 (Hüls). Designation: ISO-1874-PA12. G, 18-010.
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Physical Constants of Cellulose*

J. Ganster, H.-P. Fink
Fraunhofer Institute for Applied Polymer Research, Teltow-Seehof, FR Germany

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A. INTRODUCTION

For the present edition of *Polymer Handbook* the former chapter, "Properties of Cellulosic Materials" has been considerably shortened and restructured. Besides leaving out the infrared spectrum and some properties not considered genuinely physical, the main alteration is the omitting of the vast field of cellulose derivatives altogether. This is to be justified in view of the space given to the other polymers dealt with in the section, "Physical Constants of Some Important Polymers". Each of the cellulose derivatives (or at least each class), we think, would have required an entry of its own. Accordingly, we restricted ourselves to materials, the main component of which is native or regenerated cellulose. Therefore, we explicitly refer to the previous edition (1) for its wealth of data on cellulose derivatives, liquid crystals therefrom, nonglucose hydrocarbons and noncellulosic substances in cellulosic materials, and first order rate constants and energies of activation of homogeneous hydrolysis. Moreover, much useful and recent information can be found in the Proceedings of the Cellucon Conferences (2), the pertinent ACS volumes (3) and a number of monographs (4–9), whereas cellulose research before 1955 is well documented in Refs. (10,11).

* Based on the table in the third edition, by A. Gröbe, Fraunhofer-Institut für Grenzflächen-und Bioverfahrenstechnik, Stuttgart, Germany.

B. SOLID STATE PROPERTIES

TABLE 1. UNIT CELL DIMENSIONS[a]

Modification	Space group	*a* (Å)	*b* (Å)	*c* (Å)	*α* (°)	*β* (°)	*γ* (°)	Remarks	Refs.
I_α	P1	6.74	5.93	10.36	117	113	81	Natural occurrence (algae, bacteria)	12,13[b,c]
I_β	$P2_1$	7.85	8.14	10.34	90	90	96.6	Natural occurrence (higher plants)	14[c],15[b],16[b]
II	$P2_1$	8.01	9.04	10.36	90	90	117.1	Obtained by alkali treatment	17[c],18[b]
III		10.25	7.78	10.34	90	90	122.4	Obtained by liquid ammonia treatment	19
IV		8.01	8.12	10.34	90	90	90	Obtained by heat treatment of cellulose III	20

[a] Due to the very limited number of available X-ray reflections, atomic coordinates are difficult to determine. The question of chain orientation (parallel *vs.* anti-parallel packing) cannot be considered ultimately settled, although a parallel arrangement is widely accepted for Cellulose I, whereas Cellulose II is thought to crystallize in an anti-parallel packing mode. In each of the five cells given in the table, the *c* axis is parallel to the chain axes. The I_α cell contains a single chain with two glucose units, while all the other cells consist of two chains with two glucose units each.
[b] References deal with the same modification.
[c] Atomic coordinates given.

TABLE 2. DENSITY

Type of cellulose	Density (g/cm^3)	Refs.
Cellulose I	1.582–1.630[a]	21,22,23,24,25,26,27
Cellulose I_α	1.58[a]	12
Cellulose I_β	1.62–1.64[a]	14,16
Cellulose II	1.583–1.62[a]	22,24,28,26
Cellulose IV	1.61[a]	22
Cotton	1.545–1.585	29,30,31,32,33,34
Ramie	*ca.* 1.55	26,35
Flax	1.541	36
Hemp	1.541	36
Jute	1.532	36
Wood pulps	1.535–1.547	26,31,37,25,38,39,33
Cuprammonium fibers	1.519–1.531	31,32,34
Polynosics	1.489–1.528	40,41
Viscose fibers (and films) (rayon and staple)	1.508–1.548	31,32,38,42,43,44
High tenacity viscose fibers	1.498–1.524	42,45

[a] Calculated from X-ray or electron diffraction data.

TABLE 3. AVERAGE ORDERED FRACTION OF COTTON AND LINTERS MEASURED BY VARIOUS TECHNIQUES[a,b]

Technique	Average crystallinity value for cotton and linters (%)	Number of publications involved in the average crystallinity value	Approximate average crystallinity value	
			Wood pulp	Regenerated cellulose
PHYSICAL				
X-ray diffraction	73	25	60	35
Density	64	18	50	35
ABSORPTION AND "SWELLING" CHEMICAL				
Deuteration	58	5	45	25
Moisture regain	58		50	25
Hallwood–Horrobin	67	3	55	35
Nonfreezing water	*ca.* 85	1		50
Acid hydrolysis	90	26	85	70
Alcoholysis	*ca.* 90	4		
Periodate oxidation	92	4	92	80
Nitrogen tetroxide oxidation	*ca.* 70	1		50
Formylation	79	7		35
Iodine sorption	87	9	85	60
"NONSWELLING" CHEMICAL				
Chromic acid oxidation	99.7	1		
Thallation	99.6	2		

[a] Ref. 46.
[b] Most of these values are general averages of several published values: the number of publications involved in each average is given in the third column. The term "crystallinity value" does not imply that any particular method measures crystallinity or order in any strictly defined sense, or that the various methods measure precisely the same type or level of order/disorder; with the chemical methods for instance, the value given is merely the fraction of the material that is not readily accessible to, and thus not able to, react with the particular reagent.

TABLE 4. AVERAGE ORDERED FRACTION MEASURED BY VARIOUS TECHNIQUES[a]

Technique	Cotton	Mercerized cotton	Wood pulp	Regenerized cellulose
X-ray diffraction	0.73	0.51	0.60	0.35
Density	0.64	0.36	0.50	0.35
Deuteration or moisture regain	0.58	0.41	0.45	0.25
Acid hydrolysis	0.90	0.80	0.85	0.70
Periodate oxidation	0.92	0.90	0.92	0.80
Iodine sorption	0.87	0.68	0.85	0.60
Formylation	0.79	0.65	0.75	0.35

[a] Ref. 46.

TABLE 5. DEGREE OF CRYSTALLINITY[a]

Type of cellulose	DC[b](%)	Refs.	x_c^c(%)	k (10^{-2}) (nm^2)	Refs.	Cr[d](%)	Refs.
Natural Fibers							
Ramie	60–71	48,49,50,51	44–47		52		
			57	4	53		
	54–74	54					
Ramie, mercerized	49	55	45		52		
			37–46	2.5–3	53		
Flax						67	56
Linen						66 ± 3	57
Hemp						60 ± 3	57
Manila hemp						42 ± 4	57
Sisal						38 ± 2	58
Jute, *Corchorus olitorius*	58–66	59					
Jute, *Corchorus capsularis*	47–67	59				65 ± 3	58
Flax, bleached	Average 67, range 64–69	60					
Cotton, different origins	69–71	49	56–59	2.4–3.9	61	70	62
	71	63	47		52	79	64
	Average 70, range 66–74	60					
Cotton, mercerized			57–60	3.4–4.2	61	51	62
			42		52		
Cotton, linters	70	49	64–65	3.1–3.2	67	57	66
	73	63	56–63		65	68	56
Cotton, linters, mercerized	Average 48, range 41–55	60	43–49	2.1–2.6	65		
Algal Cellulose							
From *Valonia ventricosa*	Average 68, range 65–70	48					
Bacterial Cellulose							
From *Acetobacter xylinum*	40	48	73–79	3.3–3.9	68		
Cellulose from Woody Plants							
Cellulose from different plant stems						49–58	56
Cellulose from different woods						62–64	56
Cellulose from *Pinus radiata* (5, 10, and 15 annual ring)	73–55	69					
Bagasse						58	56
Pulps							
Different wood pulps	62–70	48,49,60,51				56–68	70
						62–65	56
						49–77	71
Different dissolving pulps	64	63	43–56		67	52–66	72
Different wood pulps, mercerized	49	55					

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TABLE 5. *cont'd*

Type of cellulose	DC[b](%)	Refs.	x_c^c(%)	k (10^{-2}) (nm^2)	Refs.	Cr[d](%)	Refs.
Man-made Cellulosic Fibers							
Viscose rayon, normal grade	38–40	48,49 50,75,76	27	1.58	67	35	74
	Average 27, range 13–36	60					
Viscose staple fibers, normal grade	30–39	48,49,76,78				33–36 34	77 79
	40–41	63					
	Average 27, range 30–52	60					
Viscose fibers, mercerized	40–52	50,55,75					
High tenacity viscose rayon	23–56	48,49,50,75,76,80					
High wet modulus (HWM) viscose fibers	27–44	48,49,75,76,78				38 42	81 79
Polynosic-fiber			35.6		52	48 48	81 79
Cuprammonium rayon	40–44 41	47,48,50 63					
Cuprammonium rayon, mercerized	49	55					
Saponified acetate fibers	Average 38	49					
Fortisan	39–54 43	49,76,78,82 83					
Regenerated carbamate fibers						50	79
Lyocell-type fiber			42	1.75	67	57	79
Cellulosic Films							
Cellophane	30–40	48,49,78	45	2.7	84		
Cuprophane			46	2.9	84		
Blown films from NMMO solution			38–41	2.6–2.8	84		
Others							
"Amorphous" powder, obtained by dry-grinding viscose rayon	8	85,10					
"Amorphous" powder, obtained by dry grinding viscose rayon, recrystallized	35–40	10					
Different cellulose samples						36–44	73
Regenerated cellulose precipitated from viscose as flake	45–53	82					
Precipitated β-cellulose	50–62	83					

[a] According to Hermans (49a) relative and absolute X-ray methods can be distinguished. DC and x_c values are absolute ones as well as some of the Cr values. The Ruland–Vonk-method provides additionally a lattice disorder factor k representing the amount of lattice distortions. The so-called crystallinity index or ratio values derived from relative methods as peak height ratios are omitted here. For these, the reader is referred to the third edition (1).
[b] According to Hermans and Weidinger (47,48).
[c] According to the method of Ruland (86) and Vonk (87).
[d] According to other methods.

TABLE 6. CRYSTALLITE SIZES

Type of cellulose	Lateral dimensions (Å)	Width and thickness (Å)	Range of length (Å)	Refs.
Cotton	50–60			88
	50		500	89
	155–230		128	90
	100			56
	40			91
	58 ± 3			92
	60			93
	64			94
	50–100			95
	100			96
	146			97
	150			98
		62 × 49		99
		64 × 50		100

TABLE 6. *cont'd*

Type of cellulose	Lateral dimensions (Å)	Width and thickness (Å)	Range of length (Å)	Refs.
		93 × 32		101
		110 × 25		102
		110 × (69–72)		52
		130 × 25		103
			400–2550	46
Cotton linters	51			104
	47–60			105
	65			56
Ramie	16–26			106
	50–100			107
	59			94,99
	68			97
	70			108
	<400			109
		61 × 167		52
			600–2500	46
	48–55			72
	46–55			110
	47–66			111
	62			112
	46–50			105
	44			91
Hemp	44			97
	49 ± 3		189	58
Flax	51.5			97
	55			56
Linen	52 ± 3		195	58
Jute	55			97
	49 × 4		174	58
Bamboo	<70			88
Manila hemp	38 ± 2		140	58
Sisal	38 ± 3		130	58
Algal cellulose (*Valonia*)		148 × 53		113
	89–124			110
	89–101			105
	112			91
Bacterial cellulose (*Acetobacter xylinum*)		84 × 70		99
	58–83			110
	53–65			105
	55			91
Chaetomorpha melagonium		169 × 114		99
Tunicin	84 × 34			99
Different wood samples	37–40		65–70	56
Cellulose from different plant stems	35–36			56
Bagasse	35			56
Different wood pulps	58–70			56
Different dissolving pulps	32–60			72
		1400–2200*	75–105	67
	41–47			105
Normal viscose fibers	50–70			77
	75–95		110–156	90
	39–42			104
	54		114	67
HWM viscose fibers	76			77
	70–85		154	90
		(80–100) × (30–40)	120–140	115
		(77–90) × (29–49)		79
	42–51			104
High tenacity rayon			120	115
Normal viscose rayon			140	115
	20–31			116
Polynosic fibers	93			77
	80–100		189	90
			160	115

* Mean cross-sectional area ($Å^2$).

TABLE 6. *cont'd*

Type of cellulose	Lateral dimensions (Å)	Width and thickness (Å)	Range of length (Å)	Refs.
Tufcel-fibers	35–47		112	110,117
Isotropic "Hermans" viscose fibers	50–200			118
Fortisan	100–160		160	90
	43–57			110
	49–51			111
			160	115
Regenerated carbamate fibers		(67–88) × (26–47)		79
Lyocell-type fibers		70 × (25–46)		79
	42		143	67
Cellophane	36–53			84
Cuprophane	33–53			84
Blown films from NMMO-solution	30–41			84

TABLE 7. X-RAY ORIENTATION OF CELLULOSE FIBERS[a]

Material	Φ (°)	Refs.	f_x	Refs.
Cotton	14.25–16.20	61	0.62–0.70	61
	13.25–17.39	127		
Cotton, mercerized	9.7–13.7	61	0.64–0.72	61
Ramie	7.5	128	0.97	10
Ramie, mercerized without tension			0.90	10
Ramie, mercerized and reoriented			0.98	10
Hemp	6.2	128		
Flax	10	128		
Jute	8.0	128	0.96–0.97	119
Sisal	20.0	128		
Coir	45	128		
Viscose rayon, normal grade			0.31–0.91	76,120,10,121
Viscose staple fibers, normal grade			0.30–0.67	76,78
Lilienfeld rayon			0.70–0.94	76,10,121
High-tenacity viscose cord rayon			0.39–0.998	50,76,122,121
Viscose tire cord			0.94–0.97	123
High-wet modulus (HWM) viscose fibers			0.45–0.993	76,122,120,121,78
Modal fibers cond.			0.57	124
Modal fibers wet			0.30	124
Polynosic fibers (Tufcel)			0.94	123
Isotropic viscose model fibers, without stretching			0.06–0.15	125
Isotropic viscose model fibers, after intense stretching			Up to 0.90	125
Cuprammonium rayon			0.86	10
Fortisan			0.7–0.99	76,122,120,78,121
Lyocell-type fibers cond.			0.62–0.63	124
			0.67–0.94	126
			>0.9	67
Tencel			0.94	123
Lyocell-type fibers wet			0.33–0.35	124

[a] For native fibers the spiral angle Φ between cellulose microfibrils (crystallites) and fiber axis is filed. The degree of uniaxial orientation of crystallites is given for regenerated fibers and some of the native by the Hermans orientation factor, f_x, according to Ref. (10). As existing data for regenerated fibers largely depend on spinning conditions, ranges of f_x are given.

TABLE 8. HEAT CAPACITY[a]

Type of cellulose	T_0 (K)	$C_p(T_0)$ (J/g/K)	a ($\times 10^3$) (J/g/K^2)	T_m (K)	Remarks	Refs.
Amorphous	350	1.414	8.08	435		129
Wood	350	1.364	5.06	435		129
Jute	350	1.339	4.64	435		129
Cotton	350	1.318	4.27	435		129
100% crystalline	350	1.230	1.42	435	Extrapolated	129
Wood	10	0.0205	4.20	300	Independent of crystallinity	130

TABLE 8. *cont'd*

Type of cellulose	T_0 (K)	$C_p(T_0)$ (J/g/K)	a ($\times 10^3$) (J/g/K^2)	T_m (K)	Remarks	Refs.
Amorphous	300	1.266	6.0	400	Ball milled	130
Wood (40% cryst.)	300	1.240	5.5	400	Ball milled	130
Wood (65% cryst.)	300	1.226	4.9	400	Ball milled	130
100% crystalline	300	1.238	4.2	400	Extrapolated	130
Ramie	273	1.775	0	373	Average	131
Flax	273	1.344–1.348	0	373	Average	132
Hemp	273	1.327–1.352	0	373	Average	132
Jute	273	1.357	0	373	Average	132
Viscose rayon	273	1.357	0	373	Average	132
	273	1.415–1.595	0	373	Average	131
Cuprammonium fibers	273	1.357	0	373	Average	132
Paper	273	1.17–1.32	0	373	Average	133

[a] The constant pressure specific heat capacity $C_p(T)$ as a function of temperature T is expressed in linear approximation as $C_p(T) = C_p(T_0) + a\,(T - T_0)$, $T_0 < T_m$, a being the slope and T_m marking the interval of validity.

TABLE 9. THERMAL EXPANSION COEFFICIENT

Type of cellulose	T (°C)	α^a ($\times 10^5$) (K^{-1})	α_3^b ($\times 10^5$) (cm^3/g/K)	Remarks	Refs.
Hydrogel	15–70		6.3–25		134
Cellulose I	RT[c]–150	13		X-ray (101) reflexion	135
	150–200	23		(101)	135
	RT–150	5.1		(10-1)	135
	150–200	1.6		(10-1)	135
	RT–150	11		(002)	135
	150–200	16		(002)	135
	RT–150	−0.64		(040)	135
	150–200	1.6		(040)	135
Cellulose II	RT–100	−31		(101)	135
	100–150	68		(101)	135
	RT–100	5.1		(10-1)	135
	100–150	16		(10-1)	135
	RT–100	7.9		(002)	135
	100–150	19		(002)	135
Amorphous sulphate cellulose	−45, −5		$7/\rho$	ρ = Cellulose density in g/cm^3	136
	55, 80		$17/\rho$	ρ = Cellulose density in g/cm^3	136
Cotton (Cellulose I)	−150 to 225	7.1–36.7		X-ray (002) reflexion	137
High strength cord a	105–150	0.7			138
High strength polynosic	105–150	0.4			138
High strength cord b	105–150	1.8			138
Rayon	−4 to 25		3.59		139
Wood pulp	−4 to 25		5.76		139
Cotton linters	−4 to 25		5.52		139
Different papers		0.2–0.75		Machine direction	140
		0.79–1.62		Cross machine direction	140
Cotton, rayon		8			141
Various celluloses			51–60		142
Linters	−30 to 25		40		143

[a] Linear expansion coefficient.
[b] Cubic expansion coefficient $d\Phi/dT$; specific volume.
[c] Room temperature.

TABLE 10. OTHER THERMAL PROPERTIES

Property	Type of cellulose	Value	Remarks	Refs.
Decomposition point (°C)	Cellulose	200–270		144
	Cotton	150		145
	Viscose rayon	180		145
Start of thermal degradation (°C)	Linters	225		146
	Bleached sulfite pulp	225		146
	Kraft pulp	240		146
	Filter paper	220	Under nitrogen	147

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TABLE 10. *cont'd*

Property	Type of cellulose	Value	Remarks	Refs.
Fast endothermal degradation (°C)	Linters	≈300		146
	Bleached sulfite pulp	≈330		146
Flammability of fibers				
Ignition temperature (°C)	Cotton	390, 400		148,149
	Viscose rayon	420		148
Self ignition temperature (°C)	Cotton	400		150
External ignition temperature (°C)	Cotton	350		150
Maximum flame temperature (°C)	Cotton	880		150
		850–1050	19–25% O_2	151
	Cotton fabric	812–945	Heating rates 169–225 K/s	152
Fast endothermal degradation (°C)	Linters	≈300	Under nitrogen	146
	Bleached sulfite pulp	≈330		146
	Cotton	290	Under nitrogen	150
	Cellulose powder	300–500	Under flowing nitrogen, char yields 89.4–8.7 wt.%	153,154
Heat of combustion (kJ/kg)	Cotton fabric	15090	Measured in air	155
	Cotton fleece	15540	Bomb-calorimetric technique	155
	Cotton	18855		150
	Cotton fabric	15452	Measured in air, independent of fabric weight	156
	Regenerated cellulose	14732		156
	Fabric	54.2 (J/cm^2)		157
	Cellulose diacetate	17179		156
	Cellulose triacetate	17598		156
Rate of heat combustion (J/s/cm)	Cotton fabric	331	In air, bomb calorimetric technique	158
Limiting oxygen index	Cotton	0.184	Fabric	149
	Viscose rayon	0.197	Fabric	149
	Cotton	0.183	Twill weave fabric, 241 gm^{-2}	159
		0.185	Bleached and mercerized	152
	Cellulose	1.34		160
	Cotton	1.22		161
		1.15–1.18	0–34 °C	133
		1.32	0–100 °C	133
		1.327–1.251		162
		1.273–1.35		132
	Mercerized cotton	1.235		161
Heat of crystallization (kJ/kg)	Cellulose, extrapolated to 100% crystallinity	105.9 ± 5.0		163
	Cellulose I	121.8		164
	Cellulose II	134.8		164
Heat of recrystallization (kJ/kg)	Amorphous cellulose→ Cellulose II	41.9	By wetting	85
Heat of transition (kJ/kg)	Cellulose I → cellulose II	38.1		165
Heat of formation (kJ/kg)	Cellulose	5949.7		166
Heat of solution (kJ/kg) of dry material	Cotton in cuane	108.0		163
	Cotton in Et_3PhNOH	142.5		167
	Rayon in cuane	95.5		163
	Rayon in Et_3PhNOH	138.3–153		168
	Ball milled cellulose in Et_3PhNOH	243		167
	Cellulose II in Et_3PhNOH	182.7		167
	Cotton	1235, 1194–1327	At zero regain	169,170,171
Differential heat of sorption of liquid water (kJ/kg)	Cotton	1090	At zero regain, from	172
		1332	sorption isotherm at zero regain, 27°C	173
		972–1040	At zero regain	174,26
		964–1006		174,26
		1047	At zero regain, 25°C	175
	Egyptian cotton	1214	At zero regain, 26°C	176
	Cotton, dried by solvent exchange	1047	At zero regain, 26°C	176
	Cotton, mercerized	1173	At zero regain	171
	Linters	1143	At zero regain	177
	Linters mercerized	1327	At zero regain	177

TABLE 10. *cont'd*

Property	Type of cellulose	Value	Remarks	Refs.
	Flax	1248,1206	At zero regain	169,174
	Wood pulps	1173–1256, 1098	At zero regain	177,178
	Fortisan	1235, 1169	At zero regain	171,174
	Cuprammonium fibers	1214, 1115	At zero regain	171,174
	Normal viscose fibers	1173–1215	At zero regain	171,174
		1050, 984,		171,174
		917–1022, 1277		171,174
	Viscose fiber	1549	At zero regain, 26°C	176
	Viscose fiber, dried by Solvent exchange	1172	At zero regain, 26°C	176
	Cotton	293	At 60% RH	169
		201–281	At 65% RH	145
	Cotton, mercerized	230	At 60% RH	171
	Viscose rayon	318	At 60% RH	169
		268–297	At 65% RH	169
Heat evolved by 1.0 g of fibers going from 40% RH to 70% RH in Joule	Cotton	84		145
	Viscose rayon	168		145
Integral heat of wetting of dry material (kJ/kg) wetting in water at zero regain	Cotton	33.9-56.2	At 20–25°C	169,171,26,175 177,179,180,181
		40.6	At 20°C	182
	Cotton, average value	46.5	At 20–25°C	46
	Cotton, bleached	40.0, 39.0		182,183
	Cotton, mercerized	62.0–78.8, 62.6	At 20–25°C	171,177
		62.6		181,184,182
	Cotton, mercerized, average value	75.2	At 20–25°C	46
	Cotton, ball milled	90.5	At 20–25°C	185
	Linters	44.8–57.8	At 20–25°C	163,177,185,186
	Ramie	34.4–48.6	At 20–25°C	26,181,180
	Flax	39.4–54.4	At 20–25°C	169,180
	Wood pulps	49.4–71.2	At 20–25°C	177,179,181,180
	Regenerated cellulose	83.8–106.4	At 20–25°C	177
	Fortisan	76.2	At 20–25°C	171
	Cuprammonium rayon	93.8	At 20–25°C	169
	Viscose fibers	68.2–105.5	At 20–25°C	163,169,171,177, 181,180,187,188
		68.2–82.5	At 20–25°C	183
	Polynosic fibers	83.1–87.8	At 20°C	189
Wetting in methanol	Cotton	7.3	At 20–25 °C	46
Wetting in bases, acids and salt solution, $\Delta H_{salt} - \Delta H_{H_2O}$ (kJ/kg)	Cotton	10.2	5% NaOH	190
		62.2	17.5% NaOH	190
		62.0	18% NaOH	191
		83.8	18% NaOH	192
	Cotton, mercerized	56.4	18% NaOH	190
	Ramie	67	20% NaOH	193
	Wood pulp	11.2	5% NaOH	190
		78.3	17.5% NaOH	190
	Wood pulp, different degrees of refining	67.0–81.0	20% NaOH, 25°C	194
	Dissolving pulp	≈68	18% NaOH, 20°C	195
	Different viscose fibers	25–47	5% NaOH	183
		31.8–36.4	5% NaOH	196
		62.8–67.8	17.5% NaOH	196
	Cotton	4.6	0.1 M H_2SO_4	182
		3.5	3 M NaCl	197
		3.1	3 M KCI	197
		5.4	3 M $MgCI_2$	197
		3.8	3 M $CaCl_2$	197
Thermal conductivity (W/m/K)	Cotton	0.071	Density 0.5 g/ml	198
	Rayon	0.054–0.07		149
	Sulfite pulp, wet	0.8		199
	Sulfite pulp, dry	0.067		199
	Laminated kraft paper	0.13		200

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TABLE 10. *cont'd*

Property	Type of cellulose	Value	Remarks	Refs.
	Different papers	0.029–0.17		201
	Alkali cellulose	0.0581	Density 0.2 g/ml	202
		0.0465		203
		0.0674		204
Transition points (°C)				
Glass transition	Cellulose	230		205
		220–245		206
Secondary transitions	Cellulose	19–23		142
		25		207
	Paper	$-20, +15, \approx 35, \approx 60$		208,140,205
	Cellulose	≈ 200		205
Endothermal process	Cotton	134	$H = 134$ J/g	209
	Bleached linters	131	$H = 131$ J/g	209
	Sulfite pulp	137	$H = 145$ J/g	209
	Sulfate pulp	147	$H = 124$ J/g	209
	Microcrystalline powder	109, 131	$H = 120$–143 J/g	209
		114	$H = 118$ J/g	209

See also Table 17, Typical Non-Aqueous Cellulose Solvents.

TABLE 11. REFRACTIVE INDEX AND BIREFRINGENCE

Type of cellulose	$n_{\parallel}$	$n_{\perp}$	$n_{\parallel} - n_{\perp}$	Refs.[a]
Ideally oriented native cellulose fiber (Cellulose I)	1.618	1.544	0.074	26
Ramie	1.595–1.601	1.525–1.534	0.061–0.071	26,210,211,212,213,214,215
Flax	1.571–1.595	1.517–1.532	0.054–0.067	212,214,216
Hemp	1.585–1.591	1.526–1.530	0.055–0.065	216,217
Cotton	1.573–1.595	1.527–1.534	0.040–0.062	210,212,214,218,45,219,215
Jute	1.577	1.536	0.041	214
Ideally oriented regenerated cellulose fiber (Cellulose II)	1.578	1.523	0.055[b]	220,(221)
			0.043[c]	26
Fortisan			0.045	222
High tenacity rayon	1.542–1.553	1.509–1.513	0.029–0.043	45,(212,223,224)
Polynosics	1.556–1.570	1.518–1.531	0.036–0.043	45,40,(221)
Polynosics cord			0.0410–0.0415	225
Normal viscose fibers	1.529–1.552	1.512–1.520	0.013–0.040	226,(212,45,223,224,40,227),215
Viscose cord			0.0350–0.0370	225
Cuprammonium fibers	1.548–1.571	1.519–1.534	0.018–0.037	26,212,218,222,(212,214)
Cellophane			0.011, 0.0145, 0.0044	228

[a] References in parenthesis give additional data.
[b] Bone dry.
[c] Conditioned.

TABLE 12. RESISTIVITY

Material	ρ^a (Ω cm)	R_s^b (Ω/gcm²)	Remarks	Refs.
Pure cellulose	10^{18}			229,230
Cotton	2×10^7		52% RH[c], 30°C, moisture dependence investigated	231
		7×10^6	65% RH, 20°C	231
	2.4×10^9		35% RH, 0.18 GPa static pressure	232
Raw cotton	8×10^5		75% RH, 25°C	233,234[d]
	5×10^5			233,234[d]

TABLE 12. *cont'd*

Material	ρ^a(Ω cm)	R_s^b(Ω gcm^{-2})	Remarks	Refs.
Cotton, washed	12×10^6 – 37×10^6		$M^e = 10\%$, 20°C, moisture dependence investigated	234
Cotton, purified	9.3×10^5		$M = 10\%$, 20°C, moisture dependence investigated	234
Ramie	6×10^4 – 1.8×10^6		$M = 10\%$, 20°C, moisture dependence investigated	234
Ramie, purified	5.7×10^6		$M = 10\%$, 20°C, moisture dependence investigated	234
Hemp	1×10^7		$M = 10\%$, 20°C, moisture dependence investigated	234
Jute, purified	2.5×10^8		$M = 10\%$, 20°C, moisture dependence investigated	234
Flax, purified	6.6×10^6		$M = 10\%$, 20°C, moisture dependence investigated	234
Viscose rayon	1×10^6 – 3×10^6		≈80% RH, 30°C, moisture dependence investigated	234
		10^8 – 10^9	$M = 10\%$, 20°C, moisture dependence investigated	234
	6.75×10^{10}		35% RH, 0.18 GPa static pressure	232
Cuprammonium rayon		2.6×10^8	$M = 10\%$, 20°C, moisture dependence investigated	234
Fortisan		3.5×10^7	$M = 10\%$, 20°C, moisture dependence investigated	234
Mercerized cotton		6.6×10^6	$M = 10\%$, 20°C, moisture dependence investigated	234
Regenerated cellulose	10^{17}			229
Cellophane cuprophane	10^{10} – 3×10^{12}		65% RH, 20°C	235
Insulating paper	$\approx 2 \times 10^{14}$		Air dry	236
	5×10^{17}		$M < 1\%$	237
	10^{12}		$M = 12\%$	237
	10^{14}		20°C, air dry	238
	10^{11}		100°C, air dry	238
Insulating kraft paper	4×10^{17}		20°C	239
	1.2×10^{17}		100°C	239

[a] Specific resistance (resistance of unit cross section per unit length).
[b] Mass specific resistance (product of ρ and density).
[c] Relative humidity.
[d] These references give additional data.
[e] Moisture content (wt.%).

TABLE 13. DIELECTRIC CONSTANT AND LOSS FACTOR AT 1 kHz[a]

Material	ε^b	tan δ^c	Range of lg^d (ν)^e	Remarks	Refs.
Pure cellulose (from spruce)	7.2	0.02	2–8	Bone dry, 20°C	240
Cotton	3.2	<0.02		Bone dry, 21°C	241
	6.1			25°C	242
	2.76		3–4	Unbeaten, density 1.0 g/cm^3	243
	2.85–3.05		3–4	Beaten, density 1.0 g/cm^3	243
	4.6	0.03	2–7	Dry, 0°C, temperatures up to 60°C investigated	244
Jute	105	1.4	2–5	Along fiber	245
	16	1.55	2–5	Transverse to fiber	245
Hemp	50	1.2	2–5	Along fiber	245
	11.2	1.28	2–5	Transverse to fiber	245
Ramie	45	1.15	2–5	Along fiber	245
	7.9	0.85	2–5	Transverse to fiber	245
Alpha wood pulp	6.15			30°C, vacuum dried at 30°C	192
Bleached sulphite pulp	2.9		3–4	Unbeaten, density 1.0 g/cm^3	243
	3.03		3–4	Beaten, density 1.0 g/cm^3	243
Paper	1.2–4				299
Viscose rayon	3.0	<0.02	1.7–5.3	Bone dry, 21°C	241
	6.7	0.18	2–7	Dry, 0°C, temperatures up to 60°C investigated	244
Regenerated cellulose film	6.7–7.5			20–70°C	246
Cellophane	7.6	0.01	1.8–6	22°C (−40 to 90°C investigated)	247

[a] More data for the frequency range indicated in the table and for other temperatures, humidities etc. are found in the references given.
[b] Real part of dielectric constant.
[c] Quotient of imaginary and real part of dielectric constant (loss factor).
[d] Decadic logarithm.
[e] Measuring frequency.

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TABLE 14. OTHER ELECTRICAL PROPERTIES

Property	Material	Value	Remarks	Refs.
Dielectric strength (break down voltage) (kV/mm)	Native cellulose fiber	50	Dry	248
	Insulating paper	7.7–9.2	20°C, 50 Hz, thickness 0.11–0.12 mm, 0.71–0.83 g/ml, RH = 65%	249
	Condenser paper	4.7–12.1	Oven dry, DC	250
	Cellophane	30–50	Thickness 1 mm, 50 Hz	235
Isoelectric point (pH)	Wood pulp	2.75		251
	Cotton	2.5	0.02 M HCl-KCl-buffer	252
Zeta-potential (mV)	Cellulose	21.0	Fines from filter paper, Whatman No. 1	253,254[a]
		30		255
	Cotton	21.1	Fines	253,254[a]
		28.5/26	In water	253,254
		21.1	In water, fines	253,254
		9.3/126	In 10^{-2} N KCl	256[b],257[b]
	Cotton linters	– 23.7	Poly (1,1-dimethylpiperidinium-3,5-diallymethylene chloride), $M_n = 50000$, monolayer, in 10^{-4} N KCl	258
	Viscose fiber	22/27	In water, fibers washed with distilled water	256[b],257[b]
		17.3	In 10^{-4} N NaCl	259[b]
	Acetate grade dissolving pulp	17.7	In 10^{-5} N KCl	259[b]
	Cross-Bevan cellulose	22.9	Fines	253,254[a]
	Chlorite holocellulose	32.0	Fines from *Eucalyptus reagnans*	253,254[a]
	Chemical pulps, bleached	17–33	Fines	253,254[a]
	Chemical pulps, unbleached	23.5–33.1	Fines	253,254[a]
	Mechanical and semi-mechanical pulps	17.2–46.1	Fines	253,254[a]
	Beech kraft pulp	20.6	Oven dried at 130°C	260
	Unbleached wood sulfite pulp	9	Distilled water, 20°C	261
	Unbleached spruces sulfite pulp	23	Distilled water	262
	Unbleached sulfate pulp	18	Distilled water	262
	Bleached birch sulfate pulp	21	Distilled water	262
	Viscose rayon	26	$NaBH_4$-reduced sample, distilled water	263
	Spruce sulfite bleached	14.2	In water	264
		16.2	In 10^{-4} N KCl	264
	Spruce sulfite unbleached	14.9	In water	264
		16.0	In 10^{-4} N KCl	264
	Beech sulfite bleached	18.6	In water	264
		21.7	In 10^{-4} N KCl	264
	Birch sulfite unbleached	15.1	In water	264
		19.0	In 10^{-4} N KCl	264

[a] These references give additional data.
[b] More concentrations and/or media investigated.

TABLE 15. CRYSTAL ELASTIC MODULUS E_l IN CHAIN DIRECTION

Modification	E_e (GPa)	Refs.
I	138	265
	120–135	266
II	88	265
	106–112	266
III_I	87	265
III_{II}	58	265
IV_I	75	265

TABLE 16. FIBER STRENGTH, ELONGATION, AND MODULUS

Type of cellulose	Breaking strength (cN/tex)[a]		Breaking elongation (%)		Modulus (cN/tex)[a]		Refs.
	Dry	Wet	Dry	Wet	Dry	Wet	
Cotton	26–43	26–47	8–10	11	370–720		1[b]
Flax	40–80	41–85	2.5–3	2.5–3	1760		1[b]
Jute	~30	30–31	1.7–1.9	1.7–1.9	1720		1[b]
Hemp	47		2.2		2170		270
Ramie	59		3.7		1460		270
Sisal	36–43		3.6–5.1		1170–1520		271
Banana	53–58		2.4–3.6		2000–2440		271
Coir	9–15		17–47		260–520		271
Palmyrah	16–20		7–15		404–560		272
Talipot	17–30		2.7–5.2		1045–1494		272
Viscose rayon (normal)	14–22	2–5	25–30	20–40	290–680		1[b]
Viscose rayon (high tenacity)	35–54	23–43	9–20	14–26	609–883		1[b]
Viscose staple (high wet modulus, normal)	16–26	7–17	14–30	22–30	424–600		1[b]
Viscose staple (high wet modulus, polynosics)	26–53	18–42	7–15	8–20	265–795		1[b]
Lyocell type	61	58	8	9	1950	490	273
$ZnCl_2$ type	15–25	7–10	15–25	18–27	450–1100		274
LiCl-DMAc type	20–29	8–13	6	10–12			275
NaOH type	16–17	4–6	15–21	16–23	971–1290	25–63	276

[a] To convert to MPa multiply value by ten times the density value when expressed in g/cm^3.
[b] Data taken from references 76,267–269.

C. SOLUTION PROPERTIES

TABLE 17. TYPICAL NON-AQUEOUS CELLULOSE SOLVENTS[a,b,c]

Number of components	Substance group	Examples
Unicomponent	*N*-Alkylpyridinium halogenides	Ethylpyridinium chloride
	Oxides of tertiary amines	*N*-Methylpiperidine-*N*-oxide
		N-Methylmorpholine-*N*-oxide
		N,N-Dimethylcyclohexylamine-*N*-oxide
Bicomponent	Dimethyl sulfoxide (DMSO) containing solvents	DMSO/methyl amine
		$DMSO/CaCl_2$
	Liquid ammonia/sodium or ammonium salts	NH_3/NaI (NH_4I)
		$NH_3/NaSCN$ (NH_4SCN)
		$NH_3/NaNO_3$
		$NH_3/N(C_2H_5)_4Br$
	Dipolar aprotic solvents/LiCl	*N,N*-Dimethyl acetamide (DMA)/LiCl
		N-Methylpyrrolidone/LiCl
		N-Methylcaprolactam/LiCl
		N-Hexamethyl phosphoric acid triamide/LiCl
		Dimethyl urea/LiCl
	Pyridine or quinoline containing systems	Pyridine/resorcinol
		Quinoline/$Ca(SCN)_2$
	Liquid SO_3/secondary or tertiary amines	SO_3/ triethyl amine
Tricomponent	NH_3 or amine/salt/polar solvent	NH_3/NaCl/morpholine
		NH_3/NaCl/DMSO
		Ethylene diamine/NaI/*N,N*-dimethyl formamide
	NH_3 or amine/SO_2 or $SOCl_2$ polar solvent	Diethylamine/SO_2/DMSO

[a] A very extensive list including sketches of phase diagrams, is given in Ref. (1).
[b] In most cases a preactivation of the cellulose is required.
[c] Ref. 277.

TABLE 18. OTHER SOLVENTS[a]

Substance group	Examples	Refs.
Mineral acids[b]	HCl, HBr	279
	H_2SO_4	280,281
	HNO_3	282,283,284
	H_3PO_4	280,285,281
	Trifluoroacetic acid	286,287,288,289,290
Inorganic salts in aqueous solution	LiCl	291,292,293
	$ZnCl_2$	281,294,295
	$Ca(SCN)_2$	296,297,298,299,300
Inorganic salts in concentrated solutions or melts, single and/or multicomponent systems	$Ca(SCN)_2$	298,301
	LiCl, LiJ, LiSCN, $CaBr_2$, $Ca(SCN)_2$	302
	$Ca(SCN)_2/CH_2O$	303
	$LiSCN \cdot 2.5H_2O$	304,305
	$KSCN + NaSCN + Ca(SCN)_2 \cdot 3H_2O$	304,305
	KSCN + NaSCN + DMSO	304,305
	$Ca(SCN)_2 \cdot 3H_2O + CH_2O$	304
	LiSCN, NaSCN, LiJ, NaJ, KJ	306,46
Strong bases in aqueous solution	LiOH	307
	NaOH	307,81
	NaOH + ZnO	307,308,309
Strong bases in aqueous solution	NaOH + BeO	307,308
Tetraalkyl bases (molecular weight >150)	Tetraethylammoniumhydroxide and some higher homologs	310,311,312
	Trimethylbenzylammoniumhydroxide ("Triton B")	313,311
	Dimethyldibenzylammoniumhydroxide ("Triton F")	313,311
	Tetraalkylphosphonium hydroxides	314
	Tetraalkylarsonium hydroxides	144
	Trialkylsulfonium hydroxides	315
	Trialkylselonium hydroxides	292
Metal complex solutions	$[Cu(NH_3)_4](OH)_2$ ("Cuoxam", "Cuam")	316,317
	Modified cuoxam	170
	$[Cu(en)_2](OH)_2$ ("Cuprieethylenediamine", "Cuene", "CED")	318,319
	Cu : biuret : alkali	320
	$[Co(en)_3(OH)_2$ ("Cooxene")	321,322
	$[Ni(NH_3)_6](OH)_2$ ("Nioxam")	323,324
	$[Ni(en)_3](OH)_2$ ("Nioxene")	323,325
	$[Zn(en)_3]$ $(OH)_2$ ("Zincoxene")	323,325
	$[Cd(en)_3](OH)_2$ ("Cadoxene")	323,326,327
	Complex solution of the Na-salt of Fe-tartaric acid in diluted NaOH solution ("FeTNa")	323,328

[a] Excerpt from the table in Ref. (1); cf. also (278) as a modern reference.
[b] Dissolution usually accompanied by strong degradation of the cellulose chains.

TABLE 19. VISCOSITY – MOLECULAR WEIGHT RELATIONSHIPS[a]

Solvent[k]	K_m ($\times 10^2$) (ml/g)	a	Viscosity range, η ($\times 10^{-2}$) (ml/g)	G (s^{-1})	T (°C)	Nature of sample	Method of calibration	Refs.
Cuoxam	0.308	1.0	0.9–9		20		OS[b] (acet.)	329
	11.3	0.657	0.2–4		25	F[c]	Comp[d]	330
	10.1	0.661	0.2–4		25	F	Comp.	330
	56.4	0.523	4.7–16.8		20	U[e]	SD[f]	331
	0.85	0.81	4.7–16.8		20	U	SD	332
	1.70	0.77	4.7–16.8		20	U	SD	10
	0.268	1.0	1.75–19.7	500		U	SD (comp.)	333
	0.70	0.9	4.8–28			U	SD (CN)[g]	334
	0.545	0.9	1–28			U	SD (CN)	335
	0.33	1.15	4.7–16.8			U	SD	336
	0.099	10				F, U	SD, LS[h] (CN)	337
	3.3	0.76	>4.25			F, U	SD (CN)	338
	0.18	1.0	<4.25			F, U	SD (CN)	338
	0.237	1.0	1.2–5.05			U	S[i]	339
	1.30	0.81	0.3–6		25	F	LS (CN)	240

TABLE 19. *cont'd*

Solvent[k]	K_m ($\times 10^2$) (ml/g)	a	Viscosity range, η ($\times 10^{-2}$) (ml/g)	G (s^{-1})	T (°C)	Nature of sample	Method of calibration	Refs.
Cuene	1.06	0.905	1–21.4	$G \to 60$	25	F, U	Comp.	341,342
	0.498	1.0	1–2.4	$G \to 60$	25	F, U	Comp.	341,342
	0.395	1.0	2.4–21.4	$G \to 60$	25	F, U	Comp.	341,342
	0.334	1.0	<10			F	OS (CN)	335
	0.412	1.0	<10				Comp.	343
	0.364	1.0	2.3–27.2	500		U	SD (CN)	344
	1.01	0.9	1.0–28	$G \to 60$		F, U	SD (CN)	334
	0.85	0.9	1.0–28	$G \to 60$		F, U	SD (CN)	335
	0.358	1.0	6–18			U	SD	345
	0.153	1.0				U	SD (CN)	337
	5.10	0.76	>600		20	F, U	SD (CN)	338
	0.277	1.0	<600		20	F, U	SD (CN)	338
	0.762	0.936	1.9–21.3			U	SD, LS	346
	2.9	0.8	1.7–3.9		20		K[j] (OS)	347
Cadoxene	0.268	1.0	0.5–7.5		25		Comp.	348
	Mean: 0.575	0.96	1.9–6.5		20	F, U	Comp.	349,350,351
	5.47	0.75	<18	500	25	U	SD	352
	0.315	1.01	2–11		20	U	SD	351
	0.235	1.0	2–11		20	U	SD	353
	0.124	1.0				F, U	SD, LS	337
	4.13	0.76	>5.3			F, U	SD (CN)	338
	0.225	1.0	<5.3			F, U	SD (CN)	338
	0.427	0.94			20	U	SD (CN)	338
	0.593	0.94	<10		20	F	SD (CN)	338
	9.33	0.72	>10		20	F	SD (CN)	338
	3.56 (3.38)	0.77	<18	500	25	U	LS	352
	3.85	0.76	0.4–1.2	500	25	F	SD, LS	354
FeTNa	0.563	1.0			20	U	Comp.	355
	0.599	1.0			20	U	Comp.	355
	1.13	0.9	2.5–22		20	F, U	Comp.	Calculated from 356
	3.57	0.805	2.5–22		20	F, U	Comp.	Calculated from 356
	0.519	1.0	3–16	$G \to 60$	20	U	SD	357
	0.571	1.0	3–16	$G \to 60$	20	U	SD	357
	0.502	1.0	3–16	$G \to 60$	20	U	SD	357
	0.407	1.01	6.6–20	$G \to 60$	20	U	SD	345,357
	0.355	1.0	<13		20	U	SD	353
	0.303	1.0	<16		20	U	SD	353
	0.201	1.0	<8		20	U	SD	353
	0.39–0.46	1.0					Comp.	358
	2.8	0.84	2.4–21.2					346
	5.31	0.78[b]	4.9–31.5				LS	359
	5.31	0.775	1.68–15.15	>400	25	U	LS	360
LiCl/DMAc	1.278	1.19	1.48–11.64		30	U	LS	361
Zincoxene	0.585	0.936			20	U	OS	362
Tetraethylammonium hydroxide (2.3 M)	0.26	1.0			20	U	OS (via CN)	363
	0.58	1.0	2.4–12.2		20		OS, comp.	364
LiOH solution	≈0.34	1.0			20	U	OS	363
$Ca(SCN)_2$ solution	≈0.5	1.0			20	U	OS	363
H_3PO_4	≈1.3	1.0			20	U	OS	363
	1.71	0.94	>2.25	(49, 72)	25	U	K	365
H_2SO_4 (50%) solution	1.64	0.92	>1.78		20	U	K	366
10% NaOH solution	0.43	1.0			20	U	OS	363

[a] The constants K_m and a given in the table are defined by the equation $[\eta] = K_m M^a$, $[\eta]$ and M being intrinsic viscosity and molecular weight, respectively. G is the shear rate.
[b] Osmotic measurements.
[c] Fractionated.
[d] Viscosimetric comparison.
[e] Unfractionated.
[f] Measurement by sedimentation–diffusion.
[g] Cellulose nitrate used for calibration.
[h] Measurement by light scattering.
[i] Measurement by sedimentation.
[j] From kinetic data.
[k] See also Table 17, Typical Non-Aqueous Cellulose Solvents.

TABLE 20. SECOND VIRIAL COEFFICIENT

The second virial coefficient listed in the table below is defined by the equation

$$\pi/c = \mathrm{RT}[1/\mathrm{M} + A_2c + A_3c^2 + \cdots]$$

where π is the osmotic pressure, C the concentrations R the gas constant, T the temperature, M the molar mass, and A_3 the third virial coefficient.

Solvent[c]	T (°C)	DP[a] range	Range of A_2 ($\times 10^3$) (cm^3mol/g^2)	Remarks	Refs.
Cuoxam	20	195–12500	0.8–3.0	No trend, $V^b = 12$	367
Cadoxene	25	175–5820	1.1–1.8	No trend, $V = 9$	352
FeTNa	25	230–3950	3.0–4.4	No trend, $V = 10$	360
LiCl/DMAc	30	770–4320	3.5–5.3	Monotonous decrease (one outlier), $V = 9$	361

[a] Degree of polymerization.
[b] Number of single values given.
[c] See also Table 17, Typical Non-Aqueous Cellulose Solvents.

TABLE 21. SEDIMENTATION AND DIFFUSION COEFFICIENTS

The sedimentation and diffusion coefficients for non-vanishing concentrations s and D, respectively, are calculated from $s^{-1} = s_0^{-1}$ $(1 + k_s c)$ and $D = D_0(1 + k_D c)$, respectively, with s_0, D_0, d_s and k_D listed in the table, where c is the cellulose concentration.

Solvent[a]	T (°C)	M^b ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_d (cm^3/g)	Refs.
Cuoxam	20	19			2.85	9.7	367
	20	21			2.75	10.6	367
	20	27	1.6	50	1.97	50	173
	20	35			1.87	109	367
	20	44	1.9	20	1.54	45	173
	20	45			1.57	113	367
	20.7	53	4.6		5.4		368
	20	75	2.6	50	1.04	0	173
	20	115			0.97	149	367
	20	137			0.72	144	367
	20	150	3.8	110	0.84	30	173
	20	160			0.63	201	367
	20	185			0.59	149	367
	20	230	4.1	170	0.54	75	173
	20	320	6.3		0.66	165	173
	20	340	7.2	390	0.72	145	173
	20	354			0.50	143	367
	20	400	6.5	390	0.54	105	173
	20	490	7.2	520	0.43	130	173
	20	500	6.3	380	0.45	115	173
	20	535			0.37	264	367
	20	569			0.37	218	367
	20	570	6.3		0.37	190	173
	20	680	6.5	320	0.32	295	173
	20	1200	9.2	690	0.26	250	173
	20	1275			0.29	854	367
	20	1500	10.3	600	0.23	320	173
	20	1750	10.4	900	0.2	350	173
	20	1900	14.0	1000	0.25	320	173
	20	2000	10.8	860	0.18	250	173
	20	5900	17.5	1700	0.1	1200	173
Cuene	25	9.5	8.3		0.95		369
	25	175	5.5		1.2		369
Cadoxene	12	10.1	0.74				354
	12	18.8	1.04				354
	12	24.5	1.13				354
	12	33.6	1.25				354
	25	43	1.80	153	1.77		352
	25	115	2.87	367	1.06		352
	25	155	2.75	370	0.75		352
	25	210	3.17	465	0.64		352
	25	275	3.80	7100	0.58		352
	25	435	4.53	1000	0.44		352
	25	745	5.49	1410	0.31		352

TABLE 21. *cont'd*

Solvent	T (°C)	M^a ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_d (cm³/g)	Refs.
FeTNa	20	111	1.75		0.89		345
	20	201	2.17		0.60		345
	20	364	2.98		0.46		345
	20	539	3.35		0.35		345
LiCl/DMAc	30	125			0.318		361
	30	152			0.293		361
	30	162			0.287		361
	30	178			0.248		361
	30	182			0.250		361
	30	320			0.175		361
	30	354			0.145		361
	30	463			0.124		361
	30	700			0.092		361

[a] See also Table 17, Typical Non-Aqueous Cellulose Solvents.
[b] Cellulose molecular weight.

TABLE 22. PARTIAL SPECIFIC VOLUMES, v_2

Solvent[a]	v_2 (cm³/g)	T (°C)	Refs.
Cuoxam	0.664	20	173
	0.642	19.8	368
Cuene	0.65	25	352
Cadoxene	0.50	25	352
FeTNa	0.654	20	370

[a] See also Table 17, Typical Non-Aqueous Cellulose Solvents.

TABLE 23. GEOMETRICAL CHAIN CHARACTERISTICS

Listed properties:

Characteristic ratio	$C_\infty = \langle R^2 \rangle_0/(nl^2)$
Unperturbed chain dimension	$A = \{\langle R^2 \rangle_0/M\}^{1/2}$
Conformation parameter	$\sigma = \langle R^2 \rangle_0/\langle R^2 \rangle_{0,f}$
Persistence length	$q = \lim\{\langle Rl_1 \rangle\}/l$ with $nl \to \infty$
Linear expansion coefficient	$\alpha_s = \{\langle s^2 \rangle/\langle s^2 \rangle_0\}^{1/2}$

where

- $\langle R^2 \rangle_0$ – Averaged squared chain end-to-end vector in unperturbed state
- n – Degree of polymerization
- l – Monomer unit length (5.18 Å)
- M – Molar mass
- $\langle R^2 \rangle_{0,f}$ – Same as $\langle R^2 \rangle_0$, but for freely rotating chain
- $\langle Rl_1 \rangle$ – Averaged projection of chain end-to-end vector onto first bond-vector
- $\langle s^2 \rangle$ – Averaged squared radius of gyration
- $\langle s^2 \rangle_0$ – Same as $\langle s^2 \rangle$ for the unperturbed state.

Property	Solvent[a]	T (°C)	Value	Remarks	Refs.
C_∞	Cuoxam	25	15.8		361
	Cadoxene	25	45.2		361
	FeTNa	30	91.9		361
	LiCl/DMAc	20	48–60		367
A (Å)	Cadoxene		1.18–1.92		371
	LiCl/DMAc	30	2.74–4.12	Monotonous M-dependence	361
σ	Cadoxene	25	2.78		361
	FeTNa	25	4.70		361
	LiCl/DMAc	30	6.71		361
q (Å)	Cadoxene	25	42	Gaussian coil limit	361
	FeTNa	25	123	Gaussian coil limit	361
	LiCl/DMAc	30	252	Gaussian coil limit	361
	LiCl/DMAc	25	110–160	Various methods	372
α_s	Cuoxam	20	≈ 1		367
	LiCl/DMAc	30	1.03–1.07		361

[a] See also Table 17, Typical Non-Aqueous Cellulose Solvents.

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TABLE 24. POLYMER–SOLVENT INTERACTION PARAMETERS

This parameter χ (Flory–Huggins parameter) figures in the equation for the reduced partial molar Gibbs energy of mixing of the solvent $\Delta G_1/RT$ (R – gas constant, T – temperature) in the following way:

$$\Delta G_1/RT = \ln(1 - \varphi_2) + \varphi_2 + \chi\varphi_2^2$$

φ_2 being the volume fraction of the polymer (cf. the corresponding chapter in this Handbook).

Solvent	Concentration (wt.% cellulose)	χ	Remarks	Refs.
Water	Saturated with water	0.124	25 °C, cotton fiber	373
		0.435–0.44	25°C, viscose rayon	373
		0.528	25°C, cellophane	373
$NMMO \cdot 1H_2O$[a]	5–15	−3	Melting point depression	374
		0.5		
NMMO		0.35–0.40		375
NMMO with 13–15 wt.% water	3–15	<−20	DP ~450, concept not applicable	376

[a] NMMO-*N*-methylmorpholine-*N*-oxide.

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Physical and Mechanical Properties of Some Important Polymers

Phillip T. DeLassus, Nicole F. Whiteman
The Dow Chemical Company Freeport, TX 77541, USA

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A. INTRODUCTION

This section of *Polymer Handbook* focuses on critical polymers in the commercial world. The polymers were chosen because they already have a large economic impact or are likely to have an economic impact during the lifetime of this Handbook. Hundreds of polymers are the subjects of study and application in the world. Many of these have commercial status. However, including all of them would compromise the utility of this chapter. Properties for all the polymers of this section plus many others are included with more details in various chapters of this Handbook.

Because of their cost and properties, polymers in this section often get first consideration for applications, or are the benchmarks against which alternative materials are compared. The data in the tables of this section can be used for rapid comparison against performance requirements.

Brief narrative descriptions of the polymers are given in the next section. More complete descriptions can be found in other places; the Handbook of Plastic Materials and Technology (I. I. Rubin (Ed.), Wiley Interscience, 1990) is an excellent resource.

A common set of properties are given in Section C. In many cases, the data are not available or are not relevant. In some cases, we have chosen to highlight a specific example of a family of polymers. However, in some cases, selecting a single member of a family did not represent the range of applications and properties available, so we included the ranges or subclassifications. Often the sources of data on polymer properties disagree. We have assumed that the disagreements were honest results of subtle differences in the polymer or the test. In some cases we report averages, in some cases we report the "best" value, and in other cases we report ranges. The reader is advised to refer to the specific product literature and to consult the technical service representatives of the suppliers. Standard or typical abbreviations for each polymer are also included.

B. NARRATIVE DESCRIPTIONS

1. Multipurpose Polymers

Poly(ethylene terephthalate) (PET) This polymer is usually made by a two-step condensation polymerization of the dimethyl ester of terephthalic acid and ethylene glycol. Articles made with this polymer can be either semi-crystalline or amorphous. Applications include fibers for carpeting and clothing, bottles (especially for soft drinks), and films for food packaging and magnetic tapes.

Poly(ethylene terephthalate, 1,4-cyclohexane dimethanol) (PETG) This polymer substitutes enough 1,4-cyclohexane dimethanol for ethylene glycol in the backbone (to prohibit crystallization). Applications include food packaging and injection molded parts.

Poly(vinyl chloride) (PVC) Applications for this polymer fall into two broad categories depending upon formulation. The name for this polymer is often freely abbreviated as "vinyl".

Flexible poly(vinyl chloride) This type typically contains 30–40 wt.% additives, especially plasticizers, to lower the glass-transition temperature. Applications include hoses, films, flooring, and automotive interiors.

Rigid poly(vinyl chloride) This glassy polymer is used for molding and profile extrusions with less additives. Typical applications include pipe, house siding, window frames, and bottles.

Ethylene–methacrylic acid copolymers, partially neutralized with sodium or zinc (Ionomer) The most important applications are for food packaging as films or sheets. They adhere to nylon in coextrusion, and they heat seal well.

Ethylene–acrylic acid copolymers (EAA) These adhesive copolymers typically have between 3 and 20 wt.% acrylic acid. They are often used in extrusion coating to provide a heat seal layer for packaging, especially when good flavor/aroma retention is needed.

Ethylene–vinyl acetate copolymers (EVA) The range of compositions can be from 2–50 wt.% vinyl acetate. Tough, clear films are made with copolymers having low levels of vinyl acetate (2–7 wt.%). Hot melt adhesives are an application for higher levels of vinyl acetate (18–40 wt.%).

Polytetrafluoroethylene (PTFE) This homopolymer of tetrafluoroethene has a wide range of valuable properties. Applications often rely on the very low surface energy (useful for non-stick coatings), the chemical resistance to many liquids (useful for gaskets and liners), and the wide range of service temperatures.

Ethylene–styrene interpolymers (ESI) These copolymers exhibit a very wide range of properties depending on composition. At low levels of styrene, the copolymers are crystalline, flexible, thermoplastics. At intermediate levels of styrene, the copolymers are amorphous and highly elastomeric. At high levels of styrene, the copolymers have a mixture of glassy and rubbery properties with a glass-transition temperature ranging to above room temperature. Applications vary as widely as the properties, including new areas for thermoplastics.

Poly(lactic acid) (PLA) This compostible polymer is synthesized from renewable resources. The properties vary according to the composition (D- and L- conformations). Applications include food packaging as film or molded cups.

2. Polyolefins and Barrier Polymers

Polyethylene family The total usage of all members of this family is the greatest of all thermoplastics. Most members of the family are easy to fabricate and have low cost. The properties vary widely across the family. Food packaging is a frequent application.

High density polyethylene (HDPE): This set of highly crystalline polymers is used in molding and film applications, with milk jugs being a prime example. These polymers are less flexible than other polyethylenes.

Low density polyethylene (LDPE): This set of branched polymers is less crystalline than HDPE. Members are flexible and clear, with moderate toughness.

Linear low density polyethylene (LLDPE): These are copolymers of ethylene with modest amounts of butene, hexene, or octene linear α-olefins. Grades are available for films and for molding. Films typically show good toughness. Some grades are suitable for fibers.

Very low density polyethylene or ultra-low density polyethylene (VLDPE or ULDPE): These are also copolymers of ethylene and linear α-olefins; however, they have densities less than 0.915 g/cm^3. They have improved toughness and sealability compared to LLDPE.

Polyolefin plastomer (POP): New catalyst technologies allow synthesis of these materials which include these with lower densities. Copolymers over a wide range of composition yield a wide range of properties for films, fibers, and molding applications.

Polypropylene (PP) Most applications use the isotactic form. Oriented (OPP) and unoriented films are used often for food packaging, sometimes in combination with vinylidene chloride copolymers. Polypropylene fibers are used for webbing in outdoor furniture, carpets, and both woven and non-woven fabrics. Polypropylene is also an important engineering thermoplastic.

Vinylidene chloride copolymers (PVDC) This set of polymers includes resins for extrusion and molding, resins for solution coating, and latexes for coating. A variety of comonomers are used to achieve different properties. The barrier properties are important for food packaging. Typically, these polymers are used with other polymers such as polyethylene or polypropylene in multi-layer structures.

Ethylene–vinyl alcohol copolymers (EVOH) These polymers are actually hydrolyzed copolymers of ethylene and vinyl acetate. They are excellent barriers to mass transport, especially when dry. They find applications in both flexible and rigid packaging for food, typically as part of a multi-layer structure.

3. Styrenics and Engineering Thermoplastics

Polystyrene family These inexpensive polymers span the range of engineering thermoplastics. They are easy to fabricate by either extrusion or molding. Typically, small amounts of additives are used, including extrusion aids, mold releases, FR agents, UV stabilizers, and plasticizers.

General purpose polystyrene (GPPS): This homopolymer is transparent and glossy. It quickly sets after molding to give stiff parts. Polystyrene can be made into foam articles such as insulating board or cups, using extrusion techniques or by expanding beads. Other applications include food packaging and molded parts in appliances.

High impact polystyrene (HIPS): This rubber-modified composite typically contains 1–10 wt.% rubber, generally polybutadiene, to give added toughness. It is also used in many applications including food packaging and molded parts.

Styrene–Acrylonitrile copolymers (SAN): A typical copolymer has 70 wt.% styrene and 30 wt.% acrylonitrile. These clear polymers have excellent dimensional stability and long-term toughness. Furthermore they are resistant to a wide range of solvents.

Rubber-modified styrene–acrylonitrile copolymers (ABS): This material has a continuous SAN phase with about 15 wt.% rubber modification, generally polybutadiene. In most applications, impact resistance is the reason for the selection of ABS. Applications include housings and covers for appliances and tools, plus a variety of automotive moldings.

Syndiotactic polystyrene (SPS): This semi-crystalline polymer can be used at higher temperatures. Applica-

tions include molded parts that must maintain close tolerances.

Polycarbonate (PC) This polymer is usually made in large scale by the condensation of phosgene and bisphenol A. It has great impact strength and excellent optical properties; hence, it is used for lenses, compact discs, glazing, instrument panels, and high-volume food services wares. It can be modified with reinforcing fibers, FR agents, and stabilizers. Development of new applications is intense.

Nylon family These are polyamides resulting from the condensation reaction of an amine function and an acid function. As a family, they are tough and hard. They are resistant to many liquids and have low coefficients of thermal expansion. They can be reinforced with glass fibers, carbon, and minerals. Applications include molded parts for electrical power transmission, molded parts for a wide range of automotive functions, pulleys, bearings and items which need good abrasion resistance and toughness.

Nylon 6: This homopolymer of caprolactam is in the middle of the range of nylons for toughness, hardness, and heat distortion.

Nylon 6,6: This copolymer of hexamethylene diamine and adipic acid has the greatest hardness and highest resistance to heat deformation and lowest toughness of the nylon family.

Poly(methyl methacrylate) (PMMA) This important member of the acrylate family is often freely abbreviated "acrylate". It has moderate toughness and excellent optical properties. It is hard. Hence, applications include glazing, fibers for transporting light, instrument panels, and packaging.

Polyoxymethylene (Acetal) Acetal resins are derived primarily from formaldehyde although copolymers are common. Endcapping is done to reduce the rate of degradation. These polymers are strong, tough, and stiff, and they have a low coefficient of friction against many materials. They are creep resistant and are extremely resistant to fatigue. Applications are often based upon dimensional stability and solvent resistance.

4. Elastomers

Poly(organosiloxanes) (silicone polymers) Most silicone polymers are either homopolymers or copolymers of dimethylsiloxane. They have high flexibility over a wide range of temperatures. They "repel" water strongly. Membranes are an important application for elastomeric grades. Other applications include stopcock grease, car polishes, and anti-stick formulations.

Chlorinated polyethylene (CPE) After a starting polyethylene has been chlorinated, the resulting material is typically 25–50 wt.% chlorine. The properties range from thermoplastic to elastomeric. Applications for CPE include automotive hoses, tubing, and wire jacketing plus extensive membranes for roofing. It can be an impact modifier for PVC.

Polyolefin elastomers (POE) These copolymers of ethylene and an α-olefin are made with single-site catalysts. They have very low densities. Materials can be designed for a wide range of applications.

Polyurethane elastomers (some TUP, thermoplastic polyurethane) These terpolymers can be used uncured for most applications; however, selected grades can be cross-linked to enhance properties. As a family these elastomers are tough and wear resistant. They have excellent chemical resistance and flexibility. They can have excellent clearity. Applications include cable jackets, Automotive fascia, connectors, fittings, and many, many more.

Ethylene-Propylene-Diene Terpolymers (EPDM) These terpolymers typically contain a few percent of a diene such as hexadiene. This material is easy to fabricate and then is usually heat-treated at 125°C to 175°C to induce crosslinking. The physical properties are much different after crosslinking. Commonly, they are heavily formulated for applications which include wire jacketing systems, automotive hoses, and roof sheeting.

C. PROPERTIES OF COMMERCIAL POLYMERS

TABLE 1. MULTIPURPOSE THERMOPLASTICS

Property	Unit	Test method	PET[a]	PETG	Rigid PVC	Flexible PVC[b]
MECHANICAL						
Density	g/cm^3	D792	1.4	1.27	1.39	1.18–1.70
Tensile strength	MPa	D638	Hoop-172 axial-69	50	55	5.5–26.2
Tensile modulus	MPa	D638	Hoop-4275 axial-2206	1724	2800	4.8–12.4
Flexural modulus	MPa	D638		2000		
Elongation to break	%	D638		180	40–80	150–450
Notched Izod at room temp.	J/m	D256		90		Varies
Hardness		D785		R105	Shore D 65–85	
THERMAL						
Deflection T @ 264 psi	°C	D648		63		
Deflection T @ 66 psi	°C	D648		71	66–77	
Vicat softening point	°C	D1525	79	180	63–82	Varies
UL temp. Index	°C	UL746B				Varies
UL flammability code rating		UL94		HB	V-0	Varies
Linear coefficient of thermal expansion	mm/mm/°C	D696		9.1×10^{-5}	$9–18 \times 10^{-6}$	$13–45 \times 10^{-6}$
ENVIRONMENTAL						
Water absorption 24 h	%	D570	<0.1	0.5	<0.5	Varies
Clarity	% Transmission	D1003	88	90	Transparent Opaque	Clear, translucent,
Outdoor weathering	%	D1435	Not suggested	Not suggested		Varies
FDA approval			Yes	Yes	Special formula available	Possible
CHEMICAL RESISTANCE TO:						
Weak acid		D543	Good	Fair	Not attacked	Not attacked
Strong acid		D543	Fair	Poor	Not to slightly attacked	Not attacked
Weak alkali		D543		Fair	Not attacked	Not attacked
Strong alkali		D543	Fair	Poor	Not to slightly attacked	Not attacked
Low molecular weight solvents		D543	Fair	Fair		Ketones, chlorinated hydrocarbons attack
Alcohols		D543	Good	Fair	Resists	Minimally attacked
ELECTRICAL						
Dielectric strength	kV/mm	D149	26	1/8″–15.7 1/16″–22.1	10–50	9.9–15.8
Dielectric constant		D150	3.3	3.2	32–40	3.3–4.5
Power factor		D150	0.03		0.007–0.020	0.04–0.14
OTHERS						
Melting point	°C	D3418	245–265	None	175	Varies
Glass transition temp.	°C	D3418	80	81	81	Varies
Special						

[a] Bottle grade.
[b] Range includes plasticizers and fillers.
[e] 9.5% acrylic acid, extrusion coating resin.
[f] High styrene content.

Polymer name					
Ethylene–methacrylic acid copolymer[c]	EVA[d]	EAA[e]	PTFE	ESI[f]	PLA[g]
0.94	0.93–0.957	0.938	2.2	0.950–1.050	1.25
33	6.2–28	17.6	21	12–41	53
			410	3–12	3450
220	6.9–110		410		
400	650–950	600	40	200–500	4.1
608	No break		No break	Shore A 60–100	16
Shore D 60	A: 73–98		D55–D70		
	D: 24–47				
			55.6		
44			121		137
73	36–82	76			
			VE-0		
$18–30 \times 10^{-5}$			9.9		
	0.1		<0.05		<0.5
6	Transparent to translucent		Opaque		
			Superb		
Yes	Yes	Yes	Yes		Yes
Not attacked	Not attacked		Not attacked	Good	
Slow attacked	Attacked by sulfuric acid		Not attacked	Good	Not resistant
Not attacked	Not attacked		Not attacked	Good	
Not attacked	Not attacked		Not attacked	Good	
Slight swell	Soluble		Not attacked	Varies	Varies
Slight swell	Not attacked		Not attacked	Good	
0.04			25.4		
2.4			2	2.2–2.6	
0.003			<0.0002		
93			327	0.001–0.008	178
			−100	−20 to +35	63
		Neck in is 6.6 cm at 25μm; minimum coating weight is 10 g/m^2	Surface energy at 20°C ~ 20 erg/cm^2	Has "Dead Fold"	Combustible; amorphous grades are transparent

[c] Ionomer; partially neutralized with sodium.
[d] Properties range for family.
[g] Sheet extrusion grade, low D isomer, semi-cyrstalline.

TABLE 2. POLYOLEFINS AND BARRIER POLYMERS

Property	Unit	Test method	HDPE[a]	LDPE[b]	LDPE[c]	LLDPE[d]
MECHANICAL						
Density	g/cm^3	D792	0.941–0.967	0.921	0.923	0.92
Tensile strength	MPa	D638	19–30	10.3	9.6	MD 56.5 CD 37.0
Tensile modulus	MPa	D638	800–1400	165.5	248	MD 183 CD 169
Flexural modulus	MPa	D638	700–1700			
Elongation to break	%	D638	10–1000	620	270	MD 600 CD 750
Notched izod at room temp.	J/m	D256	27–160	42.7 at −50°C	48 at −50°C	
Hardness		D785				
THERMAL						
Deflection *T* @ 264 psi	°C	D648				
Deflection *T* @ 66 psi	°C	D648	65–95	41		66
Vicat softening point	°C	D1525	120–130	91	93	106
UL temp. index	°C	UL7468				
UL flammability code rating		UL94				
Linear coefficient of thermal expansion	mm/mm/°C	D696	$100–200 \times 10^{-6}$	$\sim 250 \times 10^{-6}$	$\sim 250 \times 10^{-6}$	$160–200 \times 10^{-6}$
ENVIRONMENTAL						
Water absorption 24 h	%	D570	<0.01	<0.01	<0.01	
Clarity	%Transmission	D1003		Translucent		
Outdoor weathering	%	D1435				
FDA approval			Yes	Yes	Yes	Yes
CHEMICAL RESISTANCE TO:						
Weak acid		D543	Not attacked	Not attacked	Not attacked	Not attacked
Strong acid		D543	Minimally attacked	Minimally attacked	Minimally attacked	Minimally attacked
Weak alkali		D543	Not attacked	Not attacked	Not attacked	Not attacked
Strong alkali		D543	Not attacked	Not attacked	Not attacked	Not attacked
Low molecular weight solvents		D543	Minimally attacked	Minimally attacked	Minimally attacked	Not soluble
Alcohols		D543	Not attacked	Not attacked	Not attacked	Not soluble
ELECTRICAL						
Dielectric strength	KV/mm	D149	16–24			
Dielectric constant		D150	2.2–3.0	2.2	2.2	2.3
Power factor		D150	0.00005–0.003	0.0003	0.0003	<0.0005
OTHERS						
Melting point	°C	D3418	130–137			125
Glass transition temp.	°C	D3418	Not measurable	−35 inferred	−35 inferred	−35 inferred
Special					Minimum heat seal; temperature: 132°C	

[a] Properties of range.
[b] General purpose, for film & molding.
[e] For injection molding.
[f] Blown film grade, film properties reported.
[i] 38 mol% ethylene

	Polymer name					
	LLDPE[e]	VLDPE (or ULDPE)[f]	POP[g]	PP	PVDC[h]	EVOH[i]
	0.917	0.912	0.896	0.903	1.7	1.17
	15.9	MD 57.9	MD 49	35.5	34.5	60
		CD 49.6	CD 43			
	221	MD 122		1380	516.8	
		CD 135				
	283			1690		
	850	MD 575	MD 600	Depends on specimen	25	240
		CD 700	CD 710	molding, history		
	40 at −50°C			37	37.4	
				100	60	
				55	49	
				101		
	96		80	154	135	
				115		
				HB	V-0	
	$160–200 \times 10^{-6}$	$\sim 250 \times 10^{-6}$		90×10^{-6}	34×10^{-5}	
	<0.01	<0.01	<0.01	<0.03	0.1	>1.0
					85	
					moderate discoloration	
	Yes	Yes		21 CFR 177.1520 (c) 1.1	Yes	Yes
	Not attacked	Not attacked	Not attacked	Excellent	Not attacked	
	Minimally attacked	Minimally attacked	Minimally attacked	Varies with acid	Not attacked	
	Not attacked	Not attacked	Not attacked	Excellent	Minimally to badly attacked	
	Not attacked	Not attacked	Not attacked	Good	Minimally to badly attacked	
	Not soluble	Minimally attacked	Minimally attacked	Nonpolar swells; polar excellent	Not attacked	
	Not soluble	Not attacked	Not attacked	Excellent	Not attacked	
				24–28		
	2.3	~2.2		2.25		
	<0.0005	~0.0003		0.0003		
				164	160	175
	−35 inferred	−38 inferred	−45	−20	−4	62 (Dynamic)
		Seal initiation temperature: 102°C; Oxygen permeability at 23°C: 1900 nmol/m.s.GPa; Toughness (D882) −MD 97 J/cm^3 −CD 127 J/cm^3	Oxygen permeability at 23°C: 3200 nmol/m.s. GPa		Oxygen permeability at 23°C: 0.2 nmol/m.s. GPa; WVTR (37.8°C, 90% RH): 0.06 g mil/100 in.^{2} day	Oxygen permeability at 23°C 65% RH = 0.08 nmol/m.s. GPa; WVTR at 40°C 90%RH = 1.4 g.mil/100 in.^{2} day

[c] For extrusion coating.
[g] Homogeneous catalyst, blown film grade, film properties reported.
[d] For blown film, mechanical properties for blown film with blow up ratio 2:3.
[h] Extrusion grade.

TABLE 3. STYRENICS AND ENGINEERING THERMOPLASTICS

Property	Unit	Test method	GPPS[a]	HIPS[b]	SAN[c]	ABS[d]
MECHANICAL						
Density	g/cm^3	D792	1.04	1.04	1.08	1.04
Tensile strength	MPa	D638	46	24	82	40
Tensile modulus	MPa	D638	2890	1650	3860	2140
Flexural modulus	MPa	D638	3180	1910	4070	2580
Elongation to break	%	D638	1.5	52	3	25
Notched izod at room temp.	J/m	D256	93	112	27	72
Hardness		D785	M60–M84	M29	M80	R104
THERMAL						
Deflection T @ 264 psi	°C	D648	86	74	103	103
Deflection T @ 66 psi	°C	D648	95	87	108	~107
Vicat softening point	°C	D1525	107	101	111	111
UL temp index	°C	UL746B	50	50	60	~60
UL flammability code rating		UL94	NA to V-O	NA to V-O	HB	HB
Linear coefficient of thermal expansion	mm/mm/°C	D696	9.0×10^{-5}	9.0×10^{5}	6.7×10^{-5}	6.7×10^{-6}
ENVIRONMENTAL						
Water absorption 24 h	%	D570	0.05–0.07	0.05–0.07	0.05–0.40	0.20–0.45
Clarity	%Transmission	D1003			87–89	Opaque
Outdoor weathering	%	D1435			Yellows	Fair
FDA approval			Yes	Yes	No	Possible
CHEMICAL RESISTANCE TO:						
Weak acid		D543			Not attacked	Not attacked
Strong acid		D543			Minimally attacked	Minimally attacked
Weak alkali		D543			Not attacked	Not attacked
Strong alkali		D543			Minimally attacked	Minimally attacked
Low molecular weight solvents		D543	Attacked by Hydrocarbons, Aromatic Amines, Ketones, Aldehydes	Attacked by Hydrocarbons, Aromatic Amines, Ketones, Aldehydes	Minimally attacked	Minimally attacked
Alcohols		D543			Minimally attacked	Minimally attacked
ELECTRICAL						
Dielectric strength	kV/mm	D149	19.7	11.8–19.7	~14	16–31
Dielectric constant		D150	2.54	2.50–2.52	~2.8	~3.1
Power factor		D150	2×10^{-4}	6×10^{-4}	~0.009	0.007–0.015
OTHERS						
Melting point	°C	D3418				
Glass transition temp.	°C	D3418	74–110	93–105	115	~110
Special						Other grades include high impact, high gloss, and heat-resistant

[a] General purpose.
[b] Rubber modified, extrusion grade.
[e] 30% Glass-filled, ignition resistant.
[f] General purpose grade.
[i] General purpose grade.
[j] General purpose grade.

Polymer name					
SPS[e]	PC[f]	Nylon 6[g]	Nylon 6.6[h]	PMMA[i]	ACETAL[j]
1.44	1.2	1.13	1.14	1.17–1.20	1.41
95.1	72	80	90	55–76	61
		50	65		
9600	2480	3000	3400	2400–3100	2829
		1500	1700		
9600	2410	2414	2896	2800–3400	2588
		966	2206		
1.8	150	50–100	20	2–5	40–75
		200	80		
70	961	53	37	16–32	53–80
		96	64		
	R118/M74	M-86	M-90	M80–100	M78–M80
221	132	55–75	104	71–102	110
263	138	>160	>200	74–113	157
263	158			95–110	
					105
V-0	V-2	V-2	V-2	HB	94HB
30.5×10^{-6}	6.84×10^{-5}	81×10^{-6}	81×10^{-6}	$5–9 \times 10^{-5}$	8.5×10^{-5}
0.01	0.15	3 ± 0.4	2.8 ± 0.3	0.2–0.4	0.22
	87–91			91	Opaque
				Very slight yellowing at 3 years	
	Possible			Yes; for less than 8% alcohol	Yes
Good		Not resistant	Not resistant	Not attacked	Consult supplier
Good	Attacked	Not resistant	Not resistant	Minimally attacked to soluble	Badly attacked
Good	Attacked	Good resistance	Resistant	Not attacked	Not attacked
Good	Attaked	Good resistance	Resistant	Not attacked soluble to	Not attacked
Varies	Varies	Good resistance	Resistant	Not attacked	
					Not attacked
Good		Good resistance	Resistant	Not attacked to badly attacked	Not attacked
23.6	17	100	120	~20	20
		60	80		
3.1	2.93	3.5	3.2	2.8	3.7
		7.0	5.0		
0.001	0.005	0.023	0.025	0.02–0.03	0.006
		0.3	0.2		
270	(230)	220	255		165
	150			105	
	Index of refraction: 1.586				

[c] Injection molding grade.
[g] For injection molding, heat stabilized.
[d] Solution, low gloss.
[h] General purpose.

TABLE 4. ELASTOMERS

Property	Unit	Test method	Silicone[a]
MECHANICAL			
Density	g/cm^3	D792	0.97, greater when filled
Tensile strength	MPa	D638	1.0–5.5
Tensile modulus	MPa	D638	
Flexural modulus	MPa	D638	
Elongation to break	%	D638	200–850
Notched izod at room temp.	J/m	D256	
Hardness		D785	Shore A 20–60
THERMAL			
Deflection T @ 264 psi	°C	D648	
Deflection T @ 66 psi	°C	D648	
Vicat softening point	°C	D1525	
UL temp. index	°C	UL746B	
UL flammability code rating		UL94	
Linear coefficient thermal expansion	mm/mm/°C	D696	$10–19 \times 10^{-6}$
ENVIRONMENTAL			
Water absorption 24 h	%	D570	0.1
Clarity	% Transmission	D1003	
Outdoor weathering	%	D1435	
FDA approval			
CHEMICAL RESISTANCE TO:			
Weak acid		D543	
Strong acid		D543	Fair
Weak alkali		D543	
Strong alkali		D543	Fair
Low molecular weight solvents		D543	Varies
Alcohols		D543	
ELECTRICAL			
Dielectric strength	kV/mm	D149	16–22
Dielectric constant		D150	3.0–3.5
Power factor		D150	0.001–0.01
OTHERS			
Melting point	°C	D3418	
Glass transition temp.	°C	D3418	
Special			

[a] Flexible casting resins, e.g RTV.
[b] Range for elastomeric grades, 25–36 wt.% chlorine.
[c] Homogeneous catalyst, molding grade.
[d] Polyester Polycaprolactone Resin.
[e] Fully formulated.

Polymer name			
CPE[b]	POE[c]	TPu[d]	EPDM[e]
1.10–1.16	0.87	1.20	0.86, Polymer
21-Sep		42	6–16
At 200% elongation 1.2–11.7	18	8	1.2–5.6 at 50% elongation
	22	83	–
300–800	> 1000	425	100
No break			–
Shore A > 60	Shore A 72	Shore A 93A	Shore A 57–93
Flexible		Varies	
Flexible			
Flexible	41		
		Medium	Varies
	< 0.01	0.3	
			Opaque
			Excellent
	Varies	Possible	Some
Not attacked	Not attacked	Stable	Excellent
Not attacked to badly attacked	Minimally attacked	Medium	Excellent, Varies
Not attacked to badly attacked	Not attacked	Stable	Excellent
Not attacked to badly attacked	Not attacked	Medium	Excellent, Varies
Not attacked to badly attacked	Minimally attacked	No effect to attacked	Fair, Varies
Not attacked to minimally attacked	Not attacked	No effect	Good
14.8–19.7			900
4.3–5.1			3.0–3.5
0.1			0.004–0.008
	60	Varies	Most Grades Amorpnous
– 20	– 55	– 15	
		Taber Abrasion resistance 10 mg	

SECTION VI

SOLID STATE PROPERTIES

Crystallographic Data and Melting Points for Various Polymers

Robert L. Miller
Michigan Molecular Institute, 1910 West St. Andrew Rd., Midland, MI 48640, USA

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A. INTRODUCTION

These tables contain data for approximately 2700 polymers. In general, the format and organization of the tables follows that used in the 2nd edition of the "Polymer Handbook" (Section B: Crystallographic Data; Section C: Melting Points; Section D: Formula Index and Section E: References). The Formula Index is included as an aid to the searcher: it permits one to determine the polymer name used in these tables from the structural line formula for the polymer of interest.

To avoid the duplication of data for polymers appearing in both the Crystallographic Data and Melting Point tables, the entry in the Melting Point table has been flagged with an asterisk (*).

1. Nomenclature

Contrary to the rest of the *Polymer Handbook*, the ACS-IUPAC nomenclature proposals (1,2) for naming regular single-strand organic polymers have not been adopted for these tables. Basically, the nomenclature used in this portion of the *Polymer Handbook* is that of the 1st and 2nd editions and of the 1967 recommendations of the IUPAC Nomenclature Committee (3). The majority of polymers were named as the bivalent radical(s) comprising the constitutional repeating unit (CRU), with priority in naming given to (a) incorporation of important structural features (amide, ester, oxide, etc.) and (b) emphasis on symmetry of the CRU (when present). As in the past, many common polymers (poly(styrene), poly(vinyl chloride), etc.) were named according to source names.

In the majority of cases, the polymer was named according to its structure, particularly when the CRU was composed of two or more subunits following each other in a regular fashion. An example is poly(ethylene terephthalate). With more complicated structures, the CRU was divided into its possible subunits, each of which was treated as a bivalent radical and so named. One of the subunits was treated as the parent compound, for example, the "terephthalic acid" of the above example. For poly(amides) and poly(esters), the acid was chosen as the parent compound; for poly(urethanes) it was the isocyanate.

Whenever the CRU (or a portion thereof) exhibited a center of symmetry, naming began with the central subunit using Chemical Abstracts/IUPAC names for the constituent bivalent radicals (see under examples). Conjunctive names were used as needed in constructing names. For symmetrical units, this process of naming could be continued indefinitely.

Unsymmetrical bivalent units were named with replacement nomenclature, or from end to end, depending upon the complexity of the bivalent radical and the ease of naming by the alternative choices. Replacement nomenclature was used, for example, to name poly(hexamethylene 6-oxa-heptadecanediamide). The polymer from the symmetrical oxyacid would be named poly(hexamethylene oxydicapryl-amide).

More complicated structures without symmetry were named end to end. This method was particularly appropriate for the poly(oxides) of the form $-(R-O-R'-O)_n$ (and for the analogous sulfides, sulfones, ureas, and anhydrides) and for the poly(ω-amino acids) and for the poly (ω-hydroxy acids). The constitutional hydrocarbon subunits were ordered alphabetically in naming the polymer as, for example, in poly(methyleneoxy pentamethylene oxide).

For silicon-containing polymers, bivalent radical names replaced the source-based silane/siloxane names. For example, the source-named polymer, poly[(tetramethylsil-phenylene) siloxane], appears in these tables as poly(*p*-phenylene tetramethyldisiloxanylene).

For the regular polymers of multipeptides, a cyclic permutation of the individual peptide residues in the constitutional base unit was performed to permit alphabetical ordering without loss of directional or sequential sense. Thus, poly(alanylglycyl-proline) is the name given to polymers prepared form (ala-gly-pro), (gly-pro-ala), and (pro-ala-gly), but not from (ala-pro-gly) or from either of its cyclic permutations.

2. Examples of Polymer Names

2.1. Polymer Names Based on Source

Olefin, Vinyl, and Acyclic Polymers

$[-CH_2-CH_2-]_n$	Poly(ethylene)
$\begin{array}{l}[-CH-CH_2-]_n\\ \;\;\vert\\ \;\;CH_2-CH_3\end{array}$	Poly(1-butene)
$\begin{array}{l}[-CH-CH_2-]_n\\ \;\;\vert\\ \;\;CN\end{array}$	Poly(acrylonitrile)
$\begin{array}{l}[-CH-CH_2-]_n\\ \;\;\vert\\ \;\;Cl\end{array}$	Poly(vinyl chloride)
$\begin{array}{l}[-CH-CH_2-]_n\\ \;\;\vert\\ \;\;COOCH_3\end{array}$	Poly(methyl acrylate)

Poly(amides)[1]

$[-NH-CH_2-COO-]_n$	Poly(glycine)
$[-NH-(CH_2)_2-COO-]_n$	Poly(3-aminopropionic acid) (poly(β-alanine))
$[-NH-(CH_2)_3-COO-]_n$	Poly(4-aminobuyric acid)
$[-NH-(CH_2)_4-COO-]_n$	Poly(5-aminovaleric acid)
$[-NH-(CH_2)_5-COO-]_n$	Poly(6-aminocaproic acid)
$[-NH-(CH_2)_6-COO-]_n$	Poly(7-aminoenanthic acid)
$[-NH-(CH_2)_7-COO-]_n$	Poly(8-aminocaprylic acid)
$[-NH-(CH_2)_8-COO-]_n$	Poly(9-aminopelargonic acid)
$[-NH-(CH_2)_9-COO-]_n$	Poly(10-aminocapric acid)
$[-NH-(CH_2)_{10}-COO-]_n$	Poly(11-aminoundecanoic acid)
$[-NH-(CH_2)_{11}-COO-]_n$	Poly(12-aminolauric acid)

Poly(oxides)

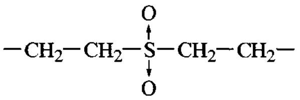
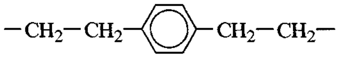
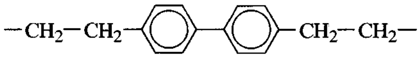
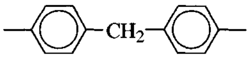
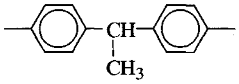
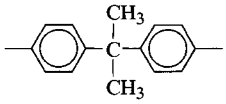
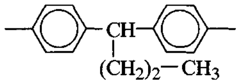
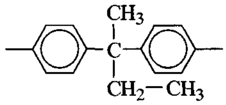
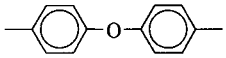
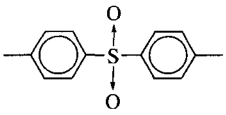
$[-CH_2-O-]_n$	Poly(oxymethylene)
$\begin{array}{l}[-CHO-]_n\\ \;\;\vert\\ \;\;CH_3\end{array}$	Poly(acetaldehyde)

[1] Poly(esters) are treated similarly.

[$-CH_2-CH_2-O-$]$_n$	Poly(ethylene oxide)
[$-CH-CH_2-O-$]$_n$ (with CH_3 on CH)	Poly(propylene oxide)
[$-CH_2-CH_2-CH_2-O-$]$_n$	Poly(trimethylene oxide)

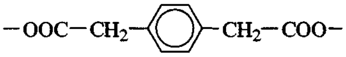
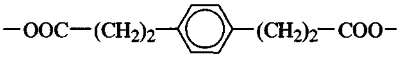
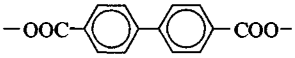
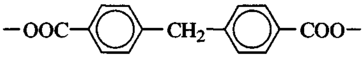
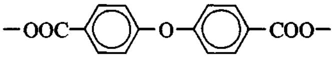
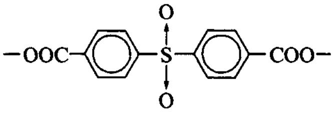
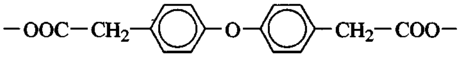
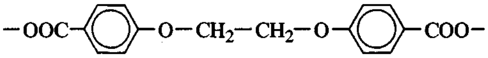
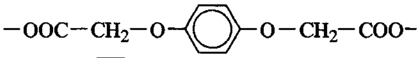
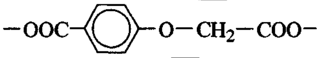
2.2. Polymer Names Based on Structure

(a) Linking Radicals

$-CH_2-CH_2-$	Ethylene
$-CH_2-CH_2-CH_2-$	Trimethylene
$-CH_2-CH_2-O-CH_2-CH_2-$	Oxydiethylene
$-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-$	Ethylenedioxy-diethylene
	Sulfonyldiethylene
$-CH_2-CH_2-CH_2-P(CH_3)-CH_2-CH_2-CH_2-$	methylphosphinidene-ditrimethylene
	*p*-Phenylenediethylene
	4,4′-Biphenylenediethylene
	4,4′-Methylenediphenylene
	4,4′-Ethylidenediphenylene
	4,4′-Isopropylidenediphenylene
	4,4′-Butylidenediphenylene
	4,4′-(2,2-Butylidene)diphenylene
	4,4′-Oxydiphenylene
	4,4′-Sulfonyldiphenylene

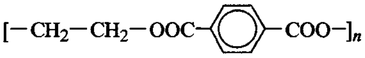
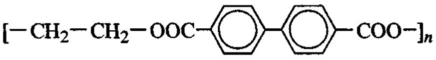
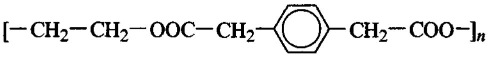
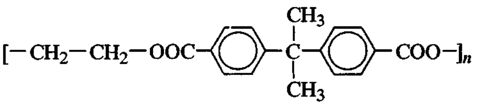
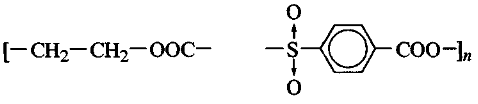
(b) Parent Compounds

$-OOC-COO-(-NHOC-CONH-)$	Oxalate (oxamide)
$-OOC-CH_2-COO-$	Malonate (malonamide)
$-OOC-(CH_2)_2-COO-$	Succinate (succinamide)
$-OOC-(CH_3)_3-COO-$	Glutarate (glutaramide)

$-OOC-(CH_2)_4-COO-$	Adipate (adipamide)
$-OOC-(CH_2)_5-COO-$	Pimelate (pimelamide)
$-OOC-(CH_2)_6-COO-$	Suberate (suberamide)
$-OOC-(CH_2)_7-COO-$	Azelaate (azelaamide)
$-OOC-(CH_2)_8-COO-$	Sebacate (sebacamide)
$-OOC-(CH_2)_9-COO-$	Nonanedioate (nonanediamide)
$-OOC-CH_2-CH_2-O-CH_2-CH_2-COO-$	Oxydipropionate
	*p*-Phenylene diacetate
	*p*-Phenylenedipropionate
	4,4′-Dibenzoate
	4,4′-Methylenedibenzoate
	4,4′-Oxydibenzoate
	4,4′-Sulfonyldibenzoate
	4,4′-Oxydiphenylenediacetate
	4,4′-(Ethylenedioxy)dibenzoate
	*p*-(Phenylenedioxy)diacetate
	(*p*-Carboxyphenoxy)acetate
	1,4-Piperazinediacetate

(c) Polymer Names

Poly(esters)[2]

	Poly(ethylene terephthalate)
	Poly(ethylene 4,4′-dibenzoate)
	Poly(ethylene *p*-phenylenediacetate)
	Poly(ethylene 4,4′-isopropylidenedibenzoate)
	Poly(ethylene 4,4′-sulfonyldibenzoate)

Poly(urethanes)

$[-CH_2-CH_2-CH_2-O-\overset{O}{\overset{\|}{C}}-NH-CH_2-CH_2-NH-\overset{O}{\overset{\|}{C}}-O-]_n$	Poly(trimethylene ethylene-urethane)

[2] Poly(amides) are treated similarly.

Poly(oxides), Poly(sulfides), Poly(amines)

$[\text{-}(CH_2)_2\text{-}O\text{-}(CH_2)_3\text{-}]_n$	Poly(ethylene trimethylene oxide)
$[\text{-}(CH_2)_2\text{-}S\text{-}(CH_2)_3\text{-}]_n$	Poly(ethylene trimethylene sulfide)
$[\text{-}(CH_2)_2\text{-}NH\text{-}(CH_2)_3\text{-}]_n$	Poly(ethylene trimethylene amine)

REFERENCES FOR INTRODUCTION

1. ACS Structure-based Nomenclature for Linear Polymers, Macromolecules, **1**, 193 (1968).
2. IUPAC Appendices on Tentative Nomenclature, Symbols, Units, and Standards – Number 29, Nomenclature of Regular Single-strand Organic Polymers, November 1972 – Macromolecules, **6**, 149 (1973).
3. 1967 IUPAC Report on Nomenclature, J. Polym. Sci. B, **6**, 257 (1968).

B. CRYSTALLOGRAPHIC DATA FOR VARIOUS POLYMERS

The following table presents crystallographic data for about 750 polymers (and for their many polymorphs) grouped, according to the generic structure of the constitutional base unit, into poly(olefins), poly(vinyls) and poly(vinylidenes), poly(aromatics) and poly(imides), poly(dienes) and poly(diynes), poly(peptides), poly(amides), poly(esters), poly(urethanes) and poly(ureas), poly(ethers), poly(oxides), poly(sulfides) and poly(sulfones), poly(saccharides), and other polymers. Where a polymer might be included in more than one group the following group definitions were used:

1. *Poly(olefins):* those olefin polymers not containing aromatic rings; all substituted derivatives of these, excluding the vinyl and vinylidene polymers. For example, poly(ethylene), poly(tetrafluoroethylene), and poly(cyclopentene), but not poly(styrene) or poly(vinyl chloride).
2. *Poly(vinyls) and Poly(vinylidenes):* those vinyl and vinylidene polymers containing atoms other than carbon and hydrogen, excepting the poly(ethers). Thus, poly(vinyl chloride) but not poly(methylvinyl ether).
3. *Poly(aromatics) and Poly(imides):* those hydrocarbon polymers containing aromatic rings, including heterocyclic ones. Thus, poly(styrene), poly(*p*-xylylene), and poly(*p*-phenylene pyromellitimide).
4. *Poly(peptides):* those polymers whose basic structure, ignoring substituents, is poly(2-aminoacetic acid), that is, poly(glycine). This group contains mainly the synthetic poly(α-amino acids).
5. *Poly(amides):* all amide polymers except the poly(α-amino acids), which are separately grouped under poly(peptides).
6. The remaining categories contain polymers according to functional groups as, for example, the poly(esters). Poly(ethers) and poly(oxides) are differentiated according to whether the ether linkage is in the side-group or in the chain backbone, respectively. For example, poly(1-butoxy-2-chloroethylene) is a poly(ether) and poly(oxymethylene) is a poly(oxide).
7. Those polymers not otherwise categorized, such as the poly(phosphazenes) and the poly(siloxanes), are grouped in the "other" category.

Within each group, polymers are listed alphabetically according to the basic structure, ignoring substituents (excepting the polypeptides, all of which have the same base structure). Substituted polymers are listed alphabetically according to the substituent under the entry for the unsubstituted polymer. Thus, poly(tetrafluoroethylene) and poly(4-methyl-1-pentene) appear, respectively, under poly(ethylene) and poly(1-pentene).

Included as part of the polymer name column is the molecular weight of the chemical repeat unit of the chain, that is, of the constitutional base unit. This is given in parentheses just below the polymer name. The values reported are in grams per mole.

Unless otherwise indicated, the reference cited in the last column applies to all of the data in that line of the tables. Where an entry in a line has been taken from a source different from that listed in the reference column, a *solidus* (/) separates the value of the entry from the reference citation. For example, one value of the melting point of poly(1-butene) is given as "126/12" which is to be read as "126°C according to Ref. 12".

The crystal system, where known, is given in column 2 of the table, using the abbreviations given later. The next column contains the space group symbol (the Schoenflies notation is used because of the limitations of common printers at mainframe installations) with the subscript portion of the symbol preceding the superscript portion. Thus, according to Ref. 14, the poly(ethylene) unit cell is orthorhombic (Ortho) with space group D_{2h}^{16} (D2h-16). For a fuller discussion of space group symbols, see "International Tables for X-Ray Crystallography", Vol. I, Kynoch Press, Birmingham, England, 1952.

The dimensions of the unit cell (*a*, *b*, *c*) are given next, in Angstroms (1 Å = 0.1 nm). *c* is the fiber axis. Unless otherwise indicated, the unit cell angles are all 90°. Where only one angle differs from 90°, its value is given. When all three angles differ from 90°, their values are listed in the order α, β, γ. The next column contains the number of constitutional base units in the unit cell described.

Columns 9 and 10 contain the densities of the completely crystalline and of the completely amorphous polymer, respectively. The values given, normally appro-

References page VI-159

priate to room temperature, are in grams per cubic centimeter ($1\ g/cm^3 = 10^3\ kg/m^3$). For uniformity crystallographic densities (column 9) have been recalculated on the basis of the 1969 IUPAC atomic weight values. Melting points in degrees Celsius and heats of fusion in kilojoules per mole are listed in the next two columns. The heats of fusion correspond to the amount of substance represented by the molecular weight associated with each polymer name.

Column 13 of the tables indicate briefly the conformation of the polymer chain in the crystal (in a helical notation) either as reported in the reference cited or as inferred from the value of the fiber axis. The designation $n * p/q$ specifies the number (n) of skeletal atoms in the asymmetric unit of the chain and the number of such asymmetric units (p) per q turns of the helix in the crystallographic repeat. Thus, poly(ethylene), as listed, has two carbon atoms in the backbone with one such unit per turn in the repeat – it is designated as a $2 * 1/1$ helix. Alternatively, poly(ethylene) considered a poly(methylene) would be designated as a $1 * 2/1$ helix – an entirely equivalent description of the conformation. Note that n may differ from the number of chain atoms in the constitutional base unit. On the one hand, isotactic poly(propene) has two skeletal atoms in the asymmetric unit and three units per turn ($2 * 3/1$). On the other hand, syndiotactic poly(propene) with the same constitutional base unit as isotactic poly(propene) has four skeletal atoms in the asymmetric unit and two units per turn ($4 * 2/1$). In this case, n signifies the number of skeletal atoms in the stereobase unit. A fuller discussion of this helical notation is given in Hughes and Lauer, J. Chem. Phys., **30**, 1165 (1959) and in Nagai and Kobayashi, J. Chem. Phys., **36**, 1268 (1961).

This list of polymers and data is not considered to be exhaustive. The compiler expands it as new information is unearthed and he is quite receptive to notification of omissions and/or corrections and to submission of unpublished data. All of the data in this table cannot be considered to have the same validity – the number of polymers for which detailed, accurate, and reliable crystal structure analyses have been conducted is still quite limited. The reader may find it desirable to refer to the original literature cited so as to gain a fuller appreciation of the reasons for apparent discrepancies within the tables.

The following abbrevaitions have been used in the tables.

Tri	Triclinic
Mono	Monoclinic
Ortho	Orthorhombic
Tet	Tetragonal
Rho	Rhombohedral (trigonal)
Hex	Hexagonal
P	Pseudo
Phex	Pseudohexagonal

TABLE 1. POLY(OLEFINS) (–HCH–CHR–)

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(acetylene)													
trans-													
I.	Phex		4.2	4.2	2.43		1	1.16				$2*1/1$	69
(26.04)	Mono		4.26	7.33	2.46	$\beta = 91.4$	2	1.126				$2*1/1$	982
	Ortho	D2h-16	7.32	4.24	2.46		2	1.33				$2*1/1$	981
	Ortho		7.37	4.065	2.45		2	1.178				$2*1/1$	979
	Ortho		5.62	4.92	2.592		2	1.207				$2*1/1$	980
	Mono	C2h-5	4.24	7.32	2.46	$\beta = 91.5$	2	1.133				$2*1/1$	1213
	Port	C2h-5	7.41	4.08	2.48		2	1.153				$2*1/1$	1228
	Ortho		3.99	7.29	2.51		2	1.184				$2*1/1$	1229
	Ortho		7.20	4.15	2.44		2	1.186				$2*1/1$	1281
	Ortho		7.31	4.06	2.45		2	1.189				$2*1/1$	1282
	Ortho		7.26	4.24	2.47		2	1.137				$2*1/1$	1283
			7.46	4.08	2.46		2	1.155				$2*1/1$	1323
			7.38	4.09	2.457		2	1.166				$2*1/1$	1324
	Ortho	D2h-16	7.330	4.090	2.457		2	1.174				$2*1/1$	1369
II.	Mono		3.73	3.73	2.44	$\gamma = 98$	1	1.286				$2*1/1$	980
cis-transoid													
	Ortho	D2h-16	7.61	4.39	4.47[b]		4	1.158				$2*2/1$	945
	Ortho		7.74	4.32	4.47		4	1.157				$2*2/1$	976
	Ortho	D2h-16	7.68	4.46	4.38		4	1.153				$2*2/1$	978
	Ortho		7.45	4.30	4.40[b]		4	1.227				$2*2/1$	1229
	Ortho		7.62	4.46	4.38		4	1.162				$2*2/1$	1282
			7.61	4.39	4.36[b]		4	1.187				$2*2/1$	1323
			7.66	4.42	4.384		4	1.165				$2*2/1$	1324
	Orhto	D2h-16	7.62	4.44	4.384		4	1.166				$2*2/1$	1369
cis-cisoid													
	Hex		5.12	5.12	4.84		3	1.180				$2*3/1$	977

TABLE 1. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
–, difluoro-													
trans-													
(62.02)	Ortho		7.58	4.29	2.48		2	2.554				2*1/1	1385
cis-													
	Ortho		8.03	4.47	4.64		4	2.473				2*2/1	1385
–, complex with:													
alkali metals													
Cs													
I.	Tet		9.09	9.09									1230
K													
I.	Tet		8.46	8.46									1230
II.	Ortho		5.94	16.37									1231
Na													
I.	Tet		8.5	8.5									1230
Rb													
I.	Tet		8.75	8.75									1230
II.	Ortho		6.16	16.68									1231
SbF_6													
	Mono		8.66	7.36	2.4	γ = 101							1261
and	Hex		9.8	9.8	5.4								1261
Poly(allene)													
I. (40.06)	Ortho	D2h-6	8.20	7.81	3.88		4	1.071		122/536		2*2/1	497
II.	Mono	C2-2 or C2h-2	6.37	5.12	3.88[b]	γ = 96.6	2	1.058				2*2/1	497
III.					3.88							2*2/1	497
–, tetrafluoro-													
(112.03)	Tet	C4-2 or D4-3	6.88	6.88	15.4		8	2.042		126		2*8/1	38
Poly(allylbenzene), see Poly(propene) 3-phenyl-													
Poly(1-butene)													
isotactic													
I.	Rho	D3d-6	17.7	17.7	6.50		18	0.951		126/12	13.9/82	2*3/1	35
(56.11)	Hex		17.3	17.3	6.7		18	0.96	0.87	132/250	6.07/277	2*3/1	45
	Rho		17.70	17.70	6.51		18	0.950		133	7.57	2*3/1	1284
								0.950	0.868	136/277	8.0/1285		252
								0.95		139	7.01		983
								0.95/12	0.860	135/320	6.92/320		391
											138/380		
											142/984		
											142/313		
II.	Tet	S4-1	15.42	15.42	21.05		44	0.819		130/380	4.06/320	2*11/3	866
	Tet	S4-1	14.89	14.89	20.87		44	0.886		124/277	6.28/277	2*11/3	207
	Tet		14.85	18.85	20.6		44	0.902		126/313	6.9/1285	2*11/3	350
	Tet		14.91	14.91	20.76		44	0.888		120	8.16	2*11/3	1284
	Tet	D2d-7	14.5	14.5	21.1		44			122/320		*40//11	914
									0.868				1195
III.	Ortho		12.49	8.96	(7.6)		8	(0.876)		106/277	6.49/277	2*4/1	207
	Ortho	D2-4	12.38	8.88	7.56		8	0.897		110/984		2*4/1	876
			12.38	8.92	7.45		8	0.906				2*4/1	531
					7.6								461
syndiotactic													
I.	Ortho	D2-5	16.9	6.05	7.78		8	0.937		45		4*2/1	1435
	Ortho	D2-5	16.81	6.06	7.73		8	0.946				4*2/1	1449
II.	Mono	C2-2	9.94	13.9	20.4		22	0.964?				4*5/3	1435
					20.0								1449
–, 3-methyl-													
(70.14)	Mono		9.55	8.54	6.84	γ = 116.5	4	0.933		300/48	17.3/82	2*4/1	9
	Mono	C2h-5	9.55	17.08	6.84	γ = 116.5	8	0.933		306/632		2*4/1	549
	Mono		19.1	17.8	6.85	γ = 116	16	0.890		310/90		2*4/1	231
	Port		19.25	17.20	6.85	γ = 116.5	16	0.918		300/282		2*4/1	355
	Tet	C4v-12	34.3	34.3	6.85		64	0.925				2*4/1	431
	Mono		19.25	17.20	6.63	γ = 116.5	16	0.948				2*4/1	280

TABLE 1. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
–, 3-methyl- [1,3-via hydride shift]													
(70.14)			5.4		7.8					55			332
										68/319			
–, 4-phenyl-													
(132.21)	Port	CS-2	10.4	18.0	6.61		6	1.064	0.962	158	4.6	2*3/1	483
					6.55					160/90		2*3/1	67
									1.041	159/282	4.36		1195
										168/187			
–, 4-trimethylsilyl-													
(128.29)	Ortho		10.97	20.02	6.46		6	0.901		206		2*3/1	772
Poly(2-butene-*alt*-ethylene)													
(84.16)	Mono	C2h-5	10.92	7.73	9.10	$\alpha = 130$	4	0.950	0.87	135		4*2/1	324
Poly(chlorotrifluoroethylene-*alt*-ethylene)													
(144.52)	Hex		9.86	9.86	5.02		3	1.703		262	18.8	4*1/1	635
					5					264	13.30		637
Poly(1,3-cyclobutylene)													
–, 1-cyano-													
(79.10)					25.3					370		3*8/	847
Poly(1,2-cycloheptylene-*alt*-ethylene)													
(124.23)					9.0					74		9*1/1	259
Poly(1,2-cyclopentylene-*alt*-ethylene)													
(96.17)	Ortho		8.76	7.83	9.02		4	1.032				4*2/1	247
	Ortho	D2h-17 or D2h-14	8.76	8.05	9.00		4	1.006		185		4*2/1	412
Poly(1,3-cyclopentylene-*alt*-methylene)													
(82.15)	Ortho		7.69	6.21	4.80		2	1.190		146		4*1/1	267
	Ortho		13.30	15.52	4.80		8	1.101		128		4*1/1	340
Poly(decenamer)													
trans-													
III.	Tri	Ci-1	4.40	5.39	12.30	66,104,118	1	0.985				10*1/1	477
(138.25)													
IV.	Mono	C2h-5	7.42	5.00	12.40	$\beta = 94.2$	2	1.001		80/562	32.9/562	10*1/1	530
Poly(1-decene)													
I. (140.27)					13.2					34/250		2*	150
										40/537			
Poly(1-docosene)													
I. (308.59)	Ortho		7.5	88	6.7		8	0.93		90		2*4/1	949
										91/872			
II.	Mono		5.3	108	7.7	$\beta = 94$	8	0.93		83		2*4/1	949
III.										75/949		2*	
Poly(dodecenamer)													
trans-													
III.	Tri	Ci-1	4.40	5.39	14.78	66,104,118	1	0.986				12*1/1	477
(166.31)													
IV.	Mono	C2h-5	7.43	5.00	14.85	$\beta = 93.5$	2	1.003		80/439	41.2/562	12*1/1	530
										84/562			
Poly(1-dodecene)													
I. (168.32)					13.2					45/48		2*	150
										49/872			
										49/250			
Poly(ethylene)													
I. (28.05)	Ortho	D2h-16	7.40	4.93	2.534		2	1.008		137/85	8.03/85	2*1/1	14
	Ortho		7.428	4.934	2.532		2	1.004		142/315	8.12/262	2*1/1	892
	Ortho		7.36	4.94	2.534		2	1.011		141/206	7.70/86	2*1/1	15
	Ortho		7.418	4.946	2.546		2	0.997		145/351	8.67/700	2*1/1	535
	Ortho		7.406	4.939	2.547		2	1.000		141/286	7.79/156	2*1/1	311
	Ortho	D2h-16	7.407	4.949	2.551		2	0.9961				2*1/1	1421
									0.855	146/362	7.62/343		138
								0.999	0.887		8.37/260		363
								0.991	0.811				406
								1.003	0.852	141	8.2		939
single crystal	Tri		7.84	5.56	120	63,71,82	96	1.004				2*1/1	72
II.	Pmono		4.05	4.85	2.54	$\gamma = 105$	1	0.966				2*1/1	58

TABLE 1. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters					Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]				
	Pmono		7.11	5.46	2.534	$\gamma = 96.5$	2	0.953				2*1/1	557
	Mono	C2h-3	8.09	4.79	2.53[b]	$\gamma = 107.9$	2	0.998				2*1/1	253
	Tri		4.285	4.820	2.54	90,110,108	1	1.002				2*1/1	254
III.	Ortho		8.46	4.88	2.45		2	0.920				2*1/1	792
(hi press.)	Tet		4.26	4.26	8.52		4	1.20				2*4/1	946
–, chlorotrifluoro-													
(116.47)	Hex		6.34	6.34	35		14	2.222	2.08/49	220/49	5.02/88	2*14/1	208
	Hex		6.5	6.5	35		14	2.11		210/46		2*14/1	21
	Hex		6.438	6.438	41.5	Approx.	17	2.18		222/341			777
	Hex		6.385	6.385	42		17	2.217				2*17/	296
	Hex		6.4	6.4	42.5		17	2.18				2*17/1	629
					43		16					2*16/1	205
								2.19/49	1.925				139
								2.192	2.032	215			116
–, ethylsilyl-													
isotactic	Hex	C3I-2	21.60	21.60	6.50		18	0.981				2*3/1	489
(86.21)													
–, tetrafluoro-													
II. (50.01)	Phex		5.54	5.54	16.8	$\gamma = 119.5$	13	2.406	2.0/1195	327/46	3.4/1195	1*13/1	11
	Tri		4.882	4.875	5.105	90,87,87	4	2.744				1*4/	266
	Tri		5.59	5.59	16.88	$\gamma' = 119.3$	13	2.347				1*13/6	209
	Mono	C2-2	5.59	9.76	16.88	$\beta = 90$	26	2.344				1*13/	602
			9.649	5.648	1.3**	γ	2	2.344				Irreg	987
	Phex		5.61	5.61		$\gamma = 119.3$						1*13/6	1286
	Tri		9.52	5.59	17.06	88,90,92	26	2.381				1*13/1	1321
I and IV.	Hex		5.61	5.61	16.8		13	2.358		330	2.87/91	1*13/1	11
(>20°C)	Hex		5.66	5.66	19.50		15	2.302		330/101	4.10/989	1*15/7	209
	Hex		5.65	5.65	19.54		15	2.306	2.060	346	4.64	1*15/	988
	Hex		5.67	5.67						332/89		1*15/7	1286
								2.304		334/1357			66
III.	Mono	C2h-3	9.50	5.05	2.62	$\gamma = 105.5$	4	2.742				1*2/1	681
(hi press.)	Ortho	D2h-16	8.73	5.69	2.62		4	2.552				1*2/1	857
	Ortho	D2h-16	8.53	5.72	2.62		4	2.598				1*2/1	986
–, trifluoro-													
(82.02)	Hex		5.59	5.59	2.50		1	2.013		222/726	5.4/726	2*1/1	389
	Hex		5.63	5.63	6.75		3	2.205		213/985	5.44/985	2*3/1	854
	Hex		5.61	5.61									1192
Poly(ethylene), complexes with:													
–, perhydrotriphenylene													
	Hex	C6-6 or C6h-2	14.34	14.34	4.78		2	1.071		181		4*1/1	1124
–, urea													
	Hex		8.22	8.22	11.02								992
(at 83 K)	Ortho		8.30	13.81	11.00								993
Poly(ethylidene)													
(28.05)	Ortho		12.38	6.28	2.5		4	0.958		100/617		1*2/1	178
										195/619			
										200/618			
Poly(heptenamer)													
trans-													
I.	Ortho	D2h-16	7.40	5.00	17.10		4	1.010		51/439		7*2/1	97
(96.17)		or C2v-9											
Poly(1-heptene)													
I. (98.19)					6.45					17/250		2*3/1	150
												2*3/1	359
–, 5-methyl-													
(112.22)					6.40					52/129		2*3/1	67
(S)	Mono	C2-2	18.40	10.62	6.36	$\beta = 90$	6	0.900				2*3/1	685
(S), (R)	Tet	S4-1	20.00	20.00	38.76		76	0.913				2*19/6	685
Poly(1-hexadecene)													
II. (224.43)	Ortho		7.5	63.2	6.6		8	0.95		68/250		2*4/1	150
Poly(hexafluoroisobutylene-*alt*-vinylidene fluoride)													
(228.08)	Ortho	C2v-21	10.64	18.37	7.83		8	1.980		327		4*2/1	947

TABLE 1. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
Poly(1-hexene)													
(84.16)	Mono		22.2	8.89	13.7	$\gamma = 94.5$	14	0.726		−55/48		2*7/2	150
	Ortho		11.7	26.9	13.7		28	0.908				2*7/2	150
–, 4-methyl-													
(98.19)	Tet		19.64	19.64	14.00		28	0.845		200/9		2*7/2	67
	Tet	C1-1	19.85	19.85	13.50		28	0.858		190/632		2*7/1	569
–, 5-methyl-													
(98.19)	Hex		10.2	10.2	6.50		3	0.835		130		2*3/1	9
	Mono	C2-2	17.62	10.17	6.33	$\beta = 90$	6	0.862		110/282		2*3/1	685
Poly(isobutene)													
(56.11)	Ortho	D2-4	6.94	11.96	18.63		16	0.964	0.915	44/66	12.0/82	2*8/5	34
	Ortho	D2-4	6.88	11.91	18.60		16	0.978	0.912/53			2*8/3	801
									0.842				139
Poly(norbornene), see Poly(1-vinylene-3-methylene)													
Poly(1-octadecene)													
II. (252.49)	Ortho		7.5	70.4	6.6		8	0.96		80/6 100/90		2*4/1	150
III.	Hex		4.24	4.24								2*	493
Poly(octamethylene)													
–, 1-methyl-													
(126.24)										−5	10.9	8*	639
Poly(octenamer)													
trans-													
III.					9.78					67/439	20.1/284		126
(110.20)	Tri	Ci-1	4.34	5.41	9.78	64,105,119	1	1.008		73/284		8*1/1	476
									0.867	76	25.3		1377
IV.	Mono	C2h-5	7.43	5.00	9.90	$\beta = 95.2$	2	0.999		77/562 62/439	23.8/562	8*1/1	530
cis-	Mono	C2h-6	4.58	9.50	17.11	$\beta = 98$	4	0.993				8*2/1	905
										38	21.0		1376
Poly(1-octene)													
(at 90 K) (112.22)	Mono		5.6	38	7.6	$\beta = 97$	8	0.93		5 10–38/48 10/872		2*4/1	1209
Poly(pentenamer)													
trans-													
I. (68.12)	Ortho	C2v-9 or D2h-16	7.28	4.97	11.90		4	1.051		23 34/682	12.0/682	5*2/1	147
Poly(1-pentene)													
isotactic													
Ia.	Mono		11.35	20.85	6.49	$\beta = 99.6$	12	0.923		130/276	6.28/501	2*3/1	355
(70.13)			21.15	11.20	6.49	$\beta = 99.6$	12	0.922		130/380		2*3/1	355
	Mono		22.4	21.2	6.49[b]	$\gamma = 91$	24	0.907		111/501		2*3/1	931
								0.96	0.85				408
Ib.					6.5							2*3/1	355
	Mono		24.3	19.3	6.50[b]	$\gamma = 96$	24	0.922				2*3/1	931
IIa.					6.60					75/48	4.00/501		152
	Mono		35.65	20.2	7.13[b]	$\gamma = 91$	40	0.907		78/282		2*4/1	818
	Port		19.30	16.90	7.08	$\gamma = 116$	16	0.898		80/9 79/501		2*4/1	355
IIb.	Port		19.60	16.75	7.08	$\gamma = 115.3$	16	0.887				2*4/1	355
III.	Ortho	D2-4	21.20	11.48	14.39		28	0.931				2*7/2	834
syndiotactic													
										42	2.94		1452
–, 5-amino-													
–, –, *N,N*-diisobutyl-													
(197.37)					6.85					112		2*	191
–, –, *N,N*-diisopropyl-													
(169.31)					7.32					130		2*	191
–, 4,4-dimethyl-													
(98.19)	Tet	S4-1	20.3	20.3	13.8		28	0.803		231/282		2*7/2	431
	Tet		20.35	20.35	7.01		16	0.899		350/90 380/441		2*4/1	442

TABLE 1. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
–, 5-hydroxy-													
(86.13)					6.5							2*	191
–, 3-methyl-													
(84.16)	Tet	C4-6	13.35	13.35	6.80		8	0.922		362/632		2*4/1	622
										273/129			
										200/441			
–, 4-methyl-													
isotactic													
I.	Tet	S4-1	18.66	18.66	13.80		28	0.814		235/48	19.7/82	2*7/2	55
(84.16)	Tet		18.70	18.70	13.54		28	0.826	>0.835	228/282	11.9/370	2*7/2	936
	Tet		18.53	18.53	13.76		28	0.828		238/632	9.9/1195	2*7/2	894
	Tet		18.54	18.54	13.84		28	0.822		250/94	5.2/1288	2*7/2	452
	Tet		18.50	18.50	13.76		28	0.831			5.5/1331	Irreg.	333
	Tet		18.60	18.60	13.85		28	0.817				2*7/2	67
	Tet	S4-1	18.63	18.63	13.85		28	0.814				2*7/2	689
	Tet	D2d-7	18.70	18.70	13.68		28	0.818				2*7/2	1177
	Tet		18.66	18.66	13.65		28	0.823				2*7/2	1198
								0.828	0.838				94
II.			19.16	19.16	7.12		16	0.855		125		2*4/1	8
III.			19.36	19.36	7.05		16	0.846		75		2*4/1	8
	Tet		19.38	19.38	6.98		16	0.853				2*4/1	1197
	Tet	C4-6	19.46	19.46	7.022		16	0.8408				2*4/1	1453
IV.					6.5							2*	845
(hi press)	Hex		16.88	16.88	6.31		18	0.808				2*3/1	1454
V.	Hex		22.17	22.17	6.69		18	0.883?				2*3/1?	990
syndiotactic													
	Tet	S4-1	18.03	18.03	46.91		48	0.880		210		4*12/7	1455
–, 5-trimethylsilyl-													
(142.32)					6.55					133/71		2*3/1	67
Poly(propene)													
isotactic													
I.	Mono	C2h-6	6.65	20.96	6.50	$\beta = 99.3$	12	0.938	0.85/45	176/10	9.92/82	2*3/1	127
(42.08)	Mono		6.66	20.78	6.495	$\beta = 99.62$	12	0.946		189/392	7.96/478	2*3/1	308
	Tri	Ci-1	13.36	11.00	6.502[b]	93,81,108	12	0.935		186/394	8.8/394	2*3/1	170
	Mono	C2h-5	6.65	20.73	6.50	$\beta = 99.7$	12	0.947		208/676	5.80/676	2*3/1	519
	Mono		6.63	20.78	6.504	$\beta = 99.5$	12	0.949		165/282	10.5/474	2*3/1	626
	Mono		6.64	20.88	6.51	$\beta = 98.7$	12	0.940		178/349	10.0/358	2*3/1	131
	Mono	C2h-5	6.69	20.98	6.504	$\beta = 99.5$	12	0.931	0.854	183/380	6.16/182	2*3/1	136
	Mono	C2h-3								180/250	7.91/251	2*3/1	330
	Mono	C2h-5	6.65	20.80	6.50	$\beta = 99.33$	12	0.945		220/974	10.9/83	2*3/1	991
										220/975	6.9/1195		
										186/1003	9.3/1212		
II.	Hex		12.74	12.74	6.35		12	0.939	0.907/112	147/789	4.22/789	2*3/1	166
	Rho		19.08	19.08	6.49		27	0.922		200/975	8.2/1212	2*3/1	485
	Rho	D3-4	6.38	6.38	6.33		3	0.939		170/974	4.0/1404	2*3/1	196
	Ortho		19.08	11.01	6.490		18	0.922		192/1212		2*3/1	308
	Hex		22.03	22.03	6.490		36	0.922		183/1404		2*3/1	308
	Rho	C3-2	19.08	19.08	(6.49)		27	0.922				2*3/1	1456
	Ortho		11.03	19.08	6.49		18	0.921				2*3/1	1457
	Rho		11	11	6.5		9	0.92				3*3/1	1642
III.	Tri		6.47	10.71		$\gamma' = 99.07$	6					2*3/1	308
	Tri		6.54	21.40	6.50	89,100,99	12	0.946				2*3/1	592
	Ortho	D2h-24	8.54	9.93	42.41		48	0.935				cf ref	1408
quenched	Tet		5.97	5.97	6			0.88/167				2*3/1	943
syndiotactic													
I.	Ortho	D2-2	14.5	5.8	7.4		8	0.898	0.858/393	161/415	1.88/545	4*2/1	169
	Ortho	D2-5	14.50	5.60	7.40		8	0.930		138/545	2.1/1195	4*2/1	430
	Ortho	D2h-27	14.50	11.20	7.40		16	0.930			8.3/1458	4*2/1	1330
								0.898	0.858	160/1459	8.0/1459		409
II.	Phex				5.05							4*1/1	306
	Ortho	C2v-9	5.22	11.17	5.06		4	0.947				4*/1	1430
III.					11.8							4*	845

TABLE 1. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n * p/q)	Refs.
(hi press.)													
IV.	Tri	C1-1	5.72	7.64	11.60	73,89,112	1	0.942				12 * 1/1	1460
(252.48)													
–, 3-cyclohexyl-													
I. (124.23)	Tet	C4-5 or S4-2	21.06	21.06	20.09		40	0.926		230/90 215/282 214/328		2 * 10/3	431
II.	Rho	C4-3 or C3i-2	19.12	19.12	6.33		9	0.926				2 * 3/1	431
–, 3-cyclopentyl-													
(110.20)	Tet	C4-5 or S4-2	20.34	20.34	47.49		96	0.894		210/328 225/90		2 * 24/7	431
	Tet		20.30	20.30	47.40		96	0.899				2 * 24/7	625
–, hexafluoro-													
(150.02)										160		2 * 4/1	268
–, 3-phenyl- [allylbenzene]													
(118.18)					6.40					230/90 208/187 185/282		2 * 3/1	67
–, 3-silyl-													
(72.18)					6.45					128/71		2 * 3/1	67
–, trimethylsilyl-													
(114.26)					6.50					360/71		2 * 3/1	67
Poly(propene-alt-ethylene) syndiotactic													
(70.14)	Mono		11.19	11.62	9.00	$\gamma = 67.03$				55			1450
Poly(1-tetradecene)													
II. (196.38)	Ortho		7.5	56.0	6.6		8	0.94		57/250 57/872		2 * 4/1	150
Poly(tetrafluoroethylene-*alt*-ethylene)													
(128.07)	Mono		9.6	9.25	5.0	$\gamma = 96$	4	1.93				4 * 1/1	722
	Ortho		8.57	11.20	5.04		4	1.758	1.684	267		4 * 1/1	1287
			9.46	5.81									1321
Poly(vinylcyclobutane)													
(82.15)	Tet		34.12	34.12	6.6		64	1.14		228/437		2 * 4/1	431
Poly(vinylcycloheptane)													
(124.23)	Tet	C4h-6	23.4	23.4	6.5		16	0.927		>300/437		2 * 4/1	431
Poly(vinylcyclohexane)													
I. (110.20)	Tet	C4h-6	21.99	21.99	6.43		16	0.942		305/90		2 * 4/1	431
	Tet		21.76	21.76	6.50		16	0.951		300/282 372/441 383/328		2 * 4/1	67
II.	Tet	C4-5 or S4-2	20.48	20.48	44.58		96	0.940				2 * 24/7	431
Poly(vinylcyclopentane)													
I. (96.17)	Tet	C4h-6	20.14	20.14	6.50		16	0.969		270/441 292/328		2 * 4/7	431
II.	Tet	C4-5 or S4-2	20.14	20.14	19.5		48	0.969				2 * 12/3	431
III.	Tet	D4h-1 or D4h-7	37.3	37.3	19.8			0.927				2 * 10/3	431
Poly(vinylcyclopropane)													
I. (68.12)					6.5					230			175
	Rho	C3-2 or C3-3	13.6	13.6	6.48		9	0.981				2 * 3/1	526
II.	Tet	S4-2	15.21	15.21	20.85		40	0.938				2 * 10/3	526
Poly(1-vinylene-3-cyclopentylene) [norbornene]													
trans-													
(94.16)					11.8					202		5 * 2/	620
	Mono		5.13	4.78	11.56	$\gamma = 73.5$	2	1.150				5 * 2/1	1451
cis-	Mono		4.64	4.22	9.84	$\gamma = 68.1$	2	1.749				5 * 2/1	1451

[a] The numbers after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make c the fiber axis.

TABLE 2. POLY(VINYLS) AND POLY(VINYLIDENES) (-HCH-CHR- and -HCH-RCR-)

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
Poly(acrylamide)													
–, *N,N*-dibutyl-													
(183.30)	Hex		26.3	26.3	6.3		12	0.97				2*3/1	93
								(1.06)					
–, *N*-isopropyl-													
(113.16)								1.118	1.070	200		2*	102
Poly(acrylic acid)													
–, allyl ester													
(112.13)					6.5					90		2*3/1	278
–, biphenyloxyhexamethylene ester													
(324.42)	Phex		23.5	23.5	6.48		6	1.043				2*3/1	1122
–, *sec*-butyl ester													
(128.17)	Ortho		17.92	10.34	6.49		6	1.062		130		2*3/1	401
–, *tert*-butyl ester													
(128.17)					6.45					193/16		2*3/1	67
	Ortho		17.92	10.50	6.48		6	1.047		200		2*3/1	401
–, *p*-carboxyphenyl ester													
(192.17)	Mono		21.50	7.42	6.68[b]	$\beta = 124$	4	1.445				2*	865
–, isobutyl ester													
(128.17)	Ortho		17.92	17.92	6.42		12	1.239		81		2*3/1	401
–, isopropyl ester													
isotactic													
(114.14)					6.5					162/120	5.9/541	2*3/1	67
					6.32			1.08		162			149
										178/541			
syndiotactic													
					5.18			1.18		115		4*1/1	113
Poly(acrylonitrile)													
syndiotactic													
(53.06)	Hex		5.99	5.99						317/77	4.86/77–		76
	Ortho		21.18	11.60	(5.1)		16	1.125		341/499	5.23/77	4*1/1	486
	Ortho		10.6	11.6	5.04		8	1.137				4*1/1	575
	Ortho	C2v-16	10.20	6.10	5.10		4	1.111				4*1/1	133
	Ortho		18.1	6.12	5.00		8	1.273				4*1/1	162
	Ortho		10.55	5.80	5.08		4	1.134				4*1/1	210
	Phex		6.1	6.11	(5.1)	$\gamma = 120$	2	1.07				4*1/1	322
	Ortho		21.0	11.9	5.04		16	1.119				4*1/1	1001
	Ortho	C2v-9	10.7	12.1	(5.1)		8	1.07				4*1/1	1332
			9.03	5.24									1631
II?	Ortho		21.48	11.55	7.096		24	1.201				2*4/	804
			21.18	11.71									1631
isotactic													
	Tet		4.74	4.74	2.55		1	1.538				2*1/1	133
(gel)	Tet		11.4	11.4	8.2		16	1.32				2*4/1	1461
Poly(isopropenylmethyl ketone)													
(84.12)	Tet		15.08	15.08	8.54		16	1.151		240		2*4/1	347
										240/255			
										200/379			
Poly(methacrylic acid)													
–, methyl ester													
isotactic													
(100.12)	Port		21.08	12.17	10.55		20	1.228	1.22/31	160/31	5.02/871	2*5/2	30
	Ortho		21.08	12.17	10.50		20	1.234		220/855		2*5/1	520
	Ortho		20.98	12.06	10.40		20	1.264				vi ref	868
	Tri		20.57	12.49	10.56	93,88,91	20	1.228				*10/1	1002
	Ortho	D2h-24	41.96	24.34	10.50		80	1.240				*10/1	1462
syndiotactic									1.19/31	200/31		4*5/2	30
it-st stereocomplex (1 : 2)													
	Mono		21.5	16.5	18.4	$\gamma = 112$						*9/1	1397
					73.6					260/1006		*30/4	1005
–, –, chloroacetone complex													
syndiotactic													
	Mono		43.5	43.5	35.4	$\gamma = 107$						4*37/4	1004

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TABLE 2. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
–, octadecyl ester													
syndiotactic													
(338.58)	Hex		4.73	4.73	30.2		1	0.961		36			500
Poly(methacrylontirile)													
I. (67.09)	Phex		9.03	9.03	6.87		4	0.918		250/436		2*	427
			7.87	8.97	6.87		4	0.918					729
II.	Mono		13.5	7.71	7.62	β = 97.7	8	1.134				2*4/1	427
Poly(thiolacrylic acid)													
–, *sec*-butyl ester													
(144.23)	Rho	C3-2			6.35							2*3/1	401
–, isobutyl ester													
(144.23)	Mono	Cs-2			6.42							2*	401
–, isopropyl ester													
(130.20)	Rho	C3-2			6.42							2*	401
–, propyl ester													
(130.20)	Mono	Cs-2			6.4							2*3/1	401
Poly(vinyl acetate)													
–, trifluoro-													
(140.06)	Ortho		9.54	12.44	4.8		4	1.633		175/821		2*	638
Poly(vinyl alcohol)													
(44.05)	Mono	C2h-2	7.81	5.51	2.52[b]	γ = 91.7	2	1.350	1.291/1	232/310	6.87/433	2*1/1	29
	Mono		7.81	5.43		γ = 91.5	2	1.34/410	1.27/410	243/480	6.99/480	2*1/1	316
	Mono		7.805	5.485	2.533[b]	γ = 92.2	2	1.350	1.26/53	265/323	7.1/1195	2*1/1	132
								1.345	1.269	228/433			184
	Mono	C2h-2	7.81	5.50	2.52[b]	γ = 92	2	1.352		267/450		2*1/1	261
	Mono		7.84	5.52	2.52[b]	γ = 93	2	1.343				2*1/1	1441
quenched	Ortho	C2v-20	7.42	5.25	2.52[b]		2	1.490				2*1/1	261
single crystal	Hex		5.45	5.45	2.51		1	1.133				2*1/1	151
I2 complex	Mono		7.87	5.53	2.525[b]	γ = 93.3	2					2*1/1	1424
Poly(vinyl bromide)													
(106.95)	Ortho	D2h-11	11.0	5.6	5.1		4	2.26		117		4*1/1	772
Poly(vinyl chloride)													
(62.50)	Ortho	D2h-11	10.6	5.4	5.1		4	1.42	1.41/413	273/372	11/372	4*1/1	7
	Ortho	D2h-11	10.40	5.30	5.10		4	1.477		310/423	4.9/835	4*1/1	235
	Ortho		10.11	5.27	5.12		4	1.522		212/143	2.8/145	4*1/1	64
	Mono		10.65	5.20	5.15[b]	γ = 90	4	1.456			3.3/423	4*1/1	140
single crystal	Ortho	D2h-11	10.24	5.24	5.08		4	1.523				4*1/1	718
Poly(vinyl fluoride)													
(46.04)	Hex		4.93	4.93	2.53		1	1.436		200/79	7.54/79	2*1/1	62
	Ortho	C2v-14	8.57	4.95	2.52		2	1.430		230/434		2*1/1	236
	Mono		4.938	4.938	2.518	γ = 120	1	1.4377				2*1/1	1463
Poly(vinyl formate)													
isotactic													
(72.06)	Rho	C3v-6-D3d-6	15.9	15.9	6.55		18	1.502				2*3/1	232
syndiotactic													
					5.0							4*1/1	232
Poly(vinylidene bromide)													
(185.85)	Mono		25.88	13.87	4.77[b]	γ = 109.8	16	3.065					33
Poly(vinylidene chloride)													
(96.94)	Mono	C2h-2	6.71	12.51	4.68[b]	γ = 123	4	1.954	1.66/43	200/721		4*1/1	915
	Mono		13.69	6.296	4.67[b]	γ = 124.8	4	1.948		190/46		4*1/1	32
	Mono		22.54	12.53	4.68[b]	γ = 95.8	16	1.958					33
	Mono	C2-2	6.73	12.54	4.68[b]	γ = 123.6	4	1.957		195	5.68		245
												2*2/1	231
									1.7754				462
Poly(vinylidene fluoride)													
α (II)	Mono		5.02	25.4	4.62	β = 107	10	1.888	1.68/776	185/434	6.7/823		171
(64.04)	Ortho	C2v-4	4.96	9.64	4.62		4	1.925	1.67/770	170/995	6.2/886	4*1/1	994
	Mono	C2-2	17.72	11.68	4.57[b]	γ = 92.7	16	1.801		220/443	5.96/726	4*1/1	417
	Ortho	C2v-9	9.66	4.96	4.64		4	1.913		171/373		2*2/1	418
	Mono	C2h-5	4.96	9.64	4.62	β = 90	4	1.925		178		4*1/1	604
	Mono	C2-2,1	9.64	5.02	4.64[b]	γ = 91.1	4	1.895		178/726		4*1/1	168

TABLE 2. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
	Port	C2-2	5.02	9.63	4.62		4	1.904		188/846		2∗2/1	563
	Ortho		9.60	5.00	4.655		4	1.904		213/1464			597
			9.80	5.05			4						750
β (I)	Ortho	C2v-14	8.45	4.88	2.55		2	2.022		212/443		2∗1/1	417
	Ortho	C2v-14	8.58	4.91	2.56		2	1.972		191		2∗1/1	604
	Ortho	C2v-14	8.47	4.90	2.56		2	2.002		207/942		2∗1/1	418
	Ortho		8.60	4.97	2.57		2	1.936					597
γ (III)	Mono	Cs-4	4.96	9.58	9.23	$\beta = 92.9$	8	1.942		218/846		8∗1/1	996
	Mono	C2-3	8.66	4.93	2.58	$\beta = 97$	2	1.945		197		2∗1/1	604
	Ortho	C2v-16	4.97	9.66	9.18		8	1.930		184/995		8∗1/1	997
	Mono		4.96	9.67	9.20	$\beta = 93$	8	1.930		231/1464		8∗1/1	998
δ (IV)			4.96	9.64								4∗1/1	999
(polar alpha)	Ortho	C2v-9	4.96	9.64	4.62		4	1.925				4∗1/1	1000
Poly(vinylmethyl ketone)													
(70.09)	Tet	S4-1	14.52	14.52	14.40		28	1.073				2∗7/2	164
	Tet		14.56	14.56	14.10		28	1.090		170		2∗7/2	379

[a] The numbers after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 3. POLY(AROMATICS) AND POLY(IMIDES)

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(4,4′-benzobisthiazole-diphenylene pyromellitimide)													
(556.57)	Ortho	D2-3	5.70	8.11	24.8		2	1.612				22∗1/1	1433
Poly(2,6-benzothiazole)													
(133.17)	Port		6.044	3.417	12.19		2	1.756				5∗2/1	1235
Poly(2,5(6)-benzoxazole)													
(117.11)	Port		6.061	3.384	11.58		2	1.638				5∗2/1	1235
Poly(4,4′-biphenylene 3,3′,4,4′-biphenylenetetracarboximide)													
(442.43)								1.480					1335
–, 2,2′-bis(trifluoromethyl)-													
(578.43)	Mono		15.40	9.90	20.25	$\gamma = 56$	4	1.501				18∗1/1	1494
	Mono		15.40	9.918	20.21	$\gamma = 56.2$	4	1.4977				18∗1/1	1495
–, 2,2′-dimethyl-													
(470.48)	Tri		20.49	15.30	40.0	62,52,80	16	1.443	1.341			18∗2/1	1584
–, 3,3′-dimethyl-													
(470.48)	Ortho		16.7	13.0	20.5		8	1.404				18∗1/1	1289
Poly(4,4′-biphenylene 4,4′-carbonyl(3,3′-dicarboxy)-dibenzamide)													
(506.47)					21.2							21∗1/1	1178
Poly(4,4′-biphenylene 3,3′,4,4′-carbonyldiphenylenetetracarboximide)													
(470.44)					21.6							19∗1/1	1178
Poly(4,4′-biphenylenedioxy-3,3′-biphenylene pyromellitimide)													
(550.53)	Ortho		7.89	6.29	25.11		2	1.467				23∗1/1	1475
	Ortho		7.85	6.37	25.31		2	1.444		388		34∗1/1	1498
Poly[2,2′-(4,4′-biphenylene) 6,6′-diquinoline]													
–, di-*p*-phenyl-													
(558.63)	Ortho		16.2	5.31	21.4		2	1.008				20∗1/1	1500
Poly(4,4′-biphenylene 4,4′-oxy(3,3′-dicarboxy)-dibenzamide)													
(494.46)					21.0							21∗1/1	1178
Poly(4,4′-biphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide)													
(458.43)					21.3					900/1018		19∗1/1	1178
Poly(4,4′-biphenylene 1,4-pyromellitamide)													
(402.36)					16.1							16∗1/1	1178
Poly(4,4′-biphenylene pyromellitimide)													
(366.33)					16.6								908
			8.58	5.48	16.6		2	1.559		827/1018		15∗1/1	928
	Ortho	D2h-9	8.57	5.51	16.78		2	1.535				15∗1/1	1476

TABLE 3. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(2,2′-bithiophene)													
–, 3,3′didecyl-													
(444.78)	Ortho		17.6	4.5	15.6		2	1.20				6*2/1	1485
–, 3,3′-dihexyl-													
(332.56)	Ortho		11.8	4.5	15.6[b]		2	1.33				6*2/1	1485
–, 3,3′-dioctyl-													
(388.67)	Mono	C2h-4	14.6	4.42	14.73	$\beta = 90$	2	1.36				6*2/1	1484
	Ortho		14.5	4.5	15.6[b]		2	1.27				6*2/1	1485
	Ortho		14.6	4.42	15.70		2	1.27				6*2/1	1486
Poly(4,4′-carbonyldiphenylene pyromellitimide)													
(394.34)					31.0[b]								908
	Ortho		7.9	6.65	32.8		4	1.520				16*2/1	1013
Poly(decamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide)													
(446.50)					23.5							21*1/1	896
Poly(decamethylene pyromellitimide)													
(354.40)	Mono		19.8	4.61	19.2	$\gamma = 96$	4	1.350		318		17*1/1	1395
										323/1267			
Poly(dodecamethylene 1,4,5,8-naphthalenetetracarboximide)													
(432.52)	Tri		6.23	4.68	19.1	90,111,100	1	1.409		308		20*1/1	1015
Poly(dodecamethylene pyromellitimide)													
α	Mono		5.58	4.89	18.9	$\gamma = 108.4$	1	1.289				19*1/1	1395
(382.46)					18.96								1371
β	Mono		18.95	4.54	21.5	$\gamma = 101.3$	4	1.401		297		19*1/1	1015
					21.43					305/1267			1371
γ					22.05								1371
δ					20.95								1371
Poly(3,4′-ethylenedioxydiethylenedioxydiphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide)													
(606.59)										268	88.0		1493
Poly(3,4′-ethylenedioxydiphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide)													
(518.48)										340	72.5		1493
Poly(2,7-fluorenylene 1,4-pyromellitamide)													
(414.37)					15.9							15*1/1	1178
Poly(2,7-fluoenylene pyromellitimide)													
(378.34)					16.3							14*1/1	1178
Poly(hexamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide)													
(390.40)					19.5								896
	Tri		8.34	9.18	19.6	90,134,117	2	(1.462)		238		17*1/1	1015
Poly(hexamethylene pyromellitimide)													
(298.30)					24.88					430			1395
Poly[4,4′-(isophthaloyldiamino)-diphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide]													
(620.58)	Ortho		9.84	4.95	28.5		2	1.485		320		26*1/1	1190
Poly[4,4′-(isophthaloyldiamino)-diphenylene *p*-phenyleneditrimellitatediimide]													
(768.69)	Ortho		6.03	7.58	73.6		4	1.518				33*2/1	1191
Poly[4,4′-(isophthaloyldiamino)-diphenylene pyromellitimide]													
(528.48)					24.2							22*1/1	1191
										1.382			1335
Poly[isophthaloyl-4,4′-diphenylenedioxy-4,4′-diphenylene 3,3′,4,4′-carbonyldiphenylenetetracarboximide]													
(786.75)	Ortho		8.07	6.135	37.50		2	1.07		350		34*1/1	1498
Poly(4,4′-methylenediphenylene pyromellitimide)													
(380.36)					29.1								908
	Ortho		8.20	6.55	32.4		4	1.452				16*2/1	1013
					14.1								1014
Poly(methylene-*p*-phenylene)													
(90.12)	Ortho		8.16	6.32	9.90		4	1.172		170		5*2/1	745
										142/744			
–, α-methyl-													
(104.15)	Ortho		10.42	5.97	9.62		4	1.156		219/1007		5*2/1	848
Poly(methylene-3,5-toluene)													
–, 2,6-diamino-													
(134.18)	Ortho		12.82	13.83	9.69		8	1.037				4*2/1	1351
Poly(2,6-naphthalene 2,4-cyclobutylenedicarboxylic acid)													
–, bis(2,4-dichlorophenyl) ester													
(558.24)	Tri	Ci-1	6.00	8.93	13.48	70,94,101	1	1.396				9*1/1	950

TABLE 3. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(4,4'-neopentylenedioxydiphenylene 3,3',4,4'-carbonyldiphenylenetetracarboximide)													
(572.57)	Mono		9.60	5.82	24.6	$\gamma = 81.1$	2	1.400				24∗1/1	1499
Poly(nonamethylene 3,3',4,4'-oxydiphenylenetetracarboximide)													
(432.48)					21.3							20∗1/1	1015
Poly(nonamethylene pyromellitimide)													
(340.38)					32.0					303			1395
										>350			1267
Poly(octamethylene 3,3',4,4'-oxydiphenylenetetracarboximide)												19∗1/1	
(418.45)	Tri		8.37	4.95	21.5	90,38,104	1	1.372	1.30				896
	Tri		8.37	4.95	21.5	90,38,104	1	1.396		202		19∗1/1	1015
Poly(octamethylene pyromellitimide)													
(326.35)	Mono		20.8	4.76	16.9	$\gamma = 95.5$	4	1.301		362		15∗1/1	1395
										383/1267			
Poly(3,4'-oxydiethylenedioxdiphenylene 3,3',4,4'-oxydiphenylenetetracarboximide)													
(562.34)										304	80.2		1493
Poly(3,4'-oxydiphenylene 3,3',4,4'-biphenylenetetracarboximide)													
(458.43)	Mono		14.8	8.20	20.6	$\gamma = 56$	4	1.469				18∗1/1	1289
Poly[4,4'''-((4',4''-oxydiphenylene)-dioxy)-diphenylene *p*-phenyleneditrimellitatediimide]													
(806.74)			5.68	8.09	78.6		4	1.484				37∗2/1	963
Poly[4,4'''-((4',4''-oxydiphenylene)-dioxy)-diphenylene pyromellitimide]													
(566.53)			8.44	5.66	53.4		4	1.475		547/1018		26∗2/1	963
					53.4								908
Poly(4,4'-oxydiphenylene 3,3',4,4'-oxydiphenylenetetracarboximide)													
(474.43)	Mono		5.17	10.85	38.2	$\gamma = 103.7$	4	1.514		427/1018		20∗2/1	684
Poly[4,4'-oxydiphenylene 3,3'-(*p*-phenylene)-ditrimellitatediamide]													
(658.58)					26.3							26∗2/1	1178
Poly(4,4'-oxydiphenylene *p*-phenyleneditrimellitatediimide)													
A. (622.54)	Mono		5.56	7.94	58.0	$\gamma = 86$	4	1.619				27∗2/1	658
			5.56	7.94	59.0	$\beta = 86$	4	1.591				27∗2/1	963
					28.7								1178
									1.366				1335
B.			13.12	7.84	57.0		8	1.410				27∗2/1	963
Poly(4,4'-oxydiphenylene 1,4-pyromellitamide)													
(418.36)					15.2							17∗1/1	1178
									1.410				1335
Poly(3,4'-oxydiphenylene pyromellitimide)													
(382.33)	Ortho		8.48	5.62	33.65		4	1.583				15∗2/1	1477
	Ortho	D2-9	5.75	8.48	33.2		4	1.569				15∗2/1	1478
Poly(4,4'-oxydiphenylene pyromellitimide)													
I. (382.33)	Ortho		6.35	4.05	32.6		2	1.514		597/1018		16∗2/1	642
	Ortho		6.31	3.97	32		2	1.58				16∗2/1	684
	Ortho	C2-2	4.66	5.96	32.9[b]	$\gamma = 100$	2	1.411					877
	Ortho		8.36	5.63	33.03		4	1.633				16∗2/1	1477
	Mono	C2-2	6.45	4.01	32.58	$\gamma = 90$	2	1.507				16∗2/1	1478
					15.9								1178
II.	Ortho		5.93	4.70	33.00		2	1.380				16∗2/1	1477
Poly(*m*-phenylene)													
(76.10)										790/964	6.90/964	3∗	
Poly(*p*-phenylene)													
(76.10)	Ortho		7.81	5.53	4.20		2	1.393		<550/735	15.0/964	4∗1/1	475
	Ortho		7.80	5.56	4.20		2	1.388		1400/964		4∗1/1	1290
	Mono		8.06	5.55	4.30	$\beta = 100$	2	1.334				4∗1/1	1334
	Ortho		7.82	5.60	4.20		2	1.374				4∗1/1	1448
	Ortho	pgg	7.79	5.51	(4.20)		2	1.402				4∗1/1	1466
												4∗2/1	508
–, complex with:													
K (1/2 K/unit)	Ortho	D2h-9	6.04	15.6	4.35		4					4∗1/1	1231
$SbCl_5$ (1/2 Sb/unit)	Ortho		15.6	6.2	4.2		2					4∗1/1	1393
SbF_5 (1/3 Sb/unit)	Hex		12.0	12.0	4.2		3					4∗1/1	1393

TABLE 3. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
Poly(*p*-phenylene benzobisoxazole) [PBO]													
(234.21)	Mono		5.64	3.58	12.07	$\gamma = 100.4$	1	1.622				11*1/1	1263
	Mono		11.20	3.540	12.050	$\gamma = 101.3$	2	1.660				11*1/1	1488
	Mono	Cs-2	11.20	3.54	12.05	$\gamma = 101.3$	2	1.660				11*1/1	1489
	Port		11.8	3.54	12.1		2	1.55				11*1/1	1490
–, complex with poly(phosphoric acid)													
I.	Mono		12.6	11.6	12.2	$\gamma = 98$							1492
II.	Mono		7.0	5.8	12.0	$\gamma = 99$							1492
Poly(*p*-phenylene benzobisthiazole) [PBT]													
(266.34)	Mono		5.83	3.54	12.35	$\gamma = 96$	1	1.745				11*1/1	1016
	Mono		11.96	3.555	12.35	$\gamma = 100.9$	2	1.716				11*1/1	1017
	Mono		11.79	3.539	12.514	$\gamma = 94.0$	2	1.698				11*1/1	1488
–, complex with poly(phosphoric acid)													
	Ortho		15.9	20.6	36.9					250		11*3/1	1316
	Mono		8.15	24.49	37.2	$\gamma = 94.5$		2.15					1491
Poly(*p*-phenylenecyclobutylene)													
–, 2,4-dipyridyl-													
(284.36)	Ortho	D2h-15	19.16	10.69	7.45		4	1.238				7*1/1	202
	Ortho	D2h-15	18.9	10.5	7.53		4	1.26		340		7*1/1	723
Poly(*p*-phenylene 2,4-cyclobutylenedicarboxylic acid)													
–, diethyl ester													
(274.32)	Mono	C2h-5	8.62	9.98	8.16[b]	$\beta = 102$	2	1.327		347/723		7*1/1	893
–, dimethyl ester													
(246.26)	Tri	Ci-1	6.04	7.42	7.82[b]	101,106,72	1	1.284		415/723		7*1/1	893
–, diphenyl ester													
(370.40)	Mono	C2h-5	7.50	17.3	7.50[b]	$\beta = 102$	2	1.292		420/723		7*1/1	893
–, dipropyl ester													
–, –, 2,4-dicyano-													
(352.39)	Mono	C2h-2	6.19	20.1	7.58	$\beta = 96$	2	1.248		335/723		7*1/1	893
Poly[4,4‴-((4′,4″-(*p*-phenylenedioxy)-diphenylene)-dioxy)-diphenylene *p*-phenyleneditrimellitatediimide]													
(898.84)			5.66	8.14	43.5		2	1.489				42*1/1	963
Poly[4,4‴-((4′,4″-(*p*-phenylenedioxy)-diphenylene)-dioxy)-diphenylene pyromellitimide]													
(658.62)			8.44	5.66	31.3		2	1.463				31*1/1	963
					31.3								908
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene 4,4′-oxy(3,3′-dicarboxy)-dibenzamide]													
(602.56)					24.6							27*1/1	1178
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide]													
(566.52)	Tri		10.52	9.45	26.1	90,95,98	4	1.472				25*1/1	684
					26.0								1178
									1.341				1335
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene *p*-phenyleneditrimellitatediimide]													
(714.64)	Ortho		5.64	8.05	34.5		2	1.515				32*1/1	658
Poly[4,4′-(*m*-phenylenedioxy)-diphenylene 1,4-pyromellitamide]													
(510.46)					19.8							21*1/1	1178
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene 1,4-pyromellitamide]													
(510.46)					19.6							22*1/1	1178
Poly[4,4′-(*m*-phenylenedioxy)-diphenylene pyromellitimide]													
(474.43)			8.76	5.47	43.4		4	1.515				20*2/1	963
					43.4								908
					21.7								1178
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene pyromellitimide]													
(474.43)	Mono		5.64	8.30	21.8	$\beta = 98.7$	2	1.562				21*1/1	684
	Ortho		8.23	5.58	22.09		2	1.553				21*1/1	1477
					21.0								1178
Poly(*p*-phenylene-1,3,4-oxadizaole)													
α	Ortho	D2-4	12.35	6.55	14.0		8	1.69				7*2/1	1496
(144.13)													
Poly[*p*-phenylene 4,4′-oxy(3,3′-dicarboxy)-dibenzamide]													
(418.36)					16.6							17*1/1	1178
Poly(*p*-phenylene 3,3′, 4,4′-oxydiphenylenetetracarboximide)													
(382.33)					16.9							15*1/1	1178
Poly(*p*-phenylene 1,4-pyromellitamide)													
(326.26)					12.2							12*1/1	1178

TABLE 3. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(*m*-phenylene pyromellitimide)													
(290.23)	Ortho		7.72	7.18	21.5		4	1.618				10*2/1	1013
Poly(*p*-phenylene pyromellitimide)													
(290.23)					12.3								908
			8.58	5.48	12.3		2	1.667				11*1/1	928
Poly(*p*-phenylenevinylene)													
(102.14)	Mono		7.90	6.05	6.58	$\alpha = 123$	2	1.286				6*1/1	1236
			8.1	6.1	6.6	$\alpha = 123$	2	1.24				6*1/1	1465
–, complex with:													
AsF_5	Ortho		10.10	6.60	6.58		2					6*1/1	1399
ClO_4^-	Ortho		9.40	6.60	6.58		2					6*1/1	1399
$FeCl_3$	Ortho		10.80	6.70	6.6		2					6*1/1	1465
H_2SO_4	Ortho		10.45	6.60	6.58		2					6*1/1	1399
SbF_5	Ortho		10.32	6.60	6.58		2					6*1/1	1399
Poly(2,5-pyrazinecyclobutylene)													
–, 2,4-diphenyl-													
(284.36)	Ortho		10.8	18.4	7.4		4	1.28		321		7*2/1	558
	Ortho	D2h-15	18.36	10.88	7.52		4	1.257		343/723		7*2/1	564
	Ortho	C2v-5	18.36	10.88	7.52		4	1.257				7*2/1	950
	Ortho		18.40	10.89	73.45		4	1.265				7*2/1	1238
Poly(styrene)													
isotactic													
(104.15)	Rho	D3d-6	22.08	22.08	6.626		18	1.113	1.04–	240/10	9.00/89	2*3/1	6
	Rho	D3d-6	21.9	21.9	6.65		18	1.127	1.065/17	250/90	8.37/174	2*3/1	128
	Rho	D3d-6	22.08	22.08	6.594		18	1.118		242/1415	8.5/1415	2*3/1	1388
									1.024				139
								1.114	1.052	235/282	10/1121		411
gel					30.6							4*6/1	1008
	Ortho		21.0	16.4	30.6		48					4*6/1	1009
syndiotactic													
α	Mono	C2h-5	19.84	12.90	5.06	$\gamma = 95$	8	1.072		266/1372	8.6/1407	4*1/1	1418
	Hex	D3h-4	26.26	26.26	5.045		18	1.033		269/1407		4*1/1	1388
	Hex		26.3	26.3	5.1		18	1.02				4*1/1	1470
					5.06					270		4*1/1	1291
					5.08					286/1417		4*1/1	1370
β	Ortho	D2h-16	8.81	28.82	5.06		8	1.077				4*1/1	1418
γ					7.5							4*2/1	1401
					7.7							4*2/1	1419
–, complex with:													
CH_2Cl_2	Ortho	D2h-10	21.4	17.1	7.5		16	1.01				4*2/1	1370
					7.7							4*2/1	1419
C_7H_8	Mono	C2h-5	17.48	13.27	7.71	$\gamma = 122$	8	1.114				4*2/1	1436
	Mono	C2h-5	17.58	13.26	7.71	$\gamma = 121.2$	8	1.100				4*2/1	1474
I_2	Mono	C2h-5	17.29	12.85	7.79	$\gamma = 120.3$	8	2.054				4*2/1	1473
–, *p-tert*-butyl-													
–, –, isotactic													
(160.26)									0.950	300			198
										308/1372			
–, *o*-fluoro-													
–, –, isotactic													
(122.14)	Rho	C3v-6	22.15	22.15	6.63		18	1.296		270/75		2*3/1	123
–, *p*-fluoro-													
–, –, isotactic													
(122.14)					8.30					265/75		2*4/1	67
	Port	D2-4	17.6	12.1	8.25		8	0.924				2*4/1	791
–, α-methyl-													
–, –, isotactic													
(118.18)	Rho				6.6							2*3/1	357
–, –, (*p*-methyl-													
–, –, –, isotactic													
(132.21)										224/888	10.0/888		

TABLE 3. *cont'd*

			Unit cell parameters					Density (g/cm^3)					
Polymer	Cryst syst.	Space group	*a*	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
–, *m*-methyl-													
–, –, isotactic													
(118.18)	Tet	S4-1	19.81	19.81	21.74		44	1.012		215		2*11/3	80
					57.1					215/74		2*29/8	163
	Tet	C4-5	19.9	19.9	78.9			1.005				2*40/	431
		or S4-2			57.0							11	103
–, *o*-methyl-													
–, –, isotactic													
(118.18)	Tet	C4v-12	19.01	19.01	8.10		16	1.073		360/74		2*4/1	125
–, –, *p*-fluoro-													
–, –, –, isotactic													
(136.17)					8.05					360/75		2*4/1	67
–, *p*-methyl-													
–, –, isotactic													
(118.18)					12.9				1.04/67	205/1402		2*	103
–, –, syndiotactic													
I.					~7.8					180/1472			1471
										173/1372			
II.					~7.8					200/1472			1471
III.	Ortho	D2h-16	13.36	23.21	5.12		8	0.977				4*1/1	1471
IV.					~5.1								1471
(mesomorphic)													
V.					~5.1								1471
–, trimethylsilyl-													
–, –, isotactic													
(176.34)					60.4					284			103
Poly[4,4′-(terephthaloyldiamino)-diphenylene pyromellitimide]													
(528.48)	Mono	C2h-5	8.64	5.18	25.38	$\beta = 90$	2	1.545				23*2/1	1191
Poly[4,4′-(terephthaloyldiamino)-diphenylene *p*-phenyleneditrimellitatediimide]													
(768.69)					37.63							34*2/1	1191
Poly(*p*-terphenylene pyromellitimide)													
(442.43)					20.9								908
			8.58	5.48	20.9		2	1.495				19*1/1	928
Poly(2,2′:5′,2″-terthiophene)													
–, 3,3″-dioctyl-													
(470.79)	Ortho		14.7	4.33	23.55		2	1.04				9*2/1	1486
Poly(4,4′-thiodiphenylene *p*-phenyleneditrimellitatediimide)													
(638.61)	Ortho		6.61	8.02	53.6		4	1.493				27*2/1	808
Poly(4,4′-thiodiphenylene pyromellitimide)													
(398.39)					29.4								908
	Ortho		8.57	6.37	61.5		8	1.576				16*4/1	1013
Poly(2,5-thiophene)													
(82.12)	Ortho		7.80	5.55	8.03		4	1.569				3*2/1	1276
	Mono		7.83	5.55	8.20	$\beta = 96$	4	1.539				3*2/1	1276
			7.79	5.53	7.7		4	1.64				3*2/1	1336
	Ortho		7.80	5.55	8.03		4	1.569				3*2/1	1448
–, 3-decyl-													
α	Mono		22.32	16.76	7.77	$\gamma = 95.5$	8	1.021				3*2/1	1630
(222.39)													
(at 120°C)	Mono		22.08	16.72	7.76	$\gamma = 95.6$	8	1.036				3*2/1	1630
β	Mono	C2-2	22.36	17.40	7.77	$\gamma = 90.5$	8	0.977				3*2/1	1447
	Ortho		23.9	3.8	15.6		4	1.042				3*4/1	1482
	Mono		51.9	7.74	7.8[b]	$\gamma = 86$	9	0.94				3*2/1	1487
(at 173 K)	Mono	C2-2	22.54	17.17	7.749	$\gamma = 90.3$	8	0.985				3*2/1	1447
(at 120°C)	Mono		21.54	17.17	7.750	$\gamma = 90.3$	8	1.0310				3*2/1	1630
–, 3-dodecyl-													
I. (250.44)	Ortho		25.83	7.75	7.77		4	1.069				3*2/1	1479
	Ortho		51.9	7.74	8.0		8	1.04				3*2/1	1481
	Ortho		21.71	3.97	7.8		2	1.24				3*2/1	1483
II.	Mono		19.8	9.37	8.07	$\gamma = 77$	4	1/140				3*2/1	1623
–, 3-hexadecyl-													
(306.55)	Ortho		24.74	4.21	7.8		2	1.25				3*2/1	1483

TABLE 3. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
–, 3-hexyl-													
(166.28)	Ortho		16.63	7.75	7.77		4	1.069				3*2/1	1479
	Ortho		33.6	7.66	7.7		8	1.11				3*2/1	1481
–, –, iodine doped													
	Ortho		37.25	23.15	7.77		24	1.932				3*2/1	1480
–, 3-methyl- (with 50% CF3S03-)													
(96.15)	Hex		19	19	12.2		22	1.63				6*11/1	1259
–, 3-octyl-													
I. (194.34)	Ortho		41.3	7.63	7.7		8	1.06				3*2/1	1481
	Ortho		17.40	3.61	7.8		2	1.32				3*2/1	1483
	Ortho		20.3	3.81	7.85		2	1.063				3*2/1	1486
	Mono		42.0	7.67	7.8	$\gamma = 87$	8	1.03				3*2/1	1487
II.	Mono		15.3	9.43	8.07	$\gamma = 72$	4	1.166				3*2/1	1623
–, 3-phenyl-													
–, –, 4′-octyl-													
(270.43)	Ortho		28.4	5.06	7.44		2	0.840				3*2/1	1637
–, 3-tetradecyl-													
(278.50)	Ortho		24.73	3.82	7.8		2	1.26				3*2/1	1483
Poly(tridecamethylene pyromellitimide)													
(396.49)					39.2					263			1395
Poly(undecamethylene pyromellitimide)													
(368.43)					32.0					292			1395
Poly(*N*-vinyl carbazole)													
(193.25)	Hex		12.30	12.30	7.44		3	0.988		>320/228		2*3/1	126
	Hex		12.00	12.00	6.47		3	1.193				2*3/1	825
	Ortho		21.6	12.5	7.44		6	0.958				2*3/1	1010
	Phex		12.3	12.3			3					2*3/1	607
	Rho		12.00	12.00	6.39		3	1.208				2*3/1	813
Poly(1-vinyl naphthalene)													
(154.21)	Tet	C4v-12	21.20	21.20	8.10		16	1.125		360/75		2*4/1	122
Poly(2-vinylpyridine)													
(105.14)					6.7					212			185
	Rho	C3-2	15.49	15.49	6.56		9	1.153				2*3/1	861
Poly(*p*-xylylene)													
α	Mono		11.68	6.10	9.16	$\beta = 102.5$	4	1.086		425/142	30.2/82	6*2/1	223
(104.15)	Ortho		21.3	33.6	6.58		31	1.138	1.05	420/219		6*1/1	426
	Mono		5.92	10.64	6.55	$\beta = 134.7$	2	1.179		375/82		6*1/1	595
	Mono		5.9	10.64	6.55	$\beta = 135$	2	1.19		435/1187		6*1/1	1181
										400/395			
										440/546			
β	Mono		8.10	5.25	6.53	$\beta = 95$	2	1.250				6*1/1	223
	Rho	C3-1	20.52	20.52	6.55		16	1.158				6*1/1	1011
	Hex		20.52	20.52	6.58		16	1.153		420		6*1/1	426
					6.55					412			224
–, chloro-													
(138.60)	Tri		5.92	12.8	6.55	90,90,135	2	1.312		290/395		6*1/1	1012
	Mono		5.9	12.8	6.55	$\beta = 135$	2	1.32				6*1/1	1181
–, ethyl-													
(132.21)	Mono		5.9	13.4	6.55	$\beta = 135$	2	1.20		170/395		6*1/1	1181
–, isopropyl-													
(146.23)	Mono		5.9	14.1	6.55	$\beta = 135$	2	1.26				6*1/1	1181

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make c the fiber axis.

TABLE 4. POLY(DIENES) AND POLY(DIYNES)

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
1,4-Poly(2,3-azabutadiene)													
–, 1,4-diethyl-													
trans-													
(112.18)					4.72							4*1/1	1504
1,2-Poly(1,3-butadiene)													
syndiotactic													
(54.09)	Ortho	D2h-11	10.98	6.60	5.14		4	0.964		154		4*1/1	7
isotactic													
	Rho	D3d-6	17.3	17.3	6.5		18	0.96		120		2*3/1	12
1,4-Poly(1,3-butadiene)													
trans-													
I.	Phex		4.54	4.54	4.9		1	1.03		100/352	10.0/352	4*1/1	37
(54.09)	Mono	C2h-5	8.63	9.11	4.83	β = 114	4	1.036		96/451	13.8/451	4*1/1	496
									0.891	55/624	6.31/624		1195
II. (>65°C)	Phex		4.88	4.88	4.68		1	0.930		141/352	4.61/352	4*1/1	154
	Hex		4.95	4.95	4.66		1	0.908		148/44	5.99/342	4*1/1	550
										145/451	4.61/451		
										142/624	3.62/624		
cis-													
	Mono	C2h-5	8.53	8.16	12.66	β = 83.33	8	0.821		6.3/335	9.2/353		60
	Mono	Cs-4	4.60	9.50	8.60	β = 109	4	1.011		1		8*1/1	124
	or	C2h-6							0.902	12/1121			1195
–, 2-*tert*-butyl-													
cis-													
(110.20)	Tri		13.95	20.78	15.3		22	0.908		106		4*11/3	367
–, chlorinated													
cis-threo-disyndiotactic													
(125.00)	Mono	C2h-4	7.37	5.30	10.10	β = 134	2	1.463				4*2/1	768
trans-erythro-diisotactic													
	Mono	C2h-5	7.05	8.05	5.10	β = 100	2	1.456				4*1/1	768
–, 2-chloro- [chloroprene]													
trans-													
(88.54)	Ortho	D2-4	8.84	10.24	4.79		4	1.356		115/229	8.37/81	4*1/1	40
	Ortho		9.0	8.23	4.79		4	1.658		80/81		4*1/1	109
cis-													
										70/1157			
–, 1-cyano													
trans-													
(79.10)					4.8							4*1/1	275
–, 2,3-dichloro-													
trans-													
I.					4.86								221
(122.98)	Mono	C2h-5	5.34	9.95	4.80	β = 93.5	2	1.604				4*1/1	565
II.	Ortho	C2v-9	8.81	12.34	4.80		4	1.565				4*1/1	699
–, –, thiourea complex													
	Mono	C2Hh5	9.87	15.83	12.53	β = 114.1		1.44					565
	Mono	C2h-5	9.91	15.85	12.5	β = 114.1		1.44					803
–, 2,3-dimethyl-													
trans-													
(82.15)					4.35					260			104
	Ortho	C2v-9	9.13	13.00	4.70		4	0.978		272/221		4*1/1	699
cis-													
					7.0					198			220
–, –, thiourea complex													
	Mono	C2h-5	10.40	15.47	12.5	β = 114.4		1.22					803
–, 2-methyl- [isoprene]													
trans-													
α					8.70					80/1121	13/1121	4*2/1	288
(68.12)					8.76						10/1128		502
	Mono	C2h-5	7.98	6.29	8.77	β = 102	4	1.051					715
									0.905				1127
β (LM)	Ortho	D2-4	7.78	11.78	4.72		4	1.046		65/46	8.0/1128	4*1/1	40
	Ortho		7.85	11.9	4.8^{b}		4	1.009		64/81	10.6/287	4*1/1	288

TABLE 4. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
	Ortho		7.83	11.87	4.75		4	1.025		82/287		4*1/1	502
									0.906	78/630			1195
										78/568			
										80/1170			
δ (HM)	Mono		5.9	7.9	9.2	γ = 94	4	1.06		74/81	12.7/81	4*2/1	502
			7.84	5.99			4			80/287			492
										87/568			
										89/1170			
ε			7.80	6.29									492
cis-													
	Mono	C2h-5	12.46	8.89	8.10	β = 92	8	1.009	0.906/53	28/81	4.40/81	8*1/1	40
			25.2	8.97	8.20[b]		16	0.976	0.910/47	36/50	4.6/1195	8*1/1	288
	Ortho	D2h-15								14/287		8*1/1	124
	Mono		26.3	8.9	8.15[b]	γ = 109.5	16	1.01		36/1169			1019
	Ortho		12.4	8.9	8.15[b]		8	1.101					1019
–, –, 3-chloro-													
trans-													
(102.56)					4.9							4*1/1	165
–, –, hydrochlorinated													
(104.58)	Port	C2h-5	5.83	10.38	8.95	β = 90	4	1.282		115		4*2/1	229
	Ortho		11.9	10.4	9.1[b]		8	1.23		110		4*2/1	70
–, 2-methylacetoxy-													
trans-													
(126.15)	Ortho		16.2	9.3	4.75		4	1.17		135		4*1/1	165
–, perhydrotriphenylene complex													
trans-													
2 phtp/monomer	Hex	C6h-2	14.26	14.26	4.78		1	1.079		183/1124			798
cis-													
–, 2-propyl-													
trans-													
(96.17)			10.95	6.65	9.2		4	0.95		42		8*1/1	368
										42/368			
–, urea complex													
	Hex	D6-2	8.22	8.22	11.01								827
1,4-Poly(1,3-butadiyne)													
–, 1,4-(4,4′-diphenyleneglutarate)-													
(330.34)	Mono	C2h-6	23.12	7.87	9.69	β = 111.29	4	1.336				4*2/1	948
	Mono	C2h-6	20.8	8.0	9.7	β = 106	4	1.41				4*2/1	913
Poly(chloroprene), see Poly(butadiene), 2-chloro-													
1,12-Poly(1,11-dodecadiyne)													
macromonomer	Mono	C2h-5	13.25	7.63	14.15[b]	γ = 118.5	4	0.847				12*1/1	1022
(160.26)													
cross-polymer	Mono	C2h-5	9.17	9.92	12.2	γ = 123.5	4	1.146					1022
5,8-Poly(5,7-dodecadiynediol)													
–, 1,12-bis(*N*-butoxycarbonyl)methylurethane-													
(508.61)			5.33	54.36	4.88		2	1.195				4*1/1	1319
	Ortho	D2-3	53.86	10.98	4.880		4	1.170				4*1/1	1329
–, 1,12-bis(ethylurethane)-													
(336.43)	Mono	C2h-5	18.30	10.78	4.89[b]	γ = 95	2	1.163				4*1/1	1318
	Mono		18.13	10.81	4.89[b]	γ = 94	2	1.169				4*1/1	1320
(hi temp)	Mono	C2h-5	19.93	9.58	4.83[b]	γ = 91	2	1.212				4*1/1	1318
	Mono		18.9	10.89	4.83[b]	γ = 91	2	1.124				4*1/1	1320
–, 1,12-bis(phenylurethane)-													
(432.52)	Mono	C2h-5	6.229	39.03	4.909	β = 106.85	2	1.258				4*1/1	95
	Mono	C2h-5	6.205	39.16	4.90[b]	β = 106.42	2	1.259				4*1/1	1353
–, 1,12-bis(*p*-toluylsulfonyl)-													
(502.64)	Tri	Ci-1	20.13	6.11	4.91	95,94,89	1	1.391				4*1/1	381
(110 K)	Tri	Ci-1	20.01	6.02	4.91	95,94,89	1	1.420				4*1/1	381
10,13-Poly(10,12-heptacosadiynoic acid)													
(as Li salt)			65										1268
(400.65)													

TABLE 4. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
1,4-Poly(1,3-heptadiene)													
trans-													
isotactic													
(96.17)	Mono	C2-2	8.62	7.95	4.85	$\beta = 99$	2	0.973		85/371		4*1/1	375
–, 6-methyl-													
trans-													
isotactic													
(110.20)					4.85					119		4*1/1	371
1,4-Poly(1,3-hexadiene)													
trans-													
isotactic													
(82.15)	Ortho	D2-4	14.02	8.02	4.85		4	1.000		82/371		4*1/1	274
–, 5-methyl-													
trans-													
isotactic													
(96.17)					4.85					88		4*1/1	371
2,5-Poly(2,4-hexadiene)													
trans-erythro-diisotactic													
(82.15)					2.3					84		2*1/1	525
–, 2,5-dimethyl-													
trans-													
(110.20)					4.8					265		4*1/1	183
										265/376			
2,5-Poly(2,4-hexadienedioic acid)													
trans-erythro-diisotactic													
–, diisopropyl ester													
(226.27)	Ortho		14.16	10.28	9.70		4	1.064		230/420		8*1/1	420
2,5-Poly(2,4-hexadienoic acid)													
trans-erythro-diisotactic													
–, 6-amino-													
0.5 $CdCl_4$/unit	Tri	Ci-1	9.67*	10.70	17.79	93,90,90	8	1.838		347		4*2/1	1123
(254.25)	Tri	Ci-1	7.214	7.245	18.59	104,97,96	4	1.823				8*1/1	1188
–, –, hydrochloride													
(163.60)										334			1123
–, butyl ester													
(168.24)	Ortho		11.36	9.70	4.80		2	1.056				4*1/1	384
–, ethyl ester													
(140.18)					4.80							4*1/1	384
–, isoamyl ester													
(182.26)					4.80							4*1/1	384
–, isobutyl ester													
(168.24)					4.80							4*1/1	384
–, isopropyl ester													
(154.21)					4.80							4*1/1	384
–, methyl ester													
(126.16)					4.80							4*1/1	384
					4.8							4*1/1	1208
trans-threo-diisotactic													
–methyl ester													
(126.16)					9.4							4*2/1	1208
2,5-Poly(2,4-hexadiyne)													
–, 1,6-di(*N*-carbazoyl)-													
(408.50)	Mono	C2h-5	13.03	17.55	4.92[b]	$\gamma = 108.7$	2	1.273				4*1/1	951
	Mono	C2h-5	12.82	17.33	4.886[b]	$\gamma = 108.3$	2	1.316				4*1/1	611
	Mono	C2h-5	12.87	17.40	4.907[b]	$\gamma = 108.3$	2	1.300				4*1/1	830
–, –, hexabromo-													
	Mono		14.21	20.67	4.75[b]	$\gamma = 106.8$						4*1/1	1503
2,5-Poly(2,4-hexadiynediol)													
(50 mrad)	Mono	C2h-5	4.176	15.78	4.703	$\beta = 110.34$	2	1.258				4*1/1	903
(" annld)	Mono	C2h-5	4.115	16.05	4.819	$\beta = 106.08$	2	1.196				4*1/1	903
(110.11)	Mono		4.109	16.09	4.793	$\beta = 106.4$	2	1.203				4*1/1	904
–, 1,6-bis(ethylurethane)-													
(252.27)	Mono	C2h-5	15.14	17.96	4.88	$\gamma = 98.42$	4	1.277				4*1/1	1240

TABLE 4. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
–, 1,6-bis(phenylsulfonyl)-													
–, –, di-*p*-fluoro-													
(426.41)	Mono	C2h-5	13.93	14.06	4.90[b]	γ = 113.3	2	1.606				4*1/1	1378
	Mono	C2h-5	13.89	14.10	4.91[b]	γ = 113.2	2	1.602				4*1/1	1379
	Mono	C2h-5	13.96	14.10	4.914[b]	γ = 113.56	2	1.597				4*1/1	1380
–, –, di-*p*-methoxy-													
(450.48)	Tri	Ci-1	12.72	8.543	4.902[b]	110,103,79	1	1.542				4*1/1	1021
–, 1,6-bis(phenylurethane)-													
I. (348.36)	Tri	Ci-1	16.78	12.53	4.89[b]	84,83,69	2	1.340				4*1/1	716
(5 dioxane/unit)					4.9								749
II.					4.9							4*1/1	749
III.					4.9							4*1/1	749
–, 1,6-bis-(*p*-toluylsulfonyl)-													
I. (418.48)	Mono	C2h-5	14.49	14.94	4.910[b]	γ = 118.14	2	1.482		102/1020	35/1020	4*1/1	898
	Mono	C2h-5	14.53	14.96	4.912[b]	γ = 118.21	2	1.477				4*1/1	1277
	Mono	C2h-5	14.91	14.48	4.93	γ = 118.0	2	1.479				4*1/1	1381
II. (120 K)	Mono	C2h-5	14.93	25.56	4.910[b]	γ = 92	4	1.484				4*1/1	899
–, 1-(*p*-toluylsulfonyl)-6-(*p*-fluorophenylsulfonyl)-													
I. (422.44)	Mono		14.22	14.52	4.909[b]	γ = 116.1	2	1.541				4*1/1	1337
II. (143 K)	Mono		14.10	14.43	4.906[b]	γ = 116.3	2	1.566				4*1/1	1337
Poly(isoprene), see Poly(butadiene), 2-methyl-													
10, 13-Poly(10,12-nonacosadiynoic acid)													
(as Li salt)	Ortho		70	8.11	4.89		4	1.04				4*1/1	1268
(428.70)													
1,9-Poly(1,8-nonadiyne)													
macromonomer	Mono	C2-2	7.88	5.67	21.00[b]	γ = 90.8	4	0.837				9*2/1	1023
(118.18)													
cross-polymer	Mono	C2h-5	9.30	17.5	4.85	β = 101.71	4	1.016				9*2/1	1023
1,4-Poly(1,3-octadiene)													
trans-													
isotactic													
(110.20)					4.85					87		4*1/1	371
2,5-Poly(2,4,6-octatriynediol)													
(134.14)	Mono	C2h-5	4.11	19.59	4.80	β = 109	2	1.219				4*1/1	780
–, 1,8-bis(phenylurethane)-													
(372.38)	Mono	C2h-5	24.65	30.74	4.89	β = 92.2	8	1.336				4*1/1	780
10,13-Poly(10,12-pentacosadiynoic acid)													
(as Li salt)			60										1268
(372.59)													
1,2-Poly(1,3-pentadiene)													
trans-													
syndiotactic													
(68.12)					5.1					10		4*1/1	230
–, 4-methyl-													
isotactic													
II.	Tet	D2d-10	17.80	17.80	36.50		72	0.849		167/707		2*18/5	488
(82.15)													
syndiotactic													
I.					11.73							12*1/1	1502
II.					5.05							4*1/1	1502
1,4-Poly(1,3-pentadiene)													
trans-													
isotactic													
(68.12)	Ortho		19.73	4.85	4.8		4	0.98		95		4*1/1	189
	Ortho	D2-4	19.80	4.86	4.85		4	0.969		104/1126		4*1/1	200
cis-													
isotactic													
	Ortho	D2-4	9.47	5.97	8.15		4	0.982				4*2/1	844
					8.15					44		4*2/1	263
syndiotactic													
	Mono	C2h-5	6.34	9.12	8.50	β = 105.9	4	0.957				8*1/1	1431
					8.50					53		8*1/1	234

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TABLE 4. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n *p/q)	Refs.
–, 2-methyl-													
trans-													
isotactic													
(RT)	Mono	C2h-5	12.89	9.186	4.820[b]	$\beta=93.5$	4	0.958		195/1365		4 * 1/1	1317
(82.15)													
(153 K)	Mono	C2h-5	12.78	9.084	4.824[b]	$\beta=93.6$	4	0.977				4 * 1/1	1317
cis-													
isotactic													
α (– 130)	Ortho	D2h-15	10.74	13.04	7.87		8	0.990		175		4 * 2/1	1364
β (RT)	Ortho	D2-4	9.30	7.73	7.90		4	0.961		165		4 * 2/1	1364
										165/1365			
–, 3-methyl-													
cis-													
isotactic													
(82.15) I.					8.02							* 2/1	1497
II.					6.97							* 3/1	1497
syndiotactic													
II.					8.6							8 * 1/1	1501
1,4-Poly(1,3-pentadiynol)													
–, 1-*N*-carbazoly-													
(245.28)	Mono	C2h-5	16.49	19.51	4.873[b]	$\gamma=124.27$	4	1.257				4 * 1/1	1354
2,5-Poly(5-phenyl-2,4-pentadienoic acid)													
trans-erythro-diisotactic													
–, butyl ester													
(230.31)					4.80							4 * 1/1	384
–methyl ester													
(188.23)					4.80							4 * 1/1	384
1,24-Poly(1,11,13,23-tetracostetrayne)													
cross-polymer	Mono	C2h-4	26.8 *	8.254	4.91 *	$\gamma=119.6$	2	1.136					1264
(322.54)													

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 5. POLY(PEPTIDES) -(NH–CHR–CO)-

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n *p/q)	Refs.
Poly(L-alanine)													
α helix	hex		8.55	8.55	70.3		47	1.246				3 * 47/13	507
(71.08)													
β	Ortho		4.79	10.7	6.88		4	1.339				3 * 2/1	507
	Ortho		4.734	10.54	6.89		4	1.373				3 * 2/1	509
–, phenyl-													
α helix	Hex		11.55	11.55								3 * 18/5	1025
(147.18)													
ω helix	Tet		11.28	11.28	5.91		4	1.300				3 * 4/1	1024
	Tet		12.86	12.86	5.59		4	1.057				3 * 4/1	1025
Poly(β-alanine), see Poly(3-aminopropionic acid)													
Poly(L-alanyl-D-alanyl-L-alanyl-D-valine)													
(312.37)	Ortho		9.5	31.0	11.0		8	1.281				12 * 1/1	1046
Poly(L-alanyl-L-alanylglycine)													
(200.22)	Ortho		9.44	9.96	20.94[b]		8	1.351				9 * 2/1	753
–phenyl- [2nd alanyl]													
(275.31)					15							9 *	774
Poly(L-alanyl-L-alanylglycyl-L-prolyl-L-prolylglycine)													
(450.49)	Ortho		10.5		29.5							18 *	755
Poly(L-alanyl-D-alanyl-L-valyl-D-valine)													
(340.42)	Ortho		9.5	34.1	11.0		8	1.269				12 * 1/1	1046

TABLE 5. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(L-alanyl-4-aminobutyric acid)													
(156.18)	Ortho		9.4	9.9	9.2		4	1.21				8*1/1	969
Poly(L-alanyl-6-aminocaproic acid)													
(184.24)	Ortho		9.4	9.8	11.5[b]		4	1.16				10*1/1	969
Poly(L-alanyl-3-aminopropionic acid)													
(142.16)	Ortho		9.4	9.8	16.1[b]		8	1.27				7*2/1	969
Poly(L-alanyl-11-aminoundecanoic acid)													
(254.37)	Ortho	D2-5	4.79	10.35	29.8		4	1.144				15*2/1	1619
Poly(L-alanyl-5-aminovaleric acid)													
(170.21)	Ortho		9.4	10.7	20.7[b]		8	1.09				9*2/1	969
Poly(L-alanyl-L-glutamylglycine)													
–, γ-ethyl-													
(285.30)	Mono		9.54	8.54	21.36[b]	$\gamma=106$	4	1.133				9*2/1	756
Poly(L-alanylglycine)													
I. (128.13)	Ortho		9.42	8.87	6.95[b]		4	1.466				6*1/1	591
	Ortho		9.44	8.96	6.94[b]		4	1.450				6*1/1	754
II.	Ortho		4.72	14.4	9.6		4	1.30				6*2/1	741
Poly(L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-glutamylglycine)													
(990.98)	Ortho		9.64	9.62	48.65		4	1.459				42*1/1	1648
Poly(L-alanylglycyl-L-alanylglyclyl-L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-glutamylglycine)													
(850.84)	Ortho		9.57	9.70	41.70		4	1.460				36*1/1	1648
Poly(L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-glutamylglycine)													
(710.70)	Ortho		9.48	10.28	34.75		4	1.394				30*1/1	1648
Poly(L-alanylglycyl-L-alanylglycyl-L-alanylglycyl-L-glutamylglycine)													
I. (570.56)	Ortho		9.48	17.34	18.8		4	1.226				24*1/1	1633
II.	Ortho		9.48	10.60	27.80		4	1.356				24*1/1	1648
Poly(L-alanylglycyl-L-alanylglycyl-L-serylglycine)													
(400.39)	Ortho		9.39	9.05	20.55[b]		4	1.522				18*	754
Poly(L-alanylglycyl-L-alanyl-L-prolyglycyl-L-proline)													
(450.49)	Ortho		10.5		29.5							18*	755
Poly(L-alanylglycylglycine)													
II. (185.18)	Mono		8.86	22.0	9.42	$\beta=90$	9	1.507				9*1/1	596
(monohydrate)	Mono	C2-2	11.0	4.8	9.45	$\beta=90$	2	1.35				9*1/1	740
Poly(L-alanylglycylglycylglycine)													
II. (242.24)	Hex		4.89	4.89	36.60		3	1.592				12*3/1	740
Poly(L-alanylglycyl-L-proline)													
dry	Hex		11.9	11.9	28.8		10	1.06				9*10/3	614
wet	Hex		11.4	11.4	9.3		3	1.07				9*3/1	614
(225.25)													
Poly(L-alanylglycyl-L-prolyl-L-prolyglycyl-L-proline)													
(476.53)	Ortho		10.6		28.7							18*	755
Poly(L-alanyl-L-prolyglycine)													
with H_2O	Mono	C2-2	8.6	7.2	9.4	$\beta=90$	2	1.4				9*1/1	616
(225.25)													
Poly(L-alanyl-L-prolylglycyl-L-prolyl-L-prolylglycine)													
(476.53)	Hex		11.9	11.9	29.5		5	1.093				18*	755
Poly(L-alanyl-D-valine)													
(170.21)	Port		9.7	14.7	6.2		4	1.28				6*1/1	1176
	Ortho		9.5	29.4	11.1		16	1.459?				6*2/1	1046
Poly(2-aminoisobutyric acid)													
(85.11)	Hex		8.7	8.7	5.96		3	1.08				3*3/1	967
–, dichloroacetic acid complex													
(106.60)	Hex	C3v-6	21.8	21.8	5.95		18	1.301				3*3/1	1053
(1 DCA/6 residues)													
Poly(L-arginine)													
–, hydrochloride													
α helix	Hex		14.7	14.7	27.0		18	1.406				3*18/	641
(2.5 H_2O/residue)													
(192.65)													
β	Mono		9.26	22.05	6.76	$\gamma=108.9$	4	1.438				3*2/1	641
(>5 H_2O/residue)													

TABLE 5. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles		Crystal.	Amorph.[a]				
Poly(L-aspartic acid)													
–, β-benzyl-													
ω helix	Tet		13.85	13.85	5.30		4	1.341				3*4/1	582
(205.21)	Tet		13.80	13.80	5.42		4	1.320				3*4/1	703
	Tet		13.88	13.88	5.3		4	1.34				3*4/1	837
racemic	Ortho		21.4	4.28	5.68		2	1.310				3*2/1	1026
–, –, *p*-chloro-													
α helix	Hex	D6-3	14.9	14.9	27.0		18	1.380				3*18/5	606
(239.66)	Hex		14.8	14.8	27		4	1.40				3*18/5	1505
ω helix	Tet	D4-4	23.3	23.3	5.20		8	1.128				3*4/1	606
	Mono		16.4	13.4	5.2	γ=99	18	1.41				3*4/1	1505
–, –, *p*-methyl-													
α helix (219.24)	Hex		14.9	14.9	27		4	1.26				3*18/5	1505
ω helix	Mono		16.6	13.4	5.28	γ=108	4	1.304				3*4/1	1505
–, α-*n*-butyl-													
I. (171.20)	Hex		13.5	13.5	19.9		13	1.177				4*13/4	1507
	Phex	C2-2	13.45	13.45	20.6	γ=120	13	1.145				4*13/4	1508
II.	Tet	C4-2	14.15	14.15	4.90		4	1.338				4*4/1	1508
–, α-ethyl-													
–, –, 2-methoxy-													
(173.17)	Phex	C2-2	12.40	12.40	20.74	γ=120	13	1.354				4*13/4	1508
–, β-ethyl-													
–, –, 2-phenyl-													
α helix (219.24)	Tet		13.2	13.2	27.0		18	1.393				3*18/5	1027
β	Ortho		17.7	4.76	6.83		2	1.265				3*2/1	1027
π helix	Ortho		20.3	11.7	19.89		17	1.310				3*17/4	1028
>200°C	Hex		17.1	17.1	19.89		17	1.229				3*17/4	1028
?	Hex		23.4	23.4									1027
–, α-isobutyl-													
I. (171.20)	Ortho		13.5	23.4	19.9		26	1.176		286/1310		4*13/4	1312
	Hex		13.5	13.5	19.9		13	1.177				4*13/4	1506
II.	Tet		14.0	14.0	4.95		4	1.172				4*4/1	1312
	Tet		13.98	13.98	4.94		4	1.178				4*4/1	1506
–, β-*n*-propyl													
β (157.17)	Mono	C2-2	9.57	25.08	6.79[b]	γ=96	8	1.288				3*2/1	579
–, –, 3-phenyl-													
(232.26)	Hex		15.6	15.6	10.5		7	1.220				3*7/2	1628
(at 140°C)	Ortho		28.0	16.1	10.5		14	1.141				3*7/2	1628
Poly(L-cysteine)													
–, s-benzyloxycarbonyl-													
β													
I. (237.27)	Ortho		4.76	32.4	6.95[b]		4	1.470				3*2/1	578
II.	Ortho		4.89	32.8	6.89[b]		4	1.426				3*2/1	578
–, *s*-benzylthio-													
ω helix (225.32)	Tet	C4-2	14.28	14.28	5.55		4	1.322				3*4/1	1029
Poly(2,4-diaminobutyric acid)													
–, *N*-benzyloxycarbonyl-													
(234.26)	Rho		27.5	27.5	27.0		56	1.232				3*18/5	720
Poly(D-glutamic acid)													
–, γ-benzyl-													
–, –, chloro-													
meta (253.68)	Phex		15.30	15.30	26.99	γ=60.23	18	1.382				3*18/5	932
ortho	Phex		15.07	15.07	27.15	γ=60.03	18	1.420				3*18/5	932
para	Ortho		15.24	26.40	10.68		14	1.372				3*7/2	932
	Hex		15.24	15.24	10.67		7	1.374				3*7/2	1033

TABLE 5. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
–, γ-*n*-hexyl-													
α helix	Hex		15.89	15.89	27		18	1.08				3 * 18/5	859
(213.27)													
–, γ-methyl-													
α helix	Hex		12.0	12.0								3 * 18/5	1162
(143.14)													
β	Ortho		9.49	19.09	7.07		8	1.484				3 * 2/1	954
			9.44	23.37	6.81	γ = 90	8	1.266					812
Poly(L-glutamic acid)													
β													
I.	Mono		9.66	9.10	6.98[b]	γ = 105	4	1.447				3 * 2/1	585
(129.12)	Mono		9.79	9.35	6.82[b]	γ = 105	4	1.422				3 * 2/1	966
II.	Mono		9.75	8.06	6.84[b]	γ = 104	4	1.644				3 * 2/1	966
	Ortho		4.95	15.6	6.90		4	1.610				3 * 2/1	836
–, γ-*n*-amyl-													
(199.25)	Hex		15.1	15.1	(27)		18	1.12				3 * 18/5	1040
	Hex		15	15	27		18	1.13				3 * 18/5	1279
–, γ-benzyl-													
α helix													
A.	Mono		15.3	14.6		γ = 121.7						3 * 18/5	1030
(219.24)	Hex		30	30			72					3 * 18/5	952
B.	Tri		15.25	15.25	27.0	84,84,122	18	1.257				3 * 18/5	587
	Mono		25.2	15.0	26.8	γ = 122.5	30	1.278				3 * 18/5	702
	Mono		15.88	13.00	27.1	γ = 113.7	18	1.279				3 * 18/5	952
(dry)	Ortho		14.76	25.40	64.11		86	1.303				* 43/12	757
	Mono		29.06	13.20	27.27	β = 96	36	1.260				3 * 18/5	1030
C.	Hex		14.95	14.95	27.1	γ = 56	18	1.305				3 * 18/5	584
(racemic)	Hex		14.95	14.95	106		71	1.260				* 71/20	584
	Mono		15.05	14.78	27	γ = 119.4	18	1.252				3 * 18/5	1030
	Hex		14.8	14.8	10.50		7	1.279				3 * 7/2	1030
D.	Hex		39.05	39.05	10.58		49	1.277				3 * 7/	953
E.	Hex		64.36	64.36	10.5			1.285				3 * 7/2	1030
single crystal	Mono		5.52	5.11	22.25	β = 97.8	2	1.171					926
racemic mixture													
I.	Ortho		24.4	15.4									1031
II.	Mono		25.6	15.6		γ = 107.7							1031
–, –, chloro-													
meta	Hex		15.50	15.50	27.10		18	1.345				3 * 18/5	1032
(racemic)	Hex		15.49	15.49	26.84		18	1.360				3 * 18/5	1035
(253.68)													
ortho	Ortho		26.50	30.60	27.02		72	1.384				3 * 18/5	1032
(racemic)	Hex		15.24	15.24	27.23		18	1.384				3 * 18/5	1034
para	Ortho		15.24	26.40	10.67		14	1.374				3 * 7/2	1032
(racemic)	Ortho		15.12	26.09	10.72		14	1.394				3 * 7/2	932
–, γ-*n*-butyl-													
(185.22)	Phex		14.1	14.1	(27)	γ = 114	18	1.13				3 * 18/5	1040
(at 100°C)	Ortho		25.4	14.66	27		36	1.101				3 * 18/5	1040
–, γ-calcium													
β (wet)	Mono	C2-2	9.40	12.82	6.83[b]	γ = 100.3							585
–, γ-*n*-dodecyl-													
(297.44)	Hex		27.6	27.6									1292
–, γ-ethyl-													
α helix													
I.	Phex		12.5	12.5	27.0	γ = 110	18	1.18				3 * 18/5	826
(157.17)	Phex		12.16	12.16	108.9	γ = 109.5	73	1.255				* 73/20	955
					16.4							3 * 11/3	1036
T.	Tet		11.72	11.72	108.9		73	1.274				3 * 73/20	955
III.	Phex		12.9	12.9	108.9	γ = 123	73	1.25				3 * 73/20	955
H.	Ortho		22.95	13.25	108.9			1.151				3 * 73/20	955
–, –, 2-chloro-													
(191.61)	Phex		11.7	11.7	16.56	γ = 118.7	11	1.760				3 * 11/3	1036
–, –, 2-phenyl-													
(233.27)	Hex		15.60	15.60	(27)			1.225				3 * 18/5	1038
	Ortho		15.38	26.65	54.4		72	1.251				3 * 18/5	1039

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TABLE 5. *cont'd*

			Unit cell parameters					Density (g/cm^3)					
Polymer	Cryst syst.	Space group	a	b	c	Angles	z	Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
–, γ-*n*-hexyl-													
(213.28)	Hex		15.8	15.8	27		18	1.09				3*18/5	1040
	Hex		15.5	15.5	27		18	1.14				3*18/5	1279
–, γ-methyl-													
α helix	Hex		11.96	11.96	27.5		18	1.256				3*18/5	588
(143.14)	Hex	11.95	11.95	27.0			18	1.281				3*18/5	576
	Hex		11.79	11.79	26.9		18	1.321				3*18/5	858
					97.26		65	(1.284)				*65/18	583
	Ortho		11.95	20.70	43.2		58	1.290				3*29/8	589
	Hex		11.82	11.82	103.0		69	1.316				*69/19	1204
	Hex		11.58	11.58	26.33		18	1.399				3*18/5	1650
precursor to α (3 chloroform/18 mers)													
	Hex		12.75	12.75	27.0		18	1.282				3*18/5	1293
	Hex		12.75	12.75	26.9		18	1.287				3*18/5	1338
(at 170°C)	Rho		21.27	21.27	176.0			1.210				117/32	1204
β			4.725		6.83							3*2/1	702
	Ortho		4.70	21	6.83		4	1.410				3*2/1	1037
–, –, dimethyl phthalate complex													
25%	Hex		27.6	27.6			72					3*18/5	1041
extracted	Phex		23.9	24.9	27	γ = 121.4	72	1.248				3*18/5	1041
–, γ-*n*-octyl-													
(241.33)	Hex		17.1	17.1	27		18	1.06				3*18/5	1279
–, γ-*n*-propyl-													
(171.20)	Phex		14.4	14.4	(27)	γ = 130	18	1.19				3*18/5	1040
(at 150°C)	Ortho		24.6	14.2	60.0		80	1.085				*40/11	1040
	Rho		24.3	24.3	60.0		120	1.112				*40/11	1533
–, –, 3-phenyl-													
(247.29)	Hex		16.30	16.30	(27)		18	1.190				3*18/5	1038
–, γ-sodium													
α helix	Hex		15.9	15.9									794
(hydrated)													
β (wet)	Port		14.4	7.0*	4.7								794
Poly(L-glutamine)													
–, *N*5-(4-hydroxybutyl)-													
(200.24)	Ortho		14.8	12.4	60.4		40	1.200				3*40/11	935
–, *N*5-(2-hydroxyethyl)-													
(172.18)	Ptet		12.1	12.1	27		18	1.30				3*18/5	968
–, *N*5-(3-hydroxypropyl)-													
(186.21)	Ortho		14.6	12.3	43.2		29	1.156				3*29/8	924
Poly(D-glutamyl-L-glutamic acid)													
–, γ-benzyl-													
α helix	Hex		15.2	15.2	28		19	1.235				3*19/5	885
(219.24)	Hex		14.9	14.9	26.6		18	1.281				6*9/5	1042
	Hex		26.0	26.0	32.4		66	1.267				6*11/6	1272
β	Hex		22.9	22.9	9.46		16	1.356				6*1/1	1042
	Ortho		9.52	22.5									1215
ω helix			27	15.8									885
	Ortho		26.92	15.54	5.40		8	1.289				6*2/1	1042
	Ortho		27.1	15.5	5.40		8	1.284				6*2/1	1272
π helix	Hex		17.0	17.0	25.6		22	1.250				6*11/5	885
	Hex		17.0	17.0	25.6		22	1.250				6*11/5	1272
π–π 5.6	Hex		18.2	18.2	56.3		56	1.262				6*14/5	1214
π–π 7.2	Hex		22.6	22.6	53.1		72	1.116				6*18/5	1214
π–π 9.0	Mono		25.3	24.4	20.2	γ = 117	36	1.180				6*9/2	1214
π–π 10.8	Mono		26.4	25.6	50.0	γ = 118		1.318				6*27/5	1214
–, γ-ethyl-													
–, –, 2-phenyl-													
α helix	Hex		15.9	15.9	26.5		18	1.204				6*9/5	1042
(233.27)	Hex		27.5	27.5	32.4		66	1.205				6*11/6	1272
β	Hex		24.2	24.2	4.75		8	1.286				6*1/1	1042
π helix	Hex		17.6	17.6	25.7		22	1.236				6*11/5	1272
Poly(glycine)													
I. (57.05)			4.77	4.77	7.0	γ = 66	2	1.30		365/795		3*2/1	581
	Mono	C2h-5	9.54	3.67	7.044[b]	γ = 113	4	1.669				3*2/1	1239

TABLE 5. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
II.	Hex	C3-2	4.8	4.8	9.3		3	1.53				3 * 3/1	273
Poly(glycyl-6-aminocaproic acid)													
I. (170.21)	Hex		4.79	4.79	35.1		3	1.216		276/1524		10 * 3/1	1311
II.	Mono		4.76		3.96	$\beta = 113$							1311
Poly(glycyl-12-aminododecanoic acid)													
II. (254.37)	Hex		4.79	4.79	112.8		6	1.131		230/1524		6 * 16/1	1512
Poly(glycyl-3-aminopropionic acid)													
I. (128.13)	Ortho		9.51	15.20	16.95[b]		16	1.389				7 * 2/1	1294
II.	Hex		4.79	4.79	22.2		3	1.447				7 * 3/1	1294
Poly(glycyl-3-aminopropionic acid-3-aminopropionic acid)													
(199.21)	Hex		4.79	4.79	35.2		3	1.419				11 * 3/4	1313
Poly(glycyl-11-aminoundecanoic acid)													
I. (240.35)	Ortho		9.60		37.5[b]							15 * 2/1	1391
II.	Hex		4.79	4.79								15 *	1391
Poly(glycylglycyl-L-proline)													
with H_2O	Mono	C2-2	12.2	4.9	9.3	$\beta = 90$	2	1.4				9 * 1/1	615
w/formic acid	Mono	C2-2	13.5	4.9	9.3	$\beta = 94$	2					9 * 1/1	615
(211.22)													
Poly(glycylprolylhydroxyproline)													
(267.28)	Hex		13.7	13.7	28.2		10	0.97				9 * 10/	612
Poly(glycyl-L-prolyl-L-proline)													
dry	Hex		12.5	12.5	28.7		10	1.07				9 * 10/	613
(251.29)													
–, α-phenyl-(glycyl)													
(327.38)	Ortho	D2-4	14.3	13.5	9.4		4	1.198				9 * 1/1	965
Poly(L-histidine)													
–, 1-benzyl-													
(227.27)	Phex		17.4	17.4	27.0	$\gamma = 130$	18	1.085				3 * 18/5	719
–, hydrochloride													
(1 H_2O/residue)	Mono		14.95	14.95	45.0	$\gamma = 116.5$	45	1.582				3 * 15/4	1295
(190.61)													
Poly(L-isoleucine)													
β	Ortho		4.80	22.36	6.88		4	1.018				3 * 2/1	806
(113.16)	Ortho		4.8	23	6.6		4	1.032				3 * 2/1	1025
Poly(L-leucine)													
α helix	Hex		13.22	13.22								3 *	806
(113.16)													
β	Ortho		4.80	23.56	6.88		4	0.966				3 * 2/1	806
Poly(L-lysine)													
α helix	Hex		19.55	19.55								3 *	586
(128.18)													
β	Ortho		9.44	17.16	6.8[b]		6	1.16				3 * 2/1	586
–, *E*-benzyloxycarbonyl-													
α helix	Hex		16.69	16.69	26.90		18	1.208				3 * 18/5	577
(262.31)													
–, hydrobromide													
(1.4 H_2O/residue)	Ortho	D2-3	9.52	16.44	6.80		4	1.46				3 * 2/1	923
(234.31)													
–, hydrochloride													
α helix	Hex		16.80	16.80									666
>84% RH													
(164.64)													
β dry	Ortho		4.62	15.20	6.66		4	2.338					666
65% RH	Ortho		4.71	16.67	6.66		4						666
Poly(L-lysyl-L-lysyl-L-valine)													
α helix	Hex		15.87	15.87								9 *	1047
(355.48)													
β	Ortho		9.35	15.04	20.88		4	0.969				9 * 2/1	1047
(with 2HCl)													
–, di-benzyloxycarbonyl-													
β	Ortho		9.38	28.24	20.22		8	1.547				9 * 2/1	1048
(623.75)													

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TABLE 5. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm³)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
			a	b	c	Angles		Crystal.	Amorph.[a]				
Poly(L-methionine)													
α helix	Hex		11.49	11.49	70.5		47	1.270				3*47/13	867
(131.19)													
Poly(D-methionyl-L-methionine)													
β	Mono		18.05	4.71	14.66[b]	β = 110.4	8	1.492				6*2/1	850
(131.19)													
Poly(L-ornithine)													
–, N-benzoyl-													
α helix	Hex		15.0	15.0	26.5		18	1.263				3*18/5	1373
(218.26)													
–, –, p-bromo-													
ω helix	Ortho		D2-4	24.6	18.4	5.68	8	1.535				3*4/1	1373
8297.15 *													
–, –, p-chloro-													
ω helix	Ortho	D2-4	24.1	18.5	5.68		8	1.326				3*4/1	1373
(252.70)													
–, –, p-fluoro-													
ω helix	Ortho	D2-4	23.8	18.7	5.68		8	1.241				3*4/1	1373
(236.25)													
–, N-benzyloxycarbonyl-													
I. (248.28)	Mono		23.3	22.7	16.2	γ = 119.2	22	1.213				3*11/3	720
	Phex		23.0	22.6	(16)	γ = 119.5	22	1.238				3*11/3	1043
	Hex		22.8	22.8	16.4		22	1.228				3*11/3	1296
II.	Ortho		29.40	14.70	27.0		36	1.272				3*18/5	1043
	Tet		20.8	20.8	60.00		80	1.270				3*40/1	1296
III.	Ortho		22.09	19.95	60.00		80	1.247				3*40/1	1296
–, hydrobromide													
α helix	Hex		15.0										784
(>86% RH)													
β (wet)	Ortho		4.60	30.2	6.64		8					3*2/1	784
(to 85% RH)													
Poly(L-proline)													
I. (97.12)	Hex	C2-2	9.05	9.05	19.0		10	1.197				3*10/3	590
II.	Rho	C3-3	6.62	6.62	9.36		3	1.362				3*3/1	510
	Rho	C3-3	6.62	6.62	9.31		3	1.369				3*3/1	512
	Rho	C3-3	6.68	6.68	9.36		3	1.338				3*3/1	511
–, acid complexes													
–, acetic	Tet		9.13	9.13	19.0		10					3*10/3	701
–, formic	Tet		8.92	8.92	19.0		10					3*10/3	701
–, propionic	Tet		9.13	9.13	19.0		10					3*10/3	701
highly solvated	Ortho		9.00	25.1	19.0								701
–, hydroxy-													
A. (113.12)	Hex	C3-3	12.3	12.3	9.15		9	1.410				3*	580
B. >66% RH	Phex		15.75	15.75	22.88	γ = 120.47						3*8/3	1044
–, –, O-acetyl-													
II. (155.15)	Hex		11.4	11.4	9.3		6	1.48				3*3/1	737
Poly(L-serine)													
–, O-acetyl-													
β	Ortho		9.71	6.48	9.6[b]		3	1.065				3*3/1	706
(129.12)													
Poly(L-tyrosine)													
–, O-benzyloxycarbonyl-													
(297.31)	Mono		18.0	18.0	16.5	γ = 122	11	1.20				3*11/3	849
Poly(L-valine)													
α helix	Hex		11.43	11.43	(27)		18	0.970				3*18/5	1025
(99.13)													
β	Ortho		4.79	19.00	6.88		4	1.052				3*2/1	806
	Ortho	D2-4	4.80	19.14	6.59		4	1.088				3*2/1	1045

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 6. POLY(AMIDES) (-NH-X-NH-CO-Y-CO- or -NH-X-CO-) see also POLY(PEPTIDES)

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.^{a}	Melting point (°C)^a	Heat of fusion kJ/mol^a	Chain conform. (n * p/q)	Refs.
Poly(2-aminoacetic acid), see Polyglycine													
Poly(*p*-aminobenzoic acid)													
(119.12)	Ortho	D2-4	7.71	5.14	12.9		4	1.548		550/735		6 * 2/1	811
	Ortho	D2-4	7.71	5.14	12.8		4	1.560				6 * 2/1	902
	Ortho	D2-4	7.75	5.30	12.87		4	1.497				6 * 2/1	1434
Poly(3-amino-2-butenoic acid)													
irrad. in vacuum													
(83.09)	Mono		19.11	8.54	10.665	β = 97.6						4 *	1530
irrad. in air													
	Mono		21.90	10.13	12.461	β = 96.8						4 *	1530
Poly(3-aminobutyric acid)													
(85.11)	Ortho		10.9	9.6	4.6		4	1.17		330		4 * 1/1	503
Poly(4-aminobutyric acid)													
α	Mono		9.44	8.22	12.1^b	γ = 116	8	1.340		260/337		5 * 2/1	272
(85.11)	Mono	C2-2	9.29	7.97	12.24^b	γ = 114.5	8	1.375		260/244		5 * 2/1	457
	Mono		9.79	8.31	12.25	γ = 117	8	1.273				5 * 2/1	1509
β	Mono				12.24^b							5 * 2/1	458
δ	Hex		4.65	4.65									458
–, 4-benzyloxycarbonyl-(L)													
I. (219.24)	Mono		9.62	19.30	12.30	β = 71.1	8	1.35				5 * 2/1	1359
II.	Hex		13.14	13.14	10.0		5	1.22				5 * 5/2	1359
–, 4-methyloxycarbonyl-(L)													
(143.14)	Hex		10.90	10.90	10.0		5	1.16				5 * 5/2	1359
Poly(10-aminocapric acid)													
α	Tri		9.80	5.12	27.54	54,90,110	4	1.110				11 * 2/1	1237
(169.27)													
γ	Phex	C2h-5	4.78	9.56	26.9	γ = 120	4	1.056		188/337		11 * 2/1	971
	Hex		4.9	4.9	26.5		2	1.02		177/146		11 * 2/1	61
Poly(6-aminocaproic acid) [caprolactam]													
α	Mono	C2-2	9.56	8.01	17.24^b	γ = 67.5	8	1.232	1.09/839	215	20.8/155	7 * 2/1	3
(113.16)	Mono	C2-2	4.81	7.61	17.10^b	γ = 79.5	4	1.221		223/153	18.1/216	7 * 2/1	26
	Mono		9.65	8.11	17.2^b	γ = 66.3	8	1.220		223/244	23.0/405	7 * 2/1	135
	Mono	C2-2	9.45	8.02	17.08	γ = 68	8	1.252		226/293	21.6/343	7 * 2/1	212
	Mono		9.66	8.32	17.0	γ = 65	8	1.214		214/304	26/1121	7 * 2/1	334
	Mono		4.77	4.06	17.25	γ = 66.5	2	1.224		272/839	19.4/839	7 * 2/1	891
	Mono	C2-2	9.71	8.19	17.40	γ = 115	8	1.199		260/1051	27/1050	7 * 2/1	1049
									0.917	228/346	27.3		1050
								1.250	1.114	250/532	24.1/697		449
								1.23	1.10		18.5/534		213
β	Hex		4.8	4.8	8.6		1	1.10				7 * 1/1	222
	Hex		4.85	4.85	8.4		1	1.10				7 * 1/1	1052
γ	Mono	C2h-5	9.35	4.81	16.60^b	γ = 120	4	1.162	1.09/839	272/839	15.6/839	7 * 2/1	336
	Mono	C2h-5	9.33	4.78	16.88^b	γ = 121	4	1.165			27/1050	7 * 2/1	246
	Hex		4.79	4.79	16.7		2	1.132				7 * 2/1	272
	Ortho		4.82	7.82	16.70		4	1.194				7 * 2/1	279
	Mono		9.14	4.84	16.68	γ = 121	4	1.188				7 * 2/1	697
	Ortho		4.83	7.83	16.68		4	1.191				7 * 2/1	697
>150°C	Rho		4.90	16.28	8.22		4	1.146				7 * 1/1	26
	Mono		4.86	4.65	16.87	γ = 60	2	1.138				7 * 2/1	891
–, complex with I2													
	Mono	C2h-5	9.13	17.9	16.2^b	γ = 59.7							1510
	or	C2-2											
–, D-(-)-3-methyl-													
(127.19)	Mono	C2-2	9.15	4.84	16.96^b	γ = 90	4	1.125		225/19		7 * 2/1	440
										226/36			
Poly(6-aminocaproic acid-*alt*-11-aminoundecanoic acid)													
(296.46)					22.5					184		19 * 1/1	714
Poly(6-aminocaproyl-5-aminovaleryl-3-aminopropionic acid)													
(297.40)	Tri		4.9	10.7	21.6	51,77,62	2	1.28				18 * 1/1	1437
Poly(8-aminocaprylic acid)													
α	Mono	C2-2	9.8	8.3	22.4^b	γ = 115	8	1.14		185/146	30/1195	9 * 2/1	272
(141.21)								1.18		202			153
										200/244			
										218/838			

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TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm³)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
			a	b	c	Angles		Crystal.	Amorph.[a]				
β	Mono												121
γ	Hex		4.79	4.79	21.7		2	1.088	1.04/495		18/1121	9*2/1	272
	Hex		4.9	4.9	21.7		2	1.04				9*2/1	61
	Phex	C2h-5	4.77	9.54	21.9	γ = 120	4	1.087				9*2/1	971
Poly(2-aminocyclopentylenecarboxy acid)													
(111.14)			8.25	4.54	7.8		2	1.26				4*2/1	1059
Poly(7-aminoenanthic acid)													
(127.19)	Tri	C1-1	9.8	10.0	9.8	56,90,69	4	1.18		233/215		8*1/1	918
	Tri	Ci-1	4.9	5.4	9.85	49,77,63	1	1.21		225/146		8*1/1	61
										217			153
								1.20			223/291		
–, (R)-3-methyl-													
(141.21)					9.24					179			479
–, (S)-4-methyl-													
(141.21)					9.43					176			479
–, (R)-5-methyl-													
(141.21)					9.11					182			479
–, (R)-6-methyl-													
(141.21)					9.57					188			479
Poly(aminoformic acid)													
–, *N*-butyl-													
(99.13)	Phex		13.3	13.3	15.4		16	1.12		175/528		2*8/3	522
Poly(2-aminoisobutyric acid), see Poly(peptide) Section													
Poly(12-aminolauric acid)													
γ	Hex		4.80	4.80	32.1		2	1.023	0.972	208/1172		13*2/1	895
(197.32)	Hex		4.70	4.70	31		2	1.10		179/177		13*2/1	660
	Phex	C2h-5	4.79	9.58	31.9[b]	γ = 120	4	1.034				13*2/1	680
	Mono		4.87	9.38	32.2[b]	γ = 121.5	4	1.045				13*2/1	759
	Mono		4.90	4.67	32.1	γ = 121.7	2	1.048	0.99			13*2/1	1054
	Mono		9.28	4.85	31.35	γ = 124.4	4	1.126				13*2/1	1511
formed during planar extrusion													
	Tri		9.28	5.29	31.35	59,90,60	4	1.223				13*2/1	1511
Poly(9-aminopelargonic acid)													
(155.24)	Tri	Ci-1	4.9	5.4	12.5	49,77,64	1	1.15		210		10*1/1	421
	Tri	C1-1	9.7	9.7	12.6	64,90,67	4	1.07		194/146		10*1/1	918
										198/292			
										209/177			
Poly(2-aminopropionic acid), see Poly(alanine)													
Poly(3-aminopropionic acid) [β alanine]													
α	Mono	C2-2	9.33	8.73	4.78[b]	γ = 120	4	1.400		340		4*1/1	491
(71.08)	Mono		9.60	8.96	4.78[b]	γ = 122.5	4	1.361		330/337		4*1/1	1265
										357/1403			
β	Ortho		9.56	7.56	4.78[a]		4	1.366				4*1/1	1265
–, 2-butyl-2-methyl-													
(141.21)					8.3					72		4*2/1	1093
–, 2,2-dimethyl-													
I. (99.13)										189/73		4*	
II.					8.4					273	13		73
	Ortho		11.57	10.95	8.39		8	1.239		268		4*2/1	1093
										270/402			
–, 2-ethyl-2-methyl-													
(113.16)					8.5					76		4*2/1	1093
–, 3-methyl-, see Poly(3-aminobutyric acid)													
–, 2-methyl-2-propyl-													
(127.19)					8.4					74		4*2/1	1093
Poly(3-aminopropyl-5-aminovaleryl-6-aminocaproic acid)													
(297.40)	Tri		4.9	10.7	21.6	51,77,62	2	1.28				18*1/1	1437
Poly(18-aminostearic acid)													
γ	Mono		4.76	9.52	46.9	γ = 120	4	1.016				19*2/1	1055
(281.48)													
Poly(2-aminotetrahydropyran-6-carboxcylic acid)													
(127.14)	Mono	C2-1	11.79	14.40	19.43	γ = 98	20	1.292	Double	305		5*10/3	1333

TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles		Crystal.	Amorph.[a]				
Poly(11-aminoundecanoic acid)													
α	Tri	C1-1	9.5	10.0	15.0	60,90,67	4	1.10		183/292	27/1161	12∗1/1	918
(183.30)	Tri		4.78	4.13	13.1	90,75,66	1	1.343	1.01	220	41/343	12∗1/1	365
	Tri	Ci-1	4.9	5.4	14.9	49,77,63	1	1.15		182/146		12∗1/1	61
	Tri		9.6	4.2	15.0	72,90,64	2	1.19		194/101		12∗1/1	59
	Tri		4.78	4.13	14.9	82,75,66	1	1.174		186		12∗1/1	263
			4.78		14.1	α = 63.5				188/444		12∗1/1	1057
										226/1161			
II.	Mono		9.75	8.02	15.0[b]	γ = 115	4	1.145				12∗1/1	529
γ	Mono		9.48	4.5	29.4[b]	γ = 118.5	4	1.10				12∗1/1	529
				7.68	14.78								1056
Poly(5-aminovaleric acid)													
α	Tri	C1-1	9.5	5.6	7.5	48,90,67	2	1.30		258/402		6∗1/1	918
(99.13)													
Poly(4,4′-benzanilidylene terephthalamide)													
(357.37)					18.63							18∗1/1	1425
Poly(1,3-cyclohexylenedimethylene adipamide)													
cis-													
(252.36)	Tri		4.8	12.6	29.6	26,85,75	2	1.19		253/1201		13∗2/1	1058
Poly(1,3-cyclohexylenedimethylene dodecanediamide)													
cis-													
(336.52)	Tri		4.8	19.0	44.6	16,90,83	2	1.12				19∗2/1	1058
Poly(1,3-cyclohexylenedimethylene suberamide)													
cis-													
(280.41)	Tri		4.8	14.5	34.8	22,85,76	2	1.15				15∗2/1	1058
Poly(decamethylene adipamide) [10.6]													
(282.43)					20.0					230		18∗1/1	110
										236/244			
										240/544			
Poly(decamethylene azelamide) [10.9]													
(324.51)										214/137	68.2/405	21∗	
											36.7/159		
γ	Phex					2							65
Poly(4,4′-decamethylenedipiperazine sebacamide)													
(476.75)										130/159	69.1/159	28∗	
										129/402			
Poly(decamethylene 4-octenediamide)													
trans-													
(308.47)				24.1						243		20∗1/1	657
Poly(decamethylene phosphinylidenedipropionamide)													
–, methyl-(diacid)													
(344.44)				20						173		19∗1/1	831
Poly(decamethylene sebacamide) [10.10]													
(338.54)	Tri		4.9	5.4	27.8	49,76,63	1	1.14		203/244	51.1/118	22∗1/1	1412
					25.6					197	34.7/159	∗1/1	110
										198/454	72.0/405		
										216/137	32.7/160		
Poly(decamethylene succinamide) [10.4]													
(254.37)	Tri		4.9	5.5	19.8	49,77,63	1	1.18		242		16∗1/1	1626
Poly(dodecamethylene oxamide) [12.2]													
(254.37)					19.5					230		16∗1/1	743
Poly(dodecamethylene phosphinylidenedipropionamide)													
–, methyl-(diacid)													
(372.49)					21.55					180			831
Poly(dodecamethylene malonamide) [12.3]													
(268.40)	Mono		8.48	4.71	41.30	β = 101	4	1.101				17∗2/1	1523
Poly(dodecamethylene sebacamide) [12.10]													
α	Tri		5.0	5.25	29.2	51,75,63	1	1.15		173/339		24∗1/1	1513
(366.59)													
β	Tri		5.0	8.16	29.2	90,75,68	1	1.15				24∗1/1	1513
Poly(dodecamethylene succinamide) [12.4]													
(282.43)	Tri		4.9	5.5	22.3	49,77,63	1	1.17		237		18∗1/1	1626

TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n * p/q)	Refs.
Poly[4,4′-(ethylenedioxydiphenylene)-ditrimethylene adipamide]													
(438.57)					26.3							25 * 1/1	516
Poly(ethylene-L-tartaramide)													
–, di-*O*-methyl-													
(202.21)	Tri		4.95	6.87	9.10	59,90,106	1	1.337		312		8 * 1/1	1629
Poly(heptamethylene adipamide) [7.6]													
γ	Phex	C2-2					2			209/291			65
(240.35)										226/339			
										250/244			
Poly(heptamethylene azelamide) [7.9]													
γ	Phex						1			201/244			65
(282.43)													
Poly(heptamethylene pimelamide) [7.7]													
(254.37)	Phex	Cs-1	4.82	18.95[b]		$\gamma=120$	1	1.105		214/244		16 * 1/1	63
										205/2			
										196/339			
										228/1625			
γ	Phex				18.95		1					16 * 1/1	65
Poly(heptamethylene sebacamide) [7.10]													
γ	Phex	C2-2					2			187/339			65
(296.46)										208/244			
Poly(heptamethylene suberamide) [7.8]													
γ	Phex	C2-2					2			230/244			65
(268.40)													
Poly(hexamethylene adipamide) [6.6]													
α													
I.	Tri	Ci-1	4.9	5.4	17.2	48,77,63	1	1.24	1.09/52	265/2	46.5/82	14 * 1/1	25
(226.32)	Mono		15.7	10.5	17.3	$\beta=73$	9	1.240	1.12/495	270/289	40/155	14 * 1/1	402
	Tri		5.00	4.17	17.3	81,76,63	1	1.204		301/1166	36.8/216	14 * 1/1	407
	Tri		4.87	5.26	17.15	50,76,64	1	1.241		280/1121	68/1121	14 * 1/1	891
	Tri		4.97	5.47	17.29	48,77,62	1	1.214			58/1166	14 * 1/1	1180
	Tri		4.96	5.52	17.41	48,76,62	1	1.208			46.9/405	14 * 1/1	1409
								1.225	1.095		53.2		1179
								1.220	1.069				54
II.	Tri		4.95	5.45	17.12	52,80,63	1	1.152		269.5	43.4	14 * 1/1	1180
								1.165	1.095		41.9		1179
β	Tri	Ci-1	4.9	8.0	17.2	90,77,67	2	1.25	1.09/495			14 * 1/1	25
high temp.	Tri		5	5.9	16.23	57,80,60	1	1.10				14 * 1/1	1060
(170°C)	Tri		4.91	5.87	16.50	56,81,60	1	1.119				14 * 1/1	1409
Poly(hexamethylene azelamide) [6.9]													
(268.40)	Mono		7.8	5.3	40.15[b]	$\gamma=87$	4	1.08		226/244		17 * 2/1	402
										185/339			
Poly(hexamethylene glutaramide) [6.5]													
(212.29)	Mono	C2h-6	4.60	8.62	30.95[b]	$\beta=114$	4	1.258		241/402		13 * 2/1	1514
(at 190°C)	Mono		5.23	8.50	30.55	$\beta=110$	4	1.105				13 * 2/1	1514
Poly(hexamethylene malonamide) [6.3]													
(184.24)	Mono		8.60	4.62	25.70	$\beta=100.4$	4	1.218		241/1524		11 * 2/1	1523
Poly(hexamethylene 4-octenediamide)													
trans-													
(252.36)					19.1					259		16 * 1/1	657
Poly[hexamethylene oxamide) [6.2]													
(170.21)	Tri	Ci-1	5.15	7.54	12.39	32,74,62	1	1.280		320/402		10 * 1/1	956
Poly(hexamethylene *m*-phenylenedisulfonamide)													
(318.41)	Mono	C2h-3	7.70	7.76	14.1	$\beta=117$	2	1.409		170		13 * 1/1	1384
Poly(hexamethylene sebacamide) [6.10]													
α	Tri	Ci-1	4.95	5.4	22.4	49,76,63	1	1.16		228/51	30.6/160	18 * 1/1	25
(282.43)	Tri		4.86	5.05	22.35	55,76,62	1	1.189		215/291	56.5/137	18 * 1/1	891
								1.152	1.041	233/244	58.6/405		54
								1.189		225/454			52
								1.17		216			153
β	Tri	Ci-1	4.9	8.0	22.4	90,77,67	2	1.20				18 * 1/1	25

TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n * p/q$)	Refs.
Poly(hexamethylene suberamide) [6.8]													
(254.37)	Tri						1			232/244			65
	Mono		9.60	8.26	19.7	$\gamma=115$	4	1.193		235/291 241/1202		16*1/1	1515
quenched	Phex		9.7	9.7		$\gamma=120$							1515
Poly(hexamethylene succinamide) [6.4]													
(198.26)	Tri		4.9	5.3	14.8	51,77,62	1	1.25	212/402	275		12*1/1	1626
Poly(hexamethylene-L-tartaramide)													
–, di-*O*-methyl-													
(252.32)	Tri		5.00	6.84	13.20	62,90,112	1	1.191		230		12*1/1	1629
Poly(hexamethylene terephthalamide) [6.T]													
(246.31)					15.6					371 371/829 D350/291		14*1/1	828
Poly(methylene adipamide) [1.6]													
(156.18)	Mono	C2h-6	8.04	4.79	20.2[b]	$\gamma=90$	4	1.333		285/1524 306/402		9*2/1	1522
Poly(4,4′-methylenedicyclohexylene azelamide)													
trans-, trans-													
(362.56)	Ortho		9.4	6.1	39.5		4	1.06				20*2/1	1315
Poly(4,4′-methylenedicyclohexylene dodecanediamide)													
trans-, trans-													
I.	Ortho	C2v-5	9.30	6.06	45.0		4	1.060				23*2/1	1315
(404.64)	Ortho		9.4	6.1	45.5		4	1.03				23*2/1	1315
II.	Mono		9.50	5.22	52.6	$\gamma=96.6$	4	1.037				23*2/1	1315
Poly(4,4′-methylenedicyclohexylene pimelamide)													
trans-, trans-													
I.	Ortho		9.4	6.1	35.8		4	1.08				18*2/1	1315
(334.50)													
II.	Mono		9.57	5.32	40.5	$\gamma=99.6$	4	1.093				18*2/1	1315
Poly(4,4′-methylenedicyclohexylene sebacamide)													
trans-, trans-													
(376.58)	Ortho		9.4	6.1	41.4		4	1.05				21*2/1	1315
Poly(4,4′-methylenedicyclohexylene suberamide)													
trans-, trans-													
(348.53)	Ortho		9.4	6.1	37.6		4	1.07				19*2/1	1315
Poly(4,4′-methylenedicyclohexylene tetradecanediamide)													
trans-, trans-													
(432.60)	Ortho		9.4	6.1	49.4		4	1.02				25*2/1	1315
Poly(4,4′-methylenedicyclohexylene tridecanediamide)													
trans-, trans-													
(418.66)	Ortho		9.4	6.1	47.4		4	1.02				24*2/1	1315
Poly(4,4′-methylenedicyclohexylene undecandediamide)													
trans-, trans-													
(390.61)	Ortho		9.4	6.1	43.5		4	1.04				22*2/1	1315
Poly(4,4′-methylenediphenylene dodecanediamide)													
I. (392.54)	Ortho		11.10	4.96	44.7		4	1.059		290 256/1443		23*2/1	1440
II.	Ortho		10.52	4.96	44.7		4	1.118				23*2/1	1440
III.	Ortho		9.64	4.96	44.7		4	1.220				23*2/1	1440
Poly(methylene dodecanediamide) [1.12]													
(240.35)	Mono	C2h-6	8.12	4.79	35.2[b]	$\gamma=90$	3	1.166		259/1524		15*2/1	1522
Poly(methylene glutaramide) [1.5]													
(142.16)	Rho	D3-5	4.79	4.79	26.1		3	1.366				8*3/1	1522
Poly(methylene malonamide) [1.3]													
(114.10)	Hex		4.79	4.79	18.0		3	1.589				6*3/2	1313
Poly(methylene pimelamide) [1.7]													
(170.21)	Rho	D3-5	4.79	4.79	34.5		3	1.237				10*3/1	1522
Poly(methylene sebacamide) [1.10]													
(212.29)	Mono	C2h-6	8.10	4.79	30.0[b]	$\gamma=90$	4	1.211		260/4024 266/1524 268/1537		13*2/1	1522

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TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
Poly(methylene suberamide) [1.8]													
(184.24)	Mono	C2h-6	8.08	4.79	25.2[b]	γ=90	4	1.255		276/1524		11*2/1	1522
Poly(nonamethylene azelamide) [9.9]													
(310.48)					24.0					177		20*1/1	110
										189/2			
										165/339			
γ	Phex						1						65
Poly(nonamethylene malonamide) [9.3]													
(226.32)	Ortho		8.32	4.71	32.70		4	1.173				14*2/1	1523
Poly(octamethylene azelamide) [8.9]													
γ	Phex						2			206/244			65
(296.46)													
Poly(octamethylene malonamide) [8.3]													
(212.29)	Mono		8.50	4.71	30.70	β=101.7	4	1.172		233/1524		13*2/1	1523
Poly(octamethylene suberamide) [8.8]													
(282.43)	Tri						1			216/291			65
										225/244			
Poly(octamethylene succinamide) [8.4]													
(226.32)	Tri		4.9	5.4	17.3	51,77,62	1	1.20		254		14*1/1	1626
Poly(octamethylene-L-tartaramide)													
–, di-*O*-methyl-													
(286.37)	Tri		5.00	6.82	15.7	57,90,111	1	1.175		208		14*1/1	1629
Poly(octamethylene terephthalamide) [8.T]													
(274.36)					17.9					335		16*1/1	828
Poly(pentamethylene azelamide) [5.9]													
(254.37)					19.5					179/291		16*1/1	2
Poly(pentamethylene glutaramide) [5.5]													
(198.26)	Mono	C2-3	8.30	4.79	13.8	γ=90	2	1.200		198/291		12*1/1	1624
										247/1625			
Poly(pentamethylene malonamide) [5.3]													
(170.21)	Ortho		8.47	4.62	22.40		4	1.290		195/402		10*2/1	1523
										248/1524			
Poly(pentamethylene pimelamide) [5.7]													
γ	Mono	Cs-2	4.83	9.35	16.62	γ=58.9	2	1.169		228		14*1/1	1210
(226.32)										183/291			
Poly(pentamethylene terephthalamide) [5.T]													
(232.28)					14.1					354		13*1/1	828
										353/829			
–, 2-methyl-(diamine)													
(246.31)	Ortho		4.61	36.7	26.5		16	1.460				13*2/1	1529
Poly(3,8-phenanthridinonediyl terephthalamide)													
(355.35)	Mono		8.1	6.5	17.2	γ=60	2	1.50				16*1/1	1063
Poly(*m*-phenylene adipamide)													
(218.26)					11.8					344		11*1/1	828
										296/402			
Poly(*p*-phenylene dodecanediamide)													
(302.42)					21.2							19*1/1	828
Poly(*m*-phenylene isophthalamide)													
(238.25)	Ortho		6.7	4.71	11.0		1	1.14		375/735		10*1/1	735
	Tri	C1-1	5.27	5.25	11.3	112,111,88	1	1.470		390/748		10*1/1	856
	Tri	C1-1	5.36	5.36	11.3	113,113,88	1	1.443		1.33		10*1/1	878
	Ortho		5.1	5	23.2		2	1.34				10*2/1	1062
–, hexamethylphosphorictriamide complex													
(596.66)	Mono		9.43	16.94	11.3	β=123.4	2	1.315					957
(2 HMPT/monomer)													
Poly(*p*-phenylene phthalamide)													
(238.25)	Ortho	D2h-14	22.8	5.5	8.1		4	1.56				10*1/1	396
Poly(*p*-phenylene pimelamide)													
(232.28)					14.7					372		14*1/1	828
Poly(*m*-phenylene sebacamide)													
(274.36)					14.9					258		17*1/1	828
Poly(*p*-phenylene sebacamide)													
(274.36)					18.5					334		18*1/1	828

TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(*m*-phenylene suberamide)													
(246.31)					13.0					302		15 * 1/1	828
Poly(*p*-phenylene suberamide)													
(246.31)					16.3					374		16 * 1/1	828
Poly(*m*-phenylene terephthalamide)													
(238.25)										500/748			
–, 4-methyl-(diamine)													
(252.27)	Mono		8.57	7.54	22.11	$\beta = 116.3$	4	1.308				11 * 2/1	1398
Poly(*p*-phenylene terephthalamide)													
I. (238.25)	Port	Cs-1	7.87	5.18	12.9	$\gamma = 90$	2	1.504		500/748		12 * 1/1	761
	Mono		7.728	5.184	12.81	$\gamma = 90.04$	2	1.542		600/735		12 * 1/1	1061
	Mono	C2h-5	7.80	5.19	12.9	$\gamma = 90$	2	1.515				12 * 1/1	902
	Ortho		7.78	5.28	12.9		2	1.493				12 * 1/1	1525
	Mono		7.79	5.18	12.89	$\gamma = 92.2$	2	1.522				12 * 1/1	1527
	Port	Cs-2	7.88	5.22	12.9		2	1.491				12 * 1/1	1620
	Ortho		7.60	5.04	12.78		2	1.616				12 * 1/1	1638
				4.8	12.7	$\alpha = 88$							1526
II.			8.0	5.1	12.9		2	1.50				12 * 1/1	958
				4.8	12.7	$\alpha = 88$							1526
single crystals & spherulites													
					11.5								1297
–, 2,2′-difluoro-													
(274.23)	Port		8.6	5.0	13.0		2	1.63				12 * 1/1	1528
Poly(*p*-phenylene 2,5-thiophenediamide)													
(272.46)	Mono		4.29	5.09	25.2	$\gamma = 98$	2	1.489				11 * 2/1	1532
Poly(piperazine adipamide)													
(196.25)					9.2					355		10 * 1/1	386
Poly(1,4-piperazine 1,3-cyclobutylenedicarboximide)													
–, 2,4-diphenyl-(diacid)													
trans-													
(346.43)	Ortho		8.74	5.93	9.22		1	1.204				9 * 1/1	934
Poly(1,4-piperazine 4-octenediamide)													
trans-													
(222.29)	Mono	C2h-5	4.54	10.00	13.50	$\beta = 110.2$	2	1.283		252/657		12 * 1/1	873
Poly(piperazine sebacamide)													
(252.36)										180/81	26.0/81	16 *	
Poly(2,5-pyrimidine terephthalamide)													
(240.22)	Ortho		7.3	5.1	12.8		2	1.67				12 * 1/1	1531
Poly(4,4′-sulfonyldiphenylene terephthalamide)													
(378.40)					15.45								1203
Poly(terephthaloyldihydrazo-di(*p*-aminobenzoyl) terephthalamide)													
(562.54)	Port		8.5	4.9	29.69		2	1.51				28 * 1/1	760
Poly(tetramethylene adipamide) [4.6]													
(198.26)	Tri	C1-1	4.95	5.47	14.66	48,78,64	1	1.245		295/291		12 * 1/1	1516
	Mono		9.6	8.26	14.7	$\gamma = 115$	4	1.246		308/51		12 * 1/1	1517
	Tri		4.9	5.5	14.8	46,78,64	1	1.29		350	41.6	12 * 1/1	1655
										319/1518			
Poly(tetramethylene azelamide) [4.9]													
γ	Phex						2			223/339			65
(240.35)										253/402			
Poly(tetramethylene malonamide) [4.3]													
156.18 *	Mono		8.65	4.62	20.40	$\beta = 102.5$	4	1.303		277/1524		9 * 2/1	1523
Poly(tetramethylene 4-octenediamide)													
trans-													
(224.30)					17.0					294		14 * 1/1	657
Poly(tetramethylene succinamide) [4.4]													
(170.21)	Tri		4.9	5.5	12.3	49,77,62	1	1.29		d		10 * 1/1	1626
										287/402			
Poly(tetramethylene-L-tartaramide)													
–, di-*O*-methyl-													
(230.26)	Tri		5.00	7.06	10.80	59,90,110	1	1.270		266		10 * 1/1	1629

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TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
Poly(tridecamethylene tridecanediamide) [13.13]													
γ	Mono		9.22	4.94	34.47	β=121.1	2	1.044	1.01	>183	97.2	28*1/1	1519
(422.70)	Mono		4.88	4.73	34.0	γ=121	1	1.043		172/1521		28*1/1	1520
Poly(*m*-xylylene adipamide)													
(246.31)	Mono		5.10	4.70	15.2	γ′=69.6	1	1.198		246/326		13*1/1	84
	Tri	Ci-1	12.01	4.83	29.8	75,26,65	2	1.250		244/544		13*2/1	459
Poly(*p*-xylylene sebacamide)													
(302.42)	Tri		5.74	4.87	20.6	76,55,65	1	1.168		300/290		18*1/1	204
										281/385			
										291/454			
										268/291			

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 7. POLY(ESTERS) (–O–X–O–CO–Y–CO– or –O–X–CO–)

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
Poly(4,4′-bicyclohexylene sebacate)													
–, *trans*-, *trans*-													
(364.53)	Mono		11.16	5.27	19.48	β=49.0	2	1.400				20*1/1	1636
smectic	Mono		11.98	5.48	19.76	β=52.5	2	1.176				20*1/1	1636
Poly(4,4′-bicyclohexylene undecanedioate)													
–, *trans*-, *trans*-													
(378.55)	Mono		12.4	5.21	23.0	β=43.5	2	1.229				21*1/1	1636
smectic	Mono		12.3	5.55	20.6	β=51.4	2	1.144				21*1/1	1636
Poly(4,4′-biphenylene 4,4′-biphenylenedicarboxylate)													
(392.11)	Ortho		7.83	5.50	20.66		2	1.464				20*1/1	1622
Poly(4,4′-biphenylene terephthalate)													
(316.31)	Ortho		7.20	5.23								16*	1622
Poly(3,4′-carbonyldiphenylene terephthalate)													
(344.32)	Ortho	C2v-17	12.51	7.561	67.66		16	1.4292				16*4/1	1562
Poly(1,3-cyclobutylene carbonate)													
–, 2,2,4,4-tetramethyl-													
trans-													
(170.21)	Tri		9.25	8.28	(6.9)	γ=96.5		1.08		360		6*1/1	364
cis-													
	Ortho		9.16	8.22	12.9		4	1.164		253		6*2/1	364
Poly(1,4-cyclohexylene adipate)													
trans-													
(226.27)					13.5					225/762		12*1/1	763
Poly(1,4-cyclohexylenedimethylene adipate)													
trans-													
I.	Mono	C2h-5	6.938	9.761	15.97	β=41.4	2	1.181		124/547		14*1/1	1262
(254.33)													
cis-													
										55/547			
Poly(1,4-cyclohexylenedimethylene succinate)													
trans-													
(226.27)	Mono	C2h-5	6.486	9.482	13.51	β=45.9	2	1.259		147/547		12*1/1	1193
cis-													
										62/547			
Poly(1,4-cyclohexylenedimethylene terephthalate)													
trans-													
(274.32)	Tri		6.37	6.63	14.2	89,47,114	1	1.266		318/547		14*1/1	199
	Tri	Ci-1	6.46	6.65	14.2	89,47,115	1	1.260				14*1/1	1077
cis-													
	Tri		6.02	6.01	13.7	89,53,112	1	1.319		256/547		14*1/1	199

TABLE 6. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(tridecamethylene tridecanediamide) [13.13]													
γ	Mono		9.22	4.94	34.47	$\beta=121.1$	2	1.044	1.01	>183	97.2	28 * 1/1	1519
(422.70)	Mono		4.88	4.73	34.0	$\gamma=121$	1	1.043		172/1521		28 * 1/1	1520
Poly(*m*-xylylene adipamide)													
(246.31)	Mono		5.10	4.70	15.2	$\gamma'=69.6$	1	1.198		246/326		13 * 1/1	84
	Tri	Ci-1	12.01	4.83	29.8	75,26,65	2	1.250		244/544		13 * 2/1	459
Poly(*p*-xylylene sebacamide)													
(302.42)	Tri		5.74	4.87	20.6	76,55,65	1	1.168		300/290		18 * 1/1	204
										281/385			
										291/454			
										268/291			

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 7. POLY(ESTERS) (–O–X–O–CO–Y–CO– or –O–X–CO–)

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(4,4′-bicyclohexylene sebacate)													
–, *trans*-, *trans*-													
(364.53)	Mono		11.16	5.27	19.48	$\beta=49.0$	2	1.400				20 * 1/1	1636
smectic	Mono		11.98	5.48	19.76	$\beta=52.5$	2	1.176				20 * 1/1	1636
Poly(4,4′-bicyclohexylene undecanedioate)													
–, *trans*-, *trans*-													
(378.55)	Mono		12.4	5.21	23.0	$\beta=43.5$	2	1.229				21 * 1/1	1636
smectic	Mono		12.3	5.55	20.6	$\beta=51.4$	2	1.144				21 * 1/1	1636
Poly(4,4′-biphenylene 4,4′-biphenylenedicarboxylate)													
(392.11)	Ortho		7.83	5.50	20.66		2	1.464				20 * 1/1	1622
Poly(4,4′-biphenylene terephthalate)													
(316.31)	Ortho		7.20	5.23								16 *	1622
Poly(3,4′-carbonyldiphenylene terephthalate)													
(344.32)	Ortho	C2v-17	12.51	7.561	67.66		16	1.4292				16 * 4/1	1562
Poly(1,3-cyclobutylene carbonate)													
–, 2,2,4,4-tetramethyl-													
trans-													
(170.21)	Tri		9.25	8.28	(6.9)	$\gamma=96.5$		1.08		360		6 * 1/1	364
cis-													
	Ortho		9.16	8.22	12.9		4	1.164		253		6 * 2/1	364
Poly(1,4-cyclohexylene adipate)													
trans-													
(226.27)					13.5					225/762		12 * 1/1	763
Poly(1,4-cyclohexylenedimethylene adipate)													
trans-													
I.	Mono	C2h-5	6.938	9.761	15.97	$\beta=41.4$	2	1.181		124/547		14 * 1/1	1262
(254.33)													
cis-													
										55/547			
Poly(1,4-cyclohexylenedimethylene succinate)													
trans-													
(226.27)	Mono	C2h-5	6.486	9.482	13.51	$\beta=45.9$	2	1.259		147/547		12 * 1/1	1193
cis-													
										62/547			
Poly(1,4-cyclohexylenedimethylene terephthalate)													
trans-													
(274.32)	Tri		6.37	6.63	14.2	89,47,114	1	1.266		318/547		14 * 1/1	199
	Tri	Ci-1	6.46	6.65	14.2	89,47,115	1	1.260				14 * 1/1	1077
cis-													
	Tri		6.02	6.01	13.7	89,53,112	1	1.319		256/547		14 * 1/1	199

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(1,4-cyclohexylene sebacate)													
trans-													
(282.38)					18.5					151/762		16*1/1	763
Poly(decamethylene adipate) [10.6]													
(284.40)	Mono		5.0	7.4	22.1		2	1.16		80/81	42.7/81	18*1/1	106
			5.11	7.43						74	44		1079
										77/300	45.6/405		
Poly(decamethylene azelate) [10.9]													
(326.48)	Mono		5.0	7.4	51.7		4	1.13		69/137	41.9/81	21*2/1	106
											50.7/405		
Poly(decamethylene glutarate) [10.5]													
(270.37)	Mono		5.0	7.4	41.6		4	1.17		58/764		17*2/1	106
Poly(decamethylene 3-hexenedioate)													
(282.38)			4.94	7.65						66	36	18*	1079
Poly(decamethylene octadecanedioate) [10.18]													
(452.72)	Mono		5.47	7.38	37.5	$\beta = 115$	2	1.096		93		30*1/1	521
Poly(decamethylene 4-octenedioate)													
(310.44)			4.74	4.05		$\gamma' = 109$				53	44	20*	1079
Poly(decamethylene oxalate) [10.2]													
(228.29)	Mono		5.28	7.00	17.0		2	1.207		79/305		14*1/1	106
	Mono		6.75	7.05	17.0	$\beta = 129$	2	1.206				14*1/1	1171
Poly(decamethylene sebacate) [10.10]													
(340.50)	Mono		5.0	7.4	27.1		2	1.13		80/137	50.2/81	22*1/1	106
										77/767	56.5/405		
										73/291	30.2/301		
											51.5/160		
Poly(decamethylene suberate) [10.8]													
(312.45)	Mono		5.0	7.4	24.6		2	1.14		75/764		20*1/1	106
			5.07	7.50						77	57		1079
Poly(decamethylene succinate) [10.4]													
(256.34)	Mono		5.0	7.4	19.6		2	1.17		68/290		16*1/1	106
										73/764			
Poly(decamethylene terephthalate) [10.T]													
(304.39)	Tri		4.62	6.30	20.10	107,96,113	1	1.022		138/81	46.1/81	18*1/1	68
										129/99	44.0/405		
										131/453			
Poly(decamethylene 4,4′-terephthaloyldioxydibenzoate)													
(544.60)	Ortho		53.7	39.9	57.7			1.287				30*2/1	1352
Poly(dodecamethylene adipate) [12.6]													
			5.04	7.42						78	52	20*	1079
Poly(dodecamethylene *N,N′*-dodecamethylenediterephthalamate)													
(662.91)	Tri		5.01	6.93	46.77	130,55,130	1	1.213		197/782	140/782	40*1/1	874
									1.124				1195
Poly(dodecamethylene 3-hexenedioate)													
(310.44)			4.94	7.64						77	46	20*	1079
Poly(dodecamethylene 4-octenedioate)													
(338.49)			4.74	4.07		$\gamma = 109$				57	55	22*	1079
Poly(dodecamethylene suberate) [12.8]													
(340.50)			5.03	7.52						80	68	22*	1079
Poly(ethylene adipate) [2.6]													
(172.18)	Mono		25.7	30.7	11.71	$\beta = 103.8$	40	1.275		52/27	15.9/265	10*1/1	105
	Mono	C2h-5	5.47	7.23	11.72	$\beta = 113.5$	2	1.345		54/291	21.0/571	10*1/1	203
	Mono		7.26	5.40	10.85	$\alpha = 67.7$	2	1.453		47/265		10*1/1	211
	Mono		5.47	7.24	11.55	$\beta = 113.5$	2	1.363		50/46		10*1/1	523
								1.302	1.204	55/543	21.7		1074
									1.219	65/571			1195
Poly(ethylene *N-N′*-azelaoyldi(*p*-aminobenzoate))													
(452.52)					26.3								1386
Poly(ethylene azelate) [2.9]													
(214.26)	Ortho		7.45	4.97	31.5		4	1.220		46/543		13*2/1	108
	Mono		25.7	30.7	31.2	$\beta = 103.8$	80	1.190				13*2/1	105
	Ortho		5.0	7.4	31.2		4	1.23				13*2/1	109
								1.233	1.119	47	43.7		1074

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n***p*/*q*)	Refs.
Poly(ethylene 4,4′-dibenzoate)													
(268.27)	Tri	Ci-1	5.73	3.77	14.73	90,90,79	1	1.426		346/291		14*1/1	1551
										333/1552			
Poly(ethylene *N,N*′-dodecamethylenediterephthalamate)													
(522.64)										244	102.6	30*	782
									1.210				1195
Poly(ethylene 4,4′-(ethylenedioxy)-dibenzoate)													
α	Mono		7.83	10.33	18.68	$\beta=83.1$	4	1.454		288	26.2	18*1/1	1078
(328.32)										240/290			
										240/291			
β	Ortho		7.28	5.65	18.64		2	1.422				18*1/1	
Poly(ethylene 2,5-furandicarboxylate)													
(182.13)	Tri		5.75	5.35	20.1	134,90,112	2	1.575				9*2/1	742
Poly(ethylene *N,N*′-hexadecanedioyldi(*p*-aminobenzoate))													
(550.70)					34.6								1386
Poly(ethylene isophthalate) [2.1]													
I. (192.17)	Tri	Ci-1	5.20	7.08	14.8	109,136,96	2	2.034				9*2/1	
					14.8					143			398
								1.358	1.346	240			111
II.					21.0								398
	Tri	Ci-1	5.41	6.35	21.2	116,136,84	2	1.478				9*2/1	572
Poly(ethylene 2,6-naphthalate)													
(242.23)	Tri	Ci-1	6.51	5.75	13.2	81,114,100	1	1.406		260/291		12*1/1	920
			3.825	5.72	13.2	$\gamma'=96$	1	1.400		337/1342	25/1342	12*1/1	1555
Poly(ethylene oxalate) [2.2]													
(116.07)	Ortho	D2h-14	6.44	6.22	11.93		4	1.613		172/678		6*2/1	675
Poly(ethylene *p*-oxybenzoate)													
α	Ortho	D2-4	10.52	4.75	15.68		4	1.392		203/327		9*2/1	494
(164.16)	Ortho	D2-4	10.49	4.75	15.60		4	1.403		224/345		9*2/1	901
										220/354			356
										215/1174			
β			11.2	14.7	18.99		16	1.395				9*2/1	494
	Mono	C2h-5	8.19	11.07	19.05	$\beta=114.8$	8	1.391				9*2/1	919
Poly(ethylene pimelate) [2.7]													
(186.21)								4.278	1.162	29/764	29.8	11*	1074
Poly(ethylene 1,4-piperazinedicarboxylate)													
(200.19)					10.4					245		10*1/1	386
Poly(ethylene sebacate) [2.10]													
I. (228.29)	Mono		5.5	15	16.9	$\beta=65$	4	1.20		72/265	13.8/265	14*1/1	100
	Mono	C2h-5	5.58	7.31	16.76	$\beta=115.5$	2	1.229		79/46	35/405	14*1/1	521
	Mono		5.52	7.30	16.65	$\beta=115.0$	2	1.247		73/539	32.0/571	14*1/1	523
	Mono		5.52	7.4	16.9	$\beta=65$	2	1.21		76/137	29.1/137	14*1/1	109
	Mono		25.7	30.7	16.67	$\beta=103.8$	40	1.187		78/302	25.6/158	14*1/1	105
									1.086	83/571			1195
II. Tri		Ci-1	5.39	7.60	16.76	105,112,72	2	1.264				14*1/1	1072
Poly(ethylene suberate) [2.8]													
(200.23)	Mono	C2h-5	5.51	7.25	14.28	$\beta=114.5$	2	1.281		75/571	26.5/571	12*1/1	203
	Mono		5.0	7.4	14.1		2	1.27		55/27		12*1/1	108
	Mono		5.50	7.25	14.10	$\beta=114.5$	2	1.300				12*1/1	523
								1.249	1.140	63	26.2		1074
										1.147			1195
Poly(ethylene succinate) [2.4]													
α	Mono		5.0	7.4	8.32		2	1.55		108/290		8*1/1	108
(144.13)	Mono		9.05	11.09	8.32	$\beta=102.8$	4	1.176		103/302		8*1/1	105
	Ortho	D2h-10	7.60	10.75	8.33		4	1.407				8*1/1	675
β					9.50							8*1/1	1539
Poly(ethylene terephthalate) [2.T]													
(192.17)	Tri	Ci-1	4.56	5.94	10.75	98,118,112	1	1.457	1.335	265	24.1/87	10*1/1	27
	Tri		5.54	4.14	10.86	107,112,92	1	1.472	1.337	284/264	22.6/157	10*1/1	195
	Tri		4.52	5.98	10.77	101,118,111	1	1.477		267/265	9:2/265	10*1/1	400
	Tri		4.48	5.85	10.75	100,118,111	1	1.515		270/374	25/405	10*1/1	853
	Tri		4.48	5.80	10.71	100,118,111	1	1.530		265/290	16.7/155	10*1/1	1061
	Tri		4.50	5.90	10.76	100,119,111	1	1.503		310	32/1071	10*1/1	1075

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters					Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]				
	Tri		4.44	5.91	10.67	100,117,112	1	1.515		280/960	26.9/960	10∗1/1	1158
	Tri		4.52	5.92	10.70	100,118,111	1	1.480		245/472	27.8/472	10∗1/1	1159
	Tri		4.53	5.87	10.73	100,119,111	1	1.501		278/724	23.3/887	10∗1/1	1543
			4.01	5.83	10.75	$\gamma' = 120$	1	1.466				10∗1/1	1555
	Tri		4.62	5.92	10.68	100,128,105	1	1.58				10∗1/1	1644
Poly(glycolic acid), see Poly(2-hydroxyacetic acid)													
Poly(heptamethylene sebacate) [7.10]													
(298.42)											25/301	19∗	
Poly(heptamethylene terephthalate) [7.T]													
(262.31)					15.0					98/453		13∗1/1	1174
Poly[heptamethylene (4,4′-terephthaloyldioxy)-4,4′-dibenzoate]													
(502.52)					49.2							27∗2/1	1561
Poly(hexadecamethylene adipate) [16.6]													
(368.56)			5.05	7.46						86	63	24∗	1079
Poly(hexadecamethylene 3-hexenedioate)													
(366.54)			4.93	7.59						87	56	24∗	1079
Poly(hexadecamethylene 4-octenedioate)													
trans-													
(394.60)			4.87	4.03		$\gamma = 109$				70	54	26∗	1079
										85/879	54.5/879		
Poly(hexadecamethylene suberate) [16.8]													
(396.61)	Mono		6.47	7.38	37	$\beta = 115$	2	0.823?		109	66.4	26∗1/1	879
			5.00	7.40						87	66	26∗	1079
Poly(hexamethylene adipate) [6.6]													
(228.29)	Ortho		10.08	7.32	16.83		4	1.221	1.096	56/290	38.1	14∗1/1	1119
										58/1079	32/1079		
										57/539			
										58/764			
										61/807			
Poly(hexamethylene 4,4′-dibenzoate)													
α	Mono	C2-2	10.98	11.47	19.62	$\beta = 89.7$	6	1.308	1.22	214/291		18∗1/1	1556
(324.38)										200/1552			
										230/1566			
β	Mono		13.39	12.84	39.19	$\beta = 84.7$	16	1.284				18∗2/1	1556
γ	Mono	C2-2	9.70	9.20	19.39	$\beta = 83.0$	4	1.254				18∗1/1	1556
Poly(hexamethylenedi(6-hydroxycaproamide) adipate)													
(454.61)					37.50					142		26∗	1105
Poly(hexamethylene *N-N*′-dodecamethylenediterephthalamate)													
(578.75)	Tri		5.02	6.87	39.27	128,54,131	1	1.252		214/782	116/782	34∗1/1	874
									1.167				1195
Poly(hexamethylene *N,N*′-hexamethylenediterephthalamate)													
(494.59)	Tri	Ci-1	5.07	6.87	31.78	127,53,132	1	1.314		253/782	92.9/782	28∗1/1	874
									1.236	265/781			1195
Poly(hexamethylene 3-hexenedioate)													
(226.27)										61	21	14∗	1079
Poly(hexamethylene 4-octenedioate)													
(254.33)										20	22	16∗	1079
Poly(hexamethylene oxalate) [6.2]													
(172.18)	Mono		6.75	6.85	11.95	$\beta = 129$	2	1.332		66/305		10∗1/1	1171
										72/764			
Poly(hexamethylene sebacate) [6.10]													
(284.40)	Mono		5.52	7.40	22.15	$\beta = 115$	2	1.152		78	38/809	18∗1/1	521
										67/290	22/301		
Poly(hexamethylene suberate) [6.8]													
(256.34)										67	34	16∗	1079
										58/291			
										65/764			
Poly(hexamethylene terephthalate) [6.T]													
(248.28)	Tri		4.57	6.10	15.40	105,98,114	1	1.146		160/81	34.8/81	14∗1/1	68
	Tri	Ci-1	9.98	9.52	15.40	120,98,95	4	1.133	1.225	161/405	33.5/405	14∗1/1	814
										154/99	35.3/159		
α	Mono		9.1	17.2	15.5	$\alpha = 127.3$	6	1.28				14∗1/1	1070
	Mono		9.100	17.56	15.74	$\alpha = 127.8$	6	1.245				14∗1/1	1184

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n***p*/*q*)	Refs.
β													
I.	Tri		4.8	5.7	15.7	104,161,108	1	1.25				14*1/1	1070
	Tri		4.91	5.68	15.44	103,118,109	1	1.285				14*1/1	1160
	Tri	Ci-1	5.217	5.284	15.74	129,98,96	1	1.277		174		14*1/1	1184
	Tri	Ci-1	4.68	11.57	15.51	105,114,109	2	1.279				14*1/1	1544
(at 135°C)	Tri	Ci-1	4.84	5.74	15.53	104,116,106	1	1.227				14*1/1	1544
II.	Tri		5.217	10.57	15.74	129,98,96	2	1.277				14*1/1	1184
γ	Tri		5.3	13.9	15.5	124,130,88	2	1.30				14*1/1	1070
(from soln.)													
Poly(2-hydroxyacetic acid) [glycolic acid]													
(58.04)	Ortho	D2-4	6.36	5.13	7.04		4	1.678		223/305	11/1121	3*2/1	312
	Ortho	D2h-16	5.22	6.19	7.02		4	1.700		233	12/464	3*2/1	490
					7		2	1.69				3*2/1	605
								1.707	1.50	230			465
Poly(*p*-hydroxybenzoic acid)													
I. (120.11)	Hex	D3-7	17.8	17.8	18.4		36	1.422		>320/881		vi ref	880
	Ortho	D2-4	7.52	5.70	12.49		4	1.490		>350/882		6*2/1	1065
	Ortho	D2-4	7.62	5.70	12.56		4	1.462				6*2/1	1182
	Ortho		7.47	5.67	12.55		4	1.501				6*2/1	1340
	Ortho		7.5	5.7	12.6		4	1.48				6*2/1	1545
II.					12.6							6*2/1	1065
	Ortho		11.1	3.7	12.6		4	1.54				6*2/1	1545
III.	Ortho		9.2	5.3	12.4		4	1.32				6*2/1	1065
(high temp.)	Ortho		9.24	5.28	12.50		4	1.308				6*2/1	1340
			9.11	5.26									1545
–, 3-*n*-decyl-													
(260.38)	Ortho		26.80	9.6	12.6		8	1.07				6*2/1	1646
–, 3-*n*-hexyl-													
(204.27)	Ortho		19.80	9.6	12.6		8	1.13				6*2/1	1646
–, 3-*n*-pentyl-													
(190.24)	Ortho		17.80	9.6	12.6		8	1.17				6*2/1	1646
–, 3-*n*-propyl-													
Ia.	Tet		16.95	16.95	12.36		16	1.213		294		6*2/1	1646
(162.19)													
Ib.	Tet		16.95	16.95	12.86		16	1.166				6*2/1	1646
II.	Ortho		14.20	9.60	12.48		8	1.266				6*2/1	1646
Poly(4,4′-hydroxybibenzoic acid)													
I. (196.20)	Ortho		7.8	5.55	10.8		2	1.39				10*1/1	1546
	Ortho		7.44	5.79	10.90		2	1.388		585		10*1/1	1550
	Ortho		7.32	5.35	10.44		2	1.594				10*1/1	1554
	Ortho		7.5	5.7	10.9		2	1.40				10*1/1	1622
(at 280°C)	Ortho		9.18	5.30	10.90		2	1.229				10*1/1	1550
II.			15.6	3.6									1546
III.	Ortho		9.0	5.2	10.8		2	1.29				10*1/1	1546
	Ortho		8.86	5.12	10.90		2	1.318				10*1/1	1550
–, 3-bromo-													
(275.10)	Tri	Ci-1	12.71	3.85	10.50	90,90,90	2	1.778				10*1/1	1639
Poly(3-hydroxy-3-butenoic acid)													
(82.07)	Mono		5.50	9.06	7.78[b]	γ=92	4	1.441		115		4*2/1	217
	Ortho	D2-3	5.43	8.94	7.75		4	1.484		115/190		4*2/1	862
Poly(3-hydroxybutyric acid)													
I. (86.09)	Ortho	D2-4	5.76	13.20	5.96		4	1.262		176/422	13/1216	4*2/1	419
	Ortho	D2-4	5.76	13.20	5.96		4	1.262		168/570		4*2/1	771
	Ortho		5.71	13.06	5.89		4	1.302		170/900		4*2/1	698
	Ortho	D2-4	5.73	13.14	5.93		4	1.281				4*2/1	1382
	Ortho		5.73	13.15	5.96		4	1.273		203/1535		4*2/1	1534
									1.177	197			1216
II.					4.70								771
Poly(10-hydroxycapric acid)													
(170.25)	Ortho		7.45	4.96	27.1		4	1.129		80/309		11*2/1	108
Poly(6-hydroxycaproic acid)													
(114.14)	Ortho	D2-4	7.496	4.974	17.30		4	1.175	1.09/712	55/560	15.4/623	7*2/1	559
	Ortho	D2-4	7.47	4.98	17.05		4	1.195		64/623		7*2/1	561

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
	Ortho	D2-4	7.48	4.98	17.26		4	1.179		69/1368		7*2/1	1420
											16.4		1368
Poly(5-hydroxy-2-(1,3-dioxane)-caprylic acid)													
trans-													
(228.29)	Ortho		7.487	5.117	13.56		2	1.459	1.093	150/797		13*1/1	796
cis-													
	Mono		7.842	5.476	12.34	γ=96.45	2	1.440	1.093	120/797		13*1/1	796
Poly(4-hydroxymethylene-2-(1,3-dioxolane)-caprylic acid)													
cis-/trans-													
(228.29)	Ortho		7.367	5.186	13.52		2	1.468	1.093	53/797		13*1/1	796
Poly(2,6-hydroxynaphthoic acid)													
I.	Mono		7.8	12.3	17.4	β=97	8	1.36				8*2/1	1547
(170.17)	Ortho	C2v-5	7.66	5.98	17.12		4	1.441				8*2/1	1548
(at 370°C)	Ortho	C2v-21	9.28	5.64	17.04		4	1.267				8*2/1	1548
II.			11.6	3.85									1547
–, 5-bromo-													
(249.06)	Mono	C2h-5	13.02	4.06	17.15	β=101	4	1.859				8*2/1	1639
Poly(2-hydroxypropionic acid) [lactic acid]													
α	Port		10.7	6.45	27.8		20	1.247				3*10/3	663
(72.06)	Ortho		10.34	5.97						215			1064
								1.290	1.248		6.69		1175
	Ortho		10.37	5.98	28.0		20	1.378				3*10/3	1557
										184	14.6		1367
β					8.8							3*3/1	1557
D,L-stereocomplex													
	Tri	C1-1	9.16	9.16	8.70	109,109,110	6	1.274				3*3/1	1557
Poly(3-hydroxypropionic acid) [propiolactone]													
α					7.02					122/317	9.1/1121	4*2/1	314
(72.06)									1.360	84/623	8.6/623		1195
β					4.82							4*1/1	314
			7.76	4.50	4.76		2	1.440				4*1/1	689
			7.73	4.48	4.77	γ′=90	2	1.449		120		4*1/1	840
–, 3-chloromethyl-													
isotactic					6.19					146			900
(120.54)										275/1195			
–, 3-dichloromethyl-													
isotactic					7.89							4*1/1	1090
(154.98)					5.77					146			900
syndiotactic					11.55							8*1/1	1090
(319.96)													
– 2,2-diethyl-													
α	Ortho		8.3	10.2	4.5		2	1.12		258/1088	21/1088	4*1/1	1087
(128.17)													
β					4.63							4*1/1	1087
–, 2,2-dimethyl-[pivalolactone]													
α													
(100.12)	Mono	C2h-5	9.02	11.64	6.02	γ=121.5	4	1.234	1.10/551	240/551	14.9/551	4*2/1	321
	Mono	C2h-5	9.05	11.58	6.03	γ=121.5	4	1.234		268/1085		4*2/1	683
	Mono	C2h-5	9.03	11.62	6.01[b]	γ=121.5	4	1.237		269/1411		4*2/1	23
β					4.76					234		4*1/1	816
γ	Ortho	D2-4	8.23	11.27	6.04		4	1.187				4*2/1	1092
	Ortho	D2-4	8.23	11.28	6.02		4	1.190				4*2/1	1390
–, 3-ethyl-[3-hydroxyvaleric acid]													
isotactic													
(100.12)	Ortho	D2-4	9.52	10.08	5.56		4	1.246		110/900		4*2/1	1183
(racemic)	Ortho		9.32	10.02	5.56		4	1.281		108		4*2/1	810
										130/1538			
–, 2-ethyl-2-methyl-													
isotactic													
β					4.75					120		4*1/1	1089
(114.14)	Port	C2-1	9.10	7.44	4.75	β=90	2	1.179		164/1211		4*1/1	1536
–, D,L-2-ethyl-2-methyl-													
	Ortho		11.8	34.2	7.1		16	1.06				4*2/1	1536

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TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
–, 3-isopropyl-													
isotactic													
(114.14)	Ortho		10.63	18.13	6.49		8	1.212		89		4 * 2/1	698
										79/900			
–, 2-methyl-													
opt. active										95	5.2		1341
racemic										100	4.8		1341
(86.09)													
–, 3-methyl-, see Poly(3-hydroxybutyric acid)													
–, 2-methyl-2-propyl-													
isotactic													
(128.17)	Ortho	D2-3	10.6	11.1	6.7		4	1.08				4 * 2/1	1536
		or D2-4								152	14.6		1651
–, D,L-2-methyl-2-propyl-													
I. (128.17)					5.9					110		4 * 2/1	785
	Ortho		17.9	13.5	12.0		16	1.174		97/959		8 * 2/1	1086
II.	Ortho		7.48	10.1	4.74		2	1.19				4 * 1/1	785
–, 3-trichloromethyl-													
isotactic	Mono		11.79	10.99	11.24	$\gamma = 108.0$	8	1.817		275/1199		4 * 2/1	1091
(189.42)					11.27								1090
Poly(3-hydroxyvaleric acid), see Poly(3-hydroxypropionic acid), 3-ethyl-													
Poly(4,4′-isopropylidenediphenylene adipate)													
–, 3,3′, 5,5′-tetrachloro-													
(476.18)										283	33.9	17 *	713
Poly(4,4′-isopropylidenediphenylene carbonate)													
(254.28)	Ortho	D2-2	11.9	10.1	21.5		8	1.307		267/57	27.9/566	12 * 2/1	5
	Mono		12.3	10.1	20.8	$\gamma = 84$	8	1.314	1.20	230	36.8/299	12 * 2/1	435
	Ortho		12.1	10.1	22.0		8	1.256		263/370		12 * 2/1	1549
								1.30	1.20	317/930			283
										230/438			
										260/736			
										295/1121			
										302/1233			
										335/1066			
Poly(lactic acid), see Poly(2-hydroxypropionic acid)													
Poly(4,4′-methylenediphenylene carbonate)													
(226.23)	Ortho	C2v-9	5.0	10.5	22.0		4	1.301	1.240	240		12 * 2/1	435
										300/438			
										278/736			
Poly[nonamethylene *N,N/*-adipolydi(*p*-aminobenzoate)]													
(508.62)					31.0								1386
Poly[nonamethylene *N,N′*-azelaoyldi(*p*-aminobenzoate)]													
(550.70)					33.3								1386
Poly(nonamethylene azelate) [9.9]													
(312.45)										65/405	43.1/159	20 *	
											49.0/405		
Poly[nonamethylene *N,N′*-glutaryldi(*p*-aminobenzoate)]													
(494.59)					29.8								1386
Poly[nonamethylene *N,N′*-hexadecanedioyldi(*p*-aminobenzoate)]													
(648.88)					41.0								1386
Poly[nonamethylene *N,N′*-sebacoyldi(*p*-aminobenzoate)]													
(564.72)					34.3								1386
Poly(nonamethylene terephthalate) [9.T]													
(290.36)					17.6					85/99		17 * 1/1	1174
										90/453			
Poly[nonamethylene *N,N′*-tetradecanedioyldi(*p*-aminobenzoate)]													
(620.83)					38.6								1386
Poly[nonamethylene *N,N′*-tridecanedioyldi(*p*-aminobenzoate)]													
(606.80)					37.5								1386
Poly(octamethylene adipate) [8.6]													
(256.34)			5.10	7.42						67	41	16 *	1079
Poly(octamethylene 3-hexenedioate)													
(254.33)										66	36	16 *	1079

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
Poly(octamethylene 4-octenedioate)													
(282.38)			4.81	4.07		$\gamma=109$				39	34	18*	1079
Poly(octamethylene suberate) [8.8]													
(284.40)			5.05	7.44						70	42	18*	1079
Poly(octamethylene terephthalate) [8.T]													
(276.33)					18.1					132/99		16*1/1	1174
Poly(oxydiethylene sebacate)													
(272.34)	Tet		17.6	17.6	38.0		32	1.229		44/325 47/767 46/765		17*2/1	105
Poly(oxydiethylene terephthalate)													
(236.22)										100 139/1654	44.4	13*	1653
Poly[pentamethylene *N,N'*-hexadecanedioyldi(*p*-aminobenzoate)]													
(592.78)					35.6								1386
Poly(pentamethylene pimelate) [5.7]													
(228.29)	Mono		6.14	7.37	17.16	$\beta=54.6$	2	1.198		43/1120		14*1/1	1119
Poly(pentamethylene terephthalate) [5.T]													
α	Tri	Ci-1	6.21	4.56	12.50	89,114,116	1	1.354		116/291		13*1/1	814
(234.25)	Tri		4.69	5.79	24.66	112,94,105	2	1.318		134/99		13*2/1	1069
	Tri		4.68	5.77	24.42	114,87,106	2	1.341		140/815 142/807		13*2/1	1160
β	Tri		4.96	5.82	28.16	126,74,120	2	1.358				13*2/1	1069
Poly[pentamethylene *N,N'*-tridecanedioyldi(*p*-aminobenzoate)]													
(550.70)					32.0								1386
Poly(*p*-phenylene adipate)													
(220.22)	Tri		14.37	13.55	10.24	125,44,111	4	1.283			20.8	12*1/1	869
Poly(*p*-phenylene 4,4'-dibenzoxyterephthalate)													
(480.43)	Mono		7.83	5.64	26.37	$\beta=97.9$	2	1.383				24*1/1	1621
Poly(*p*-phenylene *m*-carboranedicarboxylate)													
(306.32)	Ortho		11.4	7.7	18.0		4	1.29	1.172	280			832
Poly(*p*-phenylene isophthalate)													
I. (240.22)	Mono		6.97	6.92	24.32	$\alpha=95$	4	1.365		425		11*2/1	1553
II.	Ortho		5.58	3.92	24.32		2	1.500				11*2/1	1553
Poly(*m*-phenylene terephthalate)													
(240.22)	Ortho		5.61	3.96	23.90		2	1.502				11*2/1	1553
Poly(*p*-phenylene terephthalate)													
(240.22)	Mono		7.98	5.33	12.64	$\beta=98.98$	2	1.502		600/1375		12*1/1	1406
	Mono		7.85	5.48	25.38	$\beta=98.6$	4	1.478				12*2/1	1621
(at 475°C)	Ortho		9.25	5.40	12.56		2	1.272				12*1/1	1406
–, 2,5-di-*n*-hexadecyl-(diacid)													
(721.08)	Mono		26.2	7.3	12.6	$\alpha=130$	2	1.30				12*1/1	1641
	Ortho		25.6	7.2	12.734[b]		2	1.02				12*1/1	
–, phenyl- (diol)													
(316.31)	Mono	C2-2	12.77	10.08	12.58	$\gamma=90$	4	1.297		340/1375		12*1/1	1374
	Mono		28.0	4.89	12.48	$\gamma=114.8$	4	1.354				12*1/1	1558
–, chloro- (diol)													
(274.66)	Ortho		7.88	5.27	12.62		2	1.740				12*1/1	1429
Poly[(phenyl-*p*-phenylene terephthalate)-co-(1-phenylethyl-*p*-phenylene terephthalate)]													
(330.34)	Ortho	C2-2	12.77	10.18	12.58		4	1.342				12*1/1	1389
as spun	Mono		13.04	9.514	12.24	$\gamma=80.87$	4	1.463				12*1/1	1426
annealed	Mono		13.31	9.732	12.15	$\gamma=81.01$	4	1.411				12*1/1	1426
Poly(*p*-phenylene thioterephthalate)													
–, phenyl- (dithio acid)													
(348.43)	Mono		29.9	4.81	12.57	$\gamma=110.7$	4	1.368				12*1/1	1558
Poly(pivalolactone, see Poly(3-hydroxypropionic acid), 2,2-dimethyl-													
Poly(propiolactone), see Poly(3-hydroxypropionic acid)													
Poly(terephthalic anhydride)													
(148.12)	Ortho		6.04	3.97			2			410/1564		7*2/1	1563
	Mono		6.02	3.76	13.49	$\alpha=90$	2	1.611		400/1565		7*2/1	1645

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n * p/q)	Refs.
Poly(tetradecamethylene adipate) [14.6]													
(340.50)			5.00	7.40						80	59	22 *	1079
Poly(tetradecamethylene 3-hexenedioate)													
(338.49)			4.94	7.64						80	49	22 *	1079
Poly(tetradecamethylene 4-octenedioate)													
(366.54)			4.91	4.05		$\gamma' = 109$				63	55	24 *	1079
Poly(tetradecamethylene suberate) [14.8]													
(368.56)			5.03	7.46						82	66	24 *	1079
Poly(tetramethylene adipate) [4.6]													
α	Mono		6.73	7.94	14.20	$\beta = 45.5$	2	1.229		48/325		12 * 1/1	1073
(200.23)										54/539			
										60/766			
										45/696			
β	Ortho		5.062	7.325	14.67		2	1.222				12 * 1/1	1073
Poly[tetramethylene *N,N'*-azelaoyldi (*p*-aminobenzoate)]													
(480.56)					26.6								1386
Poly[tetramethylene *N,N'*-hexadecanedioyldi(*p*-aminobenzoate)]													
(578.75)					35.2								1386
Poly(tetramethylene isophthalate) [4.1]													
(220.22)								1.309	1.268	152.5	42.3	11 * 2/1	111
					26.0					150			807
Poly(tetramethylene sebacate) [4.10]													
(256.34)										60//325	17/301	16 *	
										62/425	2.08/425		
										67/766			
Poly(tetramethylene succinate) [4.4]													
(172.18)	Mono	C2h-5	5.21	9.14	10.94	$\beta = 124$	2	1.324		34/696		10 * 1/1	689
	Mono		5.23	9.08	10.79	$\beta = 123.9$	2	1.344		114/766		10 * 1/1	1540
					10.90								1541
β					11.90							10 * 1/1	1541
Poly(tetramethylene terephthalate) [4.T]													
α	Tri		4.830	5.953	11.67	100,64,69	1	1.395	1.28/824	234/807	31/405	12 * 1/1	786
(220.22)	Tri	Ci-1	5.96	4.87	11.71	116,100,110	1	1.394		232/99	32/111	12 * 1/1	814
	Tri		4.87	5.99	11.67	100,116,111	1	1.392		221/453		12 * 1/1	933
	Tri	Ci-1	5.96	4.83	11.62	115,100,111	1	1.406		245/1362		12 * 1/1	851
	Tri		4.83	6.05	11.45	100,117,111	1	1.440				12 * 1/1	860
	Tri	Ci-1	4.83	5.94	11.59	100,115,111	1	1.403		224		12 * 1/1	864
	Tri		4.89	5.95	11.67	98,116,110	1	1.36				12 * 1/1	883
	Tri		4.82	5.93	11.74	100,116,111	1	1.404				12 * 1/1	1158
								1.08/111	1.256		30.8		1071
β	Tri		4.703	6.738	13.12	55,58,56	1	1.355				14 * 1/1	786
	Tri	Ci-1	4.95	5.67	12.95	102,122,100	1	1.283				14 * 1/1	864
	Tri		4.7	5.8	13.0	102,121,105	1	1.37				14 * 1/1	883
	Tri		4.73	5.83	12.90	102,119,105	1	1.332				14 * 1/1	933
	Tri		4.73	5.75	13.11	104,121,101	1	1.330				14 * 1/1	1160
	Tri		4.73	5.88	13.06	103,120,104	1	1.320				14 * 1/1	1339
Poly[tetramethylene (4,4'-terephthaloyldioxy)-4,4'-dibenzoate]													
(460.44)	Mono	C2-2	8.42	5.79	24.83	$\beta = 101.8$	2	1.290				24 * 1/1	1559
Poly(4,4'-thiodiphenylene carbonate)													
(244.27)	Ortho	C2v-9	5.6	8.7	22.2		4	1.50	1.35	220		12 * 2/1	435
										240/540			
Poly(trimethylene adipate) [3.6]													
(186.21)	Mono		5.0	7.4	21.5		4	1.55		38		11 * 2/1	107
										45/300			
										46/609			
Poly[trimethylene *N,N'*-adipolyldi(*p*-aminobenzoate)]													
(424.45)					22.6								1386
Poly[trimethylene *N,N'*-azelaoyldi(*p*-aminobenzoate)]													
(466.53)					26.4								
Poly(trimethylene azelate) [3.9]													
(228.29)	Mono		5.0	7.4	27.7		4	1.48		50		14 * 2/1	107
										60/609			

TABLE 7. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(trimethylene dodecanediote) [3.12]													
(270.37)	Mono		5.0	7.4	35.8		4	1.36		61		17 * 2/1	107
Poly(trimethylene glutarate) [3.5]													
(172.18)	Mono		5.0	7.4	15.4		2	1.00		39		10 * 1/1	107
										53/609			
Poly[trimethylene *N,N'*-glutaryldi(*p*-aminobenzoate)]													
(410.43)				21.3									
Poly[trimethylene *N,N'*-hexadecandioyldi(*p*-aminobenzoate)]													
(564.72)					35.0								1386
Poly[trimethylene *N,N'*-malonyldi(*p*-aminobenzoate)]													
(382.37)					18.5								1386
Poly(trimethylene octadecanedioate) [3.18]													
(354.53)	Mono		5.0	7.4	51.6		4	1.23		76		23 * 2/1	107
										76/307			
Poly(trimethylene pimelate) [3.7]													
(200.23)	Mono		5.0	7.4	23.6		4	1.52		37		12 * 2/1	107
										51/609			
Poly(trimethylene sebacate) [3.10]													
(242.32)	Mono		5.0	7.4	31.3		4	1.39		53		15 * 2/1	107
	Ptet		31.2	31.2	33.5	$\gamma = 90$	96	1.184		56/305		15 * 2/1	105
	Ortho	D2-4	5.032	7.532	31.33		4	1.3554		58/609		15 * 2/1	1542
										49/696			
Poly[trimethylene *N,N'*-sebacoyldi(*p*-aminobenzoate)]													
(480.56)					27.8								1386
Poly(trimethylene suberate) [3.8]													
(214.26)	Mono		5.0	7.4	26.1		4	1.47		41		13 * 2/1	107
										52/609			
Poly(trimethylene succinate) [3.4]													
(158.15)	Mono		5.0	7.4	15.2		4	1.87		47		9 * 2/1	107
										52/300			
										52/609			
Poly(trimethylene terephthalate) [3.T]													
(206.20)	Tri	Ci-1	4.58	6.22	18.12	97,89,111	2	1.432		233/99		11 * 2/1	917
	Tri	Ci-1	4.637	6.266	18.64	98,93,111	2	1.379		227/453		11 * 2/1	
	Tri		4.59	6.21	18.31	98,90,112	2	1.428		221/291		11 * 2/1	1068
	Tri		4.64	6.27	18.64	98,93,111	2	1.377				11 * 2/1	1080
Poly[trimethylene *N,N'*-tridecanedioyldi(*p*-aminobenzoate)]													
(522.64)					31.7								1386
Poly(trimethylene undecanedioate) [3.11]													
(256.34)	Ortho		5.0	7.4	32.4		4	1.42		59		16 * 2/1	107
Poly(4,4'-vinylenediphenylene dodecanedioate)													
–, methyl-													
1S (420.55)	Mono		11.1	7.9	27.8	$\beta = 84$	4	1.15				24 * 1/1	1076
1M	Mono		13.4	4.94	27.8	$\beta = 40$	2	1.81				24 * 1/1	1076
2	(at 151°C)	Mono	14.5	5.17	27.5	$\beta = 40$	2	1.054				24 * 1/1	1076
3	(at 172°C)	Mono	14.6	5.20	27.5	$\beta = 40$	2	1.041				24 * 1/1	1076
	Mono	C2h-5	13.83	5.28	27.3	$\beta = 138.6$	2	1.059				24 * 1/1	1560

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 8. POLY(URETHANES) AND POLY(UREAS) (–O–X–O–CO–NH–Y–NH–CO– or –O–X–NH–CO) and (–NH–X–NH–CO–NH–Y–NH–CO– or –NH–X–NH–CO–)

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(decamethylene hexamethylenediurethane)													
(342.48)										154	56.5	22 *	1653
										148.634			
										161/473			

TABLE 8. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
Poly(decamethylene 4,4′-methylenediphenylenediurethane)													
(424.54)										192	69.0	25 *	1653
										166/634			
										194/473			
Poly(ethylene decamethylenediurethane)													
α					21.8					174		18 * 1/1	414
(286.37)													
β					18.9							18 * 1/1	414
Poly(ethylene 4,4′-ethylenediphenylenediurethane)													
(326.35)	Tri				19.7					312		18 * 1/1	414
Poly(ethylene hexamethylenediurethane)													
α	Tri	Ci-1	4.93	4.58	16.8	113,103,109	1	1.266		170	42/1653	14 * 1/1	627
(230.26)										184/402			
										166/473			
γ	Tri	Ci-1	4.59	5.14	13.9	γ = 119	1	1.333		170		14 * 1/1	627
Poly(ethylene 4,4′-methylenediphenylenediurethane)													
(312.32)	Hex				15.7					239			414
					15.0					237/1653	48/1653	17 * 1/1	1125
Poly(ethylene nonamethylenediurethane)													
(272.34)					36.2					168		17 * 2/1	414
Poly(heptamethylene hexamethylenediurethane)													
(300.40)										146	48.5	19 *	1653
										151/473			
Poly(heptamethylene 4,4′-methylenediphenylenediurethane)													
(382.46)					20.7					198/473		22 * 1/1	1125
										191	50.6		1653
Poly(heptamethyleneurea)													
(156.23)											10.6/404	10 *	
Poly(hexamethylene hexamethylenediurethane)													
(286.36)	Tri	Ci-1	5.05	4.54	21.9	112,108,108	1	1.226		165	52/1653	18 * 1/1	627
										171/473			
										164/634			
										150/291			
Poly(hexamethylene 4,4′-methylenediphenylenediurethane)													
I. (368.43)	Tri		4.99		41.5	114,114,84	2			179/634	52/1653	21 * 2/1	1125
	Tri		5.1	5.1	41.6	116,116,85	2	1.41		200/473		20 * 2/1	1627
II.					19.2								1637
Poly(hexamethylene trimethylenediurethane)													
(244.29)	Tri	Ci-1	5.04	5.04	34.65	111,111,111	2	1.275				15 * 2/1	1081
Poly(hexamethyleneurea)													
(142.20)										300/402	13.9/404	9 *	
										>300/291			
										268/634			
Poly(4,4′-methylenedicyclohexylenethiourea)													
trans-, trans-													
(252.42)	Ortho		9.67	6.17	24.6		4	1.142				12 * 2/1	1315
Poly(4,4′-methylenedicyclohexyleneurea)													
trans-, trans-													
(236.36)	Ortho		9.20	6.22	23.8		4	1.153				12 * 2/1	1315
Poly(4,4′-methylenediphenyleneurea)													
(224.26)	Mono	Cs-2	4.72	11.33	11.64	γ = 116.5	2	1.337				12 * 1/1	1084
Poly(nonamethylene hexamethylenediurethane)													
(328.45)										147	523	21 *	1653
Poly(nonamethylene 4,4′-methylenediphenylenediurethane)													
(410.51)										190	58.6	24 *	1653
										194/473			
Poly(octamethylene hexamethylenediurethane)													
(314.43)										157	55.2	20 *	1653
										152/634			
										162/473			
Poly(octamethylene 4,4′-methylenediphenylenediurethane)													
(396.49)					22.8					172/634	59/1653	23 * 1/1	1125
										201/473			

TABLE 8. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(oxydiethylenedioxydiethylenedioxydiethylene hexamethylenediurethane)													
(534.69)					28.1							29*1/1	875
Poly(pentamethylene hexamethylenediurethane)													
(272.34)	Mono	C2h-3	4.70	8.36	39.0	$\gamma = 115$	4	1.302		158	42/1653	17*2/1	627
										157/473			
										235/402			
										151/633			
Poly(pentamethylene 4,4′-methylenediphenylenediurethane)													
(354.41)					18.6					192/473	51/1653	20*1/1	1125
Poly(pentamethyleneurethane)													
(129.16)										189/944	33.7/944	8*	
										150/291			
										155/444			
Poly(tetramethylene hexamethylenediurethane)													
(258.32)	Tri		4.95	8.65	19.17	90,104,60	2	1.248		180/291	48/1653	16*1/1	662
	Tri		9.05	8.38	19.1	90,115,63	4	1.510		173/101		16*1/1	334
	Tri	Ci-1	4.98	4.71	19.4	116,105,109	1	1.258		184			627
										182/473			
										184/402			
Poly(tetramethylene 4,4′-methylenedicyclohexylenediurethane)													
trans-, trans-													
I. (352.48)	Tri		5.1	10.2	37.5	115,85,94	4	1.33				19*2/1	1643
II.					41.3							19*2/1	1643
Poly(tetramethylene 4,4′-methylenediphenylenediphenylenediurethane)													
I. (340.38)	Tri	Ci-1	5.31	5.26	38.61	114,115,96	2	1.438				19*2/1	1567
II.	Tri	Ci-1	5.06	5.06	36.97	115,108,95	2	1.340				19*2/1	1567
					17.0								
III.	Tri		5.05	4.67	37.9	116,116,84	2	1.523		194/634		19*2/1	1082
	Tri		4.92	5.66	38.35	124,104,86	2	1.324		248/473		19*2/1	1083
					19.2					232/1653	53/1653		1273
Poly(tetramethylene trimethylenediurethane)													
(216.24)	Tri	Ci-1	5.06	5.04	30.10	112,113,110	2	1.337				13*2/1	1081
Poly(trimethylene hexamethylenediurethane)													
(244.29)	Mono	C2h-3	4.70	8.36	33.9	$\gamma = 115$	4	1.344		168	42/1653	15*2/1	627
										167/633			
										163/473			
Poly(trimethylene 4,4′-methylenediphenylenediurethane)													
I. (326.35)					17.6					227/1653	47/1653	18*1/1	1627
II.					16.2					241/473		18*1/1	1125

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 9. POLY(ETHERS) (–HCH–CHOR–)

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(benzylvinyl ether)													
(134.18)					6.30					162/114		2*3/1	253
Poly(butylvinyl ether)													
(100.16)	Rho	C3i-2	23.7	23.7	6.50		18	0.947	0.92	64/114		2*3/1	360
–, 2-methyl-													
(114.19)					6.50					140		2*3/1	382
										128/608			
Poly(*sec*-butylvinyl ether), see Poly(propylvinyl ether), 1-methyl-													
Poly(*tert*-butylvinyl ether)													
(100.16)	Tet	C4h-6	18.84	18.84	7.65		16	0.980		160		2*4/1	269
										260/114			
										238/281			

TABLE 9. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
Poly(ethylene)													
–, 1-butoxy-2-chloro-													
trans-													
(134.61)					6.5							2*3/1	242
cis-													
					8.6							2*4/1	242
–, 1-chloro-2-isobutoxy-													
trans-													
(134.61)					20.8							2*10/3	242
–, 1-isobutoxy-2-methyl-													
trans-													
(114.19)					13.77							2*7/2	67
					13.8					226		2*7/2	141
Poly(isobutylvinyl ether)													
(100.16)	Ortho		16.8	9.70	6.50		6	0.942		117		2*3/1	161
								0.94		117			269
										165/114			
										170/281		2*3/1	152
										115/46			
Poly(isopropylvinyl ether)													
(86.13)	Tet		17.2	17.2	35.5		68	0.926		191/281		2*17/5	161
								0.93		98			269
										190/114			
Poly(methylvinyl ether)													
(58.08)	Rho	D3d-6	16.20	16.20	6.50		18	1.175		144/114		2*3/1	176
	Rho	D3d-6	16.25	16.25	6.50		18	1.168				2*3/1	429
Poly(α-methylvinyl methyl ether)													
syndiotactic	Tet		15.2	15.2	16.4		32	1.011				2*8/3	383
	(72.11)	Phex	9.02	9.02	16.0		10	1.062				4*5/2	514
	Hex		9.02	9.02	16.6		10	1.024				4*5/2	554
Poly(neopentylvinyl ether)													
(114.19)	Ortho		18.2	10.51	6.50		6	0.915		216/281		2*3/1	161
								0.91		155			269
										216/114			
Poly(propylvinyl ether)													
–, 1-methyl-													
(100.16)	Tet		18.25	35.5			68	0.956		177/608		2*17/5	424
					35.3					170		2*17/5	382

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 10. POLY(OXIDES) (–X–O–Y–O– or –R–O–)

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
Poly(acetaldehyde)													
(44.05)	Tet	C4h-6	14.63	14.63	4.79		16	1.142		165/329		2*4/1	92
–, 2-chloro-													
(78.50)	Tet	C4h-6			4.80							2*4/1	387
– 2,2-dichloro-													
(112.94)	Tet	C4h-6			5.22							2*4/1	387
–, 2,2,2-trichloro-													
(147.39)	Tet	C4h-6			6.45					>220/338		2*4/1	387
Poly(2-butene oxide)													
trans-													
(72.11)	Orhto	D2-4	13.72	4.60	6.90		4	41.100		114/399		3*2/1	397
	Ortho	D2-4	13.79	4.65	6.96		4	1.073		100/527		3*2/1	800
cis-													
	Ortho		11.20	10.44	7.01		8	1.169		162/399		3*2/1	397

TABLE 10. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n***p*/*q*)	Refs.
Poly(butyraldehyde)													
(72.11)	Tet	C4h-6	20.01	20.01	4.78		16	1.001		225/329		2*4/1	92
Poly(1,3-cyclobutyleneoxymethylene oxide)													
–, 2,2,4,4-tetramethyl-													
trans-													
α					11.5					260			361
(156.23)										260/369			
β					5.75							6*	361
cis-													
α					11.5					285			361
										285/369			
β					5.75							6*	361
Poly(decamethylene oxide)													
(156.27)	Ortho		7.40	4.94	27.49		4	1.033		79		11*2/1	482
	Ortho	D2h-16	7.40	4.93	27.29		4	1.042		79/181		11*2/1	689
Poly(1,3-dioxolane), see Poly(ethyleneoxymethylene oxide)										72/180			
Poly(1,3-dioxolane), see Poly(methyleneoxytetramethylene oxide)													
Poly(dodecamethylene oxide)													
(184.32)	Ortho		7.40	4.94	32.53		4	1.030				13*2/1	482
Poly(epichlorohydrin), see Poly(ethylene oxide), chloromethyl-													
Poly(4,4′-ethylenediphenyleneoxyheptamethylene oxide)													
–, 3-methyl-													
(324.46)	Mono		11.4	10.4	18.9	γ=84.1	6	1.450				19*1/1	1574
Poly(4,4′-ethylenediphenyleneoxynonamethylene oxide)													
–, 3-methyl-													
(352.52)	Mono		20.1	28.3	22.3	γ=88.6		vi. ref.				21*1/1	1574
Poly(4,4′-ethylenediphenyleneoxypentamethylene oxide)													
–, 3-methyl-													
(296.41)	Tri		12.7	9.61	47.3	44,96,100	12	1.495				17*3/1	1574
Poly(4,4′-ethylenediphenyleneoxyundecamethylene oxide)													
–, 3-methyl-													
(380.57)	Mono		20.8	27.4	25.5	γ=84.1		vi. ref.				23*1/1	1574
Poly(ethylene oxide)													
I. (44.05)	Mono		9.5	12.0	19.5[b]	γ=101	36	1.207	1.13/366	66/81	8.29/81	3*7/2	109
	Mono	C2h-5	8.05	13.04	19.48	β= 125.4	28	1.229		70/538	9.5/665	3*7/2	303
	Mono	Cs-2	8.03	13.09	19.52	β=125.1	28	1.220		62/180	8.04/498	3*7/2	194
	Mono		7.95	13.11	19.39	β=124.6	28	1.231		72/318	11.7/466	3*7/2	188
	Mono		8.02	13.4	19.25	β=126.9	28	1.238		69/728	9.41/728	3*7/2	227
	Mono		8.16	12.99	19.30	β=126.1	28	1.239		75/964	7.86/964	3*7/2	460
	Mono		7.51	13.35	19.90	β = 118.6	28	1.169		76/567	8.7/1195	3*7/2	1164
								1.227	1.123	75/665			190
								1.235	1.124	70/1189	7.33		390
II.	Tri	Ci-1	4.71	4.44	7.12	63,93,111	2	1.197				3*2/1	790
–, *tert*-butyl-													
isotactic													
(100.16)	Tet	D2d-8	15.42	15.42	24.65		36	1.022		135/691		3*9/4	717
										140/692			
										150/693			
										152/527			
syndiotactic													
										63/691			
–, chloromethyl- [epichlorohydrin]													
(92.52)					7.05					117			119
	Ortho	D2-4	12.14	4.90	7.07		4	1.461		121		3*2/1	194
		or C2v-9								135/318			
	Ortho	C2v-9	12.16	4.90	7.03		4	1.467				3*2/1	555
	Ortho		12.24	4.92	6.96		4	1.466				3*2/1	601
	ortho	D2-4	12.15	4.86	7.07		4	1.472				3*2/1	800
										116	10.6		1280
–, isopropyl-													
(86.13)	Ortho	D2-4	12.85	7.52	5.55		4	1.067		53		3*2/1	802

TABLE 10. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
Poly(ethylene oxide), complexes with:													
–, *p*-bromochlorobenzene (3 per 10 residues)													
	Ortho	C2v-12	16.58	9.58	28.10		40	1.510		91/1232		3*10/3	1278
–, *p*-bromofluorobenzene (3 per 10 residues)													
	Ortho	C2v-12	16.38	9.46	28.56		40	1.449				3*10/3	1278
–, *p*-chloroiodobenzene (3 per 10 residues)													
	Ortho	C2v-12	16.78	9.73	28.24		40	1.665		82/1232		3*10/3	1278
–, *p*-chlorotoluene (3 per 10 residues)													
	Ortho		8.63	9.27	28.41		20	1.199				3*10/3	1232
–, *p*-dibromobenzene (3 per 10 residues)													
	Ortho		8.37	4.84	27.98		10	1.682		96.5		3*10/3	1207
	Ortho	C2v-12	16.74	9.68	27.98		40	1.682		98/1232		3*10/3	1278
–, *p*-dichlorobenzene (3 per 10 residues)													
	Ortho	C2v-12	16.48	9.51	27.86		40	1.341		83/1232		3*10/3	1278
–, mercuric compounds													
–, –, $HgBr_2$													
I.	Ortho		13.73	8.66	11.80		16	2.540					732
(1 Hg/4 residues)													
–, –, HgCl2													
I.	Ortho		13.5	17.1	11.6		32	2.22					731
(1 Hg/4 residues)	Ortho		13.55	8.58	11.75		16	2.177				6*2/1	732
II.	Ortho		7.75	12.09	5.88		4	3.804				6*1/1	733
(1 Hg/residue)													
–, –, HgI_2					13.52								732
–, *p*-nitrophenol													
	Tri	Ci-1	11.72	5.55	15.57	91,87,104	6	1.389				9*2/1	1570
–, perhydrotriphenylene													
					6.87							3*2/1	1173
–, resorcinol													
α	Mono	C2h-5	16.05	14.25	9.84	$\beta = 112$	16	1.262				3*4/1	1099
(1 R/2 residues)	Ortho	C2v-9	10.50	10.18	9.776		8	1.260		93		3*4/1	1568
β										71/1568			
–, sodium iodide													
(1 NaI/3 EO)	Mono	C2h-5	18.15	8.41	7.98	$\gamma = 122.3$	12	1.819				9*2/1	1343
–, sodium perchlorate													
(1 Na/3 EO)	Mono	C2h-5	18.32	8.578	8.346[b]	$\gamma = 123.1$	6	1.540				9*2/1	1571
–, thiocyanates													
–, –, potassium													
1 salt:4 EO	Tri		11.37	8.18	8.10	80,66,89	8	1.343				3*4/1	1100
(dble. helix)													
–, –, sodium													
1 salt:1 EO	Mono	C2h-5	7.55	12.10	5.83	$\beta = 97.5$	4	1.574				6*1/1	1432
1 salt:3 EO	Mono	C2h-5	16.83	10.64	7.19	$\gamma = 125.5$	12	1.351				9*2/1	1432
1 salt:4 EO	Tri		10.25	8.43	7.23	91,61,104	8	1.616				3*4/1	1100
(dble. helix)													
–, trifluoromethane sulfonate													
(1 salt/3 EO)	Mono	C2h-5	16.77	10.07	8.613[b]	$\gamma = 121.0$	6	1.5355				9*2/1	1572
–, urea													
(9 urea/4 R)	Rho		10.43	10.43	9.12					143/734			730
	Rho	D3-4	10.52	10.52	9.259		4	1.3408				3*4/1	1569
Poly(ethyleneoxymethylene oxide) [1,3-dioxolane]													
I. (74.08)	Tri	C1-1	12.32	4.66	24.7	$\gamma = 100.9$	15	1.325		55/506	17.1/973	5*5/1	690
					36.6								505
										93	15.5		1163
II.	Ortho	D2H-15	9.07	7.79	9.85		8	1.414		55/937		5*2/1	688
III.	Hex		8.07	8.07	29.5		18	1.331		60/937		5*6/1	690
Poly(formaldehyde), see Poly(oxymethylene)													
Poly(heptaldehyde)													
(114.19)	Tet	C4H-6	25.9	25.9	4.52		16	1.000	0.880	147		2*4/1	970
										150/329			

TABLE 10. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters					Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]				
Poly(hexamethylene oxide)													
(100.16)	Mono	C2h-6	5.65	9.01	17.28	$\beta = 134.5$	4	1.060		58		7*2/1	482
	Mono	C2h-6	5.64	8.98	17.32	$\beta = 134.5$	4	1.063		58/181		7*2/1	689
									0.932	73.3	23.8		941
										62/542			
Poly(hexamethyleneoxymethylene oxide)													
(130.19)	Ortho	C2v-9	8.4	4.85	18.8		4	1.13		38/695		9*2/1	783
Poly(isobutylene oxide)													
(72.11)	Ortho	D2-4	10.76	5.76	7.00		4	1.104		158/593		3*2/1	594
	Ortho	D2-4	10.80	5.88	7.05		4	1.070		175		3*2/1	775
										177/548			
										160/664			
										155/318			
Poly(isobutyraldehyde)													
(72.11)	Tet				5.2					>260/329		2*4/1	96
Poly(4,4′-isopropylidenediphenyleneoxytrimethylene oxide)													
–, 2-hydroxy- (alkyl)													
(284.36)	Ortho	D2h-24	16.31	19.34	7.90		8	1.515				14*1/1	1118
Poly(isopropylidene oxide)													
(58.08)	Tet	S4-1	14.65	14.65	10.22		28	1.231		60		2*7/2	214
Poly(isovaleraldehyde)													
(86.13)	Tet		20.6	20.6	5.2		16	1.04				2*4/1	96
Poly(4,4′-methylenediphenylene oxide)													
(182.22)	Ortho		8.10	5.60	10.00		2	1.334		140		10*1/1	745
Poly(methyleneoxypentamethylene oxide) [1,3-dioxocane]													
(116.16)	tri	Ci-1	8.36	4.84	8.15	90,90,90	2	1.70		39/695		8*1/1	783
										46	7.74		1410
Poly(methyleneoxytetramethylene oxide) [1,3-dioxepane]													
(102.13)	Ortho	C2v-9	8.50	4.79	13.50		4	1.234				14*1/1	686
										30	14.5		1165
Poly(nonaldehyde)													
(142.24)	Tet		30.56	30.56	4.52		16	0.895				2*4/1	1098
Poly(nonamethylene oxide)													
(142.24)	Ortho		7.36	4.94	12.45		2	1.044		73		10*1/1	482
Poly(octamethylene oxide)													
I. (128.22)	Mono	C2h-6	5.67	9.04	22.45	$\beta = 134.5$	4	1.038		67		9*2/1	482
										74/727	29.8/727		
										74/799	29.3/799		
										83/1167	32/1167		
II.	Ortho		7.36	4.93	22.43		4	1.046				9*2/1	482
Poly(oxacyclobutane) [trimethylene oxide]													
I. (hydrate)	Mono	C2h-3	12.3	7.27	4.80	$\beta = 91$	4	1.178		36/180		4*1/1	446
(58.08)										34/181			
										35/447			
II.	Rho	C3v-6	14.13	14.13	8.41		18	1.194				8*1/1	446
III.	Ortho	D2-5	9.23	4.82	7.21		4	1.203		50/1328	8.8/1328	8*1/1	446
IV.					4.79							4*1/1	1096
–, 3,3-bisazidomethyl-													
(152.16)										128	53.6		1269
–, 3,3-bischloromethyl-													
α	Ortho		17.85	8.16	4.8		4	1.47		190/173	32.2/271	4*1/1	344
(155.02)	Ortho	D2h	8.16	17.85	4.82		4	1.466		180/148	23.0/343	4*1/1	378
	Ortho	D2h-16	17.85	8.16	4.67		4	1.514				4*1/1	689
	Ortho	C2v-9	17.85	8.15	4.78		4	1.481				4*1/1	1094
									1.371	203	19.5		1195
								1.47	1.39				343
β	Mono	Cs-1 or Cs-2	6.85	11.42	4.75	$\beta = 109.8$	2	1.472				4*1/1	172
	Mono	Cs-3	11.42	7.06	4.82	$\gamma = 114.5$	2	1.456				4*1/1	378
	Ortho	C2v-12	13.01	11.71	4.67		4	1.447				4*1/1	689

TABLE 10. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
–, 3,3-bisethoxymethyl-													
(174.24)	Hex		5.24	5.24	6.46		6?	1.25?		125	9.41	4*2/1?	1209
										83/1271			
–, 3,3-bishydroxymethyl-													
(86.13)	Mono		11.85	10.39	4.79	γ=90	4	0.970				4*1/1	1385
–, 2,2-bistrifluoromethyl-													
(194.08)	Ortho	D2-4	10.63	8.00	8.01		4	1.892				4*2/1	921
–, 3-*tert*-butyl-													
(114.19)										77	5.0		1358
–, 3,3-diethyl-													
I. (114.19)	Mono	C2-2	13.33	5.77	4.74	γ=91.1	2	1.040		47/1271		4*1/1	1097
	Mono									100	10.46	4*1/1	1298
II.	Ortho	D2-5	20.36	5.58	6.67		4	1.001				4*2/1	1299
					6.7							4*2/1	1097
	Ortho									80	10.04	4*2/1	1298
–, 3,3-dimethyl-													
I. (86.13)					4.83						47/447	4*1/1	1095
II.	Mono	C2h-5	8.93	7.48	8.35	β=97.9	4	1.036		64		8*1/1	1095
										75/1328	9.2/1328		
										80/1394			
III.	Ortho	D2-5	15.60	5.74	6.51		4	0.981		66		4*2/1	1095
										56/1328	7.4/1328		
–, 3-ethyl-3-methyl-													
(100.16)	Ortho	D2-2	18.46	5.66	6.57		4	0.969				4*2/1	1299
					6.5				0.927	60	6.28	4*2/1	1300
–, 3-methyl-3-hydroxymethyl-													
(86.13)	Mono		11.69	10.25	4.70	γ=89.4	4	1.016				4*1/1	1385
Poly(oxymethylene) [formaldehyde]													
I. (30.03)	Rho	C3-2	4.46	4.46	17.30		9	1.506	1.25	181	7.45/91	2*9/5	42
		or C3-3							1.32/640	198/217	6.66/186	2*9/5	134
	Rho		4.43	4.43	17.25		9	1.531		178/329	7.37/343	2*9/5	258
	Rho	D6h-1	4.471	4.471	17.39		9	1.491		215/964	10.0/628	2*9/5	513
	Rho		4.470	4.470	56.00		29	1.492		200/455	9.8/1121	*29/16	270
	Ortho		7.75	4.46	17.30		18	1.501			5.65/964	2*9/	249
									1.215				1195
											11.67		1344
II.	Ortho	D2-4	4.767	7.660	3.563		4	1.533				2*2/1	270
III.	Ortho		4.57	7.41	3.49		4	1.688				2*2/1	817
(at 14 kbar)													
Poly(*p*-phenylene oxide)													
(92.10)	Ortho	D2h-14	8.07	5.54	9.72		4	1.408	1.27	298	7.83/773	5*2/1	487
										262/773			
–, 2,6-dimethoxy-													
(152.15)										287	3.2	5*	793
–, 2,6-dimethyl-													
(120.15)			8.45	6.02		γ=91				261	5.86/524	5*	226
	Tet		11.92	11.92	17.10		16	1.314		272/471	3.8/471	5*4/1	621
										307	5.95		1200
										262/484	5.0/484		
											5.73/972		
											5.08/574		
											5.38/940		
											5.40/598		
–, 2,6-diphenyl-													
I. (244.29)	Tet	D4-4	12.51	12.51	17.08		8	1.214		484/201	12.2/201	5*4/1	57
Poly(*m*-phenyleneoxy-2-cyano-1,3-phenylene oxide)													
(209.20)	Mono	C2h-5	8.62	13.07	9.03	β=99	4	1.383		340		8*1/1	1427
Poly(propionaldehyde)													
(58.08)	Tet	C4h-6	17.52	17.52	4.78		16	1.052		185/329		2*4/1	92
–, 3-methoxycarbonyl-													
(116.12)					4.56					150		2*	704
–, 3-cyano-													
(83.09)	Tri		9.44	5.32	4.95	γ=102	2	1.135		176		2*2/1	240

TABLE 10. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters					Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]				
Poly(propylene oxide)													
(58.08)	Ortho	C2v-9 or D2-4	10.52	4.67	7.16		4	1.097	0.998/139	75/18 75/377	8.4/498 8.4/377	3*2/1	13
	Ortho	D2-4	10.51	4.69	7.09		4	1.104		72/664		3*2/1	800
	Ortho	D2-4	10.52	4.68	7.10		4	1.104		73/285		3*2/1	41
	Ortho	D2-4	10.40	4.64	6.92		4	1.155		80/1649	8.4/1649	3*2/1	78
	Ortho	D2-4	10.46	4.66	7.03		4	1.126				3*2/1	448
–, 3-phenoxy-													
(150.18)	Ortho		17.0	8.2	5.48		4	1.30	1.27	215 210/297 208/318 203/833 203/527		3*2/1	238
–, –, *o*-chloro-													
(184.62)	Ortho		12.6	9.90	6.93		4	1.418		200		3*2/1	445
–, 3,3,3-trifluoro-													
(112.05)	Ortho	D2-4	11.42	6.26	6.26		4	1.663				3*2/1	
Poly(tetrahydrofuran) [tetramethylene oxide]													
(72.11)	Mono	C2h-6	5.48	8.73	12.07	$\beta=34.2$	4	1.157		35	12.6/425	5*2/1	348
	Mono	C2h-6	5.59	8.90	12.07	$\beta=134.2$	4	1.112		43	12.4/600	5*2/1	460
				8.89	12.15			1.116	0.982	60/366	14.4	5*2/1	599
	Ortho	D2-4	7.22	8.75	12.25[b]		8	1.238		37/180		5*2/1	533
	Mono	C2h-6	5.61	8.92	12.25	$\beta=134.5$	4	1.095				5*2/1	403
–, complex with:													
–, –, urea (6 urea:1.8 EO)													
	Hex	C6-1	8.199	8.199	11.032			1.267					1573
Poly(4,4′-thiodiphenylene oxide)													
(200.26)	Ortho		8.16	5.55	10.20		2	1.440		340		10*1/1	745
Poly(trimethylene oxide), see Poly(oxacyclobutane)													

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 11. POLY(SULFIDES) AND POLY(SULFONES)

Polymer	Cryst syst.	Space group	Unit cell parameters					Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]				
Polymer of selenium													
(78.96)	Rho	D3-6	4.355	4.355	4.949		3	4.839		219/752	5.20/752	1*3/1	751
									4.289	221/1121	6.2/1121		1195
Polymer of sulfur													
(32.06)	Mono	C2h-2	26.4	12.32	9.26[b]	$\gamma=100.75$		2.30				1*8	288
	Ortho		8.11	9.20								Indet.	469
	Mono	C2-1	17.6	9.25	13.8	$\beta=113$	80	2.059				1*10/3	192
									1.92	250			1195
Poly(ethylene disulfide)													
(92.17)					8.8					130/294			134
					8.8					113/295 145/725		4*3/1	468
Poly(ethylene sulfide)													
(60.11)	Hex		4.92	4.92	6.74		2	1.413		210		3*2/1	241
	Ortho	D2h-6	8.50	4.95	6.70		4	1.416		190/181		3*2/1	504
	Ortho	D2-4	8.508	4.938	6.686		4	1.421		216/1104	14/1104	3*2/1	922
–, *tert*-butyl-													
opt. active	Rho	C3-2	16.91	16.91	6.50		9	1.079		162		3*3/1	906
(116.22)													
inactive	Port	C2h-5	16.67	19.27	6.52	$\beta=90$	12	1.106		210 205/694		3*3/1	906

TABLE 11. *cont'd*

			Unit cell parameters					Density (g/cm^3)					
Polymer	Cryst syst.	Space group	*a*	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* * *p*/*q*)	Refs.
–, isopropyl- isotactic													
(102.20)	Ortho	C2v-21	17.92	17.92	7.20		16	1.174				3 * 2/1	
Poly(ethylene tetrasulfide)													
(156.29)	Ortho		8.57	5.0	4.27		1	1.42				4 * 1/1	256
	Mono		8.68	5.03	4.32	$\gamma = 87$	1	1.378				4 * 1/1	257
					4.32							4 * 1/1	134
Poly(hexamethylene sulfide)													
(116.22)										90.3	19.8		1322
										79/181			
										68/295			
Poly(hexamethylene sulfone)													
(148.22)	Mono		9.88	9.26	18.24	$\beta = 121.7$	8	1.387		220		7 * 2/1	39
Poly(hexamethylenesulfonylpentamethylene sulfone)													
(282.42)	Mono		9.88	9.26	34.00	$\beta = 121.7$	8	1.418		223		13 * 2/1	39
Poly(hexamethylenesulfonyltetramethylene sulfone)													
(268.39)	Mono		9.88	9.2615.68		$\beta = 121.7$	4	1.460		246		12 * 1/1	39
Poly(methylene disulfide)													
(78.15)					4.18							3 * 2/1	467
Poly(methylene selenide)													
I. (92.99)	Hex		5.22	5.22	46.25		21	2.971		190		2 * 21/11	416
II.	Ortho	D2-4	5.37	9.03	4.27		4	2.983		170		2 * 2/1	463
Poly(methylene sulfide)													
(46.09)	Ortho		12.7	12.0	5.10		16	1.575		260		2 * 2/1	237
	Hex		5.07	5.07	36.52		17	1.600		245/181		2 * 17/9	331
										260/298			
Poly(pentamethylene sulfide)													
(102.20)	Mono	C2h-5	9.61	9.78	7.84	$\beta = 131$	4	1.221		65/295		6 * 1/1	687
Poly(pentamethylene sulfone)													
(134.19)	Mono		9.88	9.26	7.76	$\beta = 121.7$	4	1.476		243		6 * 1/1	39
Poly(pentamethylenesulfonyltetramethylene sulfone)													
(254.36)	Mono		9.88	9.26	28.33	$\beta = 121.7$	8	1.532		247		11 * 2/1	39
Poly(*p*-phenylene sulfide)													
(108.16)	Ortho	D2h-14	8.67	5.61	10.26		4	1.440		295		5 * 2/1	677
	Ortho		8.68	5.66	10.26		4	1.425		290/679		5 * 2/1	1345
	Ortho		8.57	5.59	10.33		4	1.452	1.319	315/1234	12.1	5 * 2/1	1575
										320	8.65		1362
Poly(propylene sulfide) isotactic													
(74.14)	Ortho	D2-4	9.95	4.89	8.20		4	1.234				3 * 2/1	515
Poly(tetradecamethylene sulfide)													
I. (228.44)	Tri	Ci-1	4.81	9.61	38.8	123,89,106	4	1.058				15 * 2/1	1422
Poly(tetramethylene sulfide)													
I. (88.17)	Mono	C2h-6	5.73	9.15	13.26	$\beta = 135.7$	4	1.206		67/181		5 * 5 * 2/1	961
Poly(thiazyl)													
I. (46.07)	Mono	C2h-5	4.153	7.637	4.439[b]	$\gamma = 109.7$	4	2.308				2 * 2/1	910
	Mono	C2h-5	4.12	7.64	4.43	$\gamma = 109.5$	4	2.328				2 * 2/1	912
	Mono	C2h-5	4.15	7.64	4.44	$\gamma = 110$	4	2.313				2 * 2/1	1102
I′.	Mono	C2h-5	4.04	7.86	4.43[b]	$\gamma = 109$	4	2.300				2 * 2/1	911
	Mono	C2h-5	4.040	7.849	4.429[b]	$\gamma = 109.3$	4	2.308				2 * 2/1	925
II.	Ortho	D2-4	6.251	4.807	4.429[b]		4	2.299				2 * 2/1	925
	Ortho	D2-4	4.81	6.25	4.43		4	2.298				2 * 2/1	1102
III.	Ortho	D2-4	9.20	10.72	4.93		16	2.517				2 *	1102
IV.			6.80		5.24								1103
V.			13.92		5.81								1103
Poly(trimethylene sulfide)													
(74.14)	Mono	Cs-2	5.16	10.33	4.06[b]	$\gamma = 120.5$	2	1.320		100/81		4 * 1/1	916
										90	10.4		1346
–, 3,3-dimethyl-													
(102.20)										19	5.23		1363

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 12. POLY(SACCHARIDES)

			Unit cell parameters					Density (g/cm³)					
Polymer	Cryst syst.	Space group	a	b	c	Angles	z	Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
Poly(2,1-β-D-fructofuran)													
(hemihydrate)	Ortho	D2-4	16.70	9.65	14.4		12	1.470				3*6/1	1634
(162.14)													
(monohydrate)	Ortho	D2-4	16.70	9.80	14.7		12	1.492				3*6/1	1634
Poly(1,4-β-D-galacto-1,4-β-D-mannose) (1 : 2) [guar galactomannan]													
dry			13.5	8.66	10.3[b]		2	1.34				10*	643
(486.42)													
16.5% H2O	Mono	C2-2	15.45	8.65	10.3[b]	γ=90	6						643
Poly(1,4-α-D-galactosamine)													
anhydride	Ortho		5.2	30.8	8.7		8	1.54				5*2/1	1327
(161.16)													
Poly(1,3-β-D-galactosamine-*alt*-1,4-β-D-glucuronic acid)													
–, *N*-acetyl- [chondroitin]													
–, –, 4-sulfate													
free acid	Ortho				19.6							9*2/1	819
(459.38)													
–, –, –, as Ca salt													
7 H_2O/unit	Ortho	D2-3	7.45	17.81	19.64		4					9*2/1	1242
(497.44)	Hex		12.8	12.8	27.4		6					9*3/1	1258
–, –, –, as Na salt													
I. (@ 93% RH)	Hex		14.5	14.5	28.8		6					9*3/1	819
10 H_2O	Hex	D3-6	14.52	14.52	28.32		6					9*3/1	1241
(503.34)					28.5							9*3/1	1254
II.	Ortho		16.0	26.0	24.1[b]		18					9*3/1?	1139
–, –, –, as K salt													
(535.57)	Hex	D3-4	13.85	13.85	27.76		6					9*3/1	1223
–, –, 6-sulfate													
free acid					18.6[b]							9*2/1	705
(459.38)													
–, –, –, as Na salt													
I. (503.34)	Ortho		12.1	14.4	28.5[b]		9?					9*3/1	705
	or Mono		12.1	9.3	28.5[b]	γ=93	6?					9*3/1	705
	Rho		14.3	14.3	28.7		9?					9*3/1	769
II.	Tet		13.8	13.8	78.2		32					9*8/1	769
Poly(1,4-β-D-glucosamine) [chitosan]													
I. (161.16)	Ortho		8.9	17.0	10.25[b]		8	1.38				5*2/1	1135
	Ortho		7.76	10.91	10.30		4	1.228				5*2/1	1137
	Ortho	D2-4	8.28	8.62	10.43		4	1.44				5*2/1	1579
(anhydrous)	Ortho	D2-4	8.07	8.44	10.34		4	1.520				5*2/1	1580
II.			4.4	10.0	10.3		2	1.18				5*2/1	1137
III.	Ortho		8.24	16.48	10.39		8	1.517				5*2/1	1138
IV.	Mono		13.8	16.3	40.7	α=96.5	48?	1.412				5*8/5	1581
–, *N*-acetyl- [chitin]													
α	Ortho	D2-4	4.76	18.85	10.28[b]		4	1.463				5*2/1	652
(203.19)	Ortho	D2-4	4.69	19.13	10.43		4	1.442				5*2/1	669
	Ortho	D2-3	9.25	19.25	10.46[b]		8	1.449				5*2/1	1135
	Ortho	D2-4	4.74	18.86	10.32		4	1.463				5*2/1	1222
β													
α-phase													
(anhydrous)	Mono	C2-2	4.85	9.26	10.38	γ=97.5	2	1.460				5*2/1	778
	Ortho		4.82	36.7	10.33		8	1.477				5*2/1	1136
	Mono	C2-2	4.80	9.83	10.32[b]	γ=112	2	1.495				5*2/1	1253
(hemihydrate)	Mono	C2-2	4.7	10.5	10.3	β=90	2	1.39				5*2/1	653
(monohydrate)	Ortho		9.32	22.15	10.17[b]		8	1.400				5*2/1	670
	Mono	C2-2	4.8	10.5	10.4[b]	γ=97	2	1.41				5*2/1	778
(dihydrate)	Mono	C2-2	4.8	11.1	10.4[b]	γ=97	2	1.44				5*2/1	778
β-phase (hydrated)													
I.	Mono		9.67	21.1	10.4[b]	γ=99.5	8					5*2/1	778
II.	Mono		4.78	23.3	10.1[b]	γ=94	4					5*2/1	778
γ	Mono	C2-2	4.7	28.4	10.3[b]	γ=90	6	1.47				5*2/1	779
–, –, nitrate													
	Ortho		9.2	23	10.3[b]		8					5*2/1	1135

TABLE 12. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm³)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
			a	b	c	Angles		Crystal.	Amorph.[a]				
Poly(1,3-β-D-glucosamine-*alt*-1,4-β-D-glucuronic acid)													
–, *N*-acetyl- [hyaluronic acid]													
(379.32)													
II.													
–, –, as Na salt													
(401.30)	Ortho		11.4	9.8	33.7		8	1.42				9*4/1	710
	Tet		9.9	9.9	33.9		8	1.60				9*4/1	769
dry	Tet	D4-8	9.89	9.89	33.94		8	1.61				9*4/1	1227
wet	Ortho	D2-4	11.53	9.89	33.86		8	1.50				18*2/1	1227
–, –, as K salt													
(417.41)	Ortho		11.0	9.9	33.0		8	1.54				9*4/1	711
	Tet	D4-10	17.14	17.14	32.80	Double	16	1.55				9*4/1	1225
	Ortho	D2-4	11.73	9.25	35.42		8	1.50				18*2/1	1226
III.													
K salt	Ortho		10.4	9.0	37.1		8	1.60				9*4/1	711
K salt	Tet	D4-8	9.96	9.96	37.87		8	1.54				9*4/1	1224
IV.													
Na salt	Hex	D3-6	11.7	11.7	28.5		6	1.50				9*3/1	659
Na salt	Hex	D3-6	11.70	11.70	28.50		6	1.40				9*3/1	1256
Ca salt	Hex		15.4	15.4	28.5		9	1.43				9*3/1	659
Ca salt	Hex		20.4	20.4	28.5		9	1.53				9*3/1	659
V.													
Na salt	Hex		18.7	18.7	28.5		18	1.58				9*3/1	659
dry Ca salt	Hex	D3-3	18.32	18.32	28.47		18	1.57				9*3/1	1257
wet Ca salt	Hex	D3-3	20.93	20.93	28.30		18	1.46				9*3/1	1257
VI.													
Na salt	Ortho		34.4	11.7	28.5		24	1.58				9*3/1	659
VII.													
free acid	Mono				19.6							9*2/1	659
Poly(1,3-α-D-glucose)													
I. (native)	Mono		5.81	10.0	8.35	γ=96	2	1.116				4*2/1	1130
(162.14)													
II. (dihydrate)	Ortho		5.02	9.63	8.35		2	1.630				4*2/1	1130
III. (dry)	Ortho		4.57	8.65	8.35		2	1.631				4*2/1	1130
IV.	Ortho	D2-4	16.46	9.55	8.44		8	1.623				4*2/1	1131
Poly(1,3-β-D-glucose) [curdlan]													
(anhydrous)	Hex	C6-6	14.41	14.41	5.87	Triple	6	1.530				4*6/1	1132
(162.14)	Hex	C6-6	14.38	14.38	5.82	Triple	6	1.550				4*6/1	1168
(hydrate)	Ortho		26.4	16.4	22.65		14					4*7/1	1133
	Hex		17.01	17.01	22.70	Triple	28	1.473				4*7/1	1168
(dihydrate)	Hex	C3-1	15.56	15.56	18.78	Triple	18	1.476				4*6/1	1132
–, triacetate [pachyman]													
I. (288.25)	Ortho	D2-4	11.0	19.0	22.38		12	1.228				4*6/1	1140
	Hex	C6-2	10.99	10.99	22.91		6	1.198				4*6/1	1582
II.	Ortho		11.49	20.13	18.60		12	1.335				4*6/1	1140
Poly(1,4-α-D-glucose) [amylose]													
A. (162.14)	Ortho		11.90	17.70	10.52	Double	12	1.580				5*6/1	1146
(3 H_2/4 g.)	Mono		21.24	11.72	10.68	γ=123.48	12	1.457				5*6/1	1347
B.	Ortho	D2-1	16.0	9.2	10.6[b]		8	1.38				5*2/1	644
(anhydrous)	Mono		12.0	16.25	10.48	γ=96.5	12	1.591					1145
(monohydrate)	Ortho		15.6	9.0	10.6[b]		8	1.61				5*4/1	645
(trihydrate?)	Ortho		18.33	15.87	10.41		12	1.422				5*6/1	1143
(trihydrate)	Hex		18.50	18.50	10.40	Double	12	1.397				5*6/1	1144
(tetrahydrate?)	Ortho		15.9	18.2	10.4		12	1.55				5*6/1	1219
V-A. "anhydrous" (monohydrate)													
(dehydrate)	Ortho	D2-4	12.92	22.40	7.95		12	1.560				5*6/1	843
	Ortho	D2-4	12.97	22.46	7.91		12	1.558				5*6/1	1243
	Ortho	D2-4	13.0	22.5	7.90		12	1.554				5*6/1	20
			13.2	23.3								5*6/1	647
V-H. "hydrate" (dihydrate?)													
	Ortho	D2-4	13.61	23.60	8.01		12	1.535				5*6/1	1244
	Ortho	D2-4	13.65	23.70	8.05		12	1.516				5*6/1	20

TABLE 12. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm^3)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
			a	*b*	*c*	Angles		Crystal.	Amorph.[a]				
	Ortho	D2-4	13.7	23.8	8.05		12	1.504				5*6/1	646
	Phex		14.94	14.94	7.93		7	1.503				5*7/1	668
–, triacetate													
I. (288.25)	Ortho		10.87	18.83	52.33		28	1.251				5*14/3	648
II.	Ortho		29.04	20.97	34.00		54	1.248				5*9/2	1301
–, tributyrate													
(372.42)	Ortho		22.04	38.18	18.45		30	1.195				5*5/1	1301
–, triethyl-													
1. (246.30)	Ortho	D2-4			15.48							5*4/1	1142
	Ortho	D2-4	16.13	11.66	15.48		8	1.124				5*4/1	1221
3.	Ortho	D2-4	15.36	12.18	15.48		8	1.130				5*4/1	1220
–, –, complexes with:													
chloroform													
(1 : 2)	Ortho	D2-4	16.76	14.28	16.02		8	1.267				5*4/1	1142
(1 : 1)	Ptet		14.70	14.70	15.48		8	1.215				5*4/1	1142
dichloromethane													
(1 : 2)	Ortho	D2-4	16.52	13.95	16.02		8	1.192				5*4/1	1142
(1 : 1)	Ptet		14.70	14.70	15.48		8	1.099				5*4/1	1142
nitromethane													
(1 : 1)	Ptet		14.70	14.70	15.48		8	1.147				5*4/1	1142
–, triisobutyrate													
(372.42)	Ortho		32.38	32.38	16.10		32	1.172				5*4/1	1301
–, trimethyl-													
(204.22)	Ortho	D2-4	17.24	8.704	15.64		8	1.156				5*4/1	820
–, –, complexes with													
chloroform													
(1 : 1)	Ortho	D2-4	14.57	13.28	15.96		8	1.392				5*4/1	1302
dicloromethane													
(1 : 1)	Ptet	D2-4	13.92	13.92	15.80		8	1.255				5*4/1	1302
–, tripropionate													
(330.34)	Ortho		20.26	35.10	18.46		30	1.254				5*5/1	1301
–, trivalerate													
(414.50)	Ortho		23.44	27.85	18.80		20	1.122				5*5/1	1301
Poly(1,4-α-D-glucose), complexes with:													
–, alcohols													
butanol	Ortho	D2-4	27.0	26.4			24					5*6/1	1156
(V-A)	Ortho	D2-4	13.20	27.00	7.92		12					5*6/1	1246
(V-H)	Ortho	D2-4	13.70	25.80	8.10		12					5*6/1	1246
1-naphthol	Tet	D4-4	22.9	22.9	7.8		16					5*8/1	1247
–, DMSO													
(8 DMSO/cell)	Tet	D2-4	19.17	19.17	24.39		36					5*18/	649
	Ptet	D2-4	19.21	19.21	8.12		12					5*6/1	667
	Ortho		30.23	28.18	7.91		14					5*7/1	1245
–, ethylenediamine													
(1 : 2)	Ptet	D2-4	18.87	18.87	7.99		12					5*6/1	1248
–, fatty acids	Ortho	D2-4	13.0	23.0	8.05		12					5*6/1	646
–, hydroxides													
$C(NH_2)_3OH$			13.1	22.6	9.0		12						650
LiOH			12.1	22.6	8.8		12						650
NaOH			12.3	22.6	8.9		12						650
KOH	Ortho	D2-4	12.7	22.6	9.0		12						650
NH_4OH			12.7	22.6	9.0		12						650
CSOH			12.4	22.6	8.9		12						650
–, iodine	Hex		12.97	12.97	7.91		6	1.77					651
(204.44)													
(1 I/3 residues)													
–, potassium salts													
dry bromide	Tet	D4-8	10.2	10.2	16.4		8					5*4/1	661
formate	Tet	D4-8	10.2	10.2	16.4		8					5*4/1	661
iodide	Tet	D4-8	10.5	10.5	15.9		8					5*4/1	661
wet (10% H_2O)													
acetate	Tet	D4-8	10.8	10.8	16.1		8					5*4/1	661
bicarbonate	Tet	D4-8	10.8	10.8	15.8		8					5*4/1	661

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TABLE 12. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
bromide	Tet	D4-8	10.7	10.7	16.1		8					5∗4/1	661
formate	Tet	D4-8	10.8	10.8	16.1		8					5∗4/1	661
iodide	Tet	D4-8	10.7	10.7	16.1		8					5∗4/1	661
atm. dried													
acetate	Ortho		11.0	18.1	17.9		16						661
propionate	Ortho		11.4	18.0	17.6		16						661
Poly(1,4-β-D-glucose) [cellulose]													
I. (162.14)	Mono		8.35	7.9	10.3^b	$\gamma=96$	4	1.59				5∗2/1	22
	Mono		8.20	7.90	10.3^b	$\gamma=96.7$	4	1.625				5∗2/1	98
	Mono		16.78	15.88	10.58^b	$\gamma=98$	16	1.543				5∗2/1	1249
	Mono		8.171	7.846	10.34^b	$\gamma=96.4$	4	1.635				5∗2/1	28
	Mono		10.85	12.08	10.3^b	$\gamma=1.59$	8	1.598				5∗2/1	709
	Mono		16.78	15.88	10.3^b	$\gamma=98$	16	1.585				5∗2/1	805
	Tri		9.41	8.15	10.34	90,58,96	4	1.624				5∗2/1	841
	Mono	C2-2	16.34	15.72	10.38	$\beta=97$	16	1.628				5∗2/1	852
	Mono	C2-2	7.78	8.20	10.34^b	$\gamma=96.5$	4	1.643				5∗2/1	1149
	Mono		16.43	15.70	10.33	$\gamma=97.0$	16	1.629				5∗2/1	1250
	Mono	C2-2	8.34	7.71	10.37	$\gamma=97.6$	4	1.629				5∗2/1	1576
(α)	Tri	C1-1	6.74	5.93	10.36	117,113,81	2	1.586				5∗2/1	1577
(β)	Mono	C2-2	8.01	8.17	10.36	$\gamma=97.3$	4	1.601				5∗2/1	1577
II.	Mono		8.14	9.14	10.3^b	$\gamma=118$	4	1.592				5∗2/1	22
	Mono		8.02	9.03	10.3^b	$\gamma=117.2$	4	1.623				5∗2/1	98
	Mono		7.917	9.083	10.34^b	$\gamma=117.3$	4	1.630				5∗2/1	28
	Tri		8.97	7.31	10.34^b	$\gamma=99.4$	4	1.610				5∗2/1	708
	Mono	C2-2	8.02	8.99	10.36^b	$\gamma=116.6$	4	1.612				5∗2/1	842
	Mono		15.7	18.4	10.3^b	$\gamma=117$	16	1.625				5∗2/1	884
	Mono	C2-2	9.09	7.96	10.31	$\gamma=117.3$	4	1.624				5∗2/1	889
	Mono	C2-2	4.46	7.25	10.34^b	$\gamma=98.6$	2	1.629				5∗2/1	1150
	Mono		7.94	9.12	10.30^b	$\gamma=116.33$	4	1.611				5∗2/1	1151
(monohydrate)	Mono	C2-2	9.04	9.63	10.34	$\gamma=116$	4	1.479				5∗2/1	1152
	Mono		15.92	18.22	10.31	$\gamma=117$	16	1.617				5*2/1	1303
	Mono	C2-2	8.00	9.05	10.38	$\gamma=116.8$	4	1.605				5∗2/1	1578
III.	Mono		7.74	9.9	10.3^b	$\gamma=122$	4	1.61				5∗2/1	28
	Mono	C2-2	10.25	7.78	10.34	$\gamma=122.4$	4	1.547				5∗2/1	890
	Mono		7.78	9.92	10.30^b	$\gamma=122$	4	1.597				5∗2/1	1151
IV.	Mono		8.12	7.99	10.3^b	$\gamma=90$	4	1.612				5∗2/1	98
			7.9		10.3^b							5∗2/1	239
	Mono		8.068	7.946	10.3^b	$\gamma=90$	4	1.63				5∗2/1	28
	Ortho		8.01	8.12	10.34		4	1.601				5∗2/1	1153
X.	Mono		8.10	8.16	10.3^b	$\gamma=101.7$	4	1.615				5∗2/1	98
	Mono		8.12	7.99	10.3^b	$\gamma=90$	4	1.612				5∗2/1	218
–, dinitrate													
(252.14)			13.9		8.0								24
–, sodium													
I. (1:1:2) (238.17)	Port	C2-2	8.83	25.28	10.29		8	1.377				5∗2/1	1445
IV. (2:2:1) (171.15)	Mono		9.57	8.72	10.35	$\gamma=122.0$	4	1.552				5∗2/1	1446
–, triacetate													
I. (288.25)	Ortho		44.3	13.45	10.47		16	1.228		306/114		5∗2/1	1148
	Ortho	C2-2	23.63	6.27	10.43		4	1.239				5∗2/1	938
II.	Ortho	D2-4	24.68	11.52	10.54		8	1.278				5∗2/1	962
	Port	C2-2	24.5	11.56	10.43		8	1.296				5∗2/1	4
dry			24.6	11.4									1251
–, –, nitromethane complex													
	Tet		21.15	21.15	41.36							1252	
–, tributyrate													
(372.41)	Ortho		31.3	25.6	10.36		16	1.192		207/118 206/46	12.6/118	5∗2/1	1148
–, tricaprylate													
(540.74)										116/117	13.0/117	5∗	
–, tricarbanilate													
(519.51)	Ortho		28.6	16.7	15.25		6	1.105				5∗3/1	1148

TABLE 12. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
(4 MEK/residue)													
–, triethyl-													
(246.30)	Ortho		15.64	27.09	15.0		18	1.158				5*3/1	1148
–, trimethyl-													
I. (204.22)	Ortho		4.64	43.2	10.43		8	1.298				5*2/1	1136
	Port	C2-2	4.64	43.2	10.42		8	1.299				5*2/1	1148
II.												5*3/1	1148
–, trinitrate													
(297.13)	Ortho		12.25	9.0	25.4[b]		10	1.762		697/77	3.8-	5*5/1	24
	Ortho		9.0	14.6	25.4		10	1.48		700/81	6.3/77	5*5/2	1147
–, tripropionate													
(330.34)	Ortho		31.6	22.1	15.0		24	1.257		234/144		5*3/1	1148
			11.0	15.4									1348
–, 2.44-nitrate										617/81	5.65/81		
Poly(1,4-β-D-glucose), complexes with:													
–, dimethyl-1,3-propanediamine													
(1:2)	Mono		33.64	30.40	10.26[b]	$\gamma=32.74$	16	1.00				5*2/1	1255
–, ethylenediamine													
I. (1:1)	Mono	C2-2	12.87	9.52	10.35	$\gamma=118.8$	4	1.328				5*2/1	1154
(1:2)			12.2	12.3	10.3[b]	$\gamma=43.23$	4	1.394				5*2/1	1270
–, heptamethylenediamine													
(1:2)			18.4	17.4	(10)[b]	$\gamma=29.23$	4	1.20				5*2/1	1270
–, hexamethylenediamine													
(1:2)			17.2	15.9	10.3[b]	$\gamma=32.35$	4	1.226				5*2/1	1270
–, hydrazine													
II. (1:1)	Mono	C2-2	9.37	19.88	10.39	$\gamma=120$	8	1.539				5*2/1	1154
(1:2)			9.68	9.96	(10)[b]	$\gamma=54.80$	4	1.59				5*2/1	1270
–, octamethylenediamine													
(1:2)			19.1	17.9	(10)[b]	$\gamma=28.52$	4	1.21				5*2/1	1270
–, pentamethylenediamine													
(1:2)			16.6	15.3	10.1[b]	$\gamma=32.92$	4	1.259				5*2/1	1270
–, NaOH/H_2O													
II. (1:1)	Hex		10.0	10.0	15.1		6	1.677				5*3/1	1155
–, trimethylenediamine													
(1:2)					10.2[b]								1270
Poly(1,6-α-D-glucose) [dextran]													
(162.14)	Mono	C2-2	9.22	9.22	7.78	$\beta=91.3$	4	1.631				5*2/1	1129
(high temp.)													
Poly(1,4-α-L-guluronic acid)													
(176.12)	Ortho	D2-4	7.75	10.6	8.7[b]		4	1.64				5*2/1	674
(monohydrate)	Ortho	D2-4	8.6	10.74	8.72[b]		4	1.60				5*2/1	673
Poly(1,3-α-D-mannose)													
(dihydrate)	Mono	C2-2	11.29	18.12	8.40		8	1.560				4*2/1	1356
(162.14)													
Poly(1,4-β-D-mannose)													
I. (162.14)			7.21	8.82	10.27[b]		4	1.65				5*2/1	636
	Ortho	D2-4	8.92	7.21	10.21		4	1.640				5*2/1	1141
	Ortho		8.87	7.29	10.19		4	1.634				5*2/1	1355
II.	Mono		18.8	18.7	10.2[b]	$\gamma=122.5$	16	1.43				5*2/1	636
(4 H_2O/cell)	Ortho	D2-8	8.91	16.46	10.3		8	1.505				5*2/1	1583
–, triacetate													
(288.25)				15.24								5*3/1	672
–, trimethyl-													
	Ortho		4.75	40.1	10.30		8	1.383				5*2/1	1304
Poly(1,4-β-D-mannuronic acid)													
(176.12)	Ortho	D2-4	7.58	8.58	10.35[b]		4	1.738				5*2/1	673
Poly(1,3-β-D-xylose) [xylan]													
(132.12)	Hex		13.7	13.7	5.85[b]		6	1.384				4*	654
(monohydrate)	Hex	C6-4	15.4	15.4	6.12		6	1.190					788
Poly(1,4-β-D-xylose) [hardwood xylan]													
I. dry	Hex		8.8	8.8	14.85[b]		6	1.32				5*3/1	671
(132.12)													

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TABLE 12. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm³)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
			a	b	c	Angles		Crystal.	Amorph.[a]				
(monohydrate)	Hex	D3db	9.16	9.16	14.85		6	1.386				5*3/1	671
(150.13)	Phex	C1-1	9.16	9.16	14.84	$\gamma = 120$	6	1.387				5*3/1	655
(dihydrate)	Hex		9.64	9.64	14.95		6	1.392				5*3/1	671
(168.15)													
II.	Ortho		11.5	14.4									1134
–, diacetate													
(216.19)	Mono	C2-2	7.64	12.44	10.31	$\gamma = 85$	4	1.471				5*2/1	656

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

TABLE 13. OTHER POLYMERS

Polymer	Cryst syst.	Space group	Unit cell parameters				z	Density (g/cm³)		Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
			a	b	c	Angles		Crystal.	Amorph.[a]				
Polyaniline, see Poly(*p*-phenylene amine)													
Poly(barium sebacate)													
(337.58)	Tet		8.04	8.04	15.24		4	2.276				13*1/1	1186
Poly(barium suberate)													
(309.52)	Tet		7.88	7.88	11.53		4	2.871				11*1/1	1186
Poly(4,4′-biphenylenedioxy 4,4′-diphenylene ketone) [PEDEK]													
(364.40)	Ortho		7.72	5.94	37.5		4	1.407		425		19*2/1	1596
Poly[4,4′-biphenylenedioxy)-diphenylene-*m*-phenylene diketone]													
(468.51)	Ortho		7.85	6.05	47.7		4	1.374				23*2/1	1594
Poly(cadmium sebacate)													
(312.64)	Tet		10.16	10.16	15.59		4	1.290				13*1/1	1186
Poly(cadmium suberate)													
(284.58)	Tet		8.32	8.32	12.16		4	2.246				11*1/1	1186
Poly(calcium sebacate)													
(240.32)	Tet		8.20	8.20	15.59		4	1.523				13*1/1	1186
Poly(calcium suberate)													
(212.26)	Tet		7.72	7.72	12.16		4	1.945				11*1/1	1186
Poly(carbon monoxide-*alt*-ethylene) [Poly(propanone-1)]													
α	Ortho	D26-16	6.91	5.12	7.60		4	1.383		278		3*2/1	1586
(56.06)											12.6/1587		
β	Ortho	D2h-16	7.97	4.76	7.57		4	1.296		185		3*2/1	193
(at 140°C)	Ortho	D2h-16	8.24	4.74	7.58		4	1.256				3*2/1	1586
										244/929	7.49/929		
Poly[4,4′-(carbonyldiphenylenedioxy)-diphenylene *p*-phenylene diketone]													
2/5 repeat	Ortho		7.74	6.04	10.05		2	1.404		370		10*1/1	1439
(198.61)													
Poly(decamethylene amine)													
–, *N,N*-dimethyl-													
–, –, salt with ("Ionene")													
$FeCl_4$	Hex		9.71	9.71	11.04		2	1.548		274			1405
SbF_6	Hex		9.71	9.71	11.04		2	1.548		274			1405
Poly(dimethyl ketene)													
I. (ketone)													
α	Ortho	C2v-9	12.85	6.53	8.80		8	1.261		255/130		8*1/1	432
(70.09)					8.8					250			179
β					4.40							2*2/1	456
II. (ester)										170/179			
(140.18)										180/248			
Poly(ethylene amine)													
anhydrate	Ortho	D2h-24	29.8	17.2	4.79	Double	40	1.165		58/738		3*5/1	1107
(43.07)													
hemihydrate	Mono	C2h-6	10.89	9.52	7.31	$\beta = 127.6$	8	1.152				3*2/1	1108
(52.08)													
sesquihydrate	Mono	C2h-6	11.55	9.93	7.36	$\beta = 104.5$	8	1.139				3*2/1	1106
(70.09)													

TABLE 13. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n*∗*p*/*q*)	Refs.
dihydrate	Mono	C2h-6	13.26	4.61	7.36	$\beta = 101.0$	4	1.190				3∗2/1	1106
(79.10)													
–, *N*-benzoyl-													
(147.18)										210/747		3∗	
–, –, *p*-chloro-													
(181.62)	Tri		4.74	14.8	6.55	88,86,99	2	1.334		285/747		3*2/1	746
–, *N*-butyryl-													
(113.16)										155/747		3∗	
–, –, 4-(4-methylthiophenoxy)-													
(251.34)	Tri		4.35	24.0	12.7	90,90,90	4	1.259		105		3∗4/1	739
–, *N*-heptanoyl-													
(155.24)	Tri		5.0	17.7	6.4	85,62,98	2	1.06		175/747		3∗2/1	746
–, *N*-hexanoyl-													
(141.21)	Tri		4.9	15.9	6.4	87,64,95	2	1.06		175/747		3∗2/1	746
–, *N*-isobutyryl-													
(113.16)					6.4					210/747		3∗	746
–, *N*-isovaleryl-													
(127.19)	Tri		4.7	13.0	6.4	80,82,88	2	1.11		210/747		3∗2/1	746
–, *N*-octanoyl-													
(169.27)	Tri		5.03	19.9	6.3	91,60,97	2	1.04		165/747		3∗2/1	746
–, *N*-*p*-toluoyl-													
(161.20)	Tri		4.84	14.8	6.61	91,78,99	2	1.172		260/747		3*2/1	746
–, *N*-valeryl-													
(127.19)	Tri		4.7	14.4	6.4	86,73,97	2	1.03		172/747		3∗2/1	746
Poly(ethylene amine), complexes with:													
–, acetic acid (1 : 1)													
(103.12)	Mono	C2h-2	5.76	6.20	7.39	$\gamma = 95$	2	1.302		135		3∗2/1	1392
–, HCl (1 : 1)													
(79.53)	Ptet		5.06	5.06	7.57		2	1.362		265/1423		3∗2/1	1366
–, oxalic acid and water (2 : 1 : 2)													
(105.09)	Ortho	D2h-7	6.65	10.05	7.32		4	1.427		240		3∗2/1	1428
Poly(ethylisocyanide)													
–, α-phenyl-													
(131.18)	Phex		14.92	14.92	10.33	93,90,118	10	1.078				1∗10/	863
Poly(germylene)													
–, di-*n*-hexyl-													
(242.93)	Ortho		15.65	21.46	4.06		4	1.183				1∗2/1	1635
Poly(germoxane)													
–, phthalocyaninato-													
(601.12)	Tet	C4h-1	13.27	13.27	3.53		1	1.606				2∗1/1	1205
–, –, iodine complex (1 : 1.12)													
	Tet	D4h-2	13.96	13.96	6.96		2	1.820				2∗2/1	1206
Poly(hexamethylene amine)													
–, *N*,*N*-diethyl-													
–, –, salt with ("Ionene")													
$ZnBr_4$	Tet		9.81	9.81	13.88		4	1.734					1405
–, *N*,*N*-dimethyl-													
–, –, salt with ("Ionene")													
BF_4	Hex		7.54	7.54	11.95		2	1.214		276			1405
CdI_4	Tet		9.78	9.78	13.75		4	2.213		261			1405
CF_3O_3	Hex		7.90	7.90	13.06		2	1.305		207			1405
$FeCl_4$	Hex		8.04	8.04	13.10		2	1.476		220			1405
HgI_4	Tet		9.82	9.82	13.54		4	2.454		242			1405
PF_6	Hex		7.75	7.75	11.96		2	1.458		233			1405
SbF_6	Hex		7.90	7.90	12.58		2	1.807		235			1405
$ZnBr_4$	Tet		9.52	9.52	13.46		4	1.746					1405
$Zncl_4$	Tet		9.36	9.36	13.07		4	1.345					1405
ZnI_4	Tet		9.64	9.64	13.89		4	2.134		233			1405
Poly(hydroxymethylene)													
(30.03)					2.5							1∗2/1	338
Poly(1-hydroxytrimethylene)													
(58.08)					6.89							3∗	758

TABLE 13. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (*n* **p*/*q*)	Refs.
Poly(lead sebacate)													
(407.44)	Tet		7.73	7.73	17.42		4	2.600				13*1/1	1186
Poly(lead suberate)													
(379.38)	Tet		7.64	7.64	13.66		4	3.160				11*1/1	1186
Poly(magnesium sebacate)													
(224.54)	Tet		8.26	8.26	13.11		4	1.667				13*1/1	1186
Poly(magnesium suberate)													
(196.49)	Tet		8.76	8.76	11.23		4	1.514				11*1/1	1186
Poly(manganese sebacate)													
(255.17)	Tet		7.92	7.92	14.56		4	1.856				13*1/1	1186
Poly(manganese suberate)													
(227.12)	Tet		7.52	7.52	11.83		4	2.255				11*1/1	1186
Poly(6-mercaptocaproic acid)													
(130.21)					17.8					106		7*2/1	428
Poly(octamethylene-5,5′-dibenzimidazole)													
(344.46)					21							18*1/1	470
Poly(2,5-octamethylene-1,3,4-triazole)													
–, 1-amino- (triazole)													
(194.28)					25.5					258/610		11*2/1	610
Poly(oxybisdimethylsilylene)													
II. (102.24)	Ortho		8.66	11.94	3.9		2	0.80		52		3*1/1	1618
III.	Ortho		7.92	13.72	3.9		2	0.84				3*1/1	1618
Poly(4,4′-oxydiphenylene 4,4′-biphenylene diketone) [PEKDK]													
(376.41)	Ortho		7.64	6.09	38.00		4	1.413				19*2/1	1595
Poly(4,4′-oxydiphenylene ketone) [PEK]													
(196.20)	Ortho		7.63	5.96	10.0		2	1.433	1.272	367		10*1/1	1113
	Ortho	D2h-4	7.65	5.97	10.09		2	1.414		367/1117		10*1/1	1274
	Ortho		7.76	6.00	10.01		2	1.398		365		10*1/1	1439
Poly(4,4′-oxydiphenylene *m*-phenylene diketone) [PEKK(I)]													
(300.31)	Ortho		7.66	6.11	15.76		2	1.352				14*1/1	1592
Poly(4,4′-oxydiphenylene *p*-phenylene diketone) [PEKK]													
I. 2/3 repeat	Ortho		7.69	6.06	10.16		2	1.404				10*1/1	1590
(200.21)	Ortho		7.67	6.06	10.08		2	1.419				10*1/1	1591
II.	Ortho		4.17	11.34	10.08		2	1.395		385		10*1/1	1439
	Ortho		3.93	5.75	10.16		1	1.448				10*1/1	1590
	Ortho		4.2	11.3	10.1		2	1.39				10*1/1	1591
Poly[(4,4′-oxydiphenylene *p*-phenylene diketone)-*alt*-(4,4′-oxydiphenylene *m*-phenylene diketone)]													
I. (600.62)	Ortho		7.78	6.10	31.13		2	1.350				29*1/1	1597
II.	Ortho		4.17	11.08	31.13		2	1.387				29*1/1	1597
III.	Ortho		6.41	6.10	35.04		2	1.456				29*1/1	1597
Poly(*p*-phenylene amine) [aniline]													
–, emeraldine base													
II. (181.22)	Ortho		7.80	5.75	10.05		2	1.335				10*1/1	1612
	Ortho		11.34	5.75	7.56		2	1.221				10*1/1	1613
–, –, complex with doecylbenzenesulfonate													
	Ortho	D2h-13	11.78	17.91	7.16		2	1.114				10*1/1	1613
–, emeraldine salt (HCl)													
I. (217.68)	Port		4.3	5.9	9.6		1	1.48				10*1/1	1612
II.	Ortho		7.0	8.6	10.4		2	1.15				10*1/1	1612
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene diketone]													
2/3 repeat	Ortho	D2h-14	9.96	4.78	10.7		2	1.375				10*1/1	1444
(210.88)													
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene ketone] [PEEK]													
2/3 repeat	Ortho		7.75	5.86	10.0		2	1.405	1.265	335		10*1/1	1113
(192.20)	Ortho	D2h-14	7.75	5.89	9.883		2	1.415		384/1117		10*1/1	1114
	Ortho	D2h-14	7.781	5.922	10.06		2	1.378	1.264			10*1/1	1115
	Ortho	D2h-14	7.83	5.94	9.86		2	1.392				10*1/1	1305
	Mono		7.767	5.911	9.878		2	1.407				10*1/1	1438
	Ortho		7.76	5.89	9.95		2	1.404		335		10*1/1	1439
full repeat	Ortho	D2h-14	7.88	5.94	30.50		4	1.341		338/1383	46/1383	15*2/1	1194
(288.30)	Ortho	D2h-14	7.83	5.94	29.58		4	1.392			351589	15*2/1	1305
								1.401	1.263	395	37.5		1116
(at 291°C)	Ortho		8.048	5.975	9.856		2	1.347				10*1/1	1438

TABLE 13. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm³) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. (n*p/q)	Refs.
–, methyl- (dioxy)													
(302.33)								1.348			22.3		1588
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene 4,4′-oxydiphenylene diketone] [PEEKEK]													
2/5 repeat	Ortho		7.79	5.94	9.96		2	1.396		340		10*1/1	1439
(193.80)													
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene *m*-phenylene diketone] [PEEKmK]													
(392.41)	Ortho		7.71	6.05	39.9		4	1.400				19*2/1	1593
	Ortho	D2h-14	7.747	6.086	19.87		2	1.3911				19*1/1	1640
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene *p*-phenylene diketone] [PEEKK]													
1/2 repeat	Ortho		7.80	6.01	10.01		2	1.388		360		10*1/1	1439
(196.20)	Ortho		7.79	6.025	10.08		2	1.378				10*1/1	1640
Poly(*p*-phenylene disiloxyanylene)													
–, tetramethyl-													
(208.41)	Tet		9.08	9.08	15.38		4	1.092	0.985/787	148/225	18.2/225	7*2/1	115
	Tet	D4-8	9.02	9.02	15.43		4	1.103		160/787	11.3/787	7*2/1	897
Poly(phosphazene)													
–, bis(β-naphthoxy)-													
(331.31)			22.4	13.9		γ=93							1387
–, bis(4-*n*-butylphenyl)azophenoxyethoxy-													
(639.74)	Ortho		35.7	17.85	9.85		8	1.354				2*4/21	1442
–, bis(2,2,3,3,4,4,4-heptafluorobutoxy)-													
(443.08)	Ortho		27	12.85	9.48		8	1.79				4*2/1	1611
–, bis(2,2,3,3,3-pentafluoropropoxy)-													
I. (343.06)	Mono		20.75	15.22	4.74	γ=44.6	4	2.168				2*2/1	1610
II.	Ortho		23.96	10.77	4.64		4	1.903				2*2/1	1610
–, bis(phenoxy)-													
α					4.9					390/909			552
(231.19)	Mono		16.6	13.8	9.70	γ=83	8	1.392				2*4/1	1314
γ			19.2	11.5	9.70		8	1.434				2*4/1	1314
δ	Phex		12.9	12.9									1314
–, –, di-*m*-bromo-													
α	Mono		23.7	10.0	4.85	γ=86	4	2.253		320		2*2/1	1607
(388.98)													
γ	Ortho		23.7	11.0	4.85		4	2.043				2*2/1	1607
–, –, di-*p*-bromo													
γ	Ortho		21.7	12.9	4.90		4	1.884		420		2*2/1	1607
(388.98)													
–, –, di-*m*-chloro-													
α	Mono		23.8	10.3	4.85	γ=86	4	1.808		290		2*2/1	1607
(at 180°C)	Phex		14.2	14.2								2*	870
(300.08)													
–, –, di-*p*-chloro-													
γ	Ortho	D2-4	13.08	20.23	4.90		4	1.537		405/553		2*2/1	822
(300.08)	Ortho		20.5	13.1	4.80		4	1.546		390		2*2/1	1607
										360/1387			
(at 180°C)	Phex		14.2	14.2								2*	870
–, –, di-2,4-dichloro-													
(368.97)	Mono		21.6	16.5	4.86	γ=94	4	1.418		210/553		2*2/1	1185
–, –, di-3,4-dimethyl-													
(287.30)	Port	C2-2	15.85	19.43	9.85		8	1.258				2*4/1	1111
	Ortho	D2h-14	20.5	14.9	9.98		8	1.252				4*2/1	1600
–, –, di-*p*-ethyl-													
(287.30)	Mono	C2-2	30.1	22.1	9.88	γ=111.5	16	1.248				4*2/1	1604
–, –, di-*m*-fluoro-													
α	Mono		26.2	20.1	4.85	γ=86	8	1.393		260		2*2/1	1607
(267.17)													
γ	Ortho		25.7	20.2	4.85		8	1.410				2*2/1	1607
–, –, di-*p*-fluoro-													
α	Mono		26.4	19.2	4.91	γ=86	8	1.430		365/1387		2*2/1	1360
(267.17)													
β	Mono		18.9	13.2	4.90	γ=77	4	1.490				2*2/1	1306

TABLE 13. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters					Density (g/cm^3)		Melting point	Heat of fusion	Chain conform.	Refs.
			a	*b*	*c*	Angles	*z*	Crystal.	Amorph.[a]	(°C)[a]	kJ/mol[a]	(*n* * *p*/*q*)	
γ	Ortho		27.3	19.5	4.75		8	1.404				2*2/1	1387
	Hex		13.5	13.5								2*	1306
	Ortho		26.4	19.2	4.85		8	1.444		370		2*2/1	1607
–, –, di-*p*-isopropyl-													
α	Mono	C2-2	24.55	19.56	5.56	γ = 101.0	6	1.199				2*3/1	1307
(315.35)													
β	Mono		33.24	22.69	9.80	γ = 109.2	16	1.200				2*4/1	1307
	Ortho	D2-4	31.4	11.4	9.92		8	1.180		120		4*2/1	1606
–, –, di-*p*-methoxy-													
α	Ortho		23.9	17.9	9.83		12	1.380				4*2/1	1605
(291.24)													
β	Mono		24.7	19.8	9.83	γ = 102	12	1.234				4*2/1	1605
γ	Ortho		22.1	20.1	9.63		12	1.357				4*2/1	1605
δ			14.4	14.4		γ = 120							1605
–, –, di-*p*-methyl-													
(259.24)	Ortho		14.52	18.62	4.87		4	1.308		417/1387		2*2/1	1110
	Ortho	D2h-15	28.9	18.6	9.95		16	1.288				4*2/1	1598
–, –, di-*p*-phenyl-													
(383.39)	Ortho	C2v-9	41.8	18.3	9.57		16	1.391		205		2*4/1	1349
										398/553			
–, bis(2,2,3,3-tetrafluoropropoxy)-													
I. (307.08)	Mono		24.4	9.96	4.96	γ = 123	4	2.018				2*2/1	1609
–, bis(2,2,2-trifluoroethoxy)-													
α	Ortho		10.16	9.35	4.86		2	1.748		240/553		2*2/1	1185
(243.04)					4.8								552
β	Mono		10.03	9.37	4.86	γ = 91	2	1.767				2*2/1	1112
	Mono		10.17	9.26	4.86	γ = 91	2	1.764				2*2/1	1608
γ	Ortho		20.60	9.40	4.86		4	1.715				2*2/1	1217
	Ortho		20.64	9.29	4.86		4	1.732				2*2/1	1608
δ	Hex		11.90	11.90	4.86		3?	2.031?				2*2/1	1217
–, dichloro-													
(115.89)	Ortho	C2v-9	12.72	11.07	4.92[b]		8	2.222	1.91			2*2/1	56
	Ortho		12.99	11.11	4.92		8	2.168				2*2/1	1109
	Ortho		13.01	11.09	4.92		8	2.169				2*2/1	1109
	Mono	C2h-5	5.98	12.99	4.92	β = 111.7	4	2.168				2*2/1	1326
–, difluoro-													
α	Ortho		21.43	5.83	6.49		12	2.041				2*3/1	1218
(83.04)	Ortho		11.75	11.25	6.49		12	1.929				2*3/1	1218
β	Ortho	C2v-12	8.69	5.38	4.86		4	2.427				2*2/1	1218
–, dimethyl-													
α	Ortho		13.9	5.98	4.9		4	1.22		146/1387		2*2/1	1349
(75.05)	Ortho		13.90	5.98	4.73		8	1.268		143/1350		2*2/1	1599
	Mono	C2h-5	6.345	13.80	4.887	β = 110.4	4	1.2427		146		2*2/1	1603
β					5.85					76			
–, diphenyl-													
α	Ortho		9.9	12.5	9.8		4	1.09				4*2/1	1601
(199.19)	Mono		10.1	10.1	9.95	γ = 101	4	1.328				4*2/1	1602
β					12.5								1602
γ	Ortho		19.9	10.5	9.95		8	1.273				4*2/1	1602
δ	Hex		12.8	12.8									1602
Poly(1,4-piperidinediyl-trimethylene)													
–, 2,6-dioxo-													
(153.18)	Tri		9.64	11.32	15.80	98,98,114	8	1.326		281		7*2/1	481
Poly(siloxane)													
–, diethyl-													
α-1	Mono		14.15	8.75	4.72	γ = 29.8	2	1.169	0.99			2*2/1	1266
(at 193 K)													
(102.21)													
α-2	Mono		14.59	8.90	4.75	γ = 29.66	2	1.112		7		2*2/1	1266
(at 230 K)										7	1.74		1196
β-1	Tet		7.83	7.83	4.72		2	1.173				2*2/1	1266

TABLE 13. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters *a*	*b*	*c*	Angles	*z*	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
(at 193 K)													
β-2	Tet		7.90	7.90	4.72		2	1.152		17/518	2.64/518	2*2/1	1266
(at 233 K)										17	2.15		1196
mesomorphic	Mono		14.75	8.89	4.88	γ = 31.24	2	1.023		57		2*2/1	1266
(at 290 K)													
–, dimethyl-													
(74.16)	Mono		13.0	7.75	8.3[b]	γ = 120	6	1.02	0.98	−40/517	2.72/517	2*3/1	197
										−40/631			
–, diphenyl-													
I. (198.30)	Tet		10.2	10.2	9.9		4	1.279				2*4/1	1656
II.	Ortho		20.10	10.51	10.24		8	1.218		230/907	8.0/907	2*4/1	1275
	Mono	C2-1	21.33	9.91	20.3	γ = 108.9		16		1.300		4*2/1	
–, dipropyl-													
(130.26)	Tet	C4-2	9.52	9.52	9.40		4	1.016		74	3.03	2*4/1	518
										148	5.8		1195
										206/1260			
–, pentaphenyl-*p*-toluyltri- (averaged)													
(202.77)	Ortho		21.06	10.53	10.36		8	1.172				2*4/1	1275
–, phenyl-*p*-toluyl-													
(212.32)	Ortho		21.04	10.86	9.97		8	1.238				2*4/1	1275
–, phthalocyaninato-													
(556.62)	Ortho	D2h-26	13.80	27.59	6.66		4	1.458				2*2/1	1205
–, –, bromine complex (1 : 1.12)													
	Tet	D4h-2	13.97	13.97	6.60		2	1.666				2*2/1	1206
–, –, iodine complex (1 : 1.12)													
	Tet	D4h-2	13.97	13.97	6.60		2	1.802				2*2/1	1206
Poly(silylene)													
–, *n*-butyl-*n*-pentyl-													
I. (156.34)	Ortho		13.23	22.92	13.88		14	0.864				1*7/3	1614
II. (at 100°C)	Hex		13.4	13.4									1614
–, di-*n*-butyl-													
I. (142.32)	Ortho		12.84	22.24	13.9		14	0.828				1*7/3	1396
II.	Phex		13.3	13.3									1617
–, di-*n*-decyl-													
I. (310.64)	Ortho		21.4	24.9	7.8		8	0.99				4*1/1	1617
II.	Phex		19.1	19.1									1617
–, di-*n*-dodecyl-													
I. (366.75)	Ortho		22.0	25.8	7.8		8	1.10				4*1/1	1617
II.	Phex		20.8	20.8									1617
–, diethyl-													
(86.21)	Ortho		11.08	12.10	3.99		4	1.070				1*2/1	1400
(at − 20°C)	Ortho		10.9	11.6	3.86		4	1.173				1*2/1	1632
(at 60°C)	Ortho		10.7	12.4	3.87		4	1.115				1*2/1	1632
–, di-*n*-heptyl-													
I. (226.48)	Ortho		14.68	27.38	4.02		4	0.931				1*2/1	1414
II.	Phex		16.2	16.2									1617
–, di-*n*-hexyl-													
I. (RT)	Mono		13.75	21.82	4.07	γ = 88	4	1.080				1*2/1	1309
(198.43)	Ortho	C2v-9	13.76	23.86	3.99		4	1.006				1*2/1	1615
	Mono				4.00								1308
II.	Phex		15.5	15.5									1617
–, dimethyl-													
(58.16)	Mono		12.18	8.00	3.88	γ = 91	4	1.022		387/1416		1*2/1	1413
(at 160°C)	Hex		7.79	7.79	3.88		2	0.947				1*2/1	1413
–, di-*n*-nonyl-													
I. (282.59)	Ortho		20.5	25.1	7.8		8	0.94				4*1/1	1617
II.	Phex		18.4	18.4									1617
–, di-*n*-octyl-													
I. (254.53)	Ortho		16.4	26.4	4.0		4	0.98				1*2/1	1617
II.	Ortho		20.1	21.7	7.8		8	0.99				4*1/1	1617
III.	Phex		17.9	17.9									1617

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TABLE 13. *cont'd*

Polymer	Cryst syst.	Space group	Unit cell parameters a	b	c	Angles	z	Density (g/cm^3) Crystal.	Amorph.[a]	Melting point (°C)[a]	Heat of fusion kJ/mol[a]	Chain conform. ($n*p/q$)	Refs.
–, di-*n*-pentyl-													
I. (170.37)	Phex		13.76	23.83	13.8	$\gamma = 120$	14	1.011				1*7/3	1414
	Mono		13.9	24.5	13.9	$\gamma = 120$	14	0.966				1*7/3	1616
					13.8							1*7/3	1325
II.	Hex		14.3	14.3									1616
III.	Ortho		13.7	21.4	4.0		4	0.96				1*2/1	1616
–, diphenyl-													
(182.30)	Ptet		22.96	22.96	7.02		16	1.309		>221		1*4/1	927
–, di-*n*-propyl-													
(114.26)	Tet		9.80	9.80	3.99		2	0.990				1*2/1	1400
–, di-*n*-tetradecyl-													
(422.86)	Ortho		29.78	21.37	7.84		8	1.126				4*1/1	1414
	Ortho		21.5	29.5	7.9		8	1.12				4*1/1	1617
–, di-*n*-undecyl-													
I. (338.79)	Ortho		21.6	25.0	7.8		8	1.07				4*1/1	1617
II.	Phex		20.5	20.5									1617
–, *n*-hexyl-*n*-heptyl-													
I. (212.45)	Ortho		14.1	25.0	4.0		4	1.00				4*1/1	1617
II.	Phex		15.3	15.3									1617
–, methyl-*n*-propyl-													
(86.21)	Ortho		9.6	13.1	4.0		4	1.14				1*2/1	1617
–, *n*-pentyl-*n*-hexyl-													
I. (184.40)	Mono		14.7	25.4	4.0	$\gamma = 120$	4	0.95				1*2/1	1617
II.	Phex		14.9	14.9									1617
–, *n*-propyl-*n*-pentyl-													
(142.32)	Hex		12.2	12.2									1614
Poly(stannous sebacate)													
(318.92)	Tet		8.92	8.92	13.62		4	1.955				13*1/1	1186
Poly(stannous suberate)													
(290.87)	Tet		7.78	7.78	11.53		4	2.768				11*1/1	1186
Poly(stannyloxane)													
–, phthalocyaninato-													
(647.22)	Tet	C4h-1	12.81	12.81	3.82		1	1.714				2*1/1	1205
Poly(styrene-*alt*-carbon monoxide)													
isotactic													
(132.16)	Mono	C2-2	8.367	5.47	7.574[b]	$\gamma = 110$	2	1.347				3*2/1	1469
syndiotactic													
	Mono	C2h-5	15.5	6.15	7.56	$\beta = 105$	4	1.261				3*2/1	1467
	Mono	C2h-5	15.20	6.166	7.59	$\beta = 102.5$	4	1.264	1.200			3*2/1	1468
–, *p*-fluoro-													
–, –, syndiotactic													
(150.15)	Mono	C2h-5	15.59	6.168	7.551	$\beta = 98.8$	4	1.3900	1.306			3*2/1	1468
–, *m*-methyl-													
–, –, syndiotactic													
(146.19)	Mono	C2h-5	16.14	6.816	7.580	$\beta = 100.3$	4	1.1835	1.150			3*2/1	1468
–, *p*-methyl-													
–, –, syndiotactic													
(146.19)	Mono	C2h-5	35.54	6.262	7.536	$\beta = 96.0$	8	1.1642	1.133			3*2/1	1468
Poly(zinc sebacate)													
(265.60)	Tet		7.92	7.92	13.25		4	2.122				13*1/1	1186
Poly(zinc suberate)													
(237.55)	Tet		8.68	8.68	10.69		4	1.959				11*1/1	1186

[a] The number after the solidus (/) are reference citations.
[b] The unit cell parameter assignment has been changed from that published so as to make *c* the fiber axis.

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C. MELTING POINTS OF POLYMERS

In the following table of melting points, entries are alphabetical according to the basic structure of the polymer, ignoring substituents. Substituted polymers are listed alphabetically (according to the substituent) under the entry for the unsubstituted polymer. The molecular weight is that of the chemical repeat (the constitutional base unit) in the polymer. Melting points (in °C) are taken from the reference cited. Melting points are presented in this table only for those polymers without (as yet) available crystallographic data: an asterisk (*) in the reference column signifies that the relevant melting point data is contained within the "Crystallographic Data" table of Section B.

Polymer	Molecular weight	Melting point	Refs.
Cellulose, see Poly (1,4-β-D-glucose)			*
Poly(acetaldehyde)			*
–, 2,2,2-trichloro-			*
Poly(acrylamide)	71.08		
–, *N*-docosyl-	379.67	68	1906
–, *N*-dodecyl-	239.40	–8	1906
–, *N*-hexadecyl-	295.51	45	1906
–, *N*-isopropyl-			*
–, *N*-octadecyl-	323.56	68	1906
–, *N*-tetradecyl-	267.46	18	1906
Poly(acrylic acid)	72.06		
–, allyl ester			*
–, butyl ester	128.17	47	401
–, sec-butyl ester			*
–, *tert*-butyl ester			*
–, decyl ester	212.33		
–, – 1,1-dihydroperfluoro-	554.15	100	1898
–, docosyl ester	380.66	72	1906
–, dodecyl ester	240.39	12	1906
–, hexadecyl ester	296.50	43	1906
–, isobutyl ester			*
–, isopropyl ester			*
–, octadecyl ester	324.55	56	1906
–, octyl ester	184.28		
–, –, 1,1-dihydroperfluoro-	454.14	35	1898
–, tetradecyl ester	268.44	32	1906
Poly(acrylonitrile)			*
–, α-ethyl-	81.12	200	436
–, α-isopropyl-	95.14	310	436
–, α-propyl-	95.14	210	436
Poly(2,2′-adipamidodibenzoic isophthalic anhydride)	514.49	225	1871
Poly(4,4′-adipamidodibenzoic isophthalic anhydride)	514.49	273	1871
Poly(2,2′-adipamidodibenzoic terephthalic anhydride)	514.49	235	1871
Poly(4,4′-adipamidodibenzoic terephthalic anhydride)	514.49	285	1871
Poly(adipic anhydride)	128.13	85	1840
		98	1841
		77	1564
Poly(adipoyl dithionisophthaloyldihydrazide)	336.43	280	1889
Poly(adipoyl ethylenediurea)	256.26	241	402
Poly(adipoyl octamethylenediurea)	340.42	290	402
Poly(adipoyl pentamethylenediurea)	298.34	222	402
Poly(β-alanine), see poly(3-aminopropionic acid)			*
Poly(allene)			*
–, tetrafluoro-			*
Poly(allylbenzene), see Poly(propene), 3-phenyl-			*
Poly(2-aminoacetic acid), see Poly(glycine)			*
Poly(*m*-aminobenzoic acid)	119.12	425	735
Poly(*p*-aminobenzoic acid)			*
Poly(3-aminobutyric acid)			*
Poly(4-aminobutyric acid)			*
Poly(10-aminocapric acid)			*
Poly(6-aminocaproic acid) [caprolactam]			*
–, D-(-)-3-methyl-			*
–, 6-methyl-	127.19	185	402

Polymer	Molecular weight	Melting point	Refs.
Poly(6-aminocaproic acid-*alt*-11-aminoundecanoic acid)			*
Poly(8-aminocaprylic acid)			*
Poly(3-aminocyclobutylene)-propionic acid)	125.17		
–, 2,2-dimethyl-	153.22	358	1816
Poly(4-aminocyclohexyleneacetic acid)	139.20	400	402
Poly(aminodihexamethylene suberamide)	353.55	160	402
Poly(aminoditrimethylene oxamide	185.23		
–, *N*-methyl	199.25	202	291
Poly(22-aminodocosanoic acid)	337.59	145	177
Poly(7-aminoenanthic acid)			*
–, (*R*)-3-methyl-			*
–, (*S*)-4-methyl-			*
–, (*R*)-5-methyl-			*
–, (*R*)-6-methyl-			*
–, *N*-methyl-	141.21	65	1828
Poly[*p*-(aminoethylene)-phenyleneacetic acid]	161.20	283	402
Poly[*p*-(aminoethylene)-phenylenebutyric acid]	189.26	224	402
Poly[*p*-(aminoethylene)-phenylenepropionic acid]	175.23	382	402
Poly[*p*-(aminoethylene)-phenylenevaleric acid]	203.28	275	402
Poly(2-aminoethylenesulfonic acid)	107.13	275	1938
Poly(17-aminoheptadecanoic acid)	267.46	150	292
Poly(aminoformic acid)	43.02		
–, *N*- butyl-			*
–, –, 2-methyl-	113.16	220	1909
–, *N*-phenyl-	119.12	275	528
Poly(*p*-aminohydrocinnamic acid)	147.18	310	402
		360	1911
Poly(12-aminolauric acid)			*
–, *N*-methyl-	211.35	52	1929
Poly[(3-aminomethylene)-cyclohexyleneacetic acid]	153.22		
–, 1,3-dimethyl-	181.28	297	1816
Poly[*p*-(aminomethylene)-phenyleneacetic acid]	147.18	355	402
Poly[*p*-(aminomethylene)-phenylenebutyric acid]	175.23	267	402
Poly[*p*-(aminomethylene)-phenylenepropionic acid]	161.20	300	402
Poly[*p*-(aminomethylene)-phenylenevaleric acid]	189.26	233	402
Poly(6-amino-4-oxacaproic acid)	115.13		
–, 3,5-dimethyl-	143.19	210	1902
Poly(5-amino-3-oxavaleric acid)	101.10	148	402
Poly(9-aminopelargonic acid)			*
Poly(3-aminopropionic acid) [β-alanine]			*
–, 2-butyl-2-methyl-			*
–, 2,2-dimethyl			*
–, 2,3-dimethyl-	99.13		
erythro		405	503
threo		355	503
–, 3,3-dimethyl-	99.13	296	503
–, 2-ethyl-2-methyl-			*
–, *N*-isopropyl-	113.16	130	1869
–, *N*-methyl-	85.11	225	1863
		202	1869
–, 3-methyl-, see Poly(3-aminobutyric acid)			*
–, 2-methyl-2-propyl-			*
–, *N*-phenyl-	147.18	205	1869
Poly(18-aminostearic acid)			*
Poly(2-aminotetrahydropyran-6-carboxylic acid)			*
Poly(13-amino-11-thiatridecanoic acid)	229.38	150	402
Poly(13-amino-12-thiatridecanoic acid)	229.38	150	402
Poly(6-aminothiocaproic acid)	129.22	120	402
Poly(7-aminothioenanthic acid)	143.25	235	402
Poly(α-aminotoluic acid)	133.15	300	444
Poly(13-aminotridecanoic acid)	211.35	183	177
Poly(3-aminotrimethylenesulfonic acid)	107.15	260	1932
Poly(11-aminoundecanoic acid)			*
–, *N*-allyl-	223.36	350	402
–, *N*-ethyl-	212.36	– 30	402

Polymer	Molecular weight	Melting point	Refs.
–, 2-methyl-	197.32	130	402
–, *N*-methyl-	197.32	80	402
–, *N*-phenyl-	259.39	– 30	402
–, *N*-piperazinyl-	267.42	142	402
Poly(5-aminovaleric acid)			*
Poly(L-aspartic acid)	115.09		
–, α-isobutyl ester			*
Poly(azelaic anhydride)	170.21	54	1823
Poly(azelaoyl oxalodihydrazide)	270.29	260	402
Poly(benzaldehyde-*alt*-dimethylketene)	176.22	290	1817
–, *p*-chloro-	210.66	260	1817
–, *p*-methoxy-	206.24	240	1817
–, *m*-nitro-	221.21	240	1817
Poly(benzylidenethiodecamethylene sulfide)	294.52	135	1923
Poly(benzylidenethiohexamethylene sulfide)	238.42	115	1923
–, *p*-methoxy-	268.44	130	1923
Poly(benzylvinyl ether)			*
Poly(4,4′-biphenyldicarboxaldehyde)	210.23	250	1801
Poly(4,4′-biphenylene adipamide)	294.35	400	402
Poly(4,4′-biphenylene adipate)	296.32	300	1901
Poly(4,4′-biphenylene carbodiimine)	192.22	>300	1907
–, 3,3′-dimethoxy-	220.27	190	1907
Poly(4,4′-biphenylene-4″,4‴-dibenzylidenimino adipate)	502.57		
–, 3″,3‴-dimethoxy-	562.62	220	1893
Poly(4,4′-biphenylene-4″,4‴-dibenzylidenimino sebacate)	558.68		
–, 3″,3‴-dimethoxy	618.73	230	1893
Poly[4,4′-(4,4′-biphenylenedioxy)-diphenylene carbonate]	396.40	250	1915
Poly(4,4′-biphenylenedioxy 4,4′-diphenylene ketone)			*
Poly(4,4′-biphenylene disiloxanylenedipropionamide)	370.56		
–, tetramethyl- (Si)	426.66	300	402
Poly[4,4′-(2,2′-2,2′-biphenylenedithiazole)-oxy-*p*-phenylene]	486.61	240	1810
Poly[4,4′-(2,2′-2,2′-biphenylenedithiazole)-*p*-phenylene]	394.51	250	1810
Poly(4,4′-biphenylene dithiolisophthalate)	348.44	340	1922
Poly(4,4′-biphenylene dithiolterephthalate)	348.44	>460	1922
Poly(4,4′-biphenylenegermylene)	224.79	295	1777
Poly(biphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide)			*
Poly(4,4′-biphenylene pyromellitimide)			*
Poly(4,4′-biphenylene sebacamide)	350.46	435	402
Poly(4,4′-biphenylene terephthalamide)	314.34	500	402
–, 3,3′-dimethyl-	342.40	440	402
–, –, *N,N*-diethyl-	398.51	254	1870
–, –, *N,N*′-diethyl-	370.45	316	1870
Poly(4,4′-biphenylene terephthalate)			*
–, 2,2′-dipropyl-	400.47	350	1901
Poly[4,4′-biphenylene 4″,4‴-(thiodiphenylene)-dioxy-3,3′,4,4′-diphenylenetetracarboximide]	658.68	483	1771
Poly(1,3-butadiene), 1,2-			*
Poly(1,3-butadiene), 1,4-			*
–, 2-*tert*-butyl			*
–, 2-chloro- [chloroprene]			*
–, 2,3-dimethyl-			*
–, 1-methoxy-	84.12		
trans-		118	1803
–, 2-methyl- [isoprene]			*
–, –, hydrochlorinated			*
–, 2-methylacetoxy-			*
–, 2-propyl-			*
Poly(1,3-butadiene(1,4-)-*alt*-methacrylonitrile]	121.18		
–, 1,1,4,4-tetradeutero-	125.22	75	1825
Poly[1,3-butadiene(1,4-)-*alt*-methyl methacrylate]	154.21	56	1849
Poly(butadiene oxide)	70.09	74	1809
Poly(butenamer)	54.09		
I.		210	1864
II.		150	1864
Poly(1-butene)			*
–, 4-cyclohexyl-	138.25	170	282
		138	328

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Polymer	Molecular weight	Melting point	Refs.
–, 4-*n*-*n*-diisopropylamino-	155.28	315	191
–, 3,3-dimethyl-	84.16	260	282
–, 3-methyl-			*
–, 3-methyl- (1,3-via hydride shift)			*
–, 3-phenyl-	132.21	360	90
–, 4-phenyl-			*
–, 4-*o*-tolyl-	146.23	239	187
–, 4-*p*-tolyl-	146.23	196	187
–, 4,4,4-trifluoro-	110.08	263	1813
–, 3-trifluoromethyl-	124.11	300	1813
–, 4-trimethylsilyl-			*
Poly(2-butene-*alt*-ethylene)			*
Poly(2-butene 4-octenediamide)	222.29		
trans-, *trans*-		301	657
Poly(2-butene oxide)			*
–, 2-methyl-	86.13	196	1879
Poly(2-butene sulfide)	88.17		
cis-		156	548
trans-		192	548
Poly(2-butenylene hexamethylenediurethane)	256.30		
cis-		136	402
trans-		177	402
Poly(4,4′-butylidenediphenylene carbonate)	268.31	170	438
Poly[4,4′-(2,2-butylidene)-diphenylene carbonate]	268.31	222	438
Poly(butylvinyl ether)			*
–, 2-methyl-			*
Poly(*sec*-butylvinyl ether), see Poly(propylvinyl ether), methyl-			*
Poly(*tert*-butylvinyl ether)			*
Poly(butyraldehyde)			*
Poly(caprolactam), see Poly(6-aminocaproic acid)			*
Poly(caprylaldehyde)	128.22	35	329
Poly(carbon monoxide-*alt*-ethylene) [ketone]			*
Poly[*m*-(carboxyphenoxy)-acetic anhydride]	178.14	134	1565
Poly[*p*-(carboxyphenoxy)-acetic anhydride]	178.14		
–, 3-bromo-	257.04	179	1565
Poly(chloroprene), see Poly(1,3-butadiene), chloro-			*
Poly(chlorotrifluoroethylene-*alt*-ethylene)			*
Poly(1,3-cyclobutylene)	54.09		
–, 1-cyano-			*
Poly(1,3-cyclobutylene carbonate)	114.10		
–, 2,2,4,4-tetramethyl-			*
Poly(1,3-cyclobutyleneoxymethylene oxide)	110.12		
–, 2,2,4,4-tetramethyl-			*
Poly(1,2-cycloheptylene-*alt*-ethylene)			*
Poly(1,4-poly-1,3-cyclohexadiene)	80.13		
trans-		380	221
Poly(cyclohexene oxide)	98.14	126	527
Poly(1,3-cyclohexylene adipamide)	224.30		
cis-		170	402
trans-		300	402
Poly(1,4-cyclohexylene adipamide)	224.30	400	402
Poly(1,4-cyclohexylene adipate)			*
Poly(1,3-cyclohexylene azelamide)	266.38		
cis-		125	402
trans-		300	402
Poly(1,4-cyclohexylene 3,3′-dibenzamide)	320.39	390	402
Poly(1,3-cyclohexylenedimethylene adipamide)			*
Poly(1,4-cyclohexylenedimethylene adipamide)	252.36		
cis-		246	385
		225	1878
trans-		345	385
		342	1806
		347	1878
Poly(1,4-cyclohexylenedimethylene adipate)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(1,4-cyclohexylenedimethylene azelamide)	294.44		
cis-		195	385
trans-		275	385
Poly(1,4-cyclohexylenedimethylene azelate)	296.41		
cis-		41	547
trans-		50	547
Poly(1,4-cyclohexylenedimethylene 1,4-cyclohexylenedicarboxylate)	280.36		
cis-, trans-		205	547
trans-, trans-		246	547
Poly(1,4-cyclohexylenedimethylene dithiol-1,4-cyclohexylenedicarboxylate)	312.49		
trans-, trans-		310	1922
Poly(1,4-cyclohexylenedimethylene dodecanediamide)	336.52		
cis-		215	385
		190	1878
trans-		278	385
		280	1878
Poly(1,4-cyclohexylenedimethylene dodecanedioate)	338.49		
cis-		46	547
trans-		85	547
Poly[1,4-cyclohexylenedimethylene (ethylenedithio)-diethylenediurethane]	376.53		
trans-		121	1897
Poly(1,4-cyclohexylenedimethylene glutaramide)	238.33		
cis-		167	385
trans-		290	385
Poly(1,4-cyclohexylenedimethylene glutarate)	240.30		
trans-		50	547
Poly[1,4-cyclohexylenedimethylene (hexamethylenedithio)-diethylenediurethane]	432.64		
trans-		124	1897
Poly(1,4-cyclohexylenedimethylene isophthalamide)	272.35		
trans-		310	385
Poly(1,4-cyclohexylenedimethylene isophthalate)	274.32		
trans-		197	547
Poly(1,4-cyclohexylenedimethylene 2,6-naphthalate)	324.38		
cis-		287	547
trans-		341	547
Poly(1,4-cyclohexylenedimethylene octamethylenediurethane)	340.46		
trans-		160	402
		160	291
Poly(1,4-cyclohexylenedimethylene oxalate)	198.22		
trans-		215	547
Poly(1,4-cyclohexylenedimethylene)-oxymethylene oxide)	156.22		
trans-		78	369
		86	1945
Poly[1,4-cylohexylenedimethylene (pentamethylenedithio)-diethylenediurethane]	418.61		
trans-		102	1897
Poly(1,4-cyclohexylenedimethylene *p*-phenylenediacetate)	302.37		
cis-		55	547
Poly(1,4-cyclohexylenedimethylene pimelamide)	266.38		
cis-		191	385
trans-		293	385
Poly(1,4-cyclohexylenedimethylene pimelate)	268.35		
trans-		42	547
Poly(1,4-cyclohexylenedimethylene sebacamide)	308.47		
cis-		208	385
		200	1878
trans-		300	385
		296	1878
		292	1769
Poly(1,4-cyclohexylenedimethylene sebacate)	310.43		
cis-		50	547
trans-		78	547
Poly(1,4-cyclohexylenedimethylene suberamide)	280.41		
cis-		215	385
trans-		311	385

Polymer	Molecular weight	Melting point	Refs.
Poly(1,4-cyclohexylenedimethylene suberate)	282.38		
cis-		50	547
trans-		96	547
Poly(1,4-cyclohexylenedimethylene succinate)			*
Poly(1,4-cyclohexylenedimethylene terephthalate)			*
Poly[1,4-cyclohexylenedimethylene (tetramethylenedithio)-diethylenediurethane]	404.58		
trans-		129	1897
Poly[1,4-cyclohexylenedimethylene (trimethylenedithio)-diethylenediurethane]	390.56		
trans-		105	1897
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene adipamide]	340.46	196	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene 4,4′-(ethylenedioxy)-dibenzamide]	496.60	250	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene 4,4′-(hexamethylenedioxy)-dibenzamide]	552.71	215	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene oxamide]	284.36	246	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene 4,4′-(oxydiethylenedioxy)-dibenzamide]	540.66	125	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene (*p*-phenylenedioxy)-diacetamide]	420.51	160	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene terephthalamide	360.45	384	402
Poly[(1,4-cyclohexylenedioxy)-ditrimethylene 4,4′-(tetramethylenedioxy)-dibenzamide]	524.66	224	402
Poly(1,4-cyclohexylene dithiolsuccinate)	230.35		
trans-		302	1922
Poly[1,4-cyclohexylene (ethylenedithio)-diethylenediurethane]	348.48		
trans-		214	1897
Poly[1,4-cyclohexylene (hexamethylenedithio)-diethylene-diurethane]	404.58		
trans-		204	1897
Poly(1,4-cyclohexylene 3,3′-methylenedibenzamide)	334.42	174	402
Poly(1,4-cyclohexylene octamethylenediurethane)	312.41		
trans-		255	633
		255	402
		221	291
Poly(1,4-cyclohexyleneoxymethylene oxide)	128.17		
trans-		209	369
Poly[1,4-cyclohexylene (pentamethylenedithio)-diethylene-diurethane]	390.56		
trans-		189	1897
Poly(1,3-cyclohexylene sebacamide)	280.41		
cis-		120	402
trans-		290	402
Poly(1,4-cyclohexylene sebacate)			*
Poly(1,4-cyclohexylene suberate)	254.33		
trans-		181	1174
Poly(1,2-cyclohexylene sulfide)	114.21	130	1917
Poly(1,3-cyclohexylene sulfide)	114.21	139	1917
Poly(1,2-cyclohexylene sulfone)	146.21	284	1917
Poly(1,3-cyclohexylene sulfone)	146.21	309	1917
Poly[1,4-cyclohexylene (tetramethylenedithio)-diethylene-diurethane]	376.53		
trans-		214	1897
Poly[1,4-cyclohexylene (trimethylenedithio)-diethylene-diurethane]	362.50		
trans-		202	1897
Poly(1,4-cylclohexylene urethane)	141.17	>355	444
Poly(cyclohexylidenedimethylene oxide)	126.20	152	1935
–, 3,4-dihydro-	124.18	102	1935
–, –, 4-methyl-	138.21	155	1935
–, 4-methyl-	140.23	165	1935
Poly(4,4′cyclohexylidenediphenylene carbonate)	294.35	260	438
–, 2,2′-dimethyl-	322.40	200	1915
–, 3,3′,5,5′-tetrachloro-	427.09	270	540
Poly(cyclohexylidenethiohexamethylene sulfide)	230.44	75	1923
Poly(1,2-cyclopentylene-*alt*-ethylene)			*
Poly(1,3-cyclopentylene-*alt*-methylene) [1,5-hexadiene]			*
Poly(4,4′-cyclopentylidenediphenylene carbonate)	280.32	250	438
Poly(cyclopropylene cyclopropylenedicarboxamide)	166.18	285	1865
Poly[cyclopropylene (cyclopropylenedicarboxoyl)-diurethane]	254.20		
trans-, *trans-*		245	1865
Poly(cyclopropylenedimethylene cyclopropylenedicarboxamide)	194.23	220	1865
Poly(cyclopropylenedimethylene cyclopropylenediurethane)	226.23		
cis-		175	1865
trans-		210	1865

Polymer	Molecular weight	Melting point	Refs.
Poly(cyclopropylenedimethylene hexamethylenediurethane)	270.33		
cis-		120	1860
trans-		165	1860
Poly(cyclopropylenedimethylene isophthalamide)	230.27	220	1865
Poly(cyclopropylenedimethylene isophthalate)	232.24	100	1860
Poly[cyclopropylenedimethylene 4,4′-(methylenediphenylene)-diurethane]	352.39		
cis-		230	1860
trans-		290	1860
Poly(cyclopropylenedimethylene piperazinediurethane)	240.26		
cis-		70	1860
trans-		100	1860
Poly(cyclopropylenedimethylene sebacamide)	266.38	223	1865
Poly(cyclopropylenedimethylene terephthalate)	232.24	130	1860
Poly(cyclopropylenedimethylene toluylenediurethane)	276.29		
cis-		170	1860
trans-		200	1860
Poly(cyclopropylene hexamethylenediurea)	240.31	180	1865
Poly(cyclopropylene isophthalamide)	202.21	250	1865
Poly(cyclopropylene piperazinediurea)	210.24	260	1865
Poly(cyclopropylene sebacamide)	238.33	220	1865
Poly(cyclopropylidenedimethylene oxide)	84.12	45	1935
Poly(decamethylene)	140.27		
–, 1,2-dichloro-	209.16		
trans-		47	1925
Poly(decamethylene adipamide)			*
Poly(decamethylene adipate)			*
–, 3-methyl- (diacid)	298.42	−2	1796
Poly[decamethylene *N,N*-adipolyldi(6-aminocaproate)]	510.72	137	1792
Poly(decamethylene adipoyldiurethane)	370.45	164	402
Poly(decamethyleneaminohexamethylene amine)	254.46	102	1829
Poly(decamethylene azelamide)			*
Poly(decamethylene azelate)			*
Poly(decamethylene 4,4′-biphenylenediurethane)	410.51		
–, 3,3′-dimethyl- (diisocyanate)	438.57	219	633
Poly(decamethylene carbonate)	200.28	55	1820
Poly(decamethylene *m*-carboxycarbanilate)	319.40	127	1891
Poly(decamethylene *p*-carboxycarbanilate)	319.40	158	1891
Poly[decamethylene (decamethylenedisulfonyl)-dicaproamide]	634.98	207	402
Poly(decamethylene decamethylenediurethane)	398.59	145	291
		142	634
Poly(decamethylene 2,2′-dibenzoate)	380.48	−3	1552
Poly(decamethylene 3,3′-dibenzoate)	380.48	90	1552
Poly(decamethylene 4,4′-dibenzoate)	380.48	132	1552
Poly[(decamethylenedioxy)-dihexamethylene oxide]	356.59	68	542
Poly[4,4‴-(4′,4″-(decamethylenedioxy)-diphenylenedioxy)-diphenylene terephthalate]	672.78	242	1773
Poly[4,4′-(decamethylenedioxy)-diphenyleneoxy-*p*-xylylene oxide]	460.62	211	1789
Poly[3,3′-(decamethylenedioxy)-diphenylene terephthalate]	488.58	108	1773
Poly[4,4′-(decamethylenedioxy)-diphenylene terephthalate]	488.58	259	1773
–, dichloro- (diol)	557.47	160	1773
Poly(4,4′-decamethylenediphenylene carbonate)	352.47	110	1915
		150	1174
Poly(4,4′-decamethylenedipiperazine sebacamide)			*
Poly(decamethylene disiloxanylenedipropionamide)	358.63		
–, tetramethyl- (silicone)	414.74	50	402
Poly(decamethylene disulfide)	204.39	45	1868
		65	725
Poly(decamethylenedithioethylene disulfide)	296.56	80	1837
Poly(decamethylenedithiohexamethylene disulfide)	352.67	46	1784
Poly(decamethylene dithioladipate)	316.53	75	1922
Poly(decamethylene dithiolsebacate)	372.63	103	1922
Poly(decamethylene dithiolterephthalate)	336.52	201	1922
Poly(decamethylenedithiotetramethylene disulfide)	324.62	56	1837
		58	1784
Poly(decamethylene docosanediamide)	506.86	169	454
Poly(decamethylene dodecamethylenediurea)	424.67	190	634

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Polymer	Molecular weight	Melting point	Refs.
Poly(decamethylene phosphinylidenedipropionamide)	330.41		
–, methyl- (*P*)			*
Poly(decamethylene phthalamide)	302.42	115	1868
Poly(decamethylene pimelate)	298.42	66	764
Poly(decamethylene dodecanediamide)	366.59	191	244
		192	454
Poly[decamethylene *N,N'*-dodecanedioyldi(*p*-aminobenzoate)]	606.80	171	1792
Poly(decamethylene eicosanediamide)	478.80	171	244
Poly[decamethylene 4,4'-(ethylenedioxy)-dibenzoate]	440.54	135	290
Poly[decamethylene 4,4'-(ethylenediphenylene)-dioxydiacetamide]	466.62	220	402
Poly(decamethylene *N,N'*-ethylenediterephthalamate)	494.59	277	781
Poly(decamethylene 4,4'-ethylidenedibenzamide)	406.57	150	402
Poly(decamethylene fumaramide)	252.36	50	402
–, 2,3-dimethyl- (diacid)	280.41		
trans-		267	1931
–, methyl- (diacid)	266.38	166	1931
Poly(decamethylene 2,5-furandicarboxamide)	292.38	130	1905
Poly(decamethylene 2,5-furandipropionamide)	348.49	140	402
Poly(decamethylene glutaramide)	268.40		
–, 3-carboxyl- (diacid)	312.41	70	402
Poly(decamethylene glutarate)			*
Poly[decamethylene (hexamethylenedisulfonyl)-dicapromide]	578.87	218	402
Poly(decamethylene *N,N'*-hexamethyleneditерephthalamate)	550.70	235	781
Poly(decamethylene hexamethylenediurea)	340.51	210	402
		216	634
Poly(decamethylene hexamethylenediurethane)			*
Poly(decamethylene 3-hexenedioate)			*
Poly(decamethylene isophthalamide)	302.42	186	1868
Poly(decamethylene isophthalate)	304.39	36	1794
Poly[decamethylene 4,4'-(isopropylidenediphenylene)-dioxy-diacetamide]	480.65	105	402
Poly(decamethylene malonamide)	240.35		
–, dodecyl- (diacid)	408.67	123	1774
Poly(decamethylene malonate)	242.32	34	764
Poly(decamethylene 3,3'-methylenedibenzamide)	392.54	65	402
Poly(decamethylene 4,4'-methylenedibenzamide)	392.54	100	402
Poly(decamethylene 4,4'-methylenediphenylenediurea)	422.57	246	634
Poly(decamethylene 4,4'-methylenediphenylenediurethane)			*
Poly[decamethylene (methylene-2,5-furan)-dicarboxamide]	306.41	111	402
Poly[decamethylene (methylene-2,5-tetrahydrofuran)-dicarboxamide]	310.44	85	402
Poly[decamethylene octadecamethylenediurea)	508.84	172	634
Poly(decamethylene ocatadecanediamide)	450.75	170	454
Poly[decamethylene octadecanedioate)			*
Poly[decamethylene octamethylenediurea)	368.57	201	634
Poly[decamethylene octamethylenediurethane)	370.53	146	402
Poly(decamethylene 4-octenediamide)			*
Poly(decamethylene 4-octenedioate)			*
Poly(2,5-decamethylene-1,3,4-oxadiazole)	208.30	100	1921
Poly(decamethylene oxalate)			*
Poly(decamethylene oxamide)	226.32	229	291
		252	743
		290	402
Poly(decamethylene oxamide-*alt*-decamethylene sebacamide)	564.86	231	1781
Poly(decamethylene oxide)			*
Poly(decamethylene oxydiacetate)	272.34	64	1798
Poly(decamethyleneoxymethylene oxide)	186.30	57	695
Poly(decamethyleneoxy-*p*-phenylene oxide)	248.37	<100	1868
Poly[decamethylene (pentamethylenedisulfonyl)-dicaproamide]	564.84	223	402
Poly(decamethylene *N,N'*-pentamethyleneditерephthalamate)	536.67	205	781
Poly(decamethylene *p*-phenylenediacetamide)	330.47	242	291
		265	454
Poly[decamethylene (*p*-phenylenedioxy)-diacetamide]	362.47	188	402
Poly(decamethylene *p*-phenylenedipropionamide)	358.53	265	402
		271	454
Poly(decamethylene 3,3'-phosphinylidenedibenzamide)	426.50		
–, methyl- (*P*)	440.52	155	402

Polymer	Molecular weight	Melting point	Refs.
Poly(decamethylene 4,4′-phosphinylidenedibenzamide)	426.50		
–, methyl- (*P*)	440.52	186	402
–, phenyl- (*P*)	502.59	192	402
Poly(decamethylene 2,4-pyridinedicarboxamide)	303.41	190	1905
Poly(decamethylene 2,5-pyridinedicarboxamide)	303.41	232	1905
Poly(decamethylene 2,6-pyridinedicarboxamide)	303.41	200	1905
–, 1,4-dihydro-4-*oxo*-	319.41	137	1905
Poly(decamethylene 3,5-pyridinedicarboxamide)	303.41	210	1905
Poly(decamethylene pyromelltimide)			*
–, 3-bromo- (imide)	433.30	291	1267
Poly(decamethylene sebacamide)			*
Poly(decamethylene sebacate)			*
Poly(decamethylene sebacoyldiurethane)	426.55	153	402
Poly(decamethylene suberamide)	310.48	217	244
		208	291
Poly(decamethylene suberate)			*
Poly(decamethylene succinamide)			*
Poly(decamethylene succinate)			*
–, D-1,2-dihydroxy- (diacid)	288.34	66	609
Poly(decamethylene sulfide)	172.33	78	1819
		91	181
Poly(decamethylene sulfonyldivalerate)	404.56	101	1797
Poly(decamethylene terephthalamide)	302.42	276	1868
Poly(decamethylene terephthalate)			*
Poly[decamethylene *N,N*′-terephthaloyldi(6-aminocaproate)]	530.71	166	1792
Poly(decamethylene tetradecamethylenediurea)	452.73	180	634
Poly(decamethylene tetradecanediamide)	394.64	189	2
Poly(decamethylene 2,5-tetrahydrofurandipropionamide)	352.52	178	402
Poly[decamethylene (tetramethylenedisulfonyl)-dicaproamide]	550.81	236	402
Poly(decamethylene *N,N*′-tetramethylenediterephthalamate)	522.64	261	781
Poly(decamethylene tetramethylenediurethane)	314.43	171	633
Poly(decamethylene thiodivalerate)	372.56	57	767
Poly(decamethylenethiohexamethylene sulfide)	288.55	78	1819
Poly(decamethylene 2,5-thiophenedicarboxamide)	308.44	250	1905
Poly(2,5-decamethylene-1,3,4-triazole)	207.32		
–, 1-amino- (triazole)	222.34	242	610
Poly(decamethylenetridecanediamide)	380.62	175	339
Poly(decamethylene *N,N*′-trimethylenediterephthalamate)	508.61	222	781
Poly(decamethylene urea)	198.31	200	402
		197	634
		210	291
Poly(decamethylene *p*-xylylenediurea)	360.50	260	634
Poly(decamethylene *p*-xylylenediurethane)	362.47	147	634
Poly(decenamer)			*
Poly(1-decene)			*
Poly(decylvinyl ether)	184.32	7	1900
Poly[2,7-(1,6-diazanthrylene)-4,4′-biphenylene]	330.39		
–, 4,9-diphenyl-	482.58	498	1778
Poly[2,8-(1,9-diazanthrylene)-4,4′-biphenylene]	330.39		
– 4,6-diphenyl	482.52	513	1778
Poly[2,7-(1,6-diazanthrylene)-4,4′-oxydiphenylene]	346.39		
–, 4,9-diphenyl-	498.58	490	1778
Poly[2,8-(1,9-diazanthrylene)-4,4′-oxydiphenylene]	346.39		
–, 4,6-diphenyl-	498.58	502	1778
Poly(dimethyl ketene)			*
Poly(di-1,4-naphthyleneoxyethylene oxide)	312.37	291	1787
Poly(di-1,4-naphthyleneoxyheptamethylene oxide)	382.50	239	1787
Poly(di-1,4-naphthyleneoxyhexamethylene oxide)	368.48	280	1787
Poly(di-1,4-naphthyleneoxypentamethylene oxide)	354.45	196	1787
Poly(di-1,4-naphthyleneoxytetramethylene oxide)	340.42	324	1787
Poly(di-1,4-naphthyleneoxytrimethylene oxide)	326.40	278	1787
Poly(1,4-dioxanylene-2,5-dimethylene adipamide)	256.30		
trans-		291	1769
Poly(1,4-dioxanylene-2,5-dimethylene sebacamide)	312.41		
trans-		262	1769

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Polymer	Molecular weight	Melting point	Refs.
Poly(1, 3-dioxolane), see Poly(ethyleneoxymethylene oxide)			*
Poly(1,3-dioxopane), see Poly(methyleneoxytetramethylene oxide)			*
Poly(dithiodiethylene sebacamide)	318.49	155	402
Poly(4,4′-dithiodiphenylene hexamethylenediurea)	416.56	262	402
Poly(divinylbenzal)	176.22	100	1830
–, 2-methyl-	190.24	95	1830
–, 4-methyl-	190.24	115	1830
Poly(divinylfurfural)	166.18	145	1830
Poly(1-docosene)			*
Poly(dodecamethylene)	168.32		
–, 1,2-dichloro-	237.21		
trans-		40	1925
–, 1-methyl-	182.35	30	1926
Poly(dodecamethylene adipamide)	310.48	210	339
		230	544
Poly(dodecamethylene adipate)			*
Poly[dodecamethylene *N,N*′-adipoyldi(6-aminocaproate)]	538.77	134	1792
Poly(dodecamethylene 4,4′-biphenylenediurethane)	438.57		
–, 3,3′-dimethyl- (diisocyanate)	466.62	219	402
Poly(dodecamethylene decamethylenediurethane)	426.64	133	634
Poly[4,4′-(dodecamethylenedioxy)-diphenyleneoxy-*p*-xylylene oxide]	488.67	207	1789
Poly(dodecamethylene docosanediamide)	534.92	164	454
Poly(dodecamethylene *N,N*′-dodecamethylenediterephthalamate)			*
Poly(dodecamethylene dodecamethylenediurethane)	454.70	128	633
Poly(dodecamethylene dodecanediamide)	394.64	183	454
Poly[dodecamethylene *N,N*′-dodecanedioyldi(*p*-aminobenzoate)]	634.86	167	1792
Poly(dodecamethylene *N,N*′-ethylenediterephthalamate)	522.64	264	781
Poly(dodecamethylene *N,N*′-hexamethylenediterephthalamate)	578.75	231	781
Poly(dodecamethylene hexamethylenediurea)	368.57	205	634
		238	1892
Poly(dodecamethylene hexamethylenediurethane)	370.53	139	634
Poly(dodecamethylene 3-hexenedioate)			*
Poly(dodecamethylene 4,4′-methylenediphenylenediurea)	450.63	240	634
Poly(dodecamethylene 4,4′-methylenediphenylenediurethane)	452.59	164	634
Poly(dodecamethylene 1,4,5,8-naphthalenetetracarboximide)			*
Poly(dodecamethylene octadecanediamide)	478.80	167	454
Poly(dodecamethylene 4-octenedioate)			*
Poly(dodecamethylene oxamide)			*
Poly(dodecamethylene oxamide-*alt*-dodecamethylene sebacamide)	620.96	217	1781
Poly(dodecamethylene *N,N*′-pentamethylenediterephthalamate)	564.72	206	781
Poly(dodecamethylene *p*-phenylenediacetamide)	358.53	256	454
Poly(dodecamethylene *p*-phenylenedipropionamide)	386.58	263	454
Poly(dodecamethylene phosphinylidenedipropionamide)	358.46		
–, methyl- (*P*)			*
Poly(dodecamethylene pyromellitimide)			*
–, 3-bromo- (imide)	461.36	238	1267
Poly(dodecamethylene sebacamide)			*
Poly(dodecamethylene suberate)			*
Poly(dodecamethylene succinamide)			*
Poly(dodecamethylene terephthalamide)	330.47	296	454
		301	544
Poly[dodecamethylene *N,N*′-terephthaloyldi(6-aminocaproate)]	558.76	163	1792
Poly(dodecamethylene *N,N*′-tetramethylenediterephthalamate)	550.70	258	781
Poly(dodecamethylene *N,N*′-trimethylenediterephthalamate)	536.67	216	781
Poly(dodecamethylene *p*-xylylenediurea)	388.56	258	634
Poly(dodecamethylene *p*-xylylenediurethane)	390.52	178	634
Poly(dodecanedioic anhydride)	212.29	87	1823
Poly(dodecenamer)			*
Poly(1-dodecene)			*
Poly(dodecylvinyl ether)	212.38	30	1900
Poly(eicosamethylene adipate)	424.67	87	1790
–, 3-methyl- (diacid)	438.69	60	1796
Poly(eicosamethylene azelate)	466.75	87	1790
Poly(eicosamethylene 3,3′-dibenzoate)	520.76	91	1552
Poly(eicosamethylene 4,4′-dibenzoate)	520.76	115	1552

Polymer	Molecular weight	Melting point	Refs.
Poly(eicosamethylene glutarate)	410.64	80	1790
–, 3-(*p*-nitrophenyl)- (diacid)	531.74	46	1796
Poly(eicosamethylene isophthalate)	444.66	49	1794
Poly(eicosamethylene malonate)	382.58	69	1868
		69	1790
Poly(eicosamethylene oxalate)	368.56	90	1790
Poly(eicosamethylene oxydiacetate)	412.61	89	1798
Poly(eicosamethylene phthalate)	444.66	52	1794
Poly(eicosamethylene pimelate)	438.69	84	1790
Poly(eicosamethylene sebacate)	480.78	92	1790
Poly(eicosamethylene suberate)	452.72	88	1790
Poly(eicosamethylene succinate)	396.61	89	1790
Poly(eicosamethylene sulfonyldivalerate)	544.83	117	1797
Poly(eicosamethylene terephthalate)	444.66	113	1794
Poly(eicosamethylene thiodivalerate)	512.84	79	767
Poly(enanthaldehyde, see Poly(heptaldehyde)			*
Poly(epichlorohydrin), see Poly(ethylene oxide), chloromethyl-			*
Poly(ethylene)			*
–, chlorotrifluoro-			*
–, 1-butoxy-2-methyl-	114.19		
cis- (erythro-di-isotactic)		100	1880
trans- (threo-di-isotactic)		100	1880
–, 1-*tert*-butoxy-2-methyl-	114.19		
cis- (erythro-di-isotactic)		>250	1880
–, 1-ethoxy-2-methoxy-	102.13		
trans-		217	141
–, 1-ethoxy-2-methyl-	86.13		
cis- (erythro-di-isotactic)		191	1880
trans- (threo-di-isotactic)		207	1880
		230	1804
		243	141
–, isobutoxy-2-methyl-			*
–, 1-isopropoxy-2-methyl-	100.16		
cis- (erythro-di-isotactic)		204	1880
trans- (threo-di-isotactic)		211	1880
–, 1-methoxy-2-methyl-	72.11		
cis- or *trans*- (threo-di-isotactic)		230	1880
		287	1804
		210	141
–, 1-methyl-2-propoxy-	100.16		
trans-		168	1804
–, tetrafluoro-			*
–, trifluoro-			*
Poly(ethylene adipamide)	170.21	310	402
Poly(ethylene adipamide-*alt*-ethylene oxamide)	284.32	D359	1781
Poly(ethylene adipate)			*
–, methyl- (diol)	186.21	−20	765
Poly[ethylene *N,N′*-adipoyldi(6-aminocaproate)]	398.50	163	1792
Poly(ethylene adipoyldiurethane)	258.23	210	402
Poly(ethylene amine)			*
–, *N*-acetyl-	85.11	200	747
–, *N*-benzoyl-			*
–, –, *p*-chloro-			*
–, *N*-butyryl-			*
–, –, 4-(4-methylthiophenyoxy)-			*
–, *N*-cyclohexanecarbonyl-	153.22	285	747
–, *N*-dodecanoyl-	225.38	155	747
–, *N*-heptanoyl-			*
–, *N*-hexanoyl-			*
–, *N*-isobutyryl-			*
–, *N*-isovaleryl-			*
–, *N*-2-naphthoyl-	197.24	258	747
–, *N*-octadecanoyl-	309.54	145	747
–, *N*-octanoyl-			*
–, *N*-perfluorooctanoyl-	439.12	245	747

Polymer	Molecular weight	Melting point	Refs.
–, *N*-perfluoropropionyl-	189.08	216	747
–, *N*-pivaloyl-	127.19	320	747
–, *N*-*P*-toluoyl-			*
–, *N*-valeryl-			*
Poly(ethylene azelamide-*alt*-ethylene oxamide)	326.40	343	1781
Poly(ethylene azelate)			*
–, methyl- (diol)	228.29	– 38	765
Poly(4,4′-ethylenebiphenylene)	180.25	>550	1187
Poly[ethylene *p*-(carboxyphenoxy)-acetate]	222.20	140	290
Poly[ethylene *p*-(carboxyphenoxy)-butyrate]	250.25	85	290
Poly[ethylene *p*-(carboxyphenoxy)-caproate]	278.30	45	290
Poly[ethylene *p*-(carboxyphenoxy)-heptanoate]	292.33	55	290
Poly[ethylene *p*-(carboxyphenoxy)-undecanoate]	348.44	65	290
Poly[ethylene *p*-(carboxyphenoxy)-valerate]	264.28	55	290
Poly[ethylene *p*-(carboxyphenylene)-acetamide]	204.23	221	1904
Poly(ethylene 1,4-cyclohexylenedicarboxylate)	198.22		
cis-		<30	1912
trans-		120	1912
Poly(ethylene cyclopropylenedicarboxamide)	154.17		
trans-		350	1860
Poly(ethylene decamethylenediurethane)			*
Poly(ethylene 2,2′-dibenzoate)	268.27	130	1654
–, methyl- (diol)	282.30	55	1552
Poly(ethylene 3,3′-dibenzoate)	268.27	122	1552
–, methyl- (diol)	282.30	97	1552
Poly(ethylene 4,4′-dibenzoate)			*
–, methyl- (diol)	282.30	140	1552
Poly(4,4′-ethylenedibenzoic anhydride)	252.27	340	1854
Poly(4,4′-ethylenedicyclohexylene dodecanediamide)	418.66	316	1926
Poly(4,4′-ethylenedicyclohexylene sebacamide)	390.61	333	1926
Poly[3,3′-(ethylenedioxy)-dibenzoic anhydride]	284.27	237	1854
Poly[4,4′-(ethylenedioxy)-dibenzoic anhydride]	284.27	208	1854
		215	1565
		222	1872
–, 3,3′-dimethoxy-	344.32	220	1855
Poly[4,4′-(ethylenedioxy)-dibenzoic isophthalic anhydride]	432.38	140	1871
Poly[4,4′-(ethylenedioxy)-dibenzoic phthalic anhydride]	432.38	185	1872
Poly[4,4′-(ethylenedioxy)-dibenzoic terephthalic anhydride]	432.38	209	1871
Poly[(ethylenedioxy)-diethylene adipamide]	258.32	160	291
		190	402
Poly[(ethylenedioxy)-diethylene adipate]	260.29	– 30	765
Poly[(ethylenedioxy)-diethylene azelate]	302.37	– 40	765
Poly[(ethylenedioxy)-diethylene 2,2′-dibenzoate]	356.37	41	1552
Poly[(ethylenedioxy)-diethylene 3,3′-dibenzoate]	356.37	46	1552
Poly[(ethylenedioxy)-diethylene 4,4′-dibenzoate]	356.37	93	1552
Poly[4,4′-(ethylenedioxydiethylenedioxy)-diphenylene 3,3′,4,4′-(carbonyldiphenylene)tetracarboximide]	616.58	405	1808
Poly[3,4′-(ethylenedioxydiethylenedioxy)-diphenylene 3,3′,4,4′-(oxydiphenylene)tetracarboximide]			*
Poly[(ethylenedioxy)-diethylene glutarate]	246.26	– 28	765
Poly[(ethylenedioxy)-diethylene isophthalate]	280.28	65	1794
Poly[(ethylenedioxy)-diethylene malonate]	218.21	– 28	765
Poly[(ethylenedioxy)-diethylene oxalate]	204.18	– 10	765
Poly[(ethylenedioxy)-diethylene pimelate]	274.32	– 37	765
Poly[(ethylenedioxy)-diethylene 1,4-piperazinediacetamide]	314.39	115	291
Poly[(ethylenedioxy)-diethylene sebacate]	316.39	29	696
		35	767
Poly[(ethylenedioxy)-diethylene suberate]	288.34	– 36	765
Poly[(ethylenedioxy)-diethylene succinate]	232.23	– 18	765
Poly[(ethylenedioxy)-diethylene sulfonyldivalerate	348.39	27	1797
Poly[(ethylenedioxy)-diethylene terephthalate]	280.28	65	1794
Poly[(ethylenedioxy)-diethylene thiodivalerate]	348.46	– 37	767
Poly[(ethylenedioxy)-diethylene undecanediamide]	328.45		
–, 6-hydroxy- (diacid)	344.45	156	402
Poly[4,4′-(ethylenedioxy)-diphenylene 3,3′,4,4′-(carbonyl-diphenylene)-tetracarboximide]	528.48	470	1808
Poly[3,4′-(ethylenedioxy)-diphenylene 3,3′,4,4′-(oxy-diphenylene)-tetracarboximide]			*
Poly[(ethylenedioxy)-ditrimethylene adipamide]	286.37	180	1791

Polymer	Molecular weight	Melting point	Refs.
Poly[(ethylenedioxy)-ditrimethylene azelamide]	328.45	130	1791
Poly[(ethylenedioxy)-ditrimethylene sebacamide]	342.48	160	1791
Poly[(ethylenedioxy)-ditrimethylene terephthalamide]	306.36	240	1791
Poly(4,4′-ethylenediphenylene adipamide)	322.41	400	402
Poly(4,4′-ethylenediphenylene carbonate)	240.26	300	438
Poly(4,4′-(ethylenediphenylene)-methylene]	194.28	255	1187
Poly(4,4′-ethylenediphenylene sebacamide)	378.52	360	402
Poly(ethylene disiloxanylenedipropionamide)	246.42		
–, tetramethyl- (silicone)	302.52	55	402
Poly(ethylene disulfide)			*
Poly[(ethylenedisulfonyl)-diacetic anhydride]	256.24	185	1856
Poly[(ethylenedisulfonyl)-dipropionic anhydride]	284.30	255	1856
Poly[4,4′-(2,2′-ethylenedithiazole)-*p*-phenylene]	270.37	265	1810
Poly[(ethylenedithio)-diacetic anhydride]	192.25	83	1565
Poly[(ethylenedithio)-dipropionic anhydride]	220.30	75	1565
Poly(ethylenedithiohexamethylene disulfide)	240.56	102	1837
		107	1784
Poly(ethylene dithioladipate)	204.31	125	1922
Poly(ethylene dithiolisophthalate)	224.30	185	1922
Poly(ethylene dithiol-2,5-pyridinedicarboxylate)	252.29	280	1922
Poly(ethylene dithiolterephthalate)	224.29	340	1922
Poly(ethylene dithionisophthalate)	224.29	80	1889
Poly(ethylene dithiotetramethylene disulfide)	212.40	96	1837
		88	1784
Poly(ethylene *N,N*′-dodecamethylenediterephthalamate)			*
Poly(ethylene dodecanediamide)	254.37	261	244
Poly[ethylene *N,N*′-dodecanedioyldi(*p*-aminobenzoate)]	494.59	242	1792
Poly[ethylene (ethylenediamino)-dipropionamide]	228.30		
–, *N,N*′-diisopropyl-, *N,N*′-dimethyl-	340.51	102	1875
Poly(ethylene 4,4′-ethylenedibenzoate)	296.32	212	1566
		>320	1654
Poly[ethylene (ethylenedioxy)-diacetamide]	202.21	168	1894
Poly[ethylene 3,3′-(ethylenedioxy)-dibenzoate]	328.32	141	111
Poly[ethylene 4,4′-(ethylenedioxy)-dibenzoate]			*
–, 3,3′-dimethoxy-	388.37	210	1914
Poly[ethylene 4,4′-(ethylenedioxydimethylene)-dibenzoate]	356.38	135	1174
Poly[ethylene 4,4′-(ethylenediphenylene)-diurethane]			*
Poly[ethylene 4,4′-(ethylenedithio)-dibenzoate]	360.44	190	291
Poly[ethylene (ethylenedithio)-diethylenediurethane]	294.38	168	1897
Poly(ethylene fumaramide)	140.14	50	402
Poly(ethylene glutarate)	158.15		
–, methyl- (diol)	172.18	– 18	765
–, 3-(*p*-nitro)-	279.25	76	1796
Poly(ethylene 2,4-hexadienediamide)	166.18	61	402
Poly(ethylene 4,4′-hexamethylenedibenzoate)	352.43	160	1174
Poly[ethylene (hexamethylenedithio)-diethylene-diurethane]	350.49	130	1897
Poly(ethylene hexamethylenediurea)	228.30	293	1892
		240	1768
Poly(ethylene hexamethylenediurethane)			*
Poly(ethylene isophthalate)			*
–, methyl- (diol)	206.20	87	1794
Poly(ethylene *N,N*′-lysyldiurea)	258.28		
–, methyl ester	272.30	160	1768
Poly(ethylene 4,4′-methylenedibenzoate)	282.30	220	291
		>320	1654
Poly[ethylene 4,4′-(methylenediphenylene)-diurethane]			*
Poly(ethylene 1,5-naphthalate)	242.23	230	291
Poly(ethylene 2,6-naphthalate)			*
Poly(ethylene 2,7-naphthalate)	242.23	270	1911
Poly(ethylene nonamethylenediurethane)			*
Poly(ethylene oxalate)			*
Poly(ethylene oxamide-*alt*-ethylene sebacamide)	340.42	323	1781
Poly(ethylene oxamide-*alt*-ethylene suberamide)	312.37	348	1781
Poly(ethylene oxide)			*
–, 1,1-bischloromethyl-	141.00	180	1816

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Polymer	Molecular weight	Melting point	Refs.
–, bromomethyl- [epibromohydrin]	136.98	112	1809
–, *tert*-butyl-			*
–, chloromethyl- [epichlorohydrin]			*
–, 1,2-dichloromethyl-	141.00		
cis-		235	1779
trans-		145	1779
–, fluoromethyl- [epifluorohydrin]	76.07	68	119
–, isopropyl-			*
–, neopentyl-	114.19	82	527
–, *p*-nitrophenol complex			*
–, resorcinol complex			*
–, tetrafluoro-	116.02	42	1858
–, tetramethyl-	100.16	300	664
–, urea complex			*
Poly(ethylene-*p*-oxybenzoate)			*
–, *m*-chloro-	198.61	285	1174
–, *o*-chloro-	198.61	153	1174
–, *m*-mehthyl-	178.19	292	1174
–, *o*-methyl-	178.19	157	1174
Poly(ethylene oxydiacetate)	160.13	20	1798
–, methyl- (diol)	174.15	21	1798
Poly(ethylene 4,4′-oxydibenzoate)	284.27	152	291
		134	1939
Poly[ethylene 4,4′-(oxydiethylene)-dioxydibenzoate]	372.37		
–, 3,3′-dimethoxy-	432.42	118	1914
Poly[ethylene 4,4′-oxydimethylene)-di-2-(1,3-dioxolane)-caprylate]	500.63	19	797
Poly(ethyleneoxymethylene oxide) [1,3-dioxolane]			*
Poly(ethylene *p*-oxyphenyleneacetate)	178.19	172	1841
Poly(ethyleneoxy-*p*-phenylene oxide)	136.15	270	1868
Poly[ethylene 4,4′-(pentamethylenedioxy)-dibenzoate]	370.40	150	1912
Poly[ethylene (pentamethylenedithio)-diethylenediurethane]	336.46	126	1897
Poly(ethylene *p*-phenylenediacetate)	220.22	107	325
		137	341
Poly(ethylene *m*-phenylenedisulfonamide)	262.30	182	1384
Poly(ethylene phthalamide)	190.20	250	1833
Poly(ethylene phthalate)	192.17	104	1654
–, methyl- (diol)	206.20	50	1794
Poly(ethylene pimelate)			*
–, methyl- (diol)	200.24	– 30	765
Poly(ethylene 1,4-piperazinedicarboxylate)			*
Poly(ethylene 1,4-piperazinedipropionamide)	254.33	D231	1875
–, *N,N*′-diisopropyl-	338.50	210	1875
Poly(ethylene 1,4-piperazinedipropionate)	256.30	93	1875
Poly(ethylene sebacamide)	226.32	276	244
		254	291
		280	402
Poly(ethylene sebacate)			*
–, methyl (diol)	242.32	– 26	765
Poly(ethylene sebacoyldiurea)	312.37	228	402
Poly(ethylene sebacoyldiurethane)	314.34	198	402
Poly(ethylene suberate)			*
–, methyl- (diol)	214.26	– 34	765
Poly(ethylene succinate)			*
–, methyl- (diol)	158.15	0	765
Poly(ethylene sulfide)			*
–, *tert*-butyl-			*
Poly(ethylene 4,4′-sulfonyldibenzamide)	330.36	380	1835
Poly(ethylene sulfonyldivalerate)	292.35	86	1797
–, methyl- (diol)	306.38	68	1797
Poly(ethylene L-tartaramide)	174.16		
–, di-*O*-methyl-			*
Poly(ethylene terephthalamide)	190.20	455	829
–, *N,N*′-dimethyl-	218.26	379	829
Poly(ethylene terephthalate)			*
–, chloro- (diacid)	226.62	92	1913

Polymer	Molecular weight	Melting point	Refs.
–, 2,5-dichloro-	261.06	165	1913
–, 2,5-dimethyl-	220.22	180	1913
–, methyl- (diacid)	206.20	70	1913
–, methyl- (diol)	206.20	111	1794
Poly[ethylene *N,N*′-terephthaloyldi(6-aminocaproate)]	418.49	204	1792
Poly(ethylene 2,5-tetrahydrofurandipropionamide)	240.30	218	402
Poly(ethylene 4,4′-tetramethylenedibenzoate)	324.38	170	291
Poly[ethylene 3,3′-(tetramethylenedioxy)-dibenzoate]	356.37	100	111
Poly[ethylene 4,4′-(tetramethylenedioxy)-dibenzoate]	356.37	252	1841
–, 3,3′-dimethoxy-	416.43	117	1914
Poly[ethylene 4,4′-(tetramethylenediphenylene)-diurethane]	354.41	274	414
Poly[ethylene (tetramethylenedithio)-diethylene-diurethane]	322.44	126	1897
Poly[ethylene 2,4,8,10-tetraoxa-3,9-spiro(5.5)hendecane-dicaprylate]	470.60	85	797
Poly(ethylene 4,4′-thiodibenzoate)	300.33	200	291
Poly(ethylene thiodienanthamide)	314.49	210	402
Poly(ethylene thiodivaleramide)	258.38	220	402
Poly(ethylene thiodivalerate)	260.35	28	1797
–, methyl- (diol)	274.38	– 34	767
Poly(ethylenethiohexamethylene sulfide)	176.34	86	1819
Poly(ethylenethiotetramethylene sulfide)	148.29	89	181
Poly(2,5-ethylene-1,3,4-triazole)	95.10		
–, 1-amino- (triazole)	110.12	360	610
Poly[ethylene 4,4′-(trimethylenedioxy)-dibenzoate]	342.35	190	1912
–, 3,3′-dimethoxy-	403.00	105	1914
Poly[ethylene 4,4′-(trimethylenediphenylene)-diurethane]	340.38	207	414
Poly(ethylene *N,N*′-trimethylenediterephthalamate)	396.40	205	781
Poly(ethylene urea)	86.09	400	402
Poly(ethylidene)			*
Poly(4,4′-ethylidenediphenylene carbonate)	240.26	195	438
–, phenyl-	316.36	230	438
Poly(ethylidene *p*-phenylene)	104.15	205	1876
Poly(ethylvinyl ether)	72.11	86	114
–, 2-chloro-	106.55	150	114
–, 2-methoxy-	102.13	73	114
–, 2,2,2-trifluoro-	126.08	128	114
Poly(formaldehyde), see Poly(oxymethylene)			*
Poly(2,5-furandipropionic anhydride)	194.19	67	1565
Poly(furfural-*alt*-dimethylketene)	166.18	180	1817
Poly(1,4-β-D-glucose) [cellulose]	162.14		
–, triacetate			*
–, tributyrate			*
–, tricaprate	624.90	88	144
–, tricaproate	456.58	94	144
–, tricaprylate			*
–, triheptylate	498.66	88	144
–, trilaurate	709.06	91	144
–, trimyristate	793.22	106	144
–, trinitrate			*
–, tripalmitate	877.38	105	144
–, tripropionate			*
–, trivalerate	414.50	122	144
–, 2.44-nitrate			*
Poly(glycine)			*
Poly(glycolic acid), see Poly(2-hydroxyacetic acid)			*
Poly(glycyl-12-aminododecanoic acid)			*
Poly(1,3-heptadiene), 1,4-			*
–, 5-methyl-	110.20		
trans-			
isotactic		180	1896
–, 6-methyl-			*
Poly(heptaldehyde)			*
Poly(heptamethylene)	98.19		
–, 1,2-dichloro-	167.08		
trans-		53	1925
Poly(heptamethylene adipamide)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(heptamethylene azelamide)			*
Poly[4,4′-(heptamethylenedioxy)-diphenyleneoxy-*p*-xylylene oxide]	418.54	207	1789
Poly(heptamethylene disulfide)	162.31	130	1868
Poly(heptamethylene *N,N*′-ethylenediterephthalamate)	452.51	275	781
Poly(heptamethylene *N,N*′-hexamethylenediterephthalamate)	508.61	227	781
Poly(heptamethylene hexamethylenediurea)	298.43	243	1892
Poly(heptamethylene malonamide)	198.26		
–, dodecyl- (diacid)	366.59	147	1774
Poly[heptamethylene 4,4′-(methylenediphenylene)diurethane]			*
Poly(heptamethylene 4-octenediamide)	266.38		
trans- I.		261	657
II.		249	657
Poly(heptamethylene oxamide-*alt*-heptamethylene sebacamide)	480.69	248	1781
Poly(heptamethylene *N,N*′-pentamethylenediterephthalamate)	494.59	199	781
Poly(heptamethylene *p*-phenylenediacetamide)	288.39	234	402
Poly(heptamethylene pimelamide)			*
Poly(heptamethylene sebacamide)			*
Poly(heptamethylene sebacate)			*
Poly(heptamethylene suberamide)			*
Poly(heptamethylene 4,4′-sulfonyldibenzamide)	400.49		
–, 4,4-dimethyl-	428.55	268	1835
Poly(heptamethylene terephthalamide)	260.34	328	1775
		330	828
		341	829
Poly(heptamethylene terephthalate)			*
Poly(heptamethylene 2,5-tetrahydrofurandipropionamide)	310.44	148	402
Poly(heptamethylene *N,N*′-tetramethylenediterephthalamate)	480.56	269	781
Poly(2,5-heptamethylene-1,3,4-triazole)	165.24		
–, 1-amino-	180.26	237	610
Poly(heptamethylene *N,N*′-trimethylenediterephthalamate)	466.53	222	781
Poly(heptametylene undecanediamide)	310.48	195	2
Poly(heptenamer)			*
Poly(1-heptene)			*
–, 6,6-dimethyl-	126.24	104	282
–, 5-methyl-			*
Poly[4,4′-heptylidene)-diphenylene carbonate]	310.39	200	438
Poly(hexadecamethylene adipate)			*
Poly(hexadecamethylene decamethylenediurethane)	482.75	128	634
Poly(hexadecamethylene hexamethylenediurethane)	426.64	134	634
Poly(hexadecamethylene 3-hexenedioate)			*
Poly(hexadecamethylene 4,4′-(methylenediphenylene)-diurethane]	508.70	152	634
Poly(hexadecamethylene 4-octenedioate)			*
Poly(hexadecamethylene suberate)			*
Poly(hexadecamethylene *p*-xylylenediurethane)	446.63	168	634
Poly(1-hexadecene)			*
Poly(1,5-hexadiene), see Poly(cyclopentylene-*alt*-methylene)			*
Poly(1,3-hexadiene), 1,4-			*
–, 5-methyl-			*
Poly(2,4-hexadiene), 2,5-			*
–, 2,5-dimethyl-			*
Poly(2,4-hexadienedioic acid), 2,5-	142.11		
–, diisopropyl ester			*
Poly(2,4-hexadienoic acid), 2,5-	112.13		
–, 6-amino-			*
Poly(2,4-hexadiyne adipate)	220.22	130	1782
Poly(2,4-hexadiynediol), 2,5-	110.11		
–, 1,6-bis(*p*-methoxyphenylsulfonyl)-			*
Poly(2,4-hexadiyne hexamethylenediurethane)	278.31	149	1782
Poly[2,4-hexadiyne (4,4′-methylenediphenylene)-diurethane]	360.37	150	1782
Poly(hexafluoroisobutylene-*alt*-vinylidene fluoride)			*
Poly(hexamethylene adipamide)			*
–, 2,5-dihydroxy- (diacid)	258.32	163	402
–, *N,N*′-dimethyl-	254.37	75	402
–, 3-methyl- (diacid)	240.35	216	291
		230	1859

Polymer	Molecular weight	Melting point	Refs.
–, 3-methyl- (diamine)	240.35	180	291
–, *n*-methyl-	240.35	145	291
Poly(hexamethylene adipamide-*alt*-hexamethylene oxamide)	396.53	268	1781
Poly(hexamethylene adipate)			*
Poly[hexamethylene *N,N*′-adipoyldi(6-aminocaproate)]	454.61	147	1792
Poly(hexamethylene adipoyldiurethane)	314.34	206	402
Poly(hexamethylene azelamide)			*
Poly(hexamethylene azelamide-*alt*-hexamethylene oxamide)	438.61	254	1781
Poly(hexamethylene azelate)	270.37	53	539
		55	764
Poly(hexamethylene carbonate)	144.17	60	1820
Poly(hexamethylene *m*-carboxycarbanilate)	263.29	96	1891
Poly[hexamethylene *p*-(carboxyphenoxy)-acetate]	278.30	50	290
Poly[hexamethylene *p*-(carboxyphenoxy)-caproate]	334.41	60	290
Poly[hexamethylene *p*-(carboxyphenoxy)-undecanoate]	404.55	72	290
Poly[hexamethylene *p*-(carboxyphenoxy)-valerate]	320.38	60	290
Poly[hexamethylene *p*-(carboxyphenylene)-acetamide]	260.34	227	1904
Poly(hexamethylene 1,2-cyclohexylenediacetamide)	280.41	255	402
Poly(hexamethylene 1,2-cyclohexylenedicarboxamide)	252.36		
trans-		242	402
Poly(hexamethylene 1,3-cyclohexylenedicarboxamide)	252.36		
trans-		312	402
Poly(hexamethylene 1,4-cyclohexylenedicarboxamide)	252.36		
trans-		360	402
Poly(hexamethylene 1,4-cyclohexylenedicarboxylate)	254.33		
trans-		120	1174
Poly(hexamethylene cyclopropylenedicarboxamide)	210.28		
cis-		180	1860
–, –, *N,N*′-dibutyl	432.45	20	402
–, –, *N,N*′-diethyl-	376.34	5	402
–, –, *N,N*′-diisopropyl-	404.40	20	402
–, –, *N,N*′-dimethyl-	348.29	30	402
Poly(hexamethylene glutarate)	214.26	34	764
Poly[hexamethylene (hexamethylenedioxy)-dipropionamide]	342.48	105	402
Poly[hexamethylene 4,4′-(hexamethylenedisulfonyl)-dibenzoate]	536.66	186	1174
Poly[hexamethylene (hexamethylenedisulfonyl)-dicaproamide]	522.76	222	402
Poly(hexamethylene *N,N*′-hexamethylenediterephthalamate)			*
Poly[hexamethylene (hexamethylenedithio)-diethylene-diurethane]	406.60	106	1897
Poly(hexamethylene hexamethylenediurethane)			*
Poly(hexamethylene 3-hexenedioate)			*
Poly(hexamethylene isophthalamide)	246.31	220	402
		200	828
–, 5-*tert*-butyl- (diacid)	302.42	210	402
Poly(hexamethylene isophthalate)	248.28	140	111
		80	1794
Poly(hexamethylene 4,4′-isopropylidenedibenzamide)	364.49	180	402
Poly(hexamethylene 4,4′-ketodibenzamide)	350.42	350	402
Poly(hexamethylene ketodipropionamide)	254.33	180	402
Poly(hexamethylene *N,N*′-lysyldiurea)	314.38		
–, methyl ester	328.41	180	1768
Poly(hexamethylene malonamide)			*
–, butyl- (diacid)	240.35	161	1783
		160	1774
–, decyl- (diacid)	324.51	133	1783
		134	1774
–, dimethyl- (diacid)	212.19	117	402
–, dodecyl- (diacid)	352.56	134	1783
		132	1774
–, heptadecyl- (diacid)	422.70	166	1774
–, heptyl- (diacid)	282.43	135	1774
–, hexadecyl- (diacid)	408.67	164	1783
		160	1774
–, hexyl- (diacid)	268.40	145	1783
		144	1774
–, nonyl- (diacid)	310.48	137	1774

Polymer	Molecular weight	Melting point	Refs.
–, octadecyl- (diacid)	436.72	167	1783
		163	1774
–, octyl- (diacid)	296.45	133	1783
		131	1774
–, pentadecyl- (diacid)	394.64	164	1774
–, pentyl- (diacid)	254.37	151	1774
–, propyl- (diacid)	226.32	163	1774
–, tetradecyl- (diacid)	380.62	152	1783
		148	1774
–, tridecyl- (diacid)	366.59	133	1774
–, undecyl- (diacid)	338.54	133	1774
Poly(hexamethylene 3,3′-methylenedibenzamide)	336.44	113	402
Poly(hexamethylene 4,4′-methylenediphenylene)	336.44	132	402
Poly[hexamethylene 4,4′-(methylenediphenylene)-dioxy-diacetamide]	396.49	174	402
Poly[hexamethylene 4,4′-(methylenediphenylene)-diurea]	366.46	250	402
–, 3,3′-dimethyl-	394.52	290	402
–, –, *N,N*′-diethyl-	450.63	120	402
–, –, *N,N*′-dipropyl-	478.68	90	402
Poly[hexamethylene 4,4′-(methylenediphenylene)-diurethane]			*
Poly[hexamethylene (methylene-2,5-furan)-dicarboxamide]	250.30	115	402
Poly[hexamethylene (*p*-methylenephenoxy)-diacetamide]	304.39	220	402
		226	1202
Poly[hexamethylene (*p*-methylenephenylene)-diacetamide]	283.39	204	1202
Poly[hexamethylene (methylene-2,5-tetrahydrofuran)-dicarboxamide]	254.33	78	402
Poly(hexamethylene naphthalenedicarboxamide)	298.39	200	402
Poly(hexamethylene nonamethylenediurea)	326.48	243	1892
Poly(hexamethylene octadecamethylenediurea)	452.73	192	634
Poly(hexamethylene octadecanediamide)	394.64	192	454
–, 9,10-dihydroxy-	426.64	172	402
–, *N,N*′-dimethyl-	422.70	52	1877
Poly(hexamethylene octamethylenedithiourea)	344.58	160	402
Poly(hexamethylene octamethylenediurea)	312.46	239	634
		253	1892
		255	402
Poly(hexamethylene octamethylenediurethane)	342.48	153	633
Poly(hexamethylene 4-octenediamide)			*
Poly(hexamethylene 4-octenedioate)			*
Poly(hexamethylene 5-oxadodecanediamide)	312.45	149	1847
Poly(hexamethylene 6-oxaheptadecanediamide)	382.59	160	1847
Poly(hexamethylene 5-oxahexadecanediamide)	368.56	159	1847
Poly(hexamethylene oxalate)			*
Poly(hexamethylene oxamide)			*
–, 3-oxypropyl-	228.29	240	402
Poly(hexamethylene oxamide-*alt*-hexamethylene pimelamide)	410.56	259	1781
Poly(hexamethylene oxamide-*alt*-hexamethylene sebacamide)	452.64	257	1781
Poly(hexamethylene oxamide-*alt*-hexamethylene suberamide)	424.58	260	1781
Poly(hexamethylene 6-oxapentadecanediamide)	354.53	154	1847
Poly(hexamethylene 5-oxasebacamide)	284.40	160	1847
Poly(hexamethylene 5-oxatetradecanediamide)	340.51	155	1847
Poly(hexamethylene 5-oxaundecanediamide)	298.43	152	1847
Poly(hexamethylene oxide)			*
Poly(hexamethylene oxydiacetamide)	214.26	143	402
		172	1894
Poly(hexamethylene oxydiacetate)	216.23	51	1798
		78	1791
Poly(hexamethylene 4,4′-oxydibenzoate)	340.38	74	1939
Poly(hexamethylene oxydibutyramide)	270.37	187	1847
Poly(hexamethylene oxydicaproamide)	326.48	175	1847
Poly(hexamethylene oxydienanthamide)	354.53	170	1847
Poly[hexamethylene 4,4′-(oxydimethylene)-di-2-(1,3-dioxolane)-caprylamide]	554.77	145	797
Poly(hexamethylene oxydipelarqonamide)	410.64	158	1847
Poly[hexamethylene 4,4′-(oxydiphenylene)-dioxydiacetamide]	398.46	220	402
Poly(hexamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide)			*
Poly(hexamethyelene oxydivaleramide)	298.43	180	1847
Poly(hexamethyleneoxymethylene oxide)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(hexamethyleneoxy-*p*-phenylene oxide)	192.26	170	1868
Poly[hexamethylene (pentamethylenedisulfonyl)-dicaproamide]	508.73	226	402
Poly(hexamethylene *N,N'*-pentamethylenediterephthalamate)	480.56	238	781
Poly[hexamethylene (pentamethylenedithio)-diethylene-diurethane]	392.57	98	1897
Poly(hexamethylene pentamethylenediurea)	270.38	251	1892
Poly[hexamethylene (*p*-phenoxy)-diacetamide]	290.36	86	402
		180	1202
Poly(hexamethylene *m*-phenylenediacetamide)	274.36	182	402
Poly(hexamethylene *p*-phenylenediacetamide)	274.36	300	454
Poly(hexamethylene 3,3'-*p*-phenylenedibutyramide)	330.47	196	1895
–, 3,3'-dimethyl- (diacid)	358.52	193	1895
Poly[hexamethylene (*p*-phenylenedioxy)-diacetamide]	306.36	237	402
		239	1202
Poly(hexamethylene *p*-phenylenedipropionamide)	302.42	290	291
		295	402
		298	1202
		300	1895
–, 3-methyl- (diacid)	316.44	227	1895
Poly(hexamethylene *m*-phenylenedisulfonamide)			*
Poly(hexamethylene *m*-phenylenediurea)	276.34		
–, 4-methyl- (diisocyanate)	290.37	235	402
Poly(hexamethylene 3,3'-phosphinylidenedibenzamide)	370.39		
–, methyl- (*P*)	384.42	172	402
Poly(hexamethylene 4,4'-phosphinylidenedibenzamide)	370.39		
–, hydroxy- (*P*)	386.39	245	402
–, methyl- (*P*)	384.42	213	402
–, phenyl- (*P*)	445.48	231	402
Poly(hexamethylene phthalamide)	246.31	150	1833
Poly(hexamethylene phthalate)	248.28	2	1794
Poly(hexamethylene pimelamide)	240.35	228	244
		202	339
Poly(hexamethylene pimelate)	242.32	50	539
		55	764
Poly(hexamethylene 1,4-piperazinediacetamide)	282.39	168	291
Poly(hexamethylene *N,N'*-piperazinediterephthalamate)	464.52	255	1174
Poly[hexamethylene (1,4-piperazinedithio)-dicarboxylate]	322.44	144	1934
Poly(hexamethylene piperazinediurea)	254.33	245	402
		265	1838
Poly(hexamethylene propylenediurea)	270.33		
racemic		230	1768
Poly(hexamethylene 4(H)-pyran-2,6-dicarboxamide)	250.30		
–, 4-oxo- (diacid)	264.28	77	1905
Poly(hexamethylene 2,3-pyrazoledicarboxamide)	238.29	140	1905
Poly(hexamethylene 2,4-pyrazoledicarboxamide)	238.29	271	1905
Poly(hexamethylene 2,3-pyridinedicarboxamide)	247.30	103	1905
Poly(hexamethylene 2,4-pyridinedicarboxamide)	247.30	220	1905
Poly(hexamethylene 2,5-pyridinedicarboxamide)	247.30	272	1905
Poly(hexamethylene 2,6-pyridinedicarboxamide)	247.30	220	1905
–, 1,4-dihydro-4-oxo-	263.30	178	1905
Poly(hexamethylene 3,4-pyridinedicarboxamide)	247.30	101	1905
Poly(hexamethylene 3,5-pyridinedicarboxamide)	247.30	257	1905
–, 2,6-dimethyl- (diacid)	275.35	140	1905
Poly(hexamethylene pyromellitimide)			*
Poly(hexamethylene 2,5-pyrroledipropionamide)	291.40		
–, 1-methyl- (diacid)	305.42	180	402
Poly(hexamethylene 2,5-pyrrolidinedipropionamide)	295.43		
–, 1-methyl- (diacid)	309.45	200	402
Poly(hexamethylene 5-pyrrolidonylidenedipropionamide)	295.40	250	402
Poly(hexamethylene sebacamide)			*
–, 3-methyl- (diamine)	296.46	153	402
Poly(hexamethylene sebacate)			*
Poly(hexamethylene sebacoyldiurethane)	370.45	158	402
Poly(hexamethylene 4,4'-silylenedibenzamide)	352.51		
–, dimethyl- (Si)	380.56	190	402
Poly(hexamethylene suberamide)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(hexamethylene suberate)			*
Poly[hexamethylene *N,N'*-suberoyldi(*p*-aminobenzoate)]	494.59	250	1174
Poly(hexamethylene succinamide)			*
Poly(hexamethylene succinate)	200.23	57	305
Poly(hexamethylene sulfide)			*
Poly(hexamethylene sulfone)			*
Poly(hexamethylene 4,4'-sulfonyldibenzamide)	386.46	310	1835
Poly(hexamethylene 4,4'-sulfonyldibenzoate)	388.44	280	1174
Poly[hexamethylene 4,4'-(sulfonyldimethylene)-dibenzoate]	416.49	252	1174
Poly(hexamethylene sulfonyldivaleramide)	346.49	215	402
Poly(hexamethylene sulfonyldivalerate)	348.46	92	1797
Poly(hexamethylenesulfonylpentamethylene sulfone)			*
Poly(hexamethylenesulfonyltetramethylene sulfone)			*
Poly(hexamethylene L-tartaramide)	230.26		
–, di-*O*-methyl-			*
Poly(hexamethylene terephthalamide)		*	
–, 2,5-dihydroxy- (diacid)	278.31	334	402
–, 2,5-dimethyl- (diacid)	274.36	143	402
–, *N,N'*-dimethyl-	274.36	260	829
–, methyl- (diacid)	260.34	248	402
Poly(hexamethylene terephthalate)			*
Poly[hexamethylene *N,N'*-terephthaloyldi(6-aminocaproate)]	474.60	177	1792
Poly(hexamethylene tetradecamethylenediurea)	396.62	198	634
Poly(hexamethylene tetradecanediamide)	338.54	209	2
Poly(hexamethylene 2,5-tetrahydrofurandipropionamide)	296.41	182	402
Poly[hexamethylene (tetramethylenedioxy)-dipropionamide]	314.43	110	402
Poly[hexamethylene (tetramethylenedisulfonyl)-dicaproamide]	494.70	241	402
Poly(hexamethylene *N,N'*-tetramethyleneditерephthalamate)	466.53	290	781
Poly[hexamethylene (tetramethylenedithio)-diethylene-diurethane]	378.55	120	1897
Poly(hexamethylene tetramethylenediurea)	256.35	283	1892
Poly[hexamethylene 2,4,8,10-tetraoxa-3,9-spiro(5.5)hendecane-dicaprylamide]	524.74	186	797
Poly(hexamethylene 4,4'-tetrasiloxanylenedibenzamide)	490.81		
–, tetramethyl-tetraphenyl- (Si)	847.28	140	402
Poly(hexamethylene thiodibutyramide)	286.43	200	291
Poly(hexamethylene thiodienanthamide)	370.60	170	402
Poly(hexamethylene thiodipropionamide)	258.38	216	1859
		219	402
Poly(hexamethylene thiodivaleramide)	314.49	180	402
		185	1853
Poly(hexamethylene thiodivalerate)	316.46	46	767
Poly[hexamethylenethio-4,4'-(methylenediphenylene)-diethylene sulfide]	370.61	88	1819
Poly(hexamethylenethiopentamethylene sulfide)	218.42	65	1819
Poly(hexamethylene 2,5-thiophenediacetamide)	280.39	230	1905
Poly(hexamethylene 2,5-thiophenedicarboxamide)	252.33	315	1905
Poly(hexamethylene 2,5-thiophenedipropionamide)	308.44	232	402
		210	1905
Poly(hexamethylenethiotetramethylene sulfide)	204.39	67	1819
		75	181
Poly(hexamethylenethioundecamethylene sulfide)	302.59	78	1923
Poly(hexamethylene thiourea)	158.26	160	402
Poly(2,5-hexamethylene-1,3,4-triazole)	151.21		
–, 1-amino- (triazole)	166.23	275	610
Poly[hexamethylene 4,4'-(trimethylenediphenylene)-dioxy-diacetamide]	424.54	80	402
Poly[hexamethylene(trimethylenedisulfonyl)-diimino-dicaproamide]	446.59	185	402
Poly(hexamethylene *N,N'*-trimethyleneditерephthalamate)	452.51	256	781
Poly(hexamethylene trimethylenediurea)	242.32	266	1892
Poly(hexamethylene undecanediamide)	296.46		
–, 6-hydroxy- (diacid)	312.45	165	402
Poly(hexamethylene urea)			*
Poly(hexamethylene 4,4'-vinylenedibenzamide)	348.44		
–, methyl- (diacid)	362.47	160	402
Poly[hexamethylene 4,4'-(*p*-xylylenedisulfonyl)-dibutyrate]	488.61	196	1174
Poly[hexamethylene *N,N'*-*p*-xylyleneditерephthalamate)	514.58	285	1174
Poly(hexamethylene *p*-xylylenediurea)	304.39	306	634
Poly(hexamethylene *p*-xylylenediurethane)	306.36	209	634

Polymer	Molecular weight	Melting point	Refs.
Poly(1,3,5-hexatriene), 1,6-	80.13	250	1848
Poly(hexenamer)	82.15	61	439
Poly(1-hexene)			*
–, 4,4-dimethyl-	112.22	350	90
–, 4-ethyl-	112.22	234	632
–, 3-methyl-	98.19	285	441
–, 4-methyl			*
–, 5-methyl-			*
Poly[4,4′-(2,2-hexylidene)-diphenylene carbonate]	296.36	200	438
Poly(hydrazo adipamide)	142.16	320	402
Poly(hydrazo azelamide)	184.24	237	402
Poly(hydrazo docosanediamide)	366.59	210	402
Poly(hydrazo dodecanediamide)	226.32	242	402
Poly(hydrazo glutaramide)	128.13	140	402
Poly(hydrazo pimelamide)	156.18	260	402
Poly(hydrazo sebacamide)	198.27	260	402
Poly(hydrazo suberamide)	170.21	275	402
Poly(hydrazo succinamide)	114.10	360	402
Poly(hydrazo thiodivaleramide)	230.33	180	402
Poly(2-hydroxyacetic acid) [glycolic acid]			*
–, diethyl-	114.14	200	1928
–, dimethyl-	86.09	190	1174
–, isopropyl-	100.12	205	1930
Poly(*m*-hydroxybenzoic acid)	120.11	176	1799
Poly(*p*-hydroxybenzoic acid)			*
–, 3,5-di-*tert*-butyl-	232.32	480	1814
–, 3-*n*-propyl-			*
Poly(4,4′-hydroxybibenzoic acid)			*
Poly(3-hydroxy-3-butenoic acid)			*
Poly(3-hydroxybutyric acid)			*
Poly(10-hydroxycapric acid)			*
Poly(6-hydroxycaproic acid)			*
Poly[5-hydroxy-2-(1,3-dioxane)-caprylic acid]			*
Poly(7-hydroxyenanthic acid)	128.17		
–, 4-methyl- (*R*+)	142.20	36	1836
Poly[4-hydroxymethylene-2-(1,3-dioxolane)-caprylic acid]			*
Poly[5-hydroxymethylene-5-methyl-2-(1,3-dioxane)-caprylic acid]	256.34	81	797
Poly(5-hydroxy-3-oxavaleric acid)	102.09	89	305
Poly[(*p*-hydroxyphenylene)-acetic acid]	134.13	280	1174
Poly[3-(*p*-hydroxyphenylene)-propenoic acid]	146.14		
trans-		313	1943
Poly(2-hydroxypropionic acid) [lactic acid]			*
Poly(3-hydroxypropionic acid) [propiolactone]			*
–, 2,2-bischloromethyl-	169.01	302	1174
–, 3-chloromethyl-			*
–, 2,2-dibutyl-	184.28	245	1174
–, 3-dichloromethyl-			*
–, 2,2-diethyl-			*
–, 2,2-dimethyl- [pivalolactone]			*
–, 3-ethyl- [3-hydroxyvaleric acid]			*
–, –, 1,1-dichloro-	169.01	235	1199
–, 2-ethyl-2-methyl-			*
–, 3-isopropyl-			*
–, 2-methyl-			*
–, 3-methyl-, see Poly(3-hydroxybutyric acid)			*
–, 2-methyl-2-propyl-			*
Poly[4-hydroxytetramethylene-2-(1,3-dioxolane)-caprylic acid]	270.37		
cis-		23	797
trans-		23	797
Poly(3-hydroxyvaleric acid), see poly(hydroxypropionic acid), 3-ethyl-			*
Poly(5-hydroxyvaleric acid)	100.12	55	1844
		53	305
–, 2,3,4-trimethoxy-	190.20	138	305
Poly(2-imino-1,3-dithiapentamethylene)	119.20		
–, *N*-ethyl-	147.25	68	1927

Polymer	Molecular weight	Melting point	Refs.
–, *N*-methyl-	133.23	89	1927
–, *N*-phenyl-	195.30	128	1927
–, –209.32	89	1927	
Poly(isobutene)			*
Poly(isobutylene oxide)			*
Poly(isobutylene sulfide)	88.17	187	548
Poly(4,4′-isobutylidenediphenylene carbonate)	268.31	180	438
Poly(isobutylvinyl ether)			*
Poly(isobutyraldehyde)			*
Poly(isophthalaldehyde)	134.13	80	1801
Poly(isophthalic anhydride)	148.12	259	1565
Poly[isophthalic 2,2′-(isophthaloyldiamino)-dibenzoic anhydride]	534.48	259	1871
Poly[isophthalic (4,4′-isopropylidenediphenylenedioxy)-diacetic anhydride]	474.46	65	1871
Poly[isophthalic 4,4′-(methylenedioxy)-dibenzoic anhydride]	418.36		
–, 3,3′-dimethoxy-	478.41	228	1871
Poly[isophthalic (*p*-phenylenedioxy)-diacetic anhydride]	356.29	297	1871
Poly[isophthalic 2,2′-(terephthaloyldiamino)-dibenzoic anhydride]	534.48	291	1871
Poly[isophthalic 4,4′-(tetramethylenedioxy)-dibenzoic anhydride]	460.44	100	1871
Poly[isophthalic 4,4′-(trimethylenedioxy)-dibenzoic anhydride]	446.41	165	1871
–, 3,3′-dimethoxy-	506.46	216	1871
Poly[isophthaloyl (*m*-carboxyphenoxyacetyl)-dihydrazide]	354.32	125	1833
Poly[isophthaloyl (*m*-carboxyphenoxybutyryl)-dihydrazide]	382.38	265	1833
Poly[isophthaloyl (*m*-carboxyphenoxycapryl)-dihydrazide]	410.43	249	1833
Poly[isophthaloyl (*m*-carboxyphenoxypropionyl)-dihydrazide]	368.35	238	1833
Poly[2,2′-(isophthaloyldiamino)-dibenzoic terephthalic anhydride]	534.48	264	1871
Poly(isophthaloyl dithionisophthaloyldihydrazide)	356.42	324	1889
Poly(isoprene), see Poly(1,3-butadiene), 2-methyl-			*
Poly(isopropenylmethyl ketone)			*
Poly(4,4′-isopropylidenedibenzoic anhydride)	266.30	235	1854
		240	1855
Poly[isopropylidenedimethylene, 4,4′-(methylenediphenylene)-diurethane]	354.41	190	402
Poly[isopropylidenedimethylene (1,4-piperazinedithio)-dicarboxylate]	306.40		
–, 2,5-dimethyl-	334.45	135	1934
Poly(4,4′-isopropylidenediphenylene adipate)	338.40		
–, 3,3′,5,5′-tetrachloro-			*
Poly(4,4′-isopropylidenediphenylene carbonate)			*
–, 3,3′-dichloro-	323.18	210	540
		230	736
–, 3,3′-diisopropyl-	338.45	110	1915
–, 3,3′-dimethyl-	282.34	170	540
–, 3,3′,5,5′-tetrabromo-	569.87	260	540
		267	736
–, 3,3′,5,5′-tetrachloro-	392.06	260	540
		275	736
Poly(4,4′-isopropylidenediphenylene cyclopropylene-dicarboxylate)	322.36		
cis-		130	1860
trans-		180	1860
–, 1-methyl- (diacid)	336.39		
trans-		90	1860
–, 3-methyl- (diacid)	336.39		
trans-		130	1860
Poly[(4,4′-isopropylidenediphenylenedioxy)-diacetic anhydride]	326.35	202	1855
Poly[(4,4′-isoproylidenediphenylenedioxy)-diacetic *p*-phenylenedioxydiacetic anhydride]	502.52	230	1872
Poly[(4,4′-isopropylidenediphenylenedioxy)-diacetic 4-pyridinedicarboxylic anhydride]	475.45	120	1872
Poly[(4,4′-isopropylidenediphenylenedioxy)-diacetic terephthalic anhydride]	474.47	270	1871
Poly(4,4′-isopropylidenediphenylene dithioladipate)	370.53	198	1922
Poly(4,4′-isopropylidenediphenylene dithiol-1,3-cyclohexylenedicarboxylate)	396.57	220	1922
Poly(4,4′-isopropylidenediphenylene dithionisophthalate)	390.52	152	1889
Poly(4,4′-isopropylidenediphenylene hexamethylenediurethane)	396.49	130	402
Poly(4,4′-isopropylidenediphenylene isophthalamide)	356.42	424	1886
Poly(4,4′-isopropylidenediphenylene malonate)	296.32	96	1868
Poly(4,4′-isopropylidenediphenylene 4,4′-(methylenediphenylene)-diurethane)	478.55	193	402
Poly(4,4′-isopropylidenediphenylene 1,4-piperazinedipropionate)	422.52	145	1875
Poly(isopropylidene oxide)			*
Poly(isopropylidene sulfide)	74.14	125	1882
		124	1800

Polymer	Molecular weight	Melting point	Refs.
Poly(isopropylvinyl ether)			*
Poly(ketone), see Poly(carbon monoxide-*alt*-ethylene)			*
Poly(lactic acid), see Poly(2-hydroxypropionic acid)			*
Poly(*N*,*N*′-lysyl nonamethylenediurea)	356.47		
–, methyl ester	370.49	185	1768
Poly(*N*,*N*′-lysyl pentamethylenediurea)	300.36		
–, methyl ester	314.38	175	1768
Poly(*N*,*N*′-lysyl propylenediurea)	272.30		
–, methyl ester	286.33		
racemic		175	1768
Poly(*N*,*N*′-lysyl tetramethylenediurea)	286.33		
–, methyl ester	300.36	185	1768
Poly(*N*,*N*′-lysyl trimethylenediurea)	272.30		
–, methyl ester	286.33	205	1768
Poly(*N*,*N*′-lysylurea)	172.18		
–, methyl ester	186.21	175	1768
Poly(2-mercaptoacetic acid)	74.10	169	1922
–, 2-methyl-	88.13	152	1922
Poly(6-mercaptocaproic acid)			*
–, 4-methyl-	144.24	62	1922
Poly(3-mercaptopropionic acid)	88.13	145	1922
–, 2-phthalimido-	233.24	260	1922
–, 2-(*p*-toluenesulfonamido)-	257.33	250	1922
Poly(methacrylic acid)	86.09		
–, *tert*-butyl ester	142.12		
isotactic		104	1851
syndiotactic		165	1851
–, hexadecyl ester	310.52	22	1900
–, methyl ester			*
–, octadecyl ester			*
Poly(methacrylonitrile)			*
Poly(methylene) (see also Poly(ethylene))	14.03		
–, diphenyl-	166.22	220	1831
–, di-*p*-tolyl-	194.28	180	1831
Poly(methylene adipamide)			*
Poly(4,4′-methylenedibenzoic anhydride)	238.24	332	1854
Poly[4,4′-(methylenedioxy)-dibenzoic anhydride]	270.24	220	1854
Poly[4,4′-(methylenedioxy)-dibenzoic terephthalic anhydride]	418.36		
–, 3,3′-dimethoxy-	478.41	267	1871
Poly(4,4′-methylenediphenylene adipamide)	308.38	356	402
–, 3,3′-dimethyl- (diamine)	336.44	326	402
–, –, *N*,*N*′-dibutyl-	448.65	57	402
–, –, *N*,*N*′-diethyl-	392.54	79	402
–, –, *N*,*N*′-dihexyl-	504.76	45	402
–, –, *N*,*N*′-diisoamyl-	476.70	45	402
–, –, *N*,*N*′-diisopropyl-	420.60	61	402
–, *N*,*N*′-diethyl-	364.49	62	402
–, *N*,*N*′-dimethyl-	336.44	120	402
Poly(4,4′-methylenediphenylene adipate)	310.35	140	1901
Poly(4,4′-methylenediphenylene azelamide)	350.46	275	402
		268	1443
		290	1946
–, *N*,*N*′-diethyl-	406.57	41	402
–, *N*,*N*′-dimethyl-	378.52	58	402
Poly(4,4′-methylenediphenylene carbonate)			*
–, 3,3′-dimethyl-	254.29	250	736
–, diphenyl-	378.43	230	540
–, phenyl-	302.33	215	438
Poly[4,4′-(methylenediphenylene)-diethylene sulfide]	254.39	108	1819
Poly(4,4′-methylenediphenylene disiloxanylenedipropionamide)	384.58		
–, tetramethyl- (Si)	440.69	90	402
–, –, 3,3′-dimethyl- (diamine)	454.72	265	402
Poly[3,3′-(4,4′-methylenediphenylene-*N*,*N*′-disuccinimidediyl)-imino-4,4′- methylenediphenylene amine]	556.62	295	1876
Poly(4,4′-methylenediphenylene dodecanediamide)			*
Poly(4,4′-methylenediphenylene isophthalamide)	328.37	416	1886

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Polymer	Molecular weight	Melting point	Refs.
Poly(4,4′-methylenediphenylene octadecamethylenediurea)	534.79	225	634
Poly(4,4′-methylenediphenylene octamethylenediurea)	394.52	263	634
Poly(4,4′-methylenediphenylene oxide)			*
Poly(4,4′-methylenediphenylene *m*-phenylenediurea)	358.40		
–, 3,3′-dimethyl-, 4-methyl-	400.48	307	402
Poly(4,4′-methylenediphenylene pyromellitimide)			*
Poly(4,4′-methylenediphenylene sebacamide)	364.49	280	402
		270	1443
–, *N*,*N*′-diethyl	420.60	32	402
–, 3,3′-dimethyl- (diamine)	392.54	227	402
–, *N*,*N*′-dimethyl-	392.54	55	402
Poly(4,4′-methylenediphenylene terephthalamide)	328.37	420	402
–, *N*,*N*′-dibutyl-	440.59	195	1870
–, *N*,*N*′-diethyl-	384.48	182	1870
– 3,3′-dimethyl- (diamine)	356.42	380	402
–, –, *N*,*N*′-dibutyl-	468.64	159	1870
–, –, *N*,*N*′-diethyl-	412.53	178	1870
–, –, *N*,*N*′-dimethyl-	384.48	229	1870
–, –, *N*,*N*′-dipropyl-	440.59	190	1870
–, *N*,*N*′-dimethyl-	356.42	264	1870
–, *N*,*N*′-dipropyl-	412.53	156	1870
Poly(4,4′-methylenediphenylene tetradecamethylenediurea)	478.68	229	634
Poly(*N*,*N*′-methyleneditерephthalamic anhydride)	324.29	330	1565
Poly(methyleneoxynonamethylene oxide)	172.27	55	695
Poly(methyleneoxyoctadecamethylene oxide)	298.51	72	695
Poly(methylene oxypentamethylene oxide)			*
Poly(methyleneoxytetradecamethylene oxide)	242.40	69	695
Poly(methyleneoxytetramethylene oxide) [1,3-dioxopane]			*
Poly(methylene *p*-phenylene)			*
–, 2,5-dimethyl-	118.18	300	744
–, α-methyl-			*
Poly(methylene sebacamide)			*
Poly(methylene selenide)			*
Poly(methylene sulfide)			*
–, difluoro-	82.07	35	1842
Poly(methylenethiotetramethylene sulfide)	134.26	73	181
Poly(methylvinyl ether)			*
Poly(1,5-naphthalene-4′,4″-dibenzylidenimino isophthalate)	496.52		
–, 3′,3″-dimethoxy-	556.58	220	1893
Poly(1,5-naphthalene-4′,4″-dibenzylidenimino sebacate)	532.64		
–, 3′,3″-dimethoxy-	592.69	180	1893
Poly(1,5-naphthalene-4′,4″-dibenzylidenimino terephthalate)	496.52		
–, 3′,3″-dimethoxy-	556.58	230	1893
Poly(neopentylvinyl ether)			*
Poly(nonamethylene adipamide)	268.40	205	339
	242	1818	
Poly(nonamethylene azelamide)			*
Poly(nonamethylene azelate)			*
Poly[4,4′-(nonamethylenedioxy)-diphenyleneoxy-*p*-xylylene oxide]	446.59	200	1789
Poly(nonamethylene disiloxanylenedipropionamide)	344.60		
–, diethyl-dimethyl- (Si)	428.76	10	402
–, tetraethyl- (Si)	456.82	10	402
Poly(nonamethylene disulfide)	190.36	55	1868
		60	725
Poly(nonamethylenedithiotetramethylene disulfide)	310.59	48	1784
Poly(nonamethylene *N*,*N*′-ethyleneditерephthalamate)	480.56	267	781
Poly(nonamethylene *N*,*N*′-hexamethylene diterephthalamate)	536.67	219	781
Poly(nonamethylene hexamethylenediurethane)			*
Poly(nonamethylene malonamide)			*
–, dodecyl- (diacid)	394.64	127	1774
Poly[nonamethylene 4,4′-methylenediphenylenediurethane]			*
Poly(nonamethylene 4-octenediamide)	294.44		
trans- II.		248	657
Poly(2,5-nonamethlene-1,3,4-oxadiazole)	194.28	82	1921
Poly(nonamethylene oxamide-*alt*-nonamethylene sebacamide)	536.80	234	1781

Polymer	Molecular weight	Melting point	Refs.
Poly(nonamethylene oxide)			*
Poly(nonamethylene *N,N'*-pentamethyleneditererephthalamate)	522.64	194	781
Poly(nonamethylene 3,3'-phosphinylidenedibenzamide)	412.47		
–, methyl- (*P*)	426.50	141	402
Poly(nonamethylene 4,4'-phosphinylidenedibenzamide)	412.47		
–, methyl- (*P*)	426.50	167	402
–, phenyl- (*P*)	488.57	179	402
Poly(nonamethylene pimelamide)	282.43	196	2
Poly(nonmethylene pyromellitimide)			*
–, 3-bromo- (imide)	419.27	287	1267
Poly(nonamethylene sebacamide)	324.51	176	339
		202	402
Poly(nonamethylene terephthalate)			*
Poly(nonamethylene 2,5-tetrahydrofurandipropionamide)	338.49	149	402
Poly(nonamethylene *N,N'*-tetramethyleneditererephthalamate)	508.61	259	781
Poly(nonamethylene tridecanediamide)	366.59	183	2
Poly(nonamethylene *N,N'*-trimethyleneditererephthalamate)	494.59	211	781
Poly(nonamethylene undecanediamide)	338.54	196	2
Poly(nonamethylene urea)	184.28	220	1776
Poly(1-nonene)	126.24	19	250
		22	872
Poly[4,4'-(2,2-nonylidene)-diphenylene carbonate]	338.47	190	438
Poly(norbornene), see Poly(1-vinylene-3-cyclopentylene)			*
Poly(octadecamethylene docosanediamide)	619.08	146	454
Poly(octadecamethylene dodecanediamide)	478.80	170	454
Poly(octadecamethylene 4,4'-(ethylenedixy)-dibenzoate]	552.77	122	290
Poly(octadecamethylene octadecanediamide)	562.97	152	454
Poly(octadecamethylene *p*-phenylenediacetamide)	442.69	225	454
Poly(octadecamethylene *p*-phenylenedipropionamide)	470.74	232	454
Poly(octadecamethylene sebacamide)	450.75	171	454
Poly(octadecamethylene terephthalamide)	414.63	255	454
Poly(octadecamethylene terephthalate)	416.60	116	290
Poly(octadecamethylene *p*-xylylenediurea)	472.72	226	634
Poly(octadecamethylene anhydride)	296.45	95	1823
Poly(1-octadecene)			*
Poly(1,3-octadiene), 1,4-			*
Poly(octamethylene)	112.22		
–, 1-methyl-			*
Poly(octamethylene adipamide)	254.37	250	244
		235	291
		254	544
Poly(octamethylene adipate)			*
Poly[octamethylene *N,N'*-adipoyldi(6-aminocaproate)]	482.66	140	1792
Poly(octamethylene azelamide)			*
Poly(octamethylene 4,4'-biphenylenedicarboxylate)	352.43	197	1174
Poly(octamethylene decamethylenediurethane)	370.53	137	634
Poly[4,4'-(octamethylenedicarbonyl)-diphenylene carbonate]	380.44	175	1174
Poly[4,4'-(octamethylenedioxy)-diphenyleneoxy-*p*-xylylene oxide]	432.56	220	1789
Poly(octamethylene disiloxanylenedipropionamide)	330.58		
–,tetramethyl- (Si)	386.68	95	402
Poly(octamethylene disulfide)	176.34	58	725
Poly[4,4'-(2,2'-octamethylenedithiazole)-*p*-phenylene]	354.53	164	1810
Poly(octamethylenedithiotetramethylene disulfide)	296.56	45	1784
Poly(octamethylene docosanediamide)	478.80	175	454
Poly(octamethylene dodecanediamide)	338.54	202	244
		200	454
		194	291
Poly(octamethylene dodecanedioate)	340.50	73	291
Poly[octamethylene *N,N'*-dodecanedioyldi(*p*-aminobenzoate)]	578.75	188	1792
Poly(octamethylene eicosanediamide)	450.75	179	244
Poly(octamethylene *N,N'*-ethyleneditererephthalamate)	466.53	282	781
Poly(octamethylene 2,5-furandicarboxamide)	264.32	125	1905
Poly(octamethylene *N,N'*-hexamethyleneditererephthalamate)	522.64	238	781
Poly(octamethylene hexamethylenediurethane)			*
Poly(octamethylene 3-hexenedioate)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(octamethylene isophthalamide)	274.36	186	1868
Poly(octamethylene malonamide)			*
–, dodecyl- (diacid)	380.62	125	1774
Poly[octamethylene 4,4′-(methylenediphenylene)-diurethane]			*
Poly(octamethylene octadecanediamide)	422.70	179	454
Poly(octamethylene octamethylenedithiourea)	372.63	190	402
Poly(octamethylene octamethylenediurethane)	342.48	144	402
Poly(octamethylene 4-octenediamide)	280.41		
trans-		256	657
Poly(octamethylene 4-octenedioate)			*
Poly(2,5-octamethylene-1,3,4-oxadiazole)	180.25	110	1921
		100	1862
Poly(octamethylene oxamide)	198.27	276	743
Poly(octamethylene oxamide-*alt*-octamethylene sebacamide)	508.75	244	1781
Poly(octamethylene oxide)			*
Poly(octamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide)			*
Poly(octamethylene *N,N,′*-pentamethyleneditерephthalamate)	508.61	207	781
Poly(octamethylene *p*-phenylenediacetamide)	302.42	280	454
Poly(octamethylene *p*-phenylenedipropionamide)	330.47	289	454
Poly(octamethylene 3,3′-phosphinylidenedibenzamide)	398.44		
–, methyl- (*P*)	412.47	158	402
Poly(octamethylene 4,4′-phosphinylidenedibenzamide)	398.44		
–, methyl- (*P*)	412.47	172	402
– phenyl- (*P*)	474.54	202	402
Poly(octamethylene phthalamide)	274.36	123	1868
Poly(octamethylene 2,4-pyridinedicarboxamide)	275.35	190	1905
Poly(octamethylene 2,5-pyridinedicarboxamide)	275.35	232	1905
Poly(octamethylene 2,6-pyridinedicarboxamide)	275.35	192	1905
–, 1,4-dihydro-4-oxo-	291.35	86	1905
Poly(octamethylene 3,5-pyridinedicarboxiamide)	275.35	214	1905
Poly(octamethylene pyromellitimide)			*
–, 3-bromo- (imide)	405.25	320	1267
Poly(octamethylene sebacamide)	310.48	207	153
		206	454
		210	244
Poly(octamethylene sebacoyldiurea)	396.53	212	402
Poly(octamethylene suberamide)			*
Poly(octamethylene suberate)			*
Poly(octamethylene succinamide)			*
Poly(octamethylene L-tartaramide)	258.32		
–, di-*O*-methyl-			*
Poly(octamethylene terephthalamide)			*
Poly(octamethylene terephthalate)			*
Poly[octamethylene *N,N′*-terephthaloyldi(6-aminocaproate)]	502.65	167	1792
Poly(octamethylene tetradecanediamide)	366.59	196	2
Poly(octamethylene 2,5-tetrahydrofurandipropionamide)	324.46	180	402
Poly(octamethylene *N,N′*-tetramethyleneditерephthalamate)	494.59	276	781
Poly(octamethylene tetramethylenedithiourea)	316.53	160	402
Poly(octamethylene 2,5-thiophenedicarboxamide)	280.39	304	1905
Poly(2,5-octamethylene-1,3,4-triazole)	179.27		
–, 1-amino- (triazole)	194.28	258	610
Poly(octamethylene *N,N′*-trimethyleneditерephthalamate)	480.56	231	781
Poly(octamethylene urea)	170.26	260	291
Poly(octamethylene *p*-xylylenediurea)	332.45	278	634
Poly(octamethylene *p*-xylylenediurethane)	334.42	196	634
Poly(octenamer)			*
Poly(1-octene)			*
Poly(oxacyclobutane) [trimethylene oxide]			*
–, 3,3-bisazidomethyl-			*
–, 3,3-bisbromomethyl-	243.93	220	1807
–, 3,3-bischloromethyl-			*
–, 3,3-bisethoxymethyl-			*
–, 3,3-bisfluoromethyl-	122.12	135	1805
–, 3,3-bishydroxymethyl-	118.13	D280	1271
–, 3,3-bisiodomethyl-	337.93	290	1807

Polymer	Molecular weight	Melting point	Refs.
–, 3-*tert*-butyl-			*
–, 3,3-diethyl-			*
–, 3,3-dimethyl-			*
–, 3-hydroxy-	74.08	166	1944
Poly(oxybisdimethylsilylene)			*
Poly(4,4′-oxydibenzoic anhydride)	240.21	296	1854
Poly(oxydiethylene adipate)	216.23	– 24	765
Poly(oxydiethylene azelate)	258.31	0	696
Poly(oxydiethylene 2,2′-dibenzoate)	312.32	95	1654
Poly(oxydiethylene 3,3′-dibenzoate)	312.32	75	1552
Poly(oxydiethylene 4,4′-dibenzoate)	312.32	170	1654
Poly[(oxydiethylene)-dioxydibenzoic anhydride]	328.32	190	1854
Poly[4,4′-(oxydiethylenedioxydiethylenedioxy)-diphenylene 3,3′,4,4′-(carbonyldiphenylene)-tetracarboximide]	660.64	360	1808
Poly[4,4′-(oxydiethylenedioxy)-diphenylene 3,3′,4,4′-(carbonyldiphenylene)-tetracarboximide]	572.53	402	1808
Poly[3,4′-(oxydiethylenedioxy)-diphenylene] 3,3′,4,4′-(oxydiphenylene)-tetracarboximide]			*
Poly(oxydiethylene 4,4′-ethylenedibenzoate)	340.38	105	1654
Poly(oxydiethylene glutarate)	202.21	– 22	765
Poly(oxydiethylene hexamethylenediurethane)	274.32	120	633
Poly(oxydiethylene isophthalate)	236.22	90	1654
Poly(oxydiethylene malonate)	174.15	– 11	765
Poly(oxydiethylene 4,4′-methylenedibenzoate)	326.35	145	1654
Poly(oxydiethylene oxalate)	160.13	10	765
Poly(oxydiethylene oxydiacetate)	204.18	6	1798
Poly[(oxydiethylene)-oxy-*p*-phenylene oxide]	180.20	136	1868
Poly(oxydiethylene phthalate)	236.22	11	1794
Poly(oxydiethylene pimelate)	230.26	– 26	765
Poly(oxydiethylene sebacate)			*
Poly(oxydiethylene suberate)	244.29	35	765
Poly(oxydiethylene succinate)	188.18	– 8	765
Poly(oxydiethylene sulfonyldivalerate)	304.34	66	1797
Poly(oxydiethylene terephthalate)			*
Poly(oxydiethylene thiodivalerate)	304.40	– 35	767
Poly[(oxydimethylenedioxy)-dibenzoic anhydride]	300.27	192	1854
Poly(oxydipentamethylene 5-oxadodecanediamide)	384.56	102	1847
Poly(oxydipentamethylene 6-oxadodecanediamide)	384.56	100	1847
Poly(oxydipentamethylene 6-oxaheptadecanediamide)	454.70	128	1847
Poly(oxydipentamethylene 5-oxahexadecanediamide)	440.67	122	1847
Poly(oxydipentamethylene 6-oxapentadecanediamide)	426.64	117	1847
Poly(oxydipentamethylene 5-oxasebacamide)	356.51	127	1847
Poly(oxydipentamethylene 5-oxatetradecanediamide)	412.61	118	1847
Poly(oxydipentamethylene 6-oxatridecanediamide)	398.59	106	1847
Poly(oxydipentamethylene 5-oxaundecanediamide)	370.53	108	1847
Poly(oxydipentamethylene oxydibutyramide)	342.48	138	1847
Poly(oxydipentamethylene oxydicaproamide)	398.59	128	1847
Poly(oxydipentamethylene oxydienanthamide)	426.64	129	1847
Poly(oxydipentamethylene oxydipelargonamide)	482.75	129	1847
Poly(oxydipentamethylene oxydivaleramide)	370.53	134	1847
Poly(3,4′-oxydiphenylene adipamide)	310.35	225	1832
Poly(4,4′-oxydiphenylene adipamide)	310.35	360	1832
Poly(3,4′-oxydiphenylene azelamide)	352.43	150	1832
Poly(4,4′-oxydiphenylene azelamide)	352.43	300	1832
Poly(4,4′-oxydiphenylene carbonate)	228.20	235	540
Poly(4,4′-oxydiphenylene-4″,4‴-dibenzylidenimino adipate)	518.57		
–, 3″,3‴-dimethoxy-	578.62	135	1893
Poly(4,4′-oxydiphenylene-4″,4‴-dibenzylidenimino isophthalate)	538.56		
–, 3″,3‴-dimethoxy-	598.61	185	1893
Poly(4,4′-oxydiphenylene-4″,4‴-dibenzylidenimino sebacate)	574.68		
–, 3″,3‴-dimethoxy-	634.73	140	1893
Poly(4,4‴((4′,4″-oxydiphenylene)-dioxy-diphenylene pyromellitimide)			*
Poly(2,2′-(4,4′-oxydiphenylene-4,4′-diquinoline)-4,4′-biphenylene)	574.68	475	1778
–, 3,3′-diphenyl-	726.88	500	1778
Poly(4,4′-oxydiphenylenedithiodecamethylene disulfide)	436.70	80	1837
Poly(4,4′-oxydiphenylenedithioethylene disulfide)	324.49	158	1837
Poly(4,4′-oxydiphenylenedithiotetramethylene disulfide)	352.54	94	1837

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Polymer	Molecular weight	Melting point	Refs.
Poly(3,4′-oxydiphenylene dodecanediamide)	394.52	150	1832
Poly(4,4′-oxydiphenylene dodecanediamide)	394.52	290	1832
Poly(4,4′-oxydiphenylene ketone)			*
Poly(4,4′-oxydiphenylene 3,3′,4,4′-oxydiphenylene-tetracarboximide)			*
Poly(4,4′-oxydiphenylene *m*-phenylenediketone)	300.31		
–, 2,2′-diethyl-	356.42	242	1767
–, 2,6-diisopropyl-	384.48	185	1767
–, 2-ethyl-2′-isopropyl-	370.45	228	1767
–, 2-isopropyl-2′-methyl-	356.42	220	1767
Poly(4,4′-oxydiphenylene *p*-phenylenediketone)	300.31		
–, 2-isopropyl-2′-methyl-	356.42	262	1767
Poly(3,4′-oxydiphenylene pimelamide)	324.38	170	1832
Poly(4,4′-oxydiphenylene pimelamide)	324.38	315	1832
Poly(4,4′-oxydiphenylene pyromellitimide)			*
Poly(3,4′-oxydiphenylene sebacamide)	366.46	165	1832
Poly(4,4′-oxydiphenylene sebacamide)	366.46	310	1832
Poly(3,4′-oxydiphenylene suberamide)	338.41	175	1832
Poly(4,4′-oxydiphenylene suberamide)	338.41	310	1832
Poly(3,4′-oxydiphenylene undecanediamide)	380.49	140	1832
Poly(4,4′-oxydiphenylene undecanediamide)	380.49	270	1832
Poly[2,2′-(6,6′-oxydiquinoline)-4,4′-biphenylene]	422.49		
–, 4,4′-diphenyl-	574.68	480	1778
–, 3,3′,4,4′-tetraphenyl-	726.88	480	1778
Poly[2,2′-(6,6′-oxydiquinoline)-4,4′-oxydiphenylene]	438.49		
–, 4,4′-diphenyl-	590.68	448	1778
–, 3,3′,4,4′-tetraphenyl-	742.88	476	1778
Poly[2,2′-(6,6′-oxydiquinoline)-*p*-phenylene]	346.39		
–, 4,4′-diphenyl-	498.58	455	1778
–, 3,3′,4,4′-tetraphenyl-	650.78	475	1778
Poly(oxydisilyleneditrimethylene pyromellitimide)	374.50		
–, tetramethyl- (Si)	430.61	210	1361
Poly(oxyditetramethylene hexamethylenediurethane)	330.42	124	633
Poly(oxyditrimethylene adipamide)	242.32	190	291
		213	1775
Poly(oxyditrimethylene terephthalamide)	262.31	281	1775
Poly(oxymethylene) [formaldehyde]			*
Poly(1-pentadecene)	210.40	54	872
Poly(1,3-pentadiene), 1,2-			*
–, 4-methyl-			*
Poly(1,3-pentadiene), 1,4-			*
–, 2-methyl-			*
Poly(pentamethylene)	70.14		
–, 1,2-dichloro-	139.02		
trans-		75	1925
Poly(pnetamethylene adipamide)	212.29	223	339
		225	402
		251	1852
		258	1818
–, (L)-1-carboxy- (diamine)	256.30	113	1883
–, (L-1-carboxy- (diamine)	512.60	102	1883
–, 2,2,3,3,4,4-hexafluoro- (diamine)	320.24		
–, –, *N,N′*-dibutyl-	432.45	15	402
–, –, *N,N′*-diethyl-	376.34	20	402
–, –, *N,N′*-diisopropyl-	404.40	35	402
–, –, *N,N′*-dimethyl-	348.29	30	402
Poly(pentamethylene adipamide-*alt*-pentamethylene oxamide)	368.48	281	1781
Poly(pentamethylene adipate)	214.26	40	1120
–, 2,2,3,3,4,4-hexafluoro- (diamine)	322.20	34	1933
Poly(pentamethylene azelamide)			*
Poly(pentamethylene azelamide-*alt*-pentamethylene oxamide)	410.56	268	1781
Poly(pentamethylene azelate)	256.34	41	696
		50	1120
Poly(pentamethylene carbonate)	130.14	46	1820
Poly(pentamethylene *m*-carboxycarbanilate)	249.27	80	1891
Poly(pentamethylene *p*-carboxycarbanilate)	249.27	160	1891

Polymer	Molecular weight	Melting point	Refs.
Poly[pentamethylene *p*-(carboxyphenylene)-acetamide]	246.31	216	1904
Poly[pentamethylene (cyclopropylenedicarboxoyl)-diurethane]	284.27		
trans-		250	1865
Poly(pentamethylene cyclopropylenediurethane)	228.25	170	1865
Poly[pentamethylene (decamethylenedisulfonyl)-dicaproamide]	564.84	202	402
Poly(pentamethylene 2,2′-dibenzoate)	310.35	13	1552
Poly(pentamethylene 3,3′-dibenzoate)	310.35	60	1552
Poly(pentamethylene 4,4′-dibenzoate)	310.35	170	1552
Poly(4,4′-pentamethylenedibenzoic anhydride)	294.35	118	1854
Poly[3,3′-(pentamethylenedioxy)-dibenzoic anhydride]	326.35	176	1854
Poly[4,4′-(pentamethylenedioxy)-dibenzoic anhydride]	326.35	188	1854
Poly[(pentamethylenedioxy)-didecamethylene oxide]	398.67	72	542
Poly[(pentamethylenedioxy)-dihexamethylene oxide]	286.46	46	542
Poly(pentamethylene disulfide)	134.26	44	295
Poly(pentamethylene dithiolisophthalate)	266.38	175	1922
Poly(pentamethylene dithiolterephthalate)	266.38	232	1922
Poly(pentamethylene dodecanedioate)	298.42	60	1792
Poly(pentamethylene *N,N*′-ethylenbediterephthalamate)	424.45	312	781
Poly[pentamethylene (ethylenedithio)-diethylenediuethane]	336.46	130	1897
Poly(pentamethylene glutaramide)			*
Poly(pentamethylene glutarate)	200.23	25	1120
Poly[pentamethylene (hexamethylenedisulfonyl)-dicaproamide]	508.73	210	402
Poly(pentamethylene *N,N*′-hexamethylenediterephthalamate)	480.56	255	781
Poly[pentamethylene (hexamethylenedithio)-diethylene-diurethane]	392.57	94	1897
Poly(pentamethylene hexamethylenediurethane)			*
Poly(pentamethylene isophthalate)	234.25	82	1794
Poly(pentamethylene malonamide)			*
–, dodecyl- (diacid)	338.54	208	1774
Poly[pentamethylene 4,4′-(methylenediphenylene)-diurethane]			*
Poly(pentamethylene octadecanediamide)	380.62	167	339
Poly(pentamethylene 4-octenediamide)	238.33		
trans- II.		258	657
Poly(pentamethylene oxalate)	158.15	54	1120
Poly(pentamethylene oxamide-*alt*-pentamethylene pimelamide)	382.50	273	1781
Poly(pentamethylene oxamide-*alt*-pentamethylene sebacamide)	424.58	258	1781
Poly(pentamethylene oxamide-*alt*-pentamethylene suberamide)	396.53	273	1781
Poly(pentamethylene oxydiacetamide)	200.24	130	291
Poly(pentamethylene oxydiacetate)	202.21	33	1798
Poly(pentamethylene 4,4′-oxydibenzoate)	326.35	70	1939
Poly(pentamethyleneoxy-*p*-phenylene oxide)	178.23	164	1868
Poly[pentamethylene (pentamethylenedisulfonyl)-dicaproamide]	494.70	212	402
Poly(pentamethylene *N,N*′-pentamethylenediterephthalamate)	466.53	198	781
Poly[pentamethylene (pentamethylenedithio)-diethylene-diurethane]	378.55	87	1897
Poly(pentamethylene *m*-phenylenedisulfonamide)	304.38	160	1384
Poly(pentamethylene phthalate)	234.25	9	1794
Poly(pentamethylene pimelamide)			*
Poly(pentamethylene pimelate)			*
Poly(pentamethylene sebacamide)	268.40	195	339
Poly(pentamethylene sebacate)	270.37	51	696
		57	1120
Poly(pentamethylene sebacoyldiurea)	354.45	205	402
Poly(pentamethylene suberamide)	240.35	202	339
Poly(pentamethylene suberate)	242.32	46	1120
Poly(pentamethylene succinate)	186.21	35	1120
Poly(pentamethylene sulfide)			*
Poly(pentamethylene sulfone)			*
Poly(pentamethylene sulfonyldivalerate)	334.43	86	1797
Poly(pentamethylenesulfonyltetramethylene sulfone)			*
Poly(pentamethylene terephthalamide)			*
Poly(pentamethylene terephthalate)			*
Poly(pentamethylene tetradecanediamide)	324.51	178	339
Poly(pentamethylene 2,5-tetrahydrofurandipropionamide)	282.38	153	402
Poly(pentamethylene *N,N*′-tetramethylenediterephthalamate)	452.51	284	781
Poly(pentamethylene (tetramethylenedithio)-diethylene-diurethane]	364.52	95	1897
Poly(pentamethylene thiodivalerate)	302.43	42	767

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Polymer	Molecular weight	Melting point	Refs.
Poly(pentamethylenethiotetramethylene sulfide)	190.37	67	181
Poly(2,5-pentamethylene-1,3,4-triazole)	137.19		
–, 1-amino-	152.20	260	610
Poly(pentamethylene tridecanediamide)	310.48	176	339
Poly(pentamethylene *N,N'*-trimethyleneditерephthalamate)	438.48	235	781
Poly(pentamethylene undecamethylenediurethane)	342.48	123	633
Poly(pentamethylene undecanediamide)	282.43	176	291
Poly(pentamethylene urethane)			*
Poly(pentenamer)			*
Poly(1-pentene)			*
–, 5-cyclohexyl-	152.28	123	328
–, 5-diisobutylamino-			*
–, 5-diisopropylamino-			*
–, 4,4-dimethyl-			*
–, 3-ethyl-	98.19	425	632
–, 3-methyl-			*
–, 4-methyl-			*
–, 5,5,5-trifluoro-	124.11	225	1813
–, 4-trifluoromethyl-	138.13	255	1813
–, 5-trimethylsilyl-			*
Poly[4,4'-(2,2-pentylidene)-diphenylene carbonate]	282.34	220	438
–, 4-methyl-	296.37	220	438
Poly[4,4'-(3,3-pentylidene)-diphenylene carbonate]	282.34	195	1915
–, 2,4-dimethyl-	310.39	220	1915
Poly[4,4'-perfluorodiphenyleneoxyperfluoropentamethylene oxide)	578.16		
–, 1,1,5,5-tetrahydro- (pentamethylene)	506.19	145	1908
Poly(*m*-phenylene)			*
Poly(*p*-phenylene)			*
Poly(*m*-phenylene adipamide)	218.26	296	402
		344	828
–, 3-methyl- (diamine)	232.28	225	402
Poly(*o*-phenylene adipamide)	218.26	179	1868
Poly(*m*-phenylene adipamide)			*
Poly(*p*-phenylene azelamide)	260.34	345	828
Poly(*p*-phenylene azelate)	262.31	135	1174
Poly(*p*-phenylene *m*-carboranedicarboxylate)			*
Poly(*p*-phenylene cyclobutylene)	130.19		
–, dipyridyl-			*
Poly(*p*-phenylene cyclobutylenedicarboxamide)	216.24	405	723
Poly(*p*-phenylene cyclobutylenedicarboxylic acid)	218.21		
–, dibutyl ester	330.42		
–, –, dicyano-	380.44	330	723
–, diethyl ester			*
–, –, dicyano-	324.34	340	723
–, diisopropyl ester	302.37	320	723
–, –, dicyano-	352.39	320	723
–, dimethyl ester			*
–, –, dicyano-	296.28	290	723
–, diphenyl ester			*
–, dipropyl ester	302.37		
–, –, dicyano-			*
Poly(*m*-phenylene cyclopropylenedi(carboxylate)	204.18		
cis-		65	1860
trans-		105	1860
Poly(*p*-phenylene cyclopropylenedicarboxylate)	204.18		
cis-		160	1860
trans-		280	1860
Poly(*p*-phenylenediacetic anhydride)	176.17	92	1565
		152	1855
Poly(*m*-phenylene-3,3'-dibenzamido isophthalamide)	476.49	410	1788
Poly(*m*-phenylene-4,4'-dibenzamido isophthalamide)	476.49	450	1788
Poly(*p*-phenylene-3,3'-dibenzamido isophthalamide)	476.49	475	1788
Poly(*p*-phenylene-4,4'-dibenzamido isophthalamide)	476.49	490	1788
Poly(*m*-phenylene-3,3'-dibenzamido terephthalamide)	476.49	460	1788
Poly(*m*-phenylene-4,4'-dibenzamido terephthalamide)	476.49	467	1788

Polymer	Molecular weight	Melting point	Refs.
Poly(*p*-phenylene-3,3′-dibenzamido terephthalamide)	476.49	480	1788
Poly(*p*-phenylene-4,4′-dibenzamido terephthalamide)	476.49	555	1788
Poly(*p*-phenylene-4′,4″-dibenzylidenimino adipate)	426.47		
–, 3′,3″-dimethoxy-	486.52	135	1893
Poly(*p*-phenylene-4′,4″-dibenzylidenimino isophthalate)	446.46		
–, 3′,3″-dimethoxy-	506.52	230	1893
Poly(*p*-phenylene-4′,4″-dibenzylidenimino sebacate)	482.58		
–, 3′,3″-dimethoxy-	542.63	120	1893
Poly(*p*-phenylenediethylene adipamide)	274.36	310	402
Poly(*p*-phenylenediethylene azelamide)	316.44	250	402
		290	454
Poly(*p*-phenylenediethylene docosanediamide)	498.80	230	454
Poly(*p*-phenylenediethylene dodecanediamide)	358.53	280	454
Poly(*p*-phenylenediethylene heptadecanediamide)	428.66	249	454
Poly(*p*-phenylenediethylene hexadecanediamide)	414.63	258	454
Poly(*p*-phenylenediethylene octadecanediamide)	442.69	248	454
Poly(*p*-phenylenediethylene octamethylenediurethane)	362.47	212	402
		212	291
Poly(*p*-phenylenediethylene pentadecanediamide)	400.61	248	454
Poly(*p*-phenylenediethylene *m*-phenylenediacetamide)	322.41	222	402
Poly[*p*-phenylenediethylene 3,3′-(*p*-phenylene)-dipropionate]	352.43	219	1174
Poly(*p*-phenylenediethylene sebacamide)	330.47	285	1841
		285	402
		300	454
Poly(*p*-phenylenediethylene terephthalate)	296.32	330	1881
Poly(*p*-phenylenediethylene tetradecanediamide)	386.58	267	454
Poly(*p*-phenylenediethylene thiodicaproamide)	390.58	251	1824
Poly(*p*-phenylenediethylene thiodienanthamide)	418.64	234	1824
Poly(*p*-phenylenediethylene thiodipelargonamide)	474.75	222	1824
Poly(*p*-phenylenediethylene thiodiundecanoamide)	530.86	207	1824
Poly(*p*-phenylenediethylene thiodivaleramide)	362.53	252	1824
Poly(*p*-phenylenediethylene tridecanediamide)	372.55	262	454
Poly(*p*-phenylenediethylene undecandiamide)	344.50	275	454
Poly[(*m*-phenylenedioxy)-diacetic anhydride]	208.17	130	1565
Poly[(*p*-phenylenedioxy)-diacetic anhydride]	208.17	158	1855
		152	1565
		160	1872
Poly[(*p*-phenylenedioxy)-diacetic 3,4-pyridinedicarboxylic anhydride]	357.27	312	1872
Poly[(*p*-phenylenedioxy)-diacetic terephthalic anhydride]	356.29	324	1871
Poly[(*p*-phenylenedioxy)-diacetic 4,4′-(trimethylenedioxy)-dibenzoic anhydride]	506.46	260	1872
Poly[(*p*-phenylenedioxy)-diethylene octamethylenediurethane]	394.47	212	633
		212	402
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene carbonate]	320.30	215	1915
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene ketone]			*
Poly[4,4′-(*p*-phenylenedioxy)-diphenylene 3,3′,4,4′-(*p*-phenylenedioxy)-diphenylenetetracarboximide]	658.62	660	1018
Poly(*p*-phenylenedipentamethylene terephthalate)	380.48	116	1881
Poly(*p*-phenylenedipropionic anhydride)	204.22	92	1565
Poly(*p*-phenylene disiloxanylene)	152.30		
–, tetramethyl- (Si)			*
Poly(*m*-phenylene disiloxanylenedipropionamide)	294.46		
–, 4-methyl- (diamine)	308.49		
–, –, diethyl-dimethyl- (Si)	392.65	50	402
–, –, tetraethyl- (Si)	420.70	90	402
–, –, tetramethyl- (Si)	364.59	70	402
–, tetraethyl- (Si)	406.67	70	402
–, tetramethyl- (Si)	350.57	90	402
Poly(*o*-phenylene disiloxanylenedipropionamide)	294.46		
–, diethyl-diemthyl- (Si)	378.62	40	402
–, tetraethyl- (Si)	406.67	40	402
–, tetramethyl- (Si)	350.57	40	402
Poly(*p*-phenylene disiloxanylenedipropionamide)	294.46		
–, diethyl-dimethyl- (Si)	378.62	300	402
–, tetraethyl- (Si)	406.67	290	402
–, tetramethyl- (Si)	350.57	300	402

Polymer	Molecular weight	Melting point	Refs.
Poly(*p*-phenyleneditetramethylene terephthalate)	352.43	217	1881
		220	1174
Poly[4,4′-(2,2′-*m*-phenylenedithiazole)-oxy-*p*-diphenylene]	410.51	340	1810
Poly[(*p*-phenylenedithio)-dipropionic anhydride]	268.34	55	1565
		50	1857
Poly(*p*-phenyleneditrimethylene hexamethylenediurethane)	362.47	158	633
		240	291
Poly(*p*-phenyleneditrimethylene terephthalate)	324.38	162	1881
Poly(*p*-phenyleneethylene adipamide)	246.31		
–, 1,1-dimethyl- (diamine)	274.36	235	1802
Poly[*p*-phenylene 4,4′-(ethylenedioxy)-dibenzoate]	376.37		
–, methyl- (diol)	390.39	316	1375
Poly(*p*-phenyleneethylene sebacamide)	302.42		
–, 1,1-dimethyl- (diamine)	330.47	205	1802
Poly(*p*-phenyleneethylene succinamide)	218.26		
–, 1,1-dimethyl- (diamine)	246.31	250	1802
Poly(*p*-phenyleneethylene terephthalamide)	266.30		
–, 1,1-dimethyl- (diamine)	294.35	360	1802
Poly(*p*-phenylene glutaramide)	204.23	398	828
Poly(*m*-phenylene hexamethylenediurethane)	278.31	150	402
Poly(*p*-phenylene hexamethylenediurethane)	278.31	150	402
Poly(*m*-phenylene isophthalamide)			*
Poly(*p*-phenylene isophthalamide)	238.25	500	748
Poly(*m*-phenylene isophthalate)	240.21	245	1837
Poly(*p*-phenylene isophthalate)			*
Poly(*p*-phenylene malonate)	178.14	233	1868
Poly(*p*-phenylene oxide)			*
–, 2,6-dimethoxy-			*
–, 2,6-dimethyl-			*
–, 2,6-diphenyl-			*
Poly(*p*-phenyleneoxytrimethylene oxide)	150.18	166	1868
Poly(*m*-phenylene 3,3′-phosphinylidenedibenzamide)	362.32		
–, methyl- (*P*)	376.35	260	402
–, –, 4-methyl- (diamine)	390.38	244	402
Poly(*m*-phenylene 4,4′-phosphinylidenedibenzamide)	362.32		
–, methyl- (*P*)	376.35	340	402
–, –, 4-methyl- (diamine)	390.38	252	402
–, phenyl- (*P*)	438.42	340	402
–, –, 4-methyl- (diamine)	452.45	280	402
Poly(*o*-phenylene 3,3′-phosphinylidenedibenzamide)	362.32		
–, methyl- (*P*)	376.35	181	402
Poly(*o*-phenylene 4,4′-phosphinylidenedibenzamide)	362.32		
–, methyl- (*P*)	376.35	193	402
–, phenyl- (*P*)	438.42	207	402
Poly(*p*-phenylene 3,3′-phosphinylidenedibenzamide)	362.32		
–, methyl- (*P*)	376.35	264	402
Poly(*p*-phenylene 4,4′-phosphinylidenedibenzamide)	362.32		
–, methyl- (*P*)	376.35	340	402
–, phenyl- (*P*)	438.42	340	402
Poly(*p*-phenylene pimelamide)			*
Poly(*p*-phenylene 1,4-piperazinedipropionate)	304.35	189	1875
–, methyl- (diacid)	318.37	164	1875
Poly(*m*-phenylene sebacamide)			*
–, 3-methyl- (diamine)	288.39	200	402
Poly(*o*-phenylene sebacamide)	274.36	125	1868
Poly(*p*-phenylene sebacamide)			*
Poly(*m*-phenylene suberamide)			*
Poly(*o*-phenylene suberamide)	246.31	150	1868
Poly(*p*-phenylene suberamide)			*
Poly(*m*-phenylene succinate)	192.17	260	1174
Poly(*p*-phenylene succinate)	192.17	300	1841
Poly(*p*-phenylene sulfide)			*
–, 2-methyl-	122.18	100	679
Poly(*p*-phenylene sulfonate)	156.16	276	1785
Poly(*m*-phenylene terephthalamide)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(*p*-phenylene terephthalamide)			*
Poly(*p*-phenylene terephthalate)			*
–, *tert*-butyl- (diol)	296.32	444	1375
–, phenyl- (diol)			*
Poly[*p*-phenylene 4,4′-(tetramethylene dioxy)-dibenzoate]	404.42		
–, methyl- (diol)	418.45	212	1375
Poly[*p*-phenylene 4″,4‴-(thiodiphenylene)-dioxy-3,3′,4,4′-diphenylenetetracarboximide]	582.59	426	1771
Poly(*m*-phenylene urea)	134.14		
–, 4-methyl-	148.16	284	402
Poly(phosphazene)	47.00		
–, bis-β-naphthoxy-	331.31	>350	553
–, bis-phenoxy-			*
–, –, di-*m*-bromo-			*
–, –, di-*p*-bromo-			*
–, –, di-*m*-chloro-			*
–, –, di-*p*-chloro-			*
–, –, di-2,4-dichloro-			*
–, –, di-*m*-fluoro-			*
–, –, di-*p*-fluoro-			*
–, –, di-isopropyl-			*
–, –, di-*p*-phenyl-			*
–, –, di-*m*-trifluoromethyl-	367.19	330	553
–, ,bis-2,2,2-trifluoroethoxy-			*
–, dimethyl-			*
Poly(phosphinideneditrimethylene adipamide)	258.30		
–, octyl-	370.52	135	1859
Poly(pimelic anhydride)	142.15	55	1823
Poly(piperazine adipamide)		*	
–, 3-methyl- (diacid)	210.28	300	402
Poly(piperazine azelamide)	238.33	148	402
Poly(piperazine cyclopropylenedicarboxamide)	180.21		
trans-		330	1860
–, 1-methyl- (diacid)	194.23		
trans-		130	1860
–, 3-methyl- (diacid)	194.23		
trans-		280	1860
Poly[(piperazinedicarbamoyl)-dithiohexamethylene disulfide]	352.54	196	1793
Poly[(piperazinedicarbamoyl)-dithiotetramethylene disulfide]	324.49	204	1793
Poly(1,4-piperazinediethylene hexamethylenediurethane)	342.44	165	291
Poly(1,4-piperazinediethylene sulfone)	204.29	200	1875
Poly[piperazine (ethylenediamino)-dipropionamide]	254.33		
–, *N,N′*-diisopropyl-	338.50	97	1875
–, *N,N′*-diemthyl-	282.39	113	1875
Poly[piperazine (ethylenedixoy)-diacetamide]	228.25	165	1894
Poly(piperazine isophthalamide)	216.24	340	1833
–, 2,5-dimethyl- (diamine)	244.28	315	1833
–, methyl- (diamine)	230.27	280	1833
Poly(piperazine 4-octenediamide)			*
Poly(piperazine oxydiacetamide)	184.20	258	1894
Poly(piperazine phthalamide)	216.24	325	1833
–, 2,5-dimethyl- (diamine)	244.29	>350	1833
–, methyl- (diamine)	230.27	350	1833
Poly(piperazine 1,4-piperazinedipropionamide)	280.37	D270	1875
–, methyl- (diacid)	294.40	218	1875
–, methyl- (diamine)	294.40	217	1875
Poly(piperazine sebacamide)			*
Poly(piperazine suberamide)	224.30	300	402
Poly(piperazine terephthalamide)	216.24	350	1833
		380	402
–, 2,5-dimethyl- (diamine)	244.29	350	1833
–, methyl- (diamine)	230.27	350	1833
Poly[piperazine (trimethylenedithio)-dipropionamide]	302.45	100	402
Poly(1,4-piperidinediyltrimethylene)	125.22		
–, 2,6-dioxo-			*

Polymer	Molecular weight	Melting point	Refs.
Poly(1,4-piperidene urethane)	127.14	270	444
Poly(pivalolactone), see Poly(3-hydroxypropionic acid), 2,2-dimethyl-			*
Poly(propene)			*
–, 3-cyclohexyl-			*
–, 3-cyclopentyl-			*
–, hexafluoro-			*
–, 3-phenyl- [allylbenzene]			*
–, –, 2,5-dimethyl-	146.23	338	187
–, –, 3,4-dimethyl-	146.23	275	187
–, –, 3,5-dimethyl-	146.23	252	187
–, 3-silyl-			*
–, 3-*m*-tolyl-	132.21	180	187
–, 3-*o*-tolyl-	132.21	290	187
–, 3-*p*-tolyl-	132.21	240	187
–, 3-trimethylsilyl-			*
Poly(propiolactone), see Poly(3-hydroxypropionic acid)			*
Poly(propionaldehyde)			*
–, 3-cyano-			*
–, 3-methoxycarbonyl-			*
Poly(propylene oxalate)	130.10	180	305
Poly(propylene oxide)			*
–, 2-chloromethyl-	106.55	126	1816
		126	593
–, 3-(1-naphthoxy)-	200.24	235	445
–, 3-(2-naphthoxy)-	200.24	297	445
–, 3-phenoxy-			*
–, –, *o*-chloro-			*
–, –, *p*-chloro-	184.62	176	445
		192	833
–, –, dimethyl-	178.23	125	833
–, –, *o*-isopropyl-	192.26	128	445
–, –, *p*-methoxy-	180.20	200	833
–, –, *m*-methyl-	164.20	169	445
–, –, *o*-methyl-	164.20	191	445
–, –, *p*-methyl-	164.20	212	445
		205	833
–, –, *o*-phenyl-	226.28	293	445
–, –, 2,4,6-trichloro-	253.51	130	445
Poly(propylene 4,4′-sulfonyldibenzamide)	344.38	335	1835
Poly(propylidene)	42.08	90	617
Poly(propylvinyl ether)	86.13		
–, 1-methyl-			*
Poly(2,5-pyrazinecyclobutylene)	132.16		
–, 2,4-diphenyl-			*
Poly(2,5-pyrroledipropionic anhydride)	193.20		
–, *N*-methyl-	207.223	188	1565
Poly(2,6-quinoline)	1127.2		
–, 4-phenyl-	203.24	552	1778
Poly(sebacic anhydride)	184.24	80	1564
		82	1822
Poly(sebacoyl dithionisophthaloyldihydrazide)	392.54	294	1889
Poly(selenium)			*
Poly(siloxane)	46.10		
–, diethyl-			*
–, dimethyl-			*
–, diphenyl-			*
–, dipropyl-			*
Poly(silylene)	28.09		
–, dimethyl-			*
–, diphenyl-			*
Poly[4,4′-(silylenediphenylene)-dimethylene 4,4′-disiloxanylenedibenzamide]	524.80		
–, dimethyl- (diamine), tetramethyl- (Si)	608.96	165	402
Poly[4,4′-(silylenediphenylene)-dimethylene 4,4′-silylenedibenzamide]	478.70		
–, dimethyl- (diamine), dimethyl- (Si)	550.81	215	402

Polymer	Molecular weight	Melting point	Refs.
Poly[4,4′-(silylenediphenylene)-dimethylene 4,4′-tetrasiloxanylenedibenzamide]	617.00		
–, dimethyl- (diamine)	645.06		
–, –, tetramethyl-tetraphenyl- (Si)	1001.5	150	402
Poly(4,4′-stilbenediyloxyheptamethylene oxide)	308.42		
–, α-methyl-	322.45	93	1772
Poly(4,4′-stilbenediyloxyhexamethylene oxide)	294.40		
–, α-methyl-	308.42	166	1772
Poly(4,4′-stilbenediyloxymethylene oxide)	224.46		
–, α-methyl-	238.29	254	1772
Poly(4,4′-stilbenediyloxyoctamethylene oxide)	322.45		
–, α-methyl-	336.48	114	1772
Poly(4,4′-stilbenediyloxypentamethylene oxide)	280.37		
–, α-methyl-	294.40	116	1772
Poly(4,4′-stilbenediyloxytetramethylene oxide)	266.34		
–, α-methyl-	280.37	182	1772
Poly(4,4′-stilbenediyltrimethylene oxide)	252.31		
–, α-methyl-	266.34	128	1772
Poly(styrene)			*
–, *p-tert*-butyl-			
–, –, isotactic			*
–, –, syndiotactic	160.26	310	1372
–, *m*-chloro-			
–, –, isotactic	138.60	124	1372
–, –, syndiotactic	138.60	192	1372
–, *p*-chloro-			
–, –, isotactic	138.60	165	1372
–, –, syndiotactic	138.60	299	1372
–, 2,4-dimethyl-			
–, –, isotactic	132.21	310	75
		350	74
–, 2,5-dimethyl-			
–, –, isotactic	132.21	330	75
		340	74
–, 3,4-dimethyl-			
–, isotactic	132.21	240	75
–, 3,5-dimethyl-			
–, –, isotactic	132.21	290	75
–, *o*-fluoro-			
–, –, isotactic			*
–, *m*-fluoro-			
–, –, isotactic	122.14	250	1910
–, –, syndiotactic	122.14	275	1372
–, *p*-fluoro-			
–, –, isotactic			*
–, –, syndiotactic	122.14	322	1372
–, α-methyl-			*
–, –, *p*-isopropyl-			
–, –, –, isotactic	160.26	203	888
–, –, *p*-methyl-			
–, –, –, isotactic			*
–, *o*-methyl-			
–, –, isotactic			*
–, –, *p*-fluoro-			
–, –, –, isotactic			*
–, *m*-methyl-			
–, –, isotactic			*
–, –, syndiotactic	118.18	206	1372
–, *p*-methyl-			
–, –, isotactic			*
–, –, syndiotactic			*
–, β-nitro-			
–, –, isotactic	149.15	285	1937
–, *p*-trifluoroacetyl-			
–, –, isotactic	200.16	178	1834

Polymer	Molecular weight	Melting point	Refs.
–, *p*-trimethylsilyl-			
–, –, isotactic			*
Poly(styrene-*alt*-carbon monoxide)			*
–, *o*-hydroxy-	148.16	195	1884
Poly(styrene oxide)	120.15	149	1809
		140	318
		162	693
Poly(styrene sulfone)	168.21	215	1916
Poly(styryl pyridine-*alt*-vinyl pyridine)	286.38	350	1920
Poly(suberic anhydride)	156.18	66	1823
Poly(4,4′-sulfinyldiphenylene carbonate)	260.26	250	540
Poly(4,4′-sulfonyldiphenylene carbonate)	276.26	210	540
Poly(sulfonyldipropionic anhydride)	192.18	237	1856
Poly(*p*-sulfonylphenylene sebacamide)	338.42	117	1267
Poly(sulfur trioxide)	80.06	32	288
Poly(terephthalaldehyde)	134.13	120	1801
		240	1174
–, 2,5-dimethyl-	162.19	140	1801
Poly(terephthalic anhydride)			*
Poly[terephthalic 2,2′-(terephthaloyldiamino)-dibenzoic anhydride]	534.48	312	1871
Poly[terephthalic 4,4′-(tetramethylenedioxy)-dibenzoic anhydride]	460.44	215	1871
Poly[terephthalic 4,4′-(trimethylenedioxy)-dibenzoic anhydride]	446.41	285	1871
–, 3,3′-dimethoxy-	506.46	255	1871
Poly[terephthaloyl (*m*-carboxyphenoxyacetyl)-dihydrazide]	354.32	218	1833
Poly(terephthaloyl dithionisophthaloyldihydrazide)	356.42	309	1889
Poly(tetradecamethylene adipate)			*
Poly(tetradecamethylene docosanediamide)	562.97	153	454
Poly(tetradecamethylene dodecanediamide)	422.70	175	454
Poly(tetradecamethylene *N,N′*-ethylenediterephthalamate)	550.70	249	781
Poly(tetradecamethylene *N,N′*-hexamethylenediterephthalamate)	606.80	222	781
Poly(tetradecamethylene 3-hexenedioate)			*
Poly(tetradecamethylene octadecanediamide)	506.36	158	454
Poly(tetradecamethylene 4-octenedioate)			*
Poly(tetradecamethylene *N,N′*-pentamethylenediterephthalamate)	592.78	200	781
Poly(tetradecamethylene *p*-phenylenediacetamide)	386.58	235	454
Poly(tetradecamethylene *p*-phenylenedipropionamide)	414.63	246	454
Poly(tetradecamethylene sebacamide)	394.64	175	454
Poly(tetradecamethylene suberate)			*
Poly(tetradecamethylene terephthalamide)	358.53	265	454
Poly(tetradecamethylene *N,N′*-tetramethylenediterephthalamate)	578.75	248	781
Poly(tetradecamethylene *N,N′*-trimethylenediterephthalamate)	564.72	208	781
Poly(tetradecamethylene *p*-xylylenediurea)	416.61	248	634
Poly(tetradecanedioic anhydride)	240.34	91	1823
Poly(1-tetradecene)			**
Poly(tetrahydrofuran) [tetramethylene oxide]			*
Poly(2,5-tetrahydrofurandipropionic anhydride)	198.22	135	1565
Poly(2,5-tetrahydropyrroledipropionic anhydride)	197.23		
–, *N*-methyl-	211.26	103	1565
Poly(tetramethylene adipamide)			*
Poly(tetramethylene adipamide-*alt*-tetramethylene oxamide)	340.42	325	1781
Poly(tetramethylene adipate)			*
Poly[tetramethylene *N,N′*-adipyldi(6-aminocaproate)]	426.55	156	1792
Poly(tetramethylene azelamide)			*
Poly(tetramethylene azelamide-*alt*-tetramethylene oxamide)	382.50	300	1781
Poly(tetramethylene azelate)	242.32	37	325
		39	696
		51	766
Poly(tetramethylene carbonate)	116.12	59	1820
Poly(tetramethylene *m*-carboxycarbanilate)	235.24	60	1891
Poly(tetramethylene *p*-carboxycarbanilate)	235.24	186	1891
Poly[tetramethylene *p*-(carboxyphenylene)-acetamide]	232.28	221	1904
Poly(tetramethylene 1,4-cyclohexylenediurethane)	256.30	260	633
Poly[tetramethylene (cyclopropylenedicarboxoyl)-diurethane]	270.24	226	1865
Poly(tetramethylene cyclopropylenediurethane)	214.22	180	1865
Poly[tetramethylene (decamethylenedisulfonyl)-dicapromide]	550.81	219	402

Polymer	Molecular weight	Melting point	Refs.
Poly(tetramethylene 2,2′-dibenzoate)	296.32	36	1552
Poly(tetramethylene 3,3′-dibenzoate)	296.32	66	1552
Poly(tetramethylene 4,4′-dibenzoate)	296.32	280	1566
		260	1552
		328	1174
Poly(4,4′-tetramethylenedibenzoic anhydride)	280.32	263	1854
Poly[4,4′-(tetramethylenedicarbonyl)-diphenylene succinate]	380.40	242	1174
Poly[3,3′-(tetramethylenedioxy)-dibenzoic anhydride]	312.32	199	1854
Poly[4,4′-(tetramethylenedioxy)-dibenzoic anhydride]	312.32	204	1854
–, 3,3′-dimethoxy-	372.37	172	1855
Poly[(tetramethylenedioxy)-didecamethylene oxide]	384.64	73	542
Poly[(tetramethylenedioxy)-dihexamethylene oxide]	272.43	50	542
Poly[(tetramethyleneoxy)-ditrimethylene oxamide]	258.32	160	291
		167	402
Poly(tetramethylene disiloxanylenedipropionamide)	274.47		
–, tetramethyl- (Si)	330.58		
–, –, *N,N′*-dimethyl-	358.63	120	402
Poly(tetramethylene disulfide)	120.23	39	295
		44	725
Poly[4,4′-(2,2′-tetramethylenedithiazole)-*p*-phenylene]	298.42	250	1810
Poly[4,4′-(tetramethylenedithio)-dibenzoic anhydride]	344.44	206	1854
Poly(tetramethylene dithiodicarboxylate)	208.25	115	1936
Poly(tetramethylene dithioladipate)	232.36	128	1922
Poly(tetramethylene dithiolisophthalate)	252.35	174	1922
Poly(tetramethylene dithiolsebacate)	288.47	98	1922
Poly(tetramethylene dithiolterephthalate)	252.35	310	1922
Poly(tetramethylene dithionisophthalate)	252.35	118	1889
Poly(tetramethylenedithiotrimethylene disulfide)	226.43	53	1784
Poly(tetramethylene dodecanediamide)	282.43	245	153
Poly[tetramethylene *N,N′*-dodecanedioyldi(*p*-aminobenzoate)]	522.64	192	1792
Poly[tetramethylene 4,4′-(ethylenedioxy)dibenzoate]	356.37	180	290
Poly[tetramethylene (ethylenedithio)-diethylenediurethane]	322.44	177	1897
Poly(tetramethylene glutarate)	186.21	38	766
Poly[tetramethylene (hexamethylenedisulfonyl)-dicaproamide]	494.70	228	402
Poly(tetramethylene *N,N′*-hexamethylenediterephthalamate)	466.53	300	781
Poly[tetramethylene (hexamethylenedithio)-diethylene-diurethane]	378.55	117	1897
Poly(tetramethylene hexamethylenediurethane)			*
–, 1,4-dimethyl- (diol)	286.37	104	633
Poly(tetramethylene isophthalamide)	218.26	262	828
Poly(tetramethylene isophthalate)			*
Poly(tetramethylene malonamide)			*
–, dodecyl- (diacid)	324.51	201	1774
Poly(tetramethylene malonate)	158.15	– 24	766
Poly[tetramethylene 4,4′-(methylenediphenylene)-diamino-dithiodicarboxylate]	404.50	104	1934
Poly[tetramethylene 4,4′-(methylenediphenylene)-diurethane]			*
Poly(tetramethylene nonamethylenediurethane)	300.40	140	633
Poly(tetramethylene octamethylenediurethane)	286.37	160	633
Poly(tetramethylene 4-octenediamide)			*
Poly(tetramethylene oxalate)	144.13	105	766
Poly(tetramethylene oxamide-*alt*-tetramethylene pimelamide)	354.45	301	1781
Poly(tetramethylene oxamide-*alt*-tetramethylene sebacamide)	396.53	290	1781
Poly(tetramethylene oxamide-*alt*-tetramethylene suberamide)	368.48	310	1781
Poly(tetramethylene oxide), see Poly(tetrahydrofuran)			*
Poly(tetramethylene oxydiacetate)	188.18	70	1798
Poly(tetramethylene 4,4′-oxydibenzoate)	312.32	881	939
Poly(tetramethylene 3,3′,4,4′-oxydiphenylenetetracarboximide)	362.34	352	1015
Poly[tetramethylene (pentamethylenedisulfonyl)-dicaproamide]	480.68	232	402
Poly[tetramethylene (pentamethylenedithio)-diethylene-diurethane]	364.52	113	1897
Poly(tetramethylene pentamethylenediurethane)	244.29	159	633
Poly(tetramethylene *p*-phenylenediacetate)	248.28	63	325
Poly(tetramethylene *m*-phenylenedisulfonamide)	290.35	215	1384
Poly(tetramethylene 4,4′-phosphinylidenedibenzamide)	342.34		
–, methyl- (*P*)	356.36	208	402
–, phenyl- (*P*)	418.43	230	402
Poly(tetramethylene phthalate)	220.22	18	11794

Polymer	Molecular weight	Melting point	Refs.
Poly(tetramethylene pimelamide)	212.29	233	339
		238	402
Poly(tetramethylene pimelate)	214.26	41	766
Poly[tetramethylene (1,4-piperazinedithio)-dicarboxylate]	294.38	188	1934
–, 2,5-dimethyl-	322.44	113	1934
Poly(tetramethylene 4,4′-propylenedibenzamide)	336.44	180	402
Poly[tetramethylene 4,4′-(propylenedioxy)-dibenzamide]	368.43	140	402
Poly(tetramethylene sebacamide)	254.33	254	153
		239	291
Poly(tetramethylene sebacate)			*
Poly(tetramethylene suberamide)	226.32	250	291
Poly(tetramethylene suberate)	228.29	56	291
Poly(tetramethylene succinamide)			*
–, *N*,*N*′-dimethyl-	198.27	123	402
Poly(tetramethylene succinate)			*
–, D-1,2-dimethoxy- (diacid)	232.23	92	609
Poly(tetramethylene sulfide)			*
Poly(tetramethylene sulfone)	120.17	100	1845
		>271	39
Poly(tetramethylene 4,4′-sulfonyldibenzamide)	358.41	358	1835
Poly(tetramethylene sulfonyldivalerate)	320.40	88	1797
Poly(tetramethylene L-tartaramide)	202.21		
–, di-*O*-methyl-			*
Poly(tetramethylene terephthalamide)	218.26	436	829
		475	1940
–, *N*,*N*′-dimethyl-	246.31	272	829
Poly(tetramethylene terephthalate)			*
Poly[tetramethylene *N*,*N*′-terephthaloyldi(6-aminocaproate)]	446.54	190	1792
Poly(tetramethylene 2,5-tetrahydrofurandipropionamide)	268.36	210	402
Poly[tetramethylene (tetramethylenedithio)-diethylene-diurethane]	350.49	119	1897
Poly(tetramethylene tetramethylenediurethane)	230.26	193	291
		193	633
Poly(tetramethylene tetrathiodicarboxylate}	272.37	92	1936
Poly(tetramethylene thiodicarboxylate)	176.19	90	1936
Poly(tetramethylene thioditrimethylenediurethane)	290.38	133	633
Poly(tetramethylene thiodivalerate)	288.40	38	767
Poly(tetramethylenethiotrimethylene sulfide)	162.32	64	181
Poly(tetramethylene thiourea)	130.21	213	402
Poly(2,5-tetramethylene-1,3,4-triazole)	123.16		
–, 1-amino-	138.17	300	610
Poly[tetramethylene 1,1′-(4,4′-trimethylenedipiperidine)-dithiodicarboxylate]	418.61	80	1934
Poly(tetramethylene *N*,*N*′-trimethylenediterephthalamate)	424.45	193	781
Poly(tetramethylene trithiodicarboxylate)	240.31	66	1936
Poly(tetramethylene undecamethylenediurethane)	328.45	146	633
Poly(tetramethylene undecanediamide)	268.40	208	339
		208	402
Poly(tetramethylene urea)	114.15	400	402
Poly(tetramethylene *p*-xylylenediurethane)	278.31	227	634
Poly(tetramethyl-*p*-silphenylene siloxane), see Poly(*p*-phenylene disiloxanylene), tetramethyl-			*
Poly(3,6,13,16-tetraoxa-8,10-octadecadiyne hexamethylenediurethane)	454.52	138	1782
Poly(3,6,13,16-tetraoxa-8,10-octadecadiyne (4,4′-methylenediphenylene)-diurethane)	536.58	130	1782
Poly(thiodiethylene dithioladipate)	264.43	70	1922
Poly(thiodiethylene dithiolterephthalate)	284.42	146	1922
Poly(thiodiethylene hexamethylenediurethane)	290.38	134	633
Poly(thiodiphenylene carbonate)			*
Poly(4,4′-thiodiphenylene oxide)			*
Poly(thiodipropionic anhydride)	160.19	55	1857
Poly(thioditetramethylene hexamethylenediurethane)	346.49	125	633
Poly(2,5-thiophenedipropionic anhydride)	210.25	78	1565
Poly(tridecamethylene *N*,*N*′-ethylenediterephthalamate)	536.67	257	781
Poly(tridecamethylene *N*,*N*′-hexamethylenediterephthalamate)	592.78	222	781
Poly(tridecamethylene *N*,*N*′-pentamethylenediterephthalamate)	578.75	194	781
Poly(tridecamethylene pyromellitimide)			*
Poly(tridecamethylene *N*,*N*′-tetramethylenediterephthalamate)	564.72	248	781
Poly(tridecamethylene tridecanediamide)			*

Polymer	Molecular weight	Melting point	Refs.
Poly(tridecamethylene *N,N'*-trimethylenediterephthalamate)	550.70	206	781
Poly(tridecanedioic anhydride)	226.32	78	1823
Poly(1-tridecene)	182.35	48	872
Poly(trimethylene adipamide-*alt*-trimethylene oxamide)	312.37	303	1781
Poly(trimethylene adipate)			*
–, 2,2-bisbromomethyl- (diol)	372.05	120	1874
–, 2,2-bischloromethyl- (diol)	283.15	108	1874
–, 2-bromomethyl-2-chloromethyl- (diol)	327.60	111	1874
–, 2,2-diemthyl- (diol)	214.26	37	609
Poly(trimethylene adipoyldiurethane)	272.26		
–, 2-hydroxy- (diol)	288.26	208	402
Poly(trimethylene amine)	57.10	126	1786
Poly(trimethylene azelamide-*alt*-trimethylene oxamide)	354.45	290	1781
Poly(trimethylene azelate)			*
–, 2,2-dimethyl- (diol)	256.34	0	609
Poly(poly-trimethylenebiphenylene)	194.28		
–, α,α,α′,α″,α″,α″-hexafluoro-	302.20	155	1780
Poly[trimethylene *p*-(carboxyphenylene)-acetamide]	218.26	281	1904
Poly(trimethylene 1,4-cyclohexylenedicarboxylate)	212.24		
trans-		110	1918
Poly(trimethylene cyclopropylenedicarboxamide)	168.20		
trans-		310	1860
Poly(trimethylene cyclopropylenediurethane)	200.19	170	1865
Poly(trimethylene 2,2′-dibenzoate)	282.30	78	1552
–, 1-methyl- (diol)	296.32	38	1552
Poly(trimethylene 3,3′-dibenzoate)	282.30	78	1552
–, 1-methyl- (diol)	296.32	87	1552
Poly(trimethylene 4,4′-dibenzoate)	282.30	249	1552
–, 1-methyl- (diol)	296.32	135	1552
Poly(4,4′-trimethylenedibenzoic anhydride)	266.30	215	1854
Poly[3,3′-(trimethylenedioxy)-dibenzoic anhydride]	298.29	197	1854
Poly[4,4′-(trimethylenedioxy)-dibenzoic anhydride]	298.29	267	1854
		263	1872
–, 3,3′-dimethoxy-	358.35	175	1855
Poly[(4,4′-trimethylenedipiperidinediyl)-dicarbamoyldithio-tetramethylene disulfide]	448.72	150	1793
Poly(trimethylene disulfide)	106.20	67	295
		88	725
Poly(trimethylene dodecanedioate)			*
Poly[trimethylene (ethylenedithio)-diethylenediurethane]	308.41	157	1897
Poly(trimethylene glutarate)			*
Poly[trimethylene (hexamethylenedithio)-diethylenediurethane]	364.52	115	1897
Poly(trimethylene hexamethylenediurethane)			*
–, 2-butyl-2-ethyl- (diol)	314.43	60	402
–, 2,2-dimethyl- (diol)	272.35	120	402
–, 2-methyl- (diol)	258.32	50	402
Poly(trimethylene isophthalate)	206.20	132	111
–, 1-methyl- (diol)	220.22	55	1794
Poly(trimethylene malonate)	144.13	33	609
–, 2,2-dimethyl- (diol)	172.18	67	609
Poly[trimethylene 4,4′-(methylenediphenylene)-diurethane]			*
–, 2-butyl-2-ethyl- (diol)	410.51	120	402
–, 2,2-diethyl- (diol)	382.46	150	402
–, 1-ethyl-2-propyl- (diol)	396.49	140	402
Poly(trimethylene octadecanedioate)			*
Poly(trimethylene octamethylenediurethane)	272.35		
–, 1-methyl- (diol)	286.37	82	633
		82	402
Poly(trimethylene 4-octenediamide)	210.28		
trans-		271	657
Poly(trimethylene oxalate)	130.10	86	678
		88	305
		89	609
–, 2,2-bischloromethyl-	227.04	122	1874
–, 2,2-dimethyl-	158.15	111	609
Poly(trimethylene oxamide-*alt*-trimethylene sebacamide)	368.48	276	1781

Polymer	Molecular weight	Melting point	Refs.
Poly(trimethylene oxamide-*alt*-trimethylene suberamide)	340.42	295	1781
Poly(trimethylene oxide), see Poly(oxacyclobutane)			*
Poly(trimethylene-*p*-oxybenzoate)	178.19	185	1841
		211	327
Poly(trimethylene oxydiacetate)	174.15	32	1798
–, 1-methyl- (diol)	188.18	8	1798
Poly(trimethylene 4,4′-oxydibenzoate)	298.30	90	1939
Poly[trimethylene (pentamethylenedithio)-diethylene-diurethane]	350.49	112	1897
Poly(trimethylene *p*-phenylenediacetate)	234.25	58	1918
Poly(trimethylene *m*-phenylenedisulfonamide)	276.33	157	1384
Poly(trimethylene phthalate)	206.20		
–, 1-methyl- (diol)	220.22	0	1794
Poly(trimethylene pimelate)			*
Poly(trimethylene sebacate)			*
–, 2,2-dimethyl- (diol)	270.37	26	609
Poly(trimethylene sebacoyldiurethane)	328.36		
–, 2-hydroxy- (diol)	344.36	189	402
Poly(trimethylene suberate)			*
–, 2,2-dimethyl- (diol)	242.32	17	609
Poly(trimethylene succinate)			*
–, 2,2-bischloromethyl- (diol)	255.10	74	1874
–, 2,2-dimethyl- (diol)	186.21	86	609
Poly(trimethylene sulfide)			*
–, 3,3-diethyl-	130.25	85	1770
–, 3,3-dimethyl-			*
Poly(trimethylene sulfone)	106.14	300	1890
–, 3,3-diethyl-	162.25	364	1890
–, 3,3-dimethyl-	134.19	266	1890
		303	1917
–, 3,3-dipentyl-	246.41	385	1890
Poly(trimethylene 4,4′-sulfonyldibenzamide)	344.38	298	1835
–, 2,2-dimethyl- (diamine)	372.44	284	1835
–, 1-methyl- (diamine)	358.41	272	1835
Poly(trimethylene sulfonyldivalerate)	306.38		
–, 1-methyl- (diol)	320.40	35	1797
Poly(trimethylene terephthalamide)	204.23	399	829
–, *N,N′*-dimethyl- (diamine)	232.28	220	829
Poly(trimethylene terephthalate)			*
–, 2,2-dimethyl-	234.25	140	291
–, 1-methyl- (diol)	220.22	87	1794
Poly(trimethylene tetradecanedioate)	298.42	66	1792
Poly[trimethylene (tetramethylenedithio)-diethylene-diurethane]	336.46	113	1897
Poly(trimethylene thiodivalerate)	274.38	– 36	767
–, methyl- (diol)	288.40	– 36	767
Poly(trimethylene *N,N′*-trimethylenediterephthalamate)	410.43	235	781
Poly(trimethylene undecanedioate)			*
Poly(undecamethylene adipamide)	296.46	218	544
Poly[4,4′-(undecamethylenedioxy)-diphenyleneoxy-*p*-xylylene oxide]	474.64	193	1789
Poly(undecamethylene *N,N′*-ethylenediterephthalamate)	508.61	251	781
Poly(undecamethylene *N,N′*-hexamethylenediterephthalamate)	564.72	217	781
Poly(undecamethylene oxamide-*alt*-undecamethylene sebacamide)	592.91	221	1781
Poly(undecamethylene *N,N′*-pentamethylenediterephthalamate)	550.70	199	781
Poly(undecamethylene pyromellitimide)			*
Poly(undecamethylene sebacamide)	352.56	169	339
Poly(undecamethylene terephthalamide)	316.44	292	544
Poly(undecamethylene *N,N′*-tetramethylenediterephthalamate)	536.67	248	781
Poly(undecamethylene *N,N′*-trimethylenediterephthalamate)	522.64	198	781
Poly(undecanedioic anhydride)	198.26	70	1823
Poly(1-undecene)	154.30	36	872
Poly(valeraldehyde)	86.13	155	329
Poly(vinyl acetate)	86.09		
–, trifluoro-			*
Poly(vinyl alcohol)			*
–, 2-methyl-	58.08	140	1885

Polymer	Molecular weight	Melting point	Refs.
Poly(vinyl benzoate)	148.16		
–, *p-tert*-butyl-	204.27	327	1821
Poly(vinyl bromide)			*
Poly(vinyl-*t*-butyl ketone)	112.17	150	1812
		>240	1843
Poly(*N*-vinyl carbazole)			*
Poly(vinyl chloride)			*
Poly(vinylcyclobutane)			*
Poly(vinylcycloheptane)			*
Poly(vinylcyclohexane)			*
–, *o*-methoxy-	140.23	195	1815
–, 3-methyl-	124.23	355	1867
–, 4-methyl-	124.23	250	1867
Poly(vinylcyclohexene)	108.18	418	1850
Poly(vinylcyclohexyl ketone)	138.21	>240	1843
Poly(vinylcyclopentane)			*
Poly(vinylcyclopropane)			*
Poly(*N*-vinyldiphenylamine)	195.26	320	1811
Poly(1-vinylene-3-cyclopentylene) [norbornene]			*
Poly(vinyl fluoride)			*
Poly(vinylidene chloride)			*
Poly(vinylidene fluoride)			*
Poly(vinylisopropyl ketone)	98.14	220	1843
Poly(vinyl laurate)	226.36	16	1906
Poly(vinylmethyl ketone)			*
Poly(vinyl myristate)	254.41	28	1888
Poly(1-vinyl naphthalene)			*
Poly(vinyl palmitate)	282.47	41	1888
		46	1906
Poly(3-vinyl pyrene)	228.39	214	1873
Poly(2-vinylpyridine)			*
Poly(vinyl stearate)	310.52	54	1846
		52	1888
		58	1906
Poly(*m*-xylylene)	104.15	80	546
–, 4,6-dimethyl-	132.21	135	1187
Poly(*p*-xylylene)			*
–, bromo-	183.05	270	395
–, chloro-			*
–, cyano-	129.16	270	395
–, 2,5-dichloro-	173.04	183	1831
		>300	395
–, 2,5-dimethyl-	132.21	350	1187
–, ethyl-			*
–, methyl-	118.18	210	395
		230	142
–, α,α,α′,α′-tetrafluoro-	176.11	500	1794
Poly(*m*-xylylene adipamide)			*
Poly(*p*-xylylene adipamide)	246.31	333	385
		340	402
Poly(*p*-xylylene adipate)	248.28	70	325
		80	547
		81	1919
Poly(*m*-xylylene azelamide)	288.39	172	402
Poly(*p*-xylylene azelamide)	288.39	263	385
		282	454
Poly(*p*-xylylene azelate)	290.36	59	325
		74	547
		79	1919
Poly(*p*-xylylene carbonate)	164.16	185	1820
Poly(*p*-xylylene 1,4-cyclohexylenedicarboxylate)	274.32		
trans-		106	547
Poly(*p*-xylylene disulfide)	168.27	175	1861
Poly[(*p*-xylylenedisulfonyl)-diacetic anhydride]	332.34	170	1856
Poly[(*p*-xylylenedisulfonyl)-dipropionic anhydride]	360.40	260	1856

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Polymer	Molecular weight	Melting point	Refs.
Poly[(*p*-xylylenedithio)-diacetic anhydride]	268.34	88	1565
		87	1857
Poly[(*p*-xylylenedithio)-dipropionic anhydride]	296.40	91	1565
		55	1857
Poly(*p*-xylylene dithioladipate)	280.41	170	1922
–, 2,3,5,6-tetramethyl-	336.52	255	1922
Poly(*p*-xylylene dithiolisophthalate)	300.40	210	1922
Poly(*p*-xylylene dithiol-4,4′-methylenedibenzoate)	390.52	274	1922
Poly(*p*-xylylene dithiol-*p*-phenylenediacetate)	328.45		
–, 2,3,5,6-tetramethyl- (diol)	384.56	262	1922
Poly(*p*-xylylene dithiolsebacate)	336.52		
–, 2,3,5,6-tetramethyl- (diol)	392.62	180	1922
Poly(*p*-xylylene docosanediamide)	470.74	240	402
		225	454
Poly(*p*-xylylene dodecanediamide)	330.47	272	385
		270	454
Poly(*p*-xylylene dodecanedioate)	332.44	94	547
Poly(*p*-xylylene glutaramide)	232.28	280	402
Poly(*p*-xylylene glutarate)	206.20	58	1919
Poly(*p*-xylylene heptadecanediamide)	400.61	239	454
Poly(*p*-xylylene hexadecanediamide)	386.58	248	454
–, *N*,*N*′-dimethyl-	414.63	85	1877
Poly(*m*-xylylene isophthalamide)	266.30	225	402
Poly(*p*-xylylene isophthalamide)	266.30	290	385
Poly(*p*-xylylene isophthalate)	268.27	100	547
Poly(*p*-xylylene malonamide)	204.23	110	402
Poly(*p*-xylylene octadecanediamide)	414.63	235	402
		242	454
–, *N*,*N*′-diethyl-	470.74	50	1877
–, *N*,*N*′-dimethyl-	442.69	80	1877
Poly(*p*-xylyleneoctamethylenediurethane)	334.42	168	402
Poly(*p*-xylylene 5-oxadodecanediamide)	332.44	200	1847
Poly(*p*-xylylene 6-oxadodecanediamide)	332.44	206	1847
Poly(*p*-xylylene 6-oxaheptadecanediamide)	402.58	223	1847
Poly(*p*-xylylene 5-oxahexadecanediamide)	388.55	220	1847
Poly(*p*-xylylene oxalate)	164.12	214	1919
Poly(*p*-xylylene 6-oxapentadecanediamide)	374.52	217	1847
Poly(*p*-xylylene 5-oxasebacamide)	304.39	234	1847
Poly(*p*-xylylene 5-oxatetradecanediamide)	360.50	215	1847
Poly(*p*-xylylene 6-oxatridecanediamide)	346.47	207	1847
Poly(*p*-xylylene 5-oxaundecanediamide)	318.42	190	1847
Poly(*p*-xylylene oxydibutyramide)	290.36	241	1847
		243	1853
Poly(*p*-xylylene oxydicaproamide)	346.47	234	1847
Poly(*p*-xylylene oxydienanthamide)	374.52	229	1847
Poly(*p*-xylylene oxydipelargonamide)	430.63	215	1847
Poly(*p*-xylylene oxydivaleramide)	318.42	243	1847
Poly(*p*-xylylene pentadecanediamide)	372.55	241	454
Poly(*p*-xylylene *p*-phenylenediacetate)	296.32	146	291
Poly(*p*-xylylene phthalamide)	266.30	230	402
Poly(*m*-xylylene pimelamide)	260.34	192	402
Poly(*p*-xylylene pimelamide)	260.34	284	385
Poly(*p*-xylylene pimelate)	262.30	67	547
		66	1919
Poly(*m*-xylylene sebacamide)	302.42	193	402
Poly(*p*-xylylene sebacamide)			*
Poly(*p*-xylylene sebacate)	304.39	84	325
		88	1919
		93	547
Poly(*m*-xylylene suberamide)	274.36	213	402
Poly(*p*-xylylene suberamide)	274.36	305	385
Poly(*p*-xylylene suberate)	276.33	82	547
Poly(*p*-xylylene succinamide)	218.26	360	402
Poly(*p*-xylylene succinate)	220.22	115	547
Poly(*m*-xylylene terephthalamide)	266.30	300	402

Polymer	Molecular weight	Melting point	Refs.
Poly(*p*-xylylene terephthalamide)	266.30	350	402
Poly(*p*-xylylene terephthalate)	268.27	242	547
		267	1881
Poly(*m*-xylylene tetradecanediamide)	358.53	192	402
Poly(*p*-xylylene tetradecanediamide)	358.53	257	454
Poly(*p*-xylylene thiodicaproamide)	362.53	236	1853
Poly(*p*-xylylene thiodienanthamide)	390.58	228	1853
Poly(*p*-xylylene thiodipelargonamide)	446.69	214	1824
Poly(*p*-xylylene thiodiundecanoamide)	502.80	200	1824
Poly(*p*-xylylene thiodivaleramide)	334.48	242	1853
Poly(*p*-xylylene tridecanediamide)	344.50	247	454
Poly(*p*-xylylene undecanediamide)	316.44	264	454

D. APPENDIX: FORMULA INDEX TO THE TABLES

As the number of crystallizable polymers and their complexity increased, it became necessary to devise a simple, reasonably unambiguous scheme to relate polymer structure to the specific name given to that polymer.

Some time ago, the compiler designed a shorthand notation to represent the structure of linear polymers which has proved to be useful. This scheme requires one to write the line formula for the constitutional base unit (without concern for priority or direction rules) and to count the groups/atoms comprising the unit in a specified order. In a sense, this scheme is analogous to the Chemical Abstracts Formula Index, but emphasizes groups commonly occuring in linear organic polymers rather than atoms exclusively. This scheme has the additional advantage of ensuring that data for a given polymer are not entered in the tables under differing polymer names.

The rules of this scheme are simple – count the number of groups/atoms in the constitutional base unit in the following order:

1. $-CH_2-$ (methylene as such, but not the $-CH_2-$ portion of a $-CH_3$ group).
2. $-CO-$ (carbonyls).
3. $-C_6H_4-$ (disubstituted benzenes; phenylenes; monosubstituted benzenes with the fifth proton counted under point 5 below).
4. Carbon atoms not already counted (as in $-CH_3$, $-CH=$, $-C_6H_3=$, etc.).
5. Protons ($-H$) not already counted (as in $-CH_3$, $-NH-$, etc.).
6. Oxygen atoms (exclusive of those in carbonyls).
7. Nitrogen atoms.
8. Sulfur atoms.
9. Other atoms (F, Cl, Br, Si, etc.).

The string of nine integers thus generated, arranged in the above order, is the required structure code. By looking up this code in the Formula Index Table one can find the name under which the polymer in question appears in the data tables or, alternatively, by its absence, that no data has been found for the polymer in question. The Formula Index Table is arranged in ascending order of the structural code in columns 2–10 with the assigned polymer name in column 1. Note that some very long, complicated names have been truncated. This should cause little difficulty in the use of this table. Examples of the application of this scheme are shown below.

Experience has shown that this scheme generates unique codes for the vast majority of linear polymers capable of crystallizing. Where two or more polymers do have the same structural code, the choice of correct name is usually obvious from the structure. Of course, certain classes of polymers do tend to generate many members all having a single code – for example, all of the condensation poly(amides) having a given total number of methylene groups and differing only in the proportioning of these between the diol and diacid constituents. Again, no ambiguities arise.

An advantage of this structural coding scheme is its adaptability to electronic data processing equipment. The logical step beyond this scheme could be a strict sequential notation detailing each group and its position (similar to the ACS–IUPAC Nomenclature Recommendation) in a short-hand notation for conciseness and for computer compatibility.

Polymer	Molecular weight	Melting point	Refs.
Poly(*p*-xylylene terephthalamide)	266.30	350	402
Poly(*p*-xylylene terephthalate)	268.27	242	547
		267	1881
Poly(*m*-xylylene tetradecanediamide)	358.53	192	402
Poly(*p*-xylylene tetradecanediamide)	358.53	257	454
Poly(*p*-xylylene thiodicaproamide)	362.53	236	1853
Poly(*p*-xylylene thiodienanthamide)	390.58	228	1853
Poly(*p*-xylylene thiodipelargonamide)	446.69	214	1824
Poly(*p*-xylylene thiodiundecanoamide)	502.80	200	1824
Poly(*p*-xylylene thiodivaleramide)	334.48	242	1853
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2. $-CO-$ (carbonyls).
3. $-C_6H_4-$ (disubstituted benzenes; phenylenes; mono-substituted benzenes with the fifth proton counted under point 5 below).
4. Carbon atoms not already counted (as in $-CH_3$, $-CH=$, $-C_6H_3=$, etc.).
5. Protons ($-H$) not already counted (as in $-CH_3$, $-NH-$, etc.).
6. Oxygen atoms (exclusive of those in carbonyls).
7. Nitrogen atoms.
8. Sulfur atoms.
9. Other atoms (F, Cl, Br, Si, etc.).

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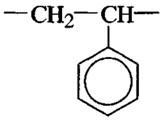
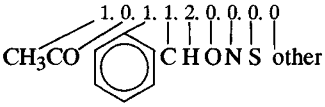
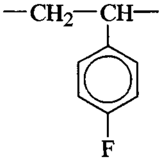
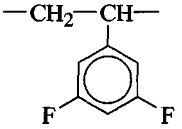
Examples*

	Structure	
		Poly(styrene)
	1.0.1.1.1.0.0.0.1	Poly(*p*-fluorostyrene)
	1.0.0.7.4.0.0.0.2	Poly(3,5-difluorostyrene)
$—NH—(CH_2)_3—CO—$	5.1.0.0.1.0.1.0.0	Poly(6-aminocaproic acid)

In the first example, there is one methylene, one phenylene, one carbon atom not otherwise counted (in –CH=), and two protons not otherwise counted (one in –CH= and one in $–C_6H_4H–$). In the second example, the fluorine atom replaces a proton from the substituted benzene ring – no other change in code occurs. In the third example, the trisubstituted benzene ring is removed from category 3 ($–C_6H_4–$) and is placed in category 4 (carbon atoms not otherwise counted) as 6 carbon atoms and in category 5 (protons) as 3 protons. In the last example, there are five methylene groups, one carbonyl, no other carbons, one proton (from –NH–), no uncounted oxygens, and one nitrogen. The approximately 2700 entries in the Formula Index Table were generated in a similar fashion.

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
0	0	0	0	0	0	0	0	0	0
Selenium	0	0	0	0	0	0	0	0	1
Silylene	0	0	0	0	0	0	0	0	1
Sulfur	0	0	0	0	0	0	0	1	0
Dichlorophosphazene	0	0	0	0	0	0	1	0	3
Thiazyl	0	0	0	0	0	0	1	1	0
Difluorophosphazene	0	0	0	0	0	1	0	0	3
Sulfur trioxide	0	0	0	0	0	3	0	1	0
Phosphazene	0	0	0	0	2	0	1	0	1
Germoxane	0	0	0	0	2	1	0	0	1
Siloxane	0	0	0	0	2	1	0	0	1
Stannyloxane	0	0	0	0	2	1	0	0	1
Difluoromethylene sulfide	0	0	0	1	0	0	0	1	2
Hydroxymethylene	0	0	0	1	2	1	0	0	0
Difluoroacetylene	0	0	0	2	0	0	0	0	2
Chlorotrifluoroethylene	0	0	0	2	0	0	0	0	4
Tetrafluoroethylene	0	0	0	2	0	0	0	0	4
Tetrafluoroethylene oxide	0	0	0	2	0	1	0	0	4
Trifluoroethylene	0	0	0	2	1	0	0	0	3
2,2,2-Trichloroacetaldehyde	0	0	0	2	1	1	0	0	3
Acetylene	0	0	0	2	2	0	0	0	0
2,2-Dichloroacetaldehyde	0	0	0	2	2	1	0	0	2
Ethylidene	0	0	0	2	4	0	0	0	0
Acetaldehyde	0	0	0	2	4	1	0	0	0
Dimethylsilylene	0	0	0	2	6	0	0	0	1
Dimethylphosphazene	0	0	0	2	6	0	1	0	1
Dimethylsiloxane	0	0	0	2	6	1	0	0	1
Oxybisdimethylsilylene	0	0	0	2	6	1	0	0	2

* Periods (·) are used to delineate the structural code integers generated.

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Tetrafluoroallene	0	0	0	3	0	0	0	0	4
Hexafluoropropene	0	0	0	3	0	0	0	0	6
Isopropylidene sulfide	0	0	0	3	6	0	0	1	0
Isopropylidene oxide	0	0	0	3	6	1	0	0	0
2-Methylvinylalcohol	0	0	0	3	6	1	0	0	0
1,3-Butadiyne, 1,4-	0	0	0	4	2	0	0	0	0
2,5-Thiophene	0	0	0	4	2	0	0	1	0
2-Butene sulfide	0	0	0	4	8	0	0	1	0
2-Butene oxide	0	0	0	4	8	1	0	0	0
Isobutyraldehyde	0	0	0	4	8	1	0	0	0
1-Methoxy-2-methylethylene	0	0	0	4	8	1	0	0	0
3-Methyl-2,5-thiophene	0	0	0	5	4	0	0	1	0
2-Methyl-2-butene oxide	0	0	0	5	10	1	0	0	0
2,4-Hexadiyne, 2,5-	0	0	0	6	6	0	0	0	0
2,4-Hexadiene, 2,5-	0	0	0	6	10	0	0	0	0
1-Isopropoxy-2-methyethylene	0	0	0	6	12	1	0	0	0
Tetramethylethylene oxide	0	0	0	6	12	1	0	0	0
2,6-Benzothiazole	0	0	0	7	3	0	1	1	0
2,5-Benzoxazole	0	0	0	7	3	1	1	0	0
2-Methyl-*p*-phenylene sulfide	0	0	0	7	6	0	0	1	0
1-*tert*-Butoxy-2-methylethylene	0	0	0	7	14	1	0	0	0
Tetrafluoro-*p*-xylylene	0	0	0	8	4	0	0	0	4
2,2′-Bithiophene	0	0	0	8	4	0	0	2	0
2,6-Dimethyl-1,4-phenylene oxide	0	0	0	8	8	1	0	0	0
2,6-Dimethoxy-1,4-phenylene oxide	0	0	0	8	8	3	0	0	0
2,5-Dimethyl-2,4-hexadiene, 2,5-	0	0	0	8	14	0	0	0	0
2,6-Quinoline	0	0	0	9	5	0	1	0	0
Terthiophene	0	0	0	12	6	0	0	3	0
Bis(2,4-dichlorophenoxy)phosphazene	0	0	0	12	6	2	1	0	5
3,3′-Dimethoxy-4,4′-biphenylene carbodiimine	0	0	0	15	12	0	2	0	0
Bis(3,4-dimethylphenoxy)phosphazene	0	0	0	16	18	2	1	0	1
4,4′-Perfluorodiphenyleneoxyperfluoropentamethylene oxide	0	0	0	17	0	2	0	0	8
Bis-β-naphthoxyphosphazene	0	0	0	20	14	2	1	0	1
m-Phenylene	0	0	1	0	0	0	0	0	0
p-Phenylene	0	0	1	0	0	0	0	0	0
p-Phenylene sulfide	0	0	1	0	0	0	0	1	0
p-Phenylene oxide	0	0	1	0	0	1	0	0	0
p-Phenylene sulfonate	0	0	1	0	0	3	0	1	0
Phenylenedisiloxanylene	0	0	1	0	4	1	0	0	2
p-Phenylene-1,3,4-oxadiazole	0	0	1	2	0	1	2	0	0
p-Phenylenevinylene	0	0	1	2	2	0	0	0	0
β-Nitrostyrene	0	0	1	2	3	2	1	0	0
Ethylidene *p*-phenylene	0	0	1	2	4	0	0	0	0
α-Methylmethylene-*p*-phenylene	0	0	1	2	4	0	0	0	0
α-Phenylethylisocyanide	0	0	1	3	5	0	1	0	0
p-Phenylene tetramethyldisiloxanylene	0	0	1	4	12	1	0	0	2
m-Phenyleneoxy-2-cyano-1,3-phenylene oxide	0	0	1	7	3	2	1	0	0
p-Phenylenebenzobisthiazole	0	0	1	8	2	0	2	2	0
p-Phenylenebenzobisoxazole	0	0	1	8	2	2	2	0	0
4-Phenyl-2,6-quinoline	0	0	1	9	5	0	1	0	0
(*p*-Phenylenedipyridyl)cyclobutylene	0	0	1	14	12	0	2	0	0
6,6′-Oxydiquinolene-*p*-phenylene	0	0	1	18	10	1	2	0	0
4,4′-Biphenylenegermylene	0	0	2	0	0	0	0	0	1
4,4′-Thiodiphenylene oxide	0	0	2	0	0	1	0	1	0
Bis(*m*-bromophenoxy)phosphazene	0	0	2	0	0	2	1	0	3
Bis(*p*-bromophenoxy)phosphazene	0	0	2	0	0	2	1	0	3
Bis(*m*-chlorophenoxy)phosphazene	0	0	2	0	0	2	1	0	3
Bis(*p*-chlorophenoxy)phosphazene	0	0	2	0	0	2	1	0	3
Bis(*m*-fluorophenoxy)phosphazene	0	0	2	0	0	2	1	0	3
Bis(*p*-fluorophenoxy)phosphazene	0	0	2	0	0	2	1	0	3
p-Phenylene amine, emeraldine base	0	0	2	0	1	0	2	0	0
Diphenylsilylene	0	0	2	0	2	0	0	0	1
Diphenylphosphazene	0	0	2	0	2	0	1	0	1
Diphenylsiloxane	0	0	2	0	2	1	0	0	1
Bisphenoxyphosphazene	0	0	2	0	2	2	1	0	1

Constitutional Base Unit Poly-		CH_2	CO	C_6H_4	C	H	O	N	S	X
4,4′-Biphenylene carbodiimine		0	0	2	1	0	0	2	0	0
Diphenylmethylene		0	0	2	1	2	0	0	0	0
Phenyl-*p*-toluylsiloxane		0	0	2	1	4	1	0	0	1
Bis(*m*-trifluoromethylphenoxy)phosphazene		0	0	2	2	0	2	1	0	7
Bis(*p*-methylphenoxy)phosphazene		0	0	2	2	6	2	1	0	1
Bis(*p*-methoxyphenoxy)phosphazene		0	0	2	2	6	4	1	0	1
Hexafluorotrimethylenebiphenylene		0	0	2	3	0	0	0	0	6
Di-*p*-tolylmethylene		0	0	2	3	6	0	0	0	0
2,6-Diphenyl-1,4-phenylene oxide		0	0	2	6	4	1	0	0	0
Bis(*p*-isopropylphenoxy)phosphazene		0	0	2	6	14	2	1	0	1
2,5-Pyrazine-2,4-diphenylcyclobutylene		0	0	2	8	8	0	2	0	0
1,6-Diazanthrylene-4,4′-biphenylene		0	0	2	12	6	0	2	0	0
1,9-Diazanthrylene-4,4′-biphenylene		0	0	2	12	6	0	2	0	0
1,6-Diazanthrylene-4,4′-oxydiphenylene		0	0	2	12	6	1	2	0	0
1,9-Diazanthrylene-4,4′-oxydiphenylene		0	0	2	12	6	1	2	0	0
6,6′-Oxydiquinoline-4,4′-biphenylene		0	0	2	18	10	1	2	0	0
6,6′-Oxydiquinoline-4,4′-oxydiphenylene		0	0	2	18	10	2	2	0	0
4,4′-Isopropylidenediphenylene dithionisophthalate		0	0	3	5	6	2	0	2	0
2,2′-Biphenylenedithiazole-*p*-phenylene		0	0	3	6	2	0	2	2	0
m-Phenylenedithiazole-oxy-*p*-diphenylene		0	0	3	6	2	1	2	2	0
4,4′-Diphenyl-2,2′-(6,6′-oxydiquinolene)-*p*-phenylene		0	0	3	18	10	1	2	0	0
Bis(*p*-phenylphenoxy)phosphazene		0	0	4	0	2	2	1	0	1
2,2′-Biphenylenedithiazole-oxy-*p*-diphenylene		0	0	4	6	2	1	2	2	0
Phthalocyaninatogermoxane		0	0	4	8	0	1	8	0	1
Phthalocyaninatosiloxane		0	0	4	8	0	1	8	0	1
Phthalocyaninatostannyloxane		0	0	4	8	0	1	8	0	1
4,6-Diphenyl-2,8-(1,9-diazanthrylene)-4,4′-biphenylene		0	0	4	12	6	0	2	0	0
4,9-Diphenyl-2,7-(1,6-diazanthrylene)-4,4′-biphenylene		0	0	4	12	6	0	2	0	0
4,6-Diphenyl-2,8-(1,9-diazanthrylene)-4,4′-oxydiphenylene		0	0	4	12	6	1	2	0	0
4,9-Diphenyl-2,7-(1,6-diazanthrylene)-4,4′-oxydiphenylene		0	0	4	12	6	1	2	0	0
2,2′-Biphenylene 6,6′-bis(4-phenylquinoline)		0	0	4	18	10	0	2	0	0
4,4′-Diphenyl-2,2′-(6,6′-oxydiquinoline)-4,4′-biphenylene		0	0	4	18	10	1	2	0	0
4,4′-Oxydiphenylene-4,4′-diquinoline-4,4′-biphenylene		0	0	4	18	10	1	2	0	0
4,4′-Diphenyl-2,2′-(6,6′-oxydiquinoline)-4,4′-oxydiphenylene		0	0	4	18	10	2	2	0	0
Tetraphenyl-2,2′-(6,6′-oxydiquinolene)-*p*-phenylene		0	0	5	18	10	1	2	0	0
Pentaphenyl-*p*-toluyltrisiloxane		0	0	6	1	8	3	0	0	3
3,3′-Diphenyl-2,2′-(4,4′-oxydiphenylene-4,4′-diquinoline)-biphenylene		0	0	6	18	10	1	2	0	0
Tetraphenyl-2,2′-(6,6′-oxydiquinoline)-4,4′-biphenylene		0	0	6	18	10	1	2	0	0
Tetraphenyl-2,2′-(6,6′-oxydiquinoline)-4,4′-oxydiphenylene		0	0	6	18	10	2	2	0	0
Aminoformic acid		0	1	0	0	1	0	1	0	0
2-Mercapto-2-methylacetic acid		0	1	0	2	4	0	0	1	0
2-Hydroxypropionic acid (lactic acid)		0	1	0	2	4	1	0	0	0
Alanine		0	1	0	2	5	0	1	0	0
3-Amino-2-butenoic acid		0	1	0	3	5	0	1	0	0
Dimethyl ketene (ketone)	I.	0	1	0	3	6	0	0	0	0
Dimethyl-2-hydroxyacetic acid		0	1	0	3	6	1	0	0	0
2-Aminoisobutyric acid		0	1	0	3	7	0	1	0	0
Isopropylhydroxyacetic acid		0	1	0	4	8	1	0	0	0
2,3-Dimethyl-3-aminopropionic acid		0	1	0	4	9	0	1	0	0
Valine		0	1	0	4	9	0	1	0	0
2,4-Hexadienoic acid, 2,5-		0	1	0	5	8	1	0	0	0
α-L-Guluronic acid, 1,4-		0	1	0	5	8	5	0	0	0
β-D-Mannuronic acid, 1,4-		0	1	0	5	8	5	0	0	0
Methyl-2,4-hexadienoate, 2,5-		0	1	0	6	10	1	0	0	0
4-Methyl-1,3-phenyleneurea		0	1	0	7	8	0	2	0	0
Dimethyl ketene (ester)	II.	0	1	0	7	12	1	0	0	0
Furfural-*alt*-dimethylketene		0	1	0	8	10	2	0	0	0
Isopropyl-2,4-hexadienoate, 2,5-		0	1	0	8	14	1	0	0	0
Tetramethylcyclobutylene carbonate		0	1	0	8	14	2	0	0	0
5-Bromo-6-hydroxy-2-naphthoic acid		0	1	0	10	5	1	0	0	1
2,6-Hydroxynaphthoic acid		0	1	0	10	6	1	0	0	0
Di-*tert*-butyl-4-hydroxybenzoic acid		0	1	0	14	20	1	0	0	0
4,4′-Isopropylidene-3,3′,5,5′-tetrabromodiphenylene carbonate		0	1	0	15	10	2	0	0	4
4,4′-Isopropylidene-3,3′,5,5′-tetrachlorodiphenylene carbonate		0	1	0	15	10	2	0	0	4
4,4′-Isopropylidene-3,3′-dichlorodiphenylene carbonate		0	1	0	15	12	2	0	0	2

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
4,4′-Isopropylidene-3,3′-dimethyldiphenylene carbonate	0	1	0	17	18	2	0	0	0
4,4′-Cyclohexylidene-3,3′,5,5-tetrachlorodiphenylene carbonate	0	1	0	18	9	2	0	0	4
4,4′-Isopropylidene-3,3′-diisopropyldiphenylene carbonate	0	1	0	21	26	2	0	0	0
m-Hydroxybenzoic acid	0	1	1	0	0	1	0	0	0
p-Hydroxybenzoic acid	0	1	1	0	0	1	0	0	0
m-Aminobenzoic acid	0	1	1	0	1	0	1	0	0
p-Aminobenzoic acid	0	1	1	0	1	0	1	0	0
N-Phenylaminoformic acid	0	1	1	0	1	0	1	0	0
m-Phenylene urea	0	1	1	0	2	0	2	0	0
3-(*p*-Hydroxyphenylene)-propenoic acid	0	1	1	2	2	1	0	0	0
5-Phenyl-2,4-pentadienoic acid, 2,5-	0	1	1	4	6	1	0	0	0
p-Chlorobenzaldehyde-*alt*-dimethylketene	0	1	1	4	7	1	0	0	1
m-Nitrobenzaldehyde-*alt*-dimethylketene	0	1	1	4	7	3	1	0	0
Benzaldehyde-*alt*-dimethylketene	0	1	1	4	8	1	0	0	0
2,5-Methyl-5-phenyl-2,4-pentadienoate	0	1	1	5	8	1	0	0	0
p-Methoxybenzaldehyde-*co*-dimethylketene	0	1	1	5	10	2	0	0	0
3-Bromo-4,4′-hydroxybibenzoic acid	0	1	1	6	3	1	0	0	1
4,4′-Hydroxybibenzoic acid	0	1	2	0	0	1	0	0	0
4,4′-Oxydiphenylene ketone	0	1	2	0	0	1	0	0	0
4,4′-Thiodiphenylene carbonate	0	1	2	0	0	2	0	1	0
4,4′-Oxydiphenylene carbonate	0	1	2	0	0	3	0	0	0
4,4′-Sulfinyldiphenylene carbonate	0	1	2	0	0	3	0	1	0
4,4′-Sulfonyldiphenylene carbonate	0	1	2	0	0	4	0	1	0
4,4′-Ethylidenediphenylene carbonate	0	1	2	2	4	2	0	0	0
4,4′-Isopropylidenediphenylene carbonate	0	1	2	3	6	2	0	0	0
4,4′-Isobutylidenediphenylene carbonate	0	1	2	4	8	2	0	0	0
4,4′-(Methyl-*p*-phenylenedioxy)-diphenylene ketone	0	1	2	7	6	2	0	0	0
4,4′-(2,4-Dimethyl-3,3-pentylidene)diphenylene carbonate	0	1	2	7	14	2	0	0	0
(*p*-Phenylenedioxy)diphenylene ketone	0	1	3	0	0	2	0	0	0
(*p*-Phenylenedioxy)diphenylene carbonate	0	1	3	0	0	4	0	0	0
4,4′-(Phenylmethylene)diphenylene carbonate	0	1	3	1	2	2	0	0	0
4,4′-Phenylethylidenediphenylene carbonate	0	1	3	2	4	2	0	0	0
4,4′-Biphenylenedioxy 4,4′-phenylene ketone	0	1	4	0	0	2	0	0	0
4,4′-Biphenylenedioxy-diphenylene carbonate	0	1	4	0	0	4	0	0	0
4,4′-(Diphenylmethylene)diphenylene carbonate	0	1	4	1	2	2	0	0	0
2,4-Hexadienedioic acid, 2,5-	0	2	0	4	6	2	0	0	0
Alanylvaline	0	2	0	6	14	0	2	0	0
2,5-Diisopropyl-2,4-hexadienedioate	0	2	0	10	18	2	0	0	0
2-Fluoro-*p*-phenylene 2-fluoroterephthalamide	0	2	0	12	8	0	2	0	2
2,6-Naphthalene-2,4-cyclobutylenedicarboxylic acid	0	2	0	14	12	2	0	0	0
2,6-Naphthalene-2,4-bisdichlorophenylcyclobutylenedicarboxylate	0	2	0	26	16	2	0	0	4
Isophthalic anhydride	0	2	1	0	0	1	0	0	0
Terephthalic anhydride	0	2	1	0	0	1	0	0	0
p-Xylylene oxalate	0	2	1	0	0	2	0	0	0
p-Phenylene *m*-carboranedicarboxylate	0	2	1	2	10	2	0	0	10
p-Phenylene 2,5-thiopheneamide	0	2	1	4	4	0	2	1	0
2,5-Pyrimidine terephthalamide	0	2	1	4	4	0	4	0	0
p-Phenylene cyclobutylenedicarboxylic acid	0	2	1	4	6	2	0	0	0
p-Phenylene cyclobutylenedicarboxamide	0	2	1	4	8	0	2	0	0
Chloro-*p*-phenylene Terephthalate	0	2	1	6	3	2	0	0	1
p-Phenylene dimethylcyclobutylenedicarboxylate	0	2	1	6	10	2	0	0	0
4-Methyl-*m*-phenylene terephthalamide	0	2	1	7	8	0	2	0	0
p-Phenylene dicyanodimethylcyclobutylenedicarboxylate	0	2	1	8	8	2	2	0	0
tert-butyl-*p*-phenylene terephthalate	0	2	1	10	12	2	0	0	0
p-Phenylene diisopropylcyclobutylenedicarboxylate	0	2	1	10	18	2	0	0	0
p-Phenylene dicyanodiisopropylcyclobutylenedicarboxylate	0	2	1	12	16	2	2	0	0
3,3′-Dimethyl-4,4′-biphenylene terephthalamide	0	2	1	14	14	0	2	0	0
2′-Isopropyl-2-methyl-4,4′-oxydiphenylene *m*-phenylenediketone	0	2	1	16	16	1	0	0	0
2′-Isopropyl-2-methyl-4,4′-oxydiphenylene *p*-phenylenediketone	0	2	1	16	16	1	0	0	0
1,5-Naphthalene-4′,4″-(dimethoxy)dibenzylidenimino isophthalate	0	2	1	26	20	4	2	0	0
1,5-Naphthalene-4′,4″-(dimethoxy)dibenzylidenimino terephthalate	0	2	1	26	20	4	2	0	0
4,4′-Oxydibenzoic anhydride	0	2	2	0	0	2	0	0	0
m-Phenylene terephthalate	0	2	2	0	0	2	0	0	0
m-Phenylene isophthalate	0	2	2	0	0	2	0	0	0
p-Phenylene isophthalate	0	2	2	0	0	2	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
m-Phenylene terephthalate	0	2	2	0	0	2	0	0	0
p-Phenylene terephthalate	0	2	2	0	0	2	0	0	0
m-Phenylene isophthalamide	0	2	2	0	2	0	2	0	0
p-Phenylene isophthalamide	0	2	2	0	2	0	2	0	0
p-Phenylene phthalamide	0	2	2	0	2	0	2	0	0
m-Phenylene terephthalamide	0	2	2	0	2	0	2	0	0
p-Phenylene terephthalamide	0	2	2	0	2	0	2	0	0
Isophthaloyl (dithionisophthaloyl)dihydrazide	0	2	2	2	4	0	4	2	0
Terephthaloyl dithionisophthaloyldihydrazide	0	2	2	2	4	0	4	2	0
4,4′-Isopropylidenedibenzoic anhydride	0	2	2	3	6	1	0	0	0
p-Phenylene phenylthioterephthalate	0	2	2	6	4	0	0	2	0
Phenyl-*p*-phenylene terephthalate	0	2	2	6	4	2	0	0	0
4,4′-Isopropylidenediphenylene 3-methylcyclopropylenedicarboxylate	0	2	2	7	12	2	0	0	0
4-Methyl-1,3-phenylene 3,3′-methylphosphinylidenedibenzamide	0	2	2	8	11	1	2	0	1
4-Methyl-1,3-phenylene 4,4′-methylphosphinylidenedibenzamide	0	2	2	8	11	1	2	0	1
2,6-Diisopropyl-4,4′-oxydiphenylene *m*-phenylenediketone	0	2	2	12	16	1	0	0	0
p-Phenylene-4′,4″-(dimethoxy)dibenzylidenimino isophthalate	0	2	2	16	14	4	2	0	0
4,4′-Biphenylene dithiolisophthalate	0	2	3	0	0	0	0	2	0
4,4′-Biphenylene dithiolterephthalate	0	2	3	0	0	0	0	2	0
4,4′-Oxydiphenylene *m*-phenylene diketone	0	2	3	0	0	1	0	0	0
4,4′-Oxydiphenylene *m*-phenylene ketone	0	2	3	0	0	1	0	0	0
4,4′-Oxydiphenylene *p*-phenylene diketone	0	2	3	0	0	1	0	0	0
4,4′-Biphenylene terephthalate	0	2	3	0	0	2	0	0	0
(*p*-Phenylenedioxy)diphenylene diketone	0	2	3	0	0	2	0	0	0
4,4′-Biphenylene terephthalamide	0	2	3	0	2	0	2	0	0
4,4′-Sulfonyldiphenylene terephthalamide	0	2	3	0	2	2	1	1	0
m-Phenylene 3,3′-phosphinylidenedibenzamide	0	2	3	0	3	1	2	0	1
o-Phenylene 3,3′-phosphinylidenedibenzamide	0	2	3	0	3	1	2	0	1
p-Phenylene 3,3′-phosphinylidenedibenzamide	0	2	3	0	3	1	2	0	1
m-Phenylene 4,4′-phosphinylidenedibenzamide	0	2	3	0	3	1	2	0	1
o-Phenylene 4,4′-phosphinylidenedibenzamide	0	2	3	0	3	1	2	0	1
p-Phenylene 4,4′-phosphinylidenedibenzamide	0	2	3	0	3	1	2	0	1
m-Phenylene 3,3′-(methylphosphinylidene)dibenzamide	0	2	3	1	5	1	2	0	1
o-Phenylene 3,3′-(methylphosphinylidene)dibenzamide	0	2	3	1	5	1	2	0	1
p-Phenylene 3,3′-(methylphosphinylidene)dibenzamide	0	2	3	1	5	1	2	0	1
m-Phenylene 4,4′-(methylphosphinylidene)dibenzamide	0	2	3	1	5	1	2	0	1
o-Phenylene 4,4′-(methylphosphinylidene)dibenzamide	0	2	3	1	5	1	2	0	1
p-Phenylene 4,4′-(methylphosphinylidene)dibenzamide	0	2	3	1	5	1	2	0	1
4,4′-Isopropylidenediphenylene isophthalamide	0	2	3	3	8	0	2	0	0
p-Phenylene diphenylcyclobutylenedicarboxylate	0	2	3	4	6	2	0	0	0
4-Methyl-1,3-phenylene 4,4′-phenylphosphinylidenedibenzamide	0	2	3	7	9	1	2	0	1
1,5-Naphthalene-4′,4″-dibenzylidenimino isophthalate	0	2	3	12	8	2	2	0	0
1,5-Naphthalene-4′,4″-dibenzylidenimino terephthalate	0	2	3	12	8	2	2	0	0
4,4′-Oxydiphenylene-4″,4‴-(dimethoxy)dibenzylidenimino isophthalate	0	2	3	16	14	5	2	0	0
4,4′-Oxydiphenylene 4,4-biphenylene diketone	0	2	4	0	0	1	0	0	0
4,4′-Biphenylene 4,4′-biphenylenedicarboxylate	0	2	4	0	0	2	0	0	0
(4,4′-Phenylenedioxy)diphenylene *m*-phenylene diketone	0	2	4	0	0	2	0	0	0
(4,4′-Phenylenedioxy)diphenylene *p*-phenylene diketone	0	2	4	0	0	2	0	0	0
m-Phenylene 4,4′-(phenylphosphinylidene)dibenzamide	0	2	4	0	3	1	2	0	1
o-Phenylene 4,4′-(phenylphosphinylidene)dibenzamide	0	2	4	0	3	1	2	0	1
p-Phenylene 4,4′-(phenylphosphinylidene)dibenzamide	0	2	4	0	3	1	2	0	1
p-Phenylene-4′,4″-dibenzylidenimino isophthalate	0	2	4	2	2	2	2	0	0
4,4′-Biphenylenedioxy-diphenylene *m*-phenylene diketone	0	2	5	0	0	2	0	0	0
(*p*-Phenylenedioxy)diphenylene oxydiphenylenediketone	0	2	5	0	0	3	0	0	0
4,4′-Oxydiphenylene-4″,4‴-dibenzylidenimino isophthalate	0	2	5	2	2	3	2	0	0
3,8-Phenanthridinonediyl terephthalamide	0	3	1	12	9	0	3	0	0
3,4′-Carbonyldiphenylene terephthalate	0	3	3	0	0	2	0	0	0
4,4′-Benzanilidylene terephthalamide	0	3	3	0	3	0	3	0	0
4,4′-(Carbonyldiphenylenedioxy)-diphenylene-*p*-phenylene diketone	0	3	5	0	0	2	0	0	0
Alanylalanylalanylvaline	0	4	0	10	24	0	4	0	0
Alanylalanylvalylvaline	0	4	0	12	28	0	4	0	0
3,3′-Bis(trifluoromethyl)biphenylene 3,3′,4,4′-biphenylenetetracarboximide	0	4	0	26	12	0	2	0	6
3,3′-Dimethyl-4,4′-biphenylene 3,3′,4,4′-biphenylenetetracarboximide	0	4	0	26	18	0	2	0	0
m-Phenylene pyromellitimide	0	4	1	6	2	0	2	0	0
p-Phenylene pyromellitimide	0	4	1	6	2	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
p-Phenylene 1,4-pyromellitamide	0	4	1	6	6	2	2	0	0
p-Phenylene 3,3′,4,4′-oxydiphenylenetetracarboximide	0	4	1	12	6	1	2	0	0
p-Phenylene 4,4′-oxy(3,3′-dicarboxy)dibenzamide	0	4	1	12	10	3	2	0	0
4,4′-Biphenylene pyromellitimide	0	4	2	6	2	0	2	0	0
4,4′-Thiodiphenylene pyromellitimide	0	4	2	6	2	0	2	1	0
3,4′-Oxydiphenylene pyromellitimide	0	4	2	6	2	1	2	0	0
4,4′-Oxydiphenylene pyromellitimide	0	4	2	6	2	1	2	0	0
4,4′-Biphenylene 1,4-pyromellitimide	0	4	2	6	6	2	2	0	0
4,4′-Oxydiphenylene 1,4-pyromellitimide	0	4	2	6	6	3	2	0	0
4,4′-Biphenylene 3,3′,4,4′-biphenylenetetracarboximide	0	4	2	12	6	0	2	0	0
4,4′-Biphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide	0	4	2	12	6	1	2	0	0
3,4′-Oxydiphenylene 3,3′,4,4′-biphenylenetetracarboximide	0	4	2	12	6	1	2	0	0
4,4′-Oxydiphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide	0	4	2	12	6	2	2	0	0
4,4′-Biphenylene 4,4′-oxy(3,3′-dicarboxy)dibenzamide	0	4	2	12	10	3	2	0	0
4,4′-Benzobisthiazole-diphenylene pyromellitimide	0	4	2	14	4	0	4	2	0
p-Terphenylene pyromellitimide	0	4	3	6	2	0	2	0	0
(*m*-Phenylenedioxy)diphenylene pyromellitimide	0	4	3	6	2	2	2	0	0
(*p*-Phenylenedioxy)diphenylene pyromellitimide	0	4	3	6	2	2	2	0	0
(*m*-Phenylenedioxy)diphenylene 1,4-pyromellitamide	0	4	3	6	6	4	2	0	0
(*p*-Phenylenedioxy)diphenylene 1,4-pyromellitamide	0	4	3	6	6	4	2	0	0
p-Phenylene thiodiphenylenedioxy-diphenylenetetracarboximide	0	4	3	12	6	2	2	1	0
(*p*-Phenylenedioxy)diphenylene oxydiphenylenetetracarboximide	0	4	3	12	6	3	2	0	0
(*p*-Phenylenedioxy)diphenylene 4,4′-oxy(3,3′-dicarboxy)dibenzamide	0	4	3	12	10	5	2	0	0
p-Phenylene 4,4′-dibenzoxyterephthalate	0	4	4	0	0	4	0	0	0
m-Phenylene-3,3′-dibenzamido isophthalamide	0	4	4	0	4	0	4	0	0
p-Phenylene-3,3′-dibenzamido isophthalamide	0	4	4	0	4	0	4	0	0
m-Phenylene-4,4′-dibenzamido isophthalamide	0	4	4	0	4	0	4	0	0
p-Phenylene-4,4′-dibenzamido isophthalamide	0	4	4	0	4	0	4	0	0
m-Phenylene-3,3′-dibenzamido terephthalamide	0	4	4	0	4	0	4	0	0
p-Phenylene-3,3′-dibenzamido terephthalamide	0	4	4	0	4	0	4	0	0
m-Phenylene-4,4′-dibenzamido terephthalamide	0	4	4	0	4	0	4	0	0
p-Phenylene-4,4′-dibenzamido terephthalamide	0	4	4	0	4	0	4	0	0
4,4′-Biphenylenedioxy-3,3′-diphenylene pyromellitimide	0	4	4	6	2	2	2	0	0
(Oxydiphenylenedioxy)diphenylene pyromellitimide	0	4	4	6	2	3	2	0	0
4,4′-Biphenylene thiodiphenylenedioxydiphenylenetetracarboximide	0	4	4	12	6	2	2	1	0
(*p*-Phenylenedioxy)diphenylene *p*-phenylenedioxydiphenylenetetracarboximide	0	4	4	12	6	4	2	0	0
(*p*-Phenylenedioxy)diphenylenedioxydiphenylene pyromellitimide	0	4	5	6	2	4	2	0	0
4,4′-Carbonyldiphenylene pyromellitimide	0	5	2	6	2	0	2	0	0
4,4′-Biphenylene 3,3′,4,4′-carbonyldiphenylenetetracarboximide	0	5	2	12	6	0	2	0	0
4,4′-Biphenylene 4,4′-carbonyl(3,3′-dicarboxy)dibenzamide	0	5	2	12	10	2	2	0	0
4,4′-(Isophthaloyldiamino)diphenylene pyromellitimide	0	6	3	6	4	0	4	0	0
4,4′-(Terephthaloyldiamino)diphenylene pyromellitimide	0	6	3	6	4	0	4	0	0
4,4′-Thiodiphenylene *p*-phenyleneditrimellitatediimide	0	6	3	12	6	2	2	1	0
4,4′-Oxydiphenylene *p*-phenyleneditrimellitatediimide	0	6	3	12	6	3	2	0	0
4,4′-(Isophthaloyldiamino)diphenylene oxydiphenylenetetracarboximide	0	6	3	12	8	1	4	0	0
4,4′-Oxydiphenylene 5,5′-(*p*-phenylene)ditrimellitatediamide	0	6	3	12	10	5	2	0	0
Isophthalic 2,2′-(isophthaloyldiamino)dibenzoic anhydride	0	6	4	0	2	2	2	0	0
Isophthalic 2,2′-(terephthaloyldiamino)dibenzoic anhydride	0	6	4	0	2	2	2	0	0
2,2′-(Isophthaloyldiamino)dibenzoic terephthalic anhydride	0	6	4	0	2	2	2	0	0
Terephthalic 2,2′-(terephthaloyldiamino)dibenzoic anhydride	0	6	4	0	2	2	2	0	0
Terephthaloyldihydrazodi (*p*-aminobenzoyl) terephthalamide	0	6	4	0	6	0	6	0	0
(*p*-Phenylenedioxy)diphenylene *p*-phenyleneditrimellitatediimide	0	6	4	12	6	4	2	0	0
(Oxydiphenylenedioxy)diphenylene *p*-phenyleneditrimellitatediimide	0	6	5	12	6	5	2	0	0
(*p*-Phenylenedioxy)diphenylenedioxydiphenylene *p*-phenyleneditrimellitamide	0	6	6	12	6	6	2	0	0
Isophthaloyldiphenylenedioxdiphenylene carbonyldiphenylenetetracarboximide	0	7	5	12	6	2	2	0	0
4,4′-(Isophthaloyldiamino)diphenylene *p*-phenyleneditrimellitatediimide	0	8	4	12	8	2	4	0	0
4,4′-(Terephthaloyldiamino)diphenylene *p*-phenyleneditrimellitate	0	8	4	12	8	2	4	0	0
1	1	0	0	0	0	0	0	0	0
Methylene	1	0	0	0	0	0	0	0	0
Methylene selenide	1	0	0	0	0	0	0	0	1
Methylene sulfide	1	0	0	0	0	0	0	1	0
Methylene disulfide	1	0	0	0	0	0	0	2	0
Oxymethylene	1	0	0	0	0	1	0	0	0
Vinylidene bromide	1	0	0	1	0	0	0	0	2
Vinylidene chloride	1	0	0	1	0	0	0	0	2

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Vinylidene fluoride	1	0	0	1	0	0	0	0	2
Vinyl bromide	1	0	0	1	1	0	0	0	1
Vinyl chloride	1	0	0	1	1	0	0	0	1
Vinyl fluoride	1	0	0	1	1	0	0	0	1
2-Chloroacetaldehyde	1	0	0	1	1	1	0	0	1
Vinyl alcohol	1	0	0	1	2	1	0	0	0
Acrylonitrile	1	0	0	2	1	0	1	0	0
3,3,3-Trifluoropropylene oxide	1	0	0	2	1	1	0	0	3
Ethyl isocyanide	1	0	0	2	3	0	1	0	0
Propene	1	0	0	2	4	0	0	0	0
Propylidene	1	0	0	2	4	0	0	0	0
Propylene sulfide	1	0	0	2	4	0	0	1	0
Methyl vinyl ether	1	0	0	2	4	1	0	0	0
Propionaldehyde	1	0	0	2	4	1	0	0	0
Propylene oxide	1	0	0	2	4	1	0	0	0
Methacrylonitrile	1	0	0	3	3	0	1	0	0
Isobutene	1	0	0	3	6	0	0	0	0
Isobutylene sulfide	1	0	0	3	6	0	0	1	0
Isobutylene oxide	1	0	0	3	6	1	0	0	0
α-Methylvinylmethyl ether	1	0	0	3	6	1	0	0	0
1-Cyano-1,3-butadiene, 1,4-	1	0	0	4	3	0	1	0	0
3-Trifluoromethyl-1-butene	1	0	0	4	5	0	0	0	3
1,3-Pentadiene, 1,2-	1	0	0	4	6	0	0	0	0
1,3-Pentadiene, 1,4-	1	0	0	4	56	0	0	0	0
1-Methoxy-1,3-butadiene, 1,4-	1	0	0	4	56	1	0	0	0
β-D-Xylose, 1,3-(xylan)	1	0	0	4	6	4	0	0	0
β-D-Xylose, 1,4-(hardwood xylan)	1	0	0	4	6	4	0	0	0
3-Methyl-1-butene	1	0	0	4	8	0	0	0	0
Isopropylethylene sulfide	1	0	0	4	8	0	0	1	0
1-Ethoxy-2-methylethylene	1	0	0	4	8	1	0	0	0
Isopropylethylene oxide	1	0	0	4	8	1	0	0	0
Isopropylvinyl ether	1	0	0	4	8	1	0	0	0
Isovaleraldehyde	1	0	0	4	8	1	0	0	0
1-Ethoxy-2-methoxyethylene	1	0	0	4	8	2	0	0	0
β-D-Glucotrinitrate, 1,4-	1	0	0	5	5	1	3	0	0
β-D-Glucodinitrate, 1,4-	1	0	0	5	6	9	2	0	0
α-Isopropylacrylonitrile	1	0	0	5	7	0	1	0	0
4-Methyl-1,3-pentadiene, 1,2-	1	0	0	5	8	0	0	0	0
2-Methyl-1,3-pentadiene, 1,4-	1	0	0	5	8	0	0	0	0
3-Methyl-1,3-pentadiene, 1,4-	1	0	0	5	8	0	0	0	0
α-D-Glucose, 1,3-	1	0	0	5	8	5	0	0	0
β-D-Glucose, 1,3- (curdlan)	1	0	0	5	8	5	0	0	0
α-D-Glucose, 1,4- (amylose)	1	0	0	5	8	5	0	0	0
β-D-Glucose, 1,4- (cellulose)	1	0	0	5	8	5	0	0	0
α-D-Glucose, 1,6- (dextran)	1	0	0	5	8	5	0	0	0
α-D-Mannose, 1,3-	1	0	0	5	8	5	0	0	0
β-D-Mannose, 1,4-	1	0	0	5	8	5	0	0	0
1-Chloro-2-isobutoxyethylene	1	0	0	5	9	1	0	0	1
α-D-Galactosamine, 1,4-	1	0	0	5	9	4	1	0	0
β-D-Glucosamine, 1,4- (chitosan)	1	0	0	5	9	4	1	0	0
3,3-Dimethyl-1-butene	1	0	0	5	10	0	0	0	0
tert-Butylethylene sulfide	1	0	0	5	10	0	0	1	0
tert-Butylethylene oxide	1	0	0	5	10	1	0	0	0
tert-Butylvinyl ether	1	0	0	5	10	1	0	0	0
2-Vinyl pyridine	1	0	0	6	5	0	1	0	0
5-Methyl-1,3-hexadiene, 1,4-	1	0	0	6	10	0	0	0	0
1-Isobutoxy-2-methylethylene	1	0	0	6	12	1	0	0	0
1,4-Tetradeuterobutadiene-*alt*-methacrylonitrile	1	0	0	7	5	0	1	0	4
Methylene 3,5-toluene	1	0	0	7	6	0	0	0	0
Methylene 2,6-diamino-3,5-toluene	1	0	0	7	8	0	2	0	0
p-Fluoro-*o*-methylstyrene	1	0	0	8	7	0	0	0	1
Methylene 2,5-dimethyl-*p*-phenylene	1	0	0	8	8	0	0	0	0
Tetramethylcyclobutyleneoxymethylene oxide	1	0	0	8	14	2	0	0	0
α-D-Trimethylglucose, 1,4-	1	0	0	8	14	5	0	0	0
β-D-Trimethylglucose, 1,4-	1	0	0	8	14	5	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
β-D-Trimethylmannose, 1,4-	1	0	0	8	14	5	0	0	0
2,4-Dimethylstyrene	1	0	0	9	10	0	0	0	0
2,5-Dimethylstyrene	1	0	0	9	10	0	0	0	0
3,4-Dimethylstyrene	1	0	0	9	10	0	0	0	0
3,5-Dimethylstyrene	1	0	0	9	10	0	0	0	0
1-Vinyl naphthalene	1	0	0	11	8	0	0	0	0
3-Vinyl pyrene	1	0	0	17	10	0	0	0	0
Methyl-*alt-p*-phenylene	1	0	1	0	0	0	0	0	0
m-Chlorostyrene	1	0	1	1	1	0	0	0	1
p-Chlorostyrene	1	0	1	1	1	0	0	0	1
m-Fluorostyrene	1	0	1	1	1	0	0	0	1
o-Fluorostyrene	1	0	1	1	1	0	0	0	1
p-Fluorostyrene	1	0	1	1	1	0	0	0	1
Styrene	1	0	1	1	2	0	0	0	0
Styrene oxide	1	0	1	1	2	1	0	0	0
Styrene sulfone	1	0	1	1	2	2	0	1	0
α-Methylstyrene	1	0	1	2	4	0	0	0	0
m-Methylstyrene	1	0	1	2	4	0	0	0	0
o-Methylstyrene	1	0	1	2	4	0	0	0	0
p-Methylstyrene	1	0	1	2	4	0	0	0	0
N-Phenyl-2-imino-1,3-dithia-4-methylpentamethylene	1	0	1	3	5	0	1	2	0
p-Methyl-α-methylstyrene	1	0	1	3	6	0	0	0	0
3-Phenyl-1-butene	1	0	1	3	6	0	0	0	0
p-Trimethylsilylstyrene	1	0	1	4	10	0	0	0	1
tert-Butylstyrene	1	0	1	5	10	0	0	0	0
p-Isopropyl-α-methylstyrene	1	0	1	5	10	0	0	0	0
Styryl pyridine-*alt*-vinyl pyridine	1	0	1	13	12	0	2	0	0
4,4′-Methylenediphenylene oxide	1	0	2	0	0	1	0	0	0
N-Vinyl carbazole	1	0	2	1	1	0	1	0	0
N-Vinyl diphenylamine	1	0	2	1	3	0	1	0	0
4,4′-Stilbenediyloxymethylene oxide	1	0	2	2	2	2	0	0	0
α-methyl-4,4′-stilbenediyloxymethylene oxide	1	0	2	3	4	2	0	0	0
1-*N*-Carbazoyl-1,3-pentadiynol	1	0	2	4	1	1	01	0	0
2-Mercaptoacetic acid	1	1	0	0	0	0	0	1	0
2-Hydroxyacetic acid (glycolic acid)	1	1	0	0	0	1	0	0	0
Glycine	1	1	0	0	1	0	1	0	0
Thiolacrylic acid	1	1	0	1	2	0	0	1	0
Acrylic acid	1	1	0	1	2	1	0	0	0
Vinyl formate	1	1	0	1	2	1	0	0	0
Acrylamide	1	1	0	1	3	0	1	0	0
Cysteine	1	1	0	1	3	0	1	1	0
Serine	1	1	0	1	3	1	1	0	0
3-Trichloromethyl-3-hydroxypropionic acid	1	1	0	2	1	1	0	0	3
Vinyl trifluoroacetate	1	1	0	2	1	1	0	0	3
3-Dichloromethyl-3-hydroxypropionic acid	1	1	0	2	2	1	0	0	2
Vinylmethyl ketone	1	1	0	2	4	0	0	0	0
3-Hydroxybutyric acid	1	1	0	2	4	1	0	0	0
Methacrylic acid	1	1	0	2	4	1	0	0	0
2-Methyl-3-hydroxypropionic acid	1	1	0	2	4	1	0	0	0
Vinyl acetate	1	1	0	2	4	1	0	0	0
3-Aminobutyric acid	1	1	0	2	5	0	1	0	0
2,4-Pentadienoic acid, 2,5-	1	1	0	3	4	1	0	0	0
3-Dichloroethyl-3-hydroxypropionic acid	1	1	0	3	4	1	0	0	2
Isopropenylmethyl ketone	1	1	0	3	6	0	0	0	0
2,2-Dimethyl-3-hydroxypropionic acid	1	1	0	3	6	1	0	0	0
Methylmethacrylate	1	1	0	3	6	1	0	0	0
2,2-Dimethyl-3-aminopropionic acid	1	1	0	3	7	0	1	0	0
3,3-Dimethyl-3-aminopropionic acid	1	1	0	3	7	0	1	0	0
Histidine	1	1	0	4	5	0	3	0	0
Histidine hydrochloride	1	1	0	4	6	0	3	0	1
6-Amino-2,4-hexadienoic acid, 2,5-	1	1	0	4	7	1	1	0	0
Vinyl isopropyl ketone	1	1	0	4	8	0	0	0	0
Isopropyl thiolacrylate	1	1	0	4	8	0	0	1	0
Isopropyl acrylate	1	1	0	4	8	1	0	0	0
3-Isopropyl-3-hydroxypropionic acid	1	1	0	4	8	1	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
6-Amino-2,4-hexadienoic acid hydrochloride, 2,5-	1	1	0	4	8	1	1	0	1
Isoleucine	1	1	0	4	9	0	1	0	0
N-Isopropyl acrylamide	1	1	0	4	9	0	1	0	0
Leucine	1	1	0	4	9	0	1	0	0
Vinyl-*tert*-butyl ketone	1	1	0	5	10	0	0	0	0
tert-Butyl acrylate	1	1	0	5	10	1	0	0	0
Ethyl-2,4-hexadienoate, 2,5-	1	1	0	6	10	1	0	0	0
N-β-D-Acetylglucosamine, 1,4- (chitin)	1	1	0	6	11	4	1	0	0
tert-Butylmethacrylate	1	1	0	6	12	1	0	0	0
2,3,4-trimethoxy-5-hydroxyvaleric acid	1	1	0	6	12	4	0	0	0
2,5-Dimethylterephthalaldehyde	1	1	0	8	8	1	0	0	0
Isobutyl-2,4-hexadienoate, 2,5-	1	1	0	8	14	1	0	0	0
β-D-Galactosamine-*alt*-1,4-β-D-glucuronic acid, 1,3-	1	1	0	10	17	9	1	0	0
β-D-Glucosamine-*alt*-1,4-β-D-glucuronic acid, 1,3-	1	1	0	10	17	9	1	0	0
3,3′-Dimethyl-4,4′-methylenediphenylene carbonate	1	1	0	14	12	2	0	0	0
(*p*-Hydroxyphenylene)acetic acid	1	1	1	0	0	1	0	0	0
Isophthalaldehyde	1	1	1	0	0	1	0	0	0
Terephthalaldehyde	1	1	1	0	0	1	0	0	0
α-Amino-*p*-toluic acid	1	1	1	0	1	0	1	0	0
p-Fluorostyrene-*alt*-carbon monoxide	1	1	1	1	1	0	0	0	1
Styrene-*alt*-carbon monoxide	1	1	1	1	2	0	0	0	0
o-Hydroxystyrene-*alt*-carbon monoxide	1	1	1	1	2	1	0	0	0
Vinyl benzoate	1	1	1	1	2	1	0	0	0
Phenylalanine	1	1	1	1	3	0	1	0	0
Tyrosine	1	1	1	1	3	1	1	0	0
p-Trifluoroacetylstyrene	1	1	1	2	1	0	0	0	3
m-Methylstyrene-*alt*-carbon monoxide	1	1	1	2	4	0	0	0	0
p-Methylstyrene-*alt*-carbon monoxide	1	1	1	2	4	0	0	0	0
3-Mercapto-2-(*p*-toluenesulfonamide)propionic acid	1	1	1	2	5	2	1	2	0
Vinyl-*p*-*tert*-butylbenzoate	1	1	1	5	10	1	0	0	0
4,4′-Biphenyldicarboxaldehyde	1	1	2	0	0	1	0	0	0
4,4′-Methylenediphenyl carbonate	1	1	2	0	0	2	0	0	0
4,4′-Methylenediphenylene urea	1	1	2	0	2	0	2	0	0
4,4′-Butylidenediphenylene carbonate	1	1	2	3	6	2	0	0	0
4,4′-(Methyl-2,2-pentylidene)diphenylene carbonate	1	1	2	5	10	2	0	0	0
Aspartic acid	1	2	0	1	3	1	1	0	0
Propylene oxalate	1	2	0	2	4	2	0	0	0
O-Acetylserine	1	2	0	2	5	1	1	0	0
Alanylglycine	1	2	0	2	6	0	2	0	0
(3-Bromo-4-carboxyphenoxy)acetic anhydride	1	2	0	6	3	2	0	0	1
β-D-Xylodiacetate, 1,4-	1	2	0	6	10	4	0	0	0
N-β-D-Acetylgalactosamine-*alt*-1,4-β-D-glucuronic acid, 1,3-	1	2	0	11	19	9	1	0	0
N-β-D-Acetylglucosamine-*alt*-1,4-β-D-glucuronic acid, 1,3-	1	2	0	11	19	9	1	0	0
N-β-D-Acetylgalactosamine-4-sulfate-*alt*-1,4-β-D-glucuronic acid	1	2	0	11	19	12	1	1	0
N-β-D-Acetylgalactosamine-6-sulfate-*alt*-1,4-β-D-glucuronic acid	1	2	0	11	19	12	1	1	0
3,3′-Dimethyl-4,4′-methylenediphenylene methyl-1,3-phenylenediurea	1	2	0	21	22	0	4	0	0
(*m*-Carboxyphenoxy)acetic anhydride	1	2	1	0	0	2	0	0	0
(*p*-Carboxyphenoxy)acetic anhydride	1	2	1	0	0	2	0	0	0
p-Phenylene malonate	1	2	1	0	0	2	0	0	0
p-Carboxyphenylacrylate	1	2	1	1	2	2	0	0	0
m-Phenylene cyclopropylenedicarboxylate	1	2	1	2	2	2	0	0	0
p-Phenylene cyclopropylenedicarboxylate	1	2	1	2	2	2	0	0	0
Cyclopropylene isophthalamide	1	2	1	2	4	0	2	0	0
Methylethylene isophthalate	1	2	1	2	4	2	0	0	0
Methylethylene phthalate	1	2	1	2	4	2	0	0	0
Methylethylene terephthalate	1	2	1	2	4	2	0	0	0
3,3′-Dimethyl-4,4′-methylenediphenylene terephthalamide	1	2	1	14	14	0	2	0	0
2-ethyl-2′-Isopropyl-4,4′-oxydiphenylene *m*-phenylenediketone	1	2	1	16	16	1	0	0	0
N,N′-Dimethyl-4,4′-(dimethylmethylene)diphenylene terephthalamide	1	2	1	16	18	0	2	0	0
4,4′-Methylenedibenzoic anhydride	1	2	2	0	0	1	0	0	0
4,4′-(Methylenedioxy)dibenzoic anhydride	1	2	2	0	0	3	0	0	0
Methylethylene 2,2′-dibenzoate	1	2	2	2	4	2	0	0	0
Methylethylene 3,3′-dibenzoate	1	2	2	2	4	2	0	0	0
Methylethylene 4,4′-dibenzoate	1	2	2	2	4	2	0	0	0
Propylene 4,4′-sulfonyldibenzamide	1	2	2	2	6	2	2	1	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
4,4′-Isopropylidenediphenylene malonate	1	2	2	3	6	2	0	0	0
p-Phenylene(1,1-dimethyl)ethylene terephthalamide	1	2	2	3	8	0	2	0	0
4,4′-Isopropylidenediphenylene cyclopropylenedicarboxylate	1	2	2	5	8	2	0	0	0
4,4′-Isopropylidenediphenylene 1-methylcyclopropylenedicarboxylate	1	2	2	6	10	2	0	0	0
4,4′-Methylenediphenylene isophthalamide	1	2	3	0	2	0	2	0	0
4,4′-Methylenediphenylene terephthalamide	1	2	3	0	2	0	2	0	0
4,4′-Methylenediphenylene *m*-phenylenediurea	1	2	3	0	4	0	4	0	0
N,N′-Dimethyl-4,4′-methylenediphenylene terephthalamide	1	2	3	2	6	0	2	0	0
4,4′-Isopropylidenediphenylene (methylenediphenylene)diurethane	1	2	4	3	8	2	2	0	0
Alanylalanylglycine	1	3	0	4	12	0	3	0	0
β-D-Glucotriacetate, 1,3-	1	3	0	8	14	5	0	0	0
α-D-Glucotriacetate, 1,4-	1	3	0	8	14	5	0	0	0
β-D-Glucotriacetate, 1,4-	1	3	0	8	14	5	0	0	0
β-D-Mannotriacetate, 1,4-	1	3	0	8	14	5	0	0	0
α-D-Glucotriisobutyrate, 1,4-	1	3	0	14	26	5	0	0	0
3-Mercapto-2-phthalimidopropionic acid	1	3	1	1	1	0	1	1	0
β-D-Glucotricarbanilate, 1,4-	1	3	3	5	11	5	3	0	0
2,7-Fluorenylene pyromellitimide	1	4	0	18	8	0	2	0	0
2,7-Fluorenylene 1,4-pyromellitamide	1	4	0	18	12	2	2	0	0
Isophthalic 4,4′-methylenedioxy-3,3′-dimethoxydibenzoic anhydride	1	4	1	14	12	6	0	0	0
4,4′-(Methylenedioxy)-3,3′-dimethoxydibenzoic terephthalic anhydride	1	4	1	14	12	6	0	0	0
N,N′-Methylenediterephthalamic anhydride	1	4	2	0	2	1	2	0	0
Isophthaloyl (*m*-carboxyphenoxyacetyl)dihydrazide	1	4	2	0	4	1	4	0	0
Terephthaloyl (*m*-carboxyphenoxyacetyl)dihydrazide	1	4	2	0	4	1	4	0	0
4,4′-Methylenediphenylene pyromellitimide	1	4	2	6	2	0	2	0	0
Isophthalic 4,4′-(methylenedioxy)dibenzoic anhydride	1	4	3	0	0	4	0	0	0
4,4′-(Methylenedioxy)dibenzoic terephthalic anhydride	1	4	3	0	0	4	0	0	0
2	2	0	0	0	0	0	0	0	0
Ethylene	2	0	0	0	0	0	0	0	0
Ethylene sulfide	2	0	0	0	0	0	0	1	0
Ethylene disulfide	2	0	0	0	0	0	0	2	0
Ethylene tetrasulfide	2	0	0	0	0	0	0	4	0
Ethylene oxide	2	0	0	0	0	1	0	0	0
Ethylene amine	2	0	0	0	1	0	1	0	0
2-Aminoethylenesulfonic acid	2	0	0	0	1	2	1	1	0
Ethyleneamine-HCl complex	2	0	0	0	2	0	1	0	1
Allene	2	0	0	1	0	0	0	0	0
2-Imino-1,3-dithiapentamethylene	2	0	0	1	1	0	1	2	0
Bromomethylethylene oxide	2	0	0	1	1	1	0	0	1
Chloromethylethylene oxide (epichlorohydrin)	2	0	0	1	1	1	0	0	1
Fluoromethylethylene oxide	2	0	0	1	1	1	0	0	1
1-Hydroxytrimethylene	2	0	0	1	2	1	0	0	0
3-Hydroxyoxacyclobutane	2	0	0	1	2	2	0	0	0
3-Silylpropene	2	0	0	1	4	0	0	0	1
2,3-Dichloro-1,3-butadiene, 1,4-	2	0	0	2	0	0	0	0	2
Chlorotrifluoroethylene-*alt*-ethylene	2	0	0	2	0	0	0	0	4
Tetrafluoroethylene-*alt*-ethylene	2	0	0	2	0	0	0	0	4
Bis(2,2,2-trifluoroethoxy)phosphazene	2	0	0	2	0	2	1	0	7
2-Chloro-1,3-butadiene, 1,4- (chloroprene)	2	0	0	2	1	0	0	0	1
4,4,4-Trifluoro-1-butene	2	0	0	2	1	0	0	0	3
2,5-Ethylene-1,3,4-triazole	2	0	0	2	1	0	3	0	0
2,2,2-Trifluoroethylvinyl ether	2	0	0	2	1	1	0	0	3
3-Cyanopropionaldehyde	2	0	0	2	1	1	1	0	0
1,3-Butadiene, 1,2-	2	0	0	2	2	0	0	0	0
1,3-Butadiene, 1,4-	2	0	0	2	2	0	0	0	0
1,3-Cyclobutylene	2	0	0	2	2	0	0	0	0
Chlorinated 1,3-butadiene, 1,4-	2	0	0	2	2	0	0	0	2
2,5-Ethylene-1-amino-1,3,4-triazole	2	0	0	2	2	0	4	0	0
Butadiene oxide	2	0	0	2	2	1	0	0	0
1,2-Dichloromethylethylene oxide	2	0	0	2	2	1	0	0	2
N-Methyl-2-imino-1,3-dithiapentamethylene	2	0	0	2	3	0	1	2	0
2-Chloromethylpropylene oxide	2	0	0	2	3	1	0	0	1
1-Butene	2	0	0	2	4	0	0	0	0
Butyraldehyde	2	0	0	2	4	1	0	0	0
Ethylvinyl ether	2	0	0	2	4	1	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Diethylsilylene	2	0	0	2	6	0	0	0	1
Ethylsilylethylene	2	0	0	2	6	0	0	0	1
Methyl-*n*-propylsilylene	2	0	0	2	6	0	0	0	1
Diethylsiloxane	2	0	0	2	6	1	0	0	1
2,2-Bistrifluoromethyloxacyclobutane	2	0	0	3	0	1	0	0	6
1-Cyano-1,3-cyclobutylene	2	0	0	3	1	0	1	0	0
3-Chloro-2-methyl-1,3-butadiene, 1,4-	2	0	0	3	3	0	0	0	1
α-Ethylacrylonitrile	2	0	0	3	3	0	1	0	0
2-Methyl-1,3-butadiene, 1,4- (isoprene)	2	0	0	3	4	0	0	0	0
3-Methyl-1-butene, 1,3-	2	0	0	3	6	0	0	0	0
3,3-Dimethyltrimethylene sulfide	2	0	0	3	6	0	0	1	0
3,3-Dimethyloxacyclobutane	2	0	0	3	6	1	0	0	0
3,3-Dimethyltrimethylene sulfone	2	0	0	3	6	2	0	1	0
Hexafluoroisobutylene-*alt*-vinylidene fluoride	2	0	0	4	0	0	0	0	8
Bis(2,2,3,3,3-pentafluoropropoxy)phosphazene	2	0	0	4	0	2	1	0	11
2,4-Hexadiyne-1,6-diol, 2,5-	2	0	0	4	2	2	0	0	0
Bis(2,2,3,3-tetrafluoropropoxy)phosphazene	2	0	0	4	2	2	1	0	9
1,3-Cyclohexadiene, 1,4-	2	0	0	4	4	0	0	0	0
1,3,5-Hexatriene, 1,6-	2	0	0	4	4	0	0	0	0
4-Trifluoromethyl-1-pentene	2	0	0	4	5	0	0	0	3
2,3-Dimethyl-1,3-butadiene, 1,4-	2	0	0	4	6	0	0	0	0
1,3-Hexadiene, 1,4-	2	0	0	4	6	0	0	0	0
β-D-Fructofuran	2	0	0	4	6	5	0	0	0
2-Butene-*alt*-ethylene	2	0	0	4	8	0	0	0	0
3-Methyl-1-pentene	2	0	0	4	8	0	0	0	0
4-Methyl-1-pentene	2	0	0	4	8	0	0	0	0
1,4-Diethyl-2,3-azabutadiene, 1,4-	2	0	0	4	8	0	2	0	0
Isobutylvinyl ether	2	0	0	4	8	1	0	0	0
1-Methyl-2-propoxyethylene	2	0	0	4	8	1	0	0	0
1-Methylpropylvinyl ether	2	0	0	4	8	1	0	0	0
3-Trimethylsilylpropene	2	0	0	4	10	0	0	0	1
4,4-Dimethyl-1-pentene	2	0	0	5	10	0	0	0	0
3-*tert*-Butyloxacylobutane	2	0	0	5	10	1	0	0	0
Neopentylethylene oxide	2	0	0	5	10	1	0	0	0
Neopentylvinyl ether	2	0	0	5	10	1	0	0	0
Bis(2,2,3,3,4,4,4-heptafluorobutoxy)phosphazene	2	0	0	6	0	2	1	0	15
2,5-Dichloro-*p*-xylyene	2	0	0	6	2	0	0	0	2
2,4,6-Octatriynediol, 2,5-	2	0	0	6	2	2	0	0	0
Bromo-*p*-xylylene	2	0	0	6	3	0	0	0	1
Chloro-*p*-xylylene	2	0	0	6	3	0	0	0	1
2,5-Pyrazinecyclobutylene	2	0	0	6	4	0	2	0	0
2-*tert*-Butyl-1,3-butadiene, 1,4-	2	0	0	6	10	0	0	0	0
5-Methyl-1,3-heptadiene, 1,4-	2	0	0	6	10	0	0	0	0
6-Methyl-1,3-heptadiene, 1,4-	2	0	0	6	10	0	0	0	0
Cyano-*p*-xylylene	2	0	0	7	3	0	1	0	0
2,4,6-Trichloro-3-phenoxypropylene oxide	2	0	0	7	3	2	0	0	3
Methyl-*p*-xylylene	2	0	0	7	6	0	0	0	0
Divinyl furfural	2	0	0	7	6	3	0	0	0
4,6-Dimethyl-*m*-xylyene	2	0	0	8	8	0	0	0	0
2,5-Dimethyl-*p*-xylyene	2	0	0	8	8	0	0	0	0
2,5-Dimethyl-3-phenylpropene	2	0	0	9	10	0	0	0	0
3,4-Dimethyl-3-phenylpropene	2	0	0	9	10	0	0	0	0
3,5-Dimethyl-3-phenylpropene	2	0	0	9	10	0	0	0	0
Isopropyl-*p*-xylylene	2	0	0	9	10	0	0	0	0
2,6-Dimethyl-3-phenoxypropylene oxide	2	0	0	9	10	2	0	0	0
3-(1-Naphthoxy)propylene oxide	2	0	0	11	8	2	0	0	0
3-(2-Naphthoxy)propylene oxide	2	0	0	11	8	2	0	0	0
4,4′-perfluorodiphenyleneoxytetrahydroperfluoropentamethylene oxide	2	0	0	15	0	2	0	0	4
Di-1,4-naphthaleneoxyethylene oxide	2	0	0	20	12	2	0	0	0
m-Xylylene	2	0	1	0	0	0	0	0	0
p-Xylylene	2	0	1	0	0	0	0	0	0
p-Xylylene disulfide	2	0	1	0	0	0	0	2	0
Ethyleneoxy-*p*-phenylene oxide	2	0	1	0	0	2	0	0	0
Ethylene *m*-phenylenedisulfonamide	2	0	1	0	2	4	2	2	0
N-Phenyl-2-imino-1,3-dithiapentamethylene	2	0	1	1	1	0	1	2	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
o-Chloro-3-phenoxypropylene oxide	2	0	1	1	1	2	0	0	1
p-Chloro-3-phenoxypropylene oxide	2	0	1	1	1	2	0	0	1
3-Phenylpropene (allylbenzene)	2	0	1	1	2	0	0	0	0
Benzylvinyl ether	2	0	1	1	2	1	0	0	0
3-Phenoxypropylene oxide	2	0	1	1	2	2	0	0	0
Ethylene dithionisophthalate	2	0	1	2	0	2	0	2	0
p-Phenylenecyclobutylene	2	0	1	2	2	0	0	0	0
3-*m*-Tolylpropene	2	0	1	2	4	0	0	0	0
3-*o*-Tolylpropene	2	0	1	2	4	0	0	0	0
3-*p*-Tolylpropene	2	0	1	2	4	0	0	0	0
m-Methyl-3-phenoxypropylene oxide	2	0	1	2	4	2	0	0	0
o-Methyl-3-phenoxypropylene oxide	2	0	1	2	4	2	0	0	0
p-Methyl-3-phenoxypropylene oxide	2	0	1	2	4	2	0	0	0
p-Methoxy-3-phenoxypropylene oxide	2	0	1	2	4	3	0	0	0
Divinylbenzal	2	0	1	3	4	2	0	0	0
2-Methyldivinylbenzal	2	0	1	4	6	2	0	0	0
4-Methyldivinylbenzal	2	0	1	4	6	2	0	0	0
o-Isopropyl-3-phenoxypropylene oxide	2	0	1	4	8	2	0	0	0
2,2′-Ethylenedithiazole-*p*-phenylene	2	0	1	6	2	0	2	2	0
4,4′-Ethylenebiphenylene	2	0	2	0	0	0	0	0	0
4,4′-(Oxydiphenylene)dithioethylene disulfide	2	0	2	0	0	1	0	4	0
o-Phenyl-3-phenoxypropylene oxide	2	0	2	1	2	2	0	0	0
Bis(*p*-ethylphenoxy)phosphazene	2	0	2	2	6	2	1	0	1
1,6-Bis(*p*-fluorophenylsulfonyl)-2,4-hexadiynediol, 2,5-	2	0	2	4	0	6	0	2	2
4,4′-Isopropylidenediphenyleneoxy(2-hydroxy)trimethylene oxide	2	0	2	4	8	3	0	0	0
1-(*p*-Toluylsulfonyl)-6-(*p*-fluorobenzylsulfonyl)-hexadiynediol	2	0	2	5	3	6	0	2	1
1,6-Bis(*p*-toluylsulfonyl)-2,4-hexadiynediol, 2,5-	2	0	2	6	6	6	0	2	0
1,6-Bis(*p*-methoxyphenylsufonyl)-2,4-hexadiynediol, 2,5-	2	0	2	6	6	8	0	2	0
1,6-Di(*N*-carbazoyl)-2,4-hexadiyne, 2,5-	2	0	4	4	0	0	2	0	0
Carbon monoxide-*alt*-ethylene	2	1	0	0	0	0	0	0	0
3-Mercaptopropionic acid	2	1	0	0	0	0	0	1	0
3-Hydroxypropionic acid (propiolactone)	2	1	0	0	0	1	0	0	0
3-Aminopropionic acid (β-alanine)	2	1	0	0	1	0	1	0	0
Ethylene urea	2	1	0	0	2	0	2	0	0
Ethyleneamine-oxalic acid-water complex (2 : 1 : 2)	2	1	0	0	3	2	1	0	0
3-Hydroxy-3-butenoic acid	2	1	0	1	0	1	0	0	0
3-chloromethyl-3-hydroxypropionic acid	2	1	0	1	1	1	0	0	1
N-Acetylethylene amine	2	1	0	1	3	0	1	0	0
N-Methyl-3-aminopropionic acid	2	1	0	1	3	0	1	0	0
2,4-Diaminobutyric acid	2	1	0	1	4	0	2	0	0
Ethyleneamine-acetic acid complex (1 : 1)	2	1	0	1	5	1	1	0	0
N-(Perfluoropropionyl)ethylene amine	2	1	0	2	0	0	1	0	5
1,3-Cyclobutylene carbonate	2	1	0	2	2	2	0	0	0
Hydroxyproline	2	1	0	2	3	1	1	0	0
3-Ethyl-3-hydroxypropionic acid	2	1	0	2	4	1	0	0	0
3-Methoxycarbonylpropionaldehyde	2	1	0	2	4	2	0	0	0
Methionine	2	1	0	2	5	0	1	1	0
Diethyl-2-hydroxyacetic acid	2	1	0	3	6	1	0	0	0
2-Ethyl-2-methyl-3-hydroxypropionic acid	2	1	0	3	6	1	0	0	0
2-Ethyl-2-methyl-3-aminopropionic acid	2	1	0	3	7	0	1	0	0
N-Isobutyrylethylene amine	2	1	0	3	7	0	1	0	0
N-Isopropyl-3-aminopropionic acid	2	1	0	3	7	0	1	0	0
2-Methyl-*N*-butylaminoformic acid	2	1	0	3	7	0	1	0	0
sec-butylthiolacrylate	2	1	0	4	8	0	0	1	0
Isobutylthiolacrylate	2	1	0	4	8	0	0	1	0
sec-butyl acrylate	2	1	0	4	8	1	0	0	0
Isobutyl acrylate	2	1	0	4	8	1	0	0	0
N-Pivaloylethylene amine	2	1	0	4	9	0	1	0	0
3,5-Dimethyl-6-amino-4-oxacaproic acid	2	1	0	4	9	1	1	0	0
Ethylene *m*-chloro-*p*-oxybenzoate	2	1	0	6	3	2	0	0	1
Ethylene-*o*-chloro-*p*-oxybenzoate	2	1	0	6	3	2	0	0	1
N-(Perfluorooctanoyl)ethylene amine	2	1	0	7	0	0	1	0	5
3-*n*-Propylhydroxybenzoic acid	2	1	0	7	6	1	0	0	0
Ethylene *m*-methyl-*p*-oxybenzoate	2	1	0	7	6	2	0	0	0
Ethylene *o*-methyl-*p*-oxybenzoate	2	1	0	7	6	2	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
1,1-Dihydroperfluorooctyl acrylate	2	1	0	8	1	1	0	0	5
Isoamyl-2,4-hexadienoate, 2,5-	2	1	0	8	14	1	0	0	0
1,1-Dihydroperfluorodecyl acrylate	2	1	0	10	1	1	0	0	9
N-2-Naphthoylethylene amine	2	1	0	10	7	0	1	0	0
N-(*p*-Chlorobenzoyl)ethylene amine	2	1	1	0	0	0	1	0	1
Ethylene-*p*-oxybenzoate	2	1	1	0	0	2	0	0	0
p-Xylylene carbonate	2	1	1	0	0	2	0	0	0
p-Aminohydrocinnamic acid	2	1	1	0	1	0	1	0	0
p-(Aminomethylene)phenyleneacetic acid	2	1	1	0	1	0	1	0	0
N-Benzoylethylene amine	2	1	1	0	1	0	1	0	0
N-Phenyl-3-aminopropionic acid	2	1	1	0	1	0	1	0	0
N-(*p*-Toluoyl)ethylene amine	2	1	1	1	3	0	1	0	0
S-Benzylthiocysteine	2	1	1	1	3	0	1	2	0
1-Benzylhistidine	2	1	1	4	5	0	3	0	0
4,4′-Ethylenediphenylene carbonate	2	1	2	0	0	2	0	0	0
4,4′-Butylidenediphenylene carbonate	2	1	2	2	4	2	0	0	0
4,4′-Pentylidenediphenylene carbonate	2	1	2	3	6	2	0	0	0
Ethylene oxalate	2	2	0	0	0	2	0	0	0
Hydrazo succinamide	2	2	0	0	2	0	2	0	0
Methylene malonamide	2	2	0	0	2	0	2	0	0
Glutamic acid	2	2	0	1	3	1	1	0	0
Glutamine	2	2	0	1	4	0	2	0	0
Ethylene fumaramide	2	2	0	2	4	0	2	0	0
Ethylasparate	2	2	0	2	5	1	1	0	0
Methyl glutamate	2	2	0	2	5	1	1	0	0
4-Methyloxycarbonyl-4-aminobutyric acid	2	2	0	2	5	1	1	0	0
Alanyl-3-aminopropionic acid	2	2	0	2	6	0	2	0	0
Ethylene -L-tartaramide	2	2	0	2	6	2	2	0	0
O-Acetylhydroxyproline	2	2	0	3	5	1	1	0	0
2,2-dimethyltrimethylene oxalate	2	2	0	3	6	2	0	0	0
Ethylene 2,5-furandicarboxylate	2	2	0	4	2	3	0	0	0
Cyclopropylene cyclopropylenedicarboxamide	2	2	0	4	6	0	2	0	0
Ethylene 2,4-hexadienediamide	2	2	0	4	6	0	2	0	0
Isobutyl aspartate	2	2	0	4	9	1	1	0	0
Ethylene di-*O*-methyl-L-tartaramide	2	2	0	4	10	2	2	0	0
Ethylene dithiol-2,5-pyridinedicarboxylate	2	2	0	5	3	0	1	2	0
Ethylene 2,5-dichloroterephthalate	2	2	0	6	2	2	0	0	2
Ethylene chloroterephthalate	2	2	0	6	3	2	0	0	1
Ethylene methylterephthalate	2	2	0	7	6	2	0	0	0
Ethylene 2,5-dimethylterephthalate	2	2	0	8	8	2	0	0	0
Ethylene 1,5-naphthalate	2	2	0	10	6	2	0	0	0
Ethylene 2,6-naphthalate	2	2	0	10	6	2	0	0	0
Ethylene 2,7-naphthalate	2	2	0	10	6	2	0	0	0
4,4′-Ethylenedioxy-3,3′-dimethoxydibenzoic anhydride	2	2	0	14	12	5	0	0	0
2,5-Dimethylterephthalaldehyde	2	2	0	16	16	2	0	0	0
Ethylene dithiolisophthalate	2	2	1	0	0	0	0	2	0
Ethylene dithiolterephthalate	2	2	1	0	0	0	0	2	0
p-Phenylenediacetic anhydride	2	2	1	0	0	1	0	0	0
Ethylene isophthalate	2	2	1	0	0	2	0	0	0
Ethylene phthalate	2	2	1	0	0	2	0	0	0
Ethylene terephthalate	2	2	1	0	0	2	0	0	0
m-Phenylene succinate	2	2	1	0	0	2	0	0	0
p-Phenylene succinate	2	2	1	0	0	2	0	0	0
(*m*-Phenylenedioxy)diacetic anhydride	2	2	1	0	0	3	0	0	0
(*p*-Phenylenedioxy)diacetic anhydride	2	2	1	0	0	3	0	0	0
Ethylene phthalamide	2	2	1	0	2	0	2	0	0
Ethylene terephthalamide	2	2	1	0	2	0	2	0	0
p-Chlorobenzylasparate	2	2	1	1	2	1	1	0	1
Benzyl aspartate	2	2	1	1	3	1	1	0	0
S-Benzyloxycarbonylcysteine	2	2	1	1	3	1	1	1	0
1-Methyltrimethylene isophthalate	2	2	1	2	4	2	0	0	0
1-Methyltrimethylene phthalate	2	2	1	2	4	2	0	0	0
1-Methyltrimethylene terephthalate	2	2	1	2	4	2	0	0	0
Methylbenzyl aspartate	2	2	1	2	5	1	1	0	0
N,*N*′-Dimethylethylene terephthalamide	2	2	1	2	6	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
2,2-Dimethyltrimethylene terephthalate	2	2	1	3	6	2	0	0	0
2,5-Dimethylpiperazine isophthalamide	2	2	1	4	8	0	2	0	0
2,5-Dimethylpiperazine phthalamide	2	2	1	4	8	0	2	0	0
2,5-Dimethylpiperazine terephthalamide	2	2	1	4	8	0	2	0	0
p-Phenylene diethylcyclobutylenedicarboxylate	2	2	1	6	10	2	0	0	0
p-Phenylene dicyanodiethylcyclobutylenedicarboxylate	2	2	1	8	8	2	2	0	0
2,2′-Diethyl-4,4′-oxydiphenylene *m*-phenylenediketone	2	2	1	14	12	1	0	0	0
N,N′-Diethyl-3,3′-dimethylbiphenylene terephthalamide	2	2	1	16	18	0	2	0	0
p-Xylylene dithiolisophthalate	2	2	2	0	0	0	0	2	0
4,4′-Ethylenedibenzoic anhydride	2	2	2	0	0	1	0	0	0
Ethylene 2,2′-dibenzoate	2	2	2	0	0	2	0	0	0
Ethylene 3,3′-dibenzoate	2	2	2	0	0	2	0	0	0
Ethylene 4,4′-dibenzoate	2	2	2	0	0	2	0	0	0
Isophthalaldehyde	2	2	2	0	0	2	0	0	0
Terephthalaldehyde	2	2	2	0	0	2	0	0	0
p-Xylylene isophthalate	2	2	2	0	0	2	0	0	0
p-Xylylene terephthalate	2	2	2	0	0	2	0	0	0
Ethylene 4,4′-thiodibenzoate	2	2	2	0	0	2	0	1	0
3,3′-(Ethylenedioxy)dibenzoic anhydride	2	2	2	0	0	3	0	0	0
4,4′-(Ethylenedioxy)dibenzoic anhydride	2	2	2	0	0	3	0	0	0
Ethylene 4,4′-oxydibenzoate	2	2	2	0	0	3	0	0	0
4,4′-(Oxydimethylene)dioxydibenzoic anhydride	2	2	2	0	0	4	0	0	0
p-Phenyleneethylene terephthalamide	2	2	2	0	2	0	2	0	0
m-Xylylene isophthalamide	2	2	2	0	2	0	2	0	0
p-Xylylene isophthalamide	2	2	2	0	2	0	2	0	0
p-Xylylene phthalamide	2	2	2	0	2	0	2	0	0
m-Xylylene terephthalamide	2	2	2	0	2	0	2	0	0
p-Xylylene terephthalamide	2	2	2	0	2	0	2	0	0
Ethylene 4,4′-sulfonyldibenzamide	2	2	2	0	2	2	2	1	0
O-Benzyloxycarbonyltyrosine	2	2	2	1	3	2	1	0	0
1-Methyltrimethylene 2,2′-dibenzoate	2	2	2	2	4	2	0	0	0
1-Methyltrimethylene 3,3′-dibenzoate	2	2	2	2	4	2	0	0	0
1-Methyltrimethylene 4,4′-dibenzoate	2	2	2	2	4	2	0	0	0
1-Methyltrimethylene 4,4′-sulfonyldibenzamide	2	2	2	2	6	2	2	1	0
(4,4′-Isopropylidenediphenylene)dioxydiacetic anhydride	2	2	2	3	6	3	0	0	0
2,2-Dimethyltrimethylene sulfonyldibenzamide	2	2	2	3	8	2	2	1	0
1,6-Bis(phenylurethane)-2,4-hexadiynediol, 2,5-	2	2	2	4	4	2	2	0	0
1,8-Bis(phenylurethane)-2,4,6-octatriynediol, 2,5-	2	2	2	6	4	2	2	0	0
Methyl-*p*-phenylene 4,4′-ethylenedioxydibenzoate	2	2	2	7	6	4	0	0	0
p-Phenylene 4,4′-(ethylenedioxy)dibenzoate	2	2	3	0	0	4	0	0	0
N,N′-Diethylbiphenylene terephthalamide	2	2	3	2	6	0	2	0	0
4,4′-Biphenyldicarboxaldehyde	2	2	4	0	0	2	0	0	0
4,4′-(Silylenediphenylene)dimethylene 4,4′-silylenedibenzamide	2	2	4	0	6	0	2	0	2
4,4′-(Silylenediphenylene)dimethylene 4,4′-disiloxanylenedibenzamide	2	2	4	0	8	1	2	0	3
4,4′-(Silylenediphenylene)dimethylene 4,4′-tetrasiloxanylenedibenzamide	2	2	4	0	12	3	2	0	5
4,4′-Dimethylsilylenediphenylenedimethylene tetrasiloxanylenedibenzamide	2	2	4	2	16	3	2	0	5
4,4′-Dimethylsilylenediphenylenedimethylene dimethylsilylenedibenzamide	2	2	4	4	14	1	2	0	2
4,4′-Dimethylsilylenediphenylenedimethylene tetramethyldisiloxanylenedi	2	2	4	6	20	1	2	0	3
4,4′-Dimethylsilylenediphenylenedimethylene tetramethyltetraphenyltetra	2	2	8	6	20	3	2	0	5
Alanylglycylglycine	2	3	0	2	7	0	3	0	0
Alanyl(phenylalanyl)glycine)	2	3	1	3	9	0	3	0	0
Cyclopropylene (cyclopropylenedicarboxoyl)diurethane	2	4	0	4	6	2	2	0	0
(*p*-Phenylenedioxy)diacetic 3,4-pyridinedicarboxylic anhydride	2	4	1	5	3	4	1	0	0
Isophthalic (*p*-phenylenedioxy)diacetic anhydride	2	4	2	0	0	4	0	0	0
(*p*-Phenylenedioxy)diacetic terephthalic anhydride	2	4	2	0	0	4	0	0	0
Isophthaloyl (*m*-carboxyphenoxypropionyl)dihydrazide	2	4	2	0	4	1	4	0	0
4,4′-(Isopropylidenediphenylene)dioxydiacetic pyridinedicarboxylic anhydride	2	4	2	8	9	4	1	0	0
3,4′-(Ethylenedioxy)diphenylene 3,3′,4,4′-Oxydiphenylenetetracarboximide	2	4	2	12	6	3	2	0	0
4,4′-(Ethylenedioxy)dibenzoic isophthalic anhydride	2	4	3	0	0	4	0	0	0
4,4′-(Ethylenedioxy)dibenzoic phthalic anhydride	2	4	3	0	0	4	0	0	0
4,4′-(Ethylenedioxy)dibenzoic terephthalic anhydride	2	4	3	0	0	4	0	0	0
Isophthalic (isopropylidenediphenylene)diacetic anhydride	2	4	3	3	6	4	0	0	0
4,4′-(Isopropylidenediphenylene(dioxydiacetic terephthalic anhydride	2	4	3	3	6	4	0	0	0
4,4′-(Ethylenedioxy)diphenylene carbonyldiphenylenetetracarboximide	2	5	2	12	4	2	2	0	0
Neopentylene-4,4′-diphenylene 3,3′,4,4′-carbonyldiphenylenetetracarbox	2	5	2	15	12	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
3	3	0	0	0	0	0	0	0	0
Trimethylene sulfide	3	0	0	0	0	0	0	1	0
Trimethylene disulfide	3	0	0	0	0	0	0	2	0
Oxacyclobutane (trimethylene oxide)	3	0	0	0	0	1	0	0	0
Ethyleneoxymethylene oxide (dioxolane)	3	0	0	0	0	2	0	0	0
Trimethylene sulfone	3	0	0	0	0	2	0	1	0
Trimethylene amine	3	0	0	0	1	0	1	0	0
3-Aminotrimethylenesulfonic acid	3	0	0	0	1	2	0	1	0
1,1-Bischloromethylethylene oxide	3	0	0	1	0	1	0	0	2
2-Chloroethylvinylether	3	0	0	1	1	1	0	0	1
5,5,5-Trifluoro-1-pentene	3	0	0	2	1	0	0	0	3
Pentenamer	3	0	0	2	2	0	0	0	0
Vinyl cyclopropane	3	0	0	2	2	0	0	0	0
1,2-Dichloropentamethylene	3	0	0	2	2	0	0	0	2
1,3-Cyclobutyleneoxymethylene oxide	3	0	0	2	2	2	0	0	0
Hydrochlorinated 2-methyl-1,3-butadiene, 1,4-	3	0	0	2	3	0	0	0	1
N-Ethyl-2-imino-1,3-dithiapentamethylene	3	0	0	2	3	0	1	2	0
1-Pentene	3	0	0	2	4	0	0	0	0
Propene-*alt*-ethylene	3	0	0	2	4	0	0	0	0
3-Methyl-3-hydroxymethyloxacyclobutane	3	0	0	2	4	1	0	0	0
Propylvinyl ether	3	0	0	2	4	1	0	0	0
Valeraldehyde	3	0	0	2	4	1	0	0	0
2-Methoxyethylvinyl ether	3	0	0	2	4	2	0	0	0
α-Propylacrylonitrile	3	0	0	3	3	0	1	0	0
1-Butoxy-2-chloroethylene	3	0	0	3	5	1	0	0	1
3-Ethyl-3-methyloxacyclobutane	3	0	0	3	6	1	0	0	0
1-Vinylene-3-cyclopentylene	3	0	0	4	4	0	0	0	0
1,3-Heptadiene, 1,4-	3	0	0	4	6	0	0	0	0
3-Ethyl-1-pentene	3	0	0	4	8	0	0	0	0
3-Methyl-1-hexene	3	0	0	4	8	0	0	0	0
4-Methyl-1-hexene	3	0	0	4	8	0	0	0	0
5-Methyl-1-hexene	3	0	0	4	8	0	0	0	0
1-Butoxy-2-methylethylene	3	0	0	4	8	1	0	0	0
2-Methylbutylvinyl ether	3	0	0	4	8	1	0	0	0
4-Trimethylsilylbutene	3	0	0	4	10	0	0	0	1
1,4-Butadiene-*alt*-methacrylonitrile	3	0	0	5	5	0	1	0	0
4,4-Dimethyl-1-hexene	3	0	0	5	10	0	0	0	0
Ethyl-*p*-xylylene	3	0	0	7	6	0	0	0	0
4-Diisopropylamino-1-butene	3	0	0	7	15	0	1	0	0
β-D-Galacto-1,4-β-D-mannose, 1,4- (1 : 2) (guar gallactomannan)	3	0	0	15	24	5	0	0	0
Di-1,4-naphthaleneoxytrimethylene oxide	3	0	0	20	12	2	0	0	0
p-Phenyleneoxytrimethylene oxide	3	0	1	0	0	2	0	0	0
Trimethylene *m*-phenylenedisulfonamide	3	0	1	0	2	4	2	2	0
4-Phenyl-1-butene	3	0	1	1	2	0	0	0	0
4-*o*-Tolyl-1-butene	3	0	1	2	4	0	0	0	0
4-*p*-Tolyl-1-butene	3	0	1	2	4	0	0	0	0
4,4′-(Ethylenediphenylene)methylene	3	0	2	0	0	0	0	0	0
Trimethylene biphenylene	3	0	2	0	0	0	0	0	0
4,4′-Stilbenediyloxytrimethylene oxide	3	0	2	2	2	2	0	0	0
α-Methyl-4,4′-stilbenediyloxytrimethylene oxide	3	0	2	3	4	2	0	0	0
4,4′-Isopropylidenediphenyleneoxytrimethylene oxide	3	0	2	3	6	2	0	0	0
5-Hydroxy-3-oxavaleric acid	3	1	0	0	0	2	0	0	0
4-Aminobutyric acid	3	1	0	0	1	0	1	0	0
5-Amino-3-oxavaleric acid	3	1	0	0	1	1	1	0	0
2,2-Bischloromethyl-3-hydroxypropionic acid	3	1	0	1	0	1	0	0	2
Proline	3	1	0	1	1	0	1	0	0
N-Butylaminoformic acid	3	1	0	1	3	0	1	0	0
Ornithine	3	1	0	1	4	0	2	0	0
Ornithine hydrobromide	3	1	0	1	5	0	2	0	1
Allyl acrylate	3	1	0	2	2	1	0	0	0
2-Aminocyclopentylenecarboxy acid	3	1	0	2	3	0	1	0	0
2,6-Aminotetrahydropyran carboxylic acid	3	1	0	2	3	1	1	0	0
Propylthiolacrylate	3	1	0	2	4	0	0	1	0
Arginine	3	1	0	2	6	0	4	0	0
Arginine hydrochloride	3	1	0	2	7	0	4	0	1

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
2-Methylacetoxy-1,3-butadiene	3	1	0	3	4	1	0	0	0
2,2-Diethyl-3-hydroxypropionic acid	3	1	0	3	6	1	0	0	0
2-Methyl-2-propyl-3-hydroxpropionic acid	3	1	0	3	6	1	0	0	0
N-Isovalerylethylene amine	3	1	0	3	7	0	1	0	0
2-Methyl-2-propyl-3-aminopropionic acid	3	1	0	3	7	0	1	0	0
1,4-Butadiene-*alt*-methyl methacrylate	3	1	0	5	8	1	0	0	0
(2,2-Dimethyl-3-aminocyclobutylene)propionic acid	3	1	0	5	9	0	1	0	0
Butyl-2,4-hexadienoate, 2,5-	3	1	0	6	10	1	0	0	0
Ethylene *p*-oxyphenyleneacetate	3	1	1	0	0	2	0	0	0
Trimethylene *p*-oxybenzoate	3	1	1	0	0	2	0	0	0
p-(Aminoethylene)phenyleneacetic acid	3	1	1	0	1	0	1	0	0
p-(Aminomethylene)phenylenepropionic acid	3	1	1	0	1	0	1	0	0
2,5-Butyl-5-phenyl-2,4-pentadienoate	3	1	1	5	8	1	0	0	0
4,4′-Hexylidenediphenylene carbonate	3	1	2	3	6	2	0	0	0
Trimethylene oxalate	3	2	0	0	0	2	0	0	0
Glycyl-3-aminopropionic acid	3	2	0	0	2	0	2	0	0
Hydrazo glutaramide	3	2	0	0	2	0	2	0	0
Ethylene cyclopropylenedicarboxamide	3	2	0	2	4	0	2	0	0
Methylethylene succinate	3	2	0	2	4	2	0	0	0
Methylethylene oxydiacetate	3	2	0	2	4	3	0	0	0
Ethyl glutamate	3	2	0	2	5	1	1	0	0
n-Propyl aspartate	3	2	0	2	5	1	1	0	0
2-Methoxyethyl aspartate	3	2	0	2	5	2	1	0	0
Alanyl-4-aminobutyric acid	3	2	0	2	6	0	2	0	0
2,2-Dimethyltrimethylene malonate	3	2	0	3	6	2	0	0	0
Cyclopropylenedimethylene toluylenediurethane	3	2	0	9	10	2	2	0	0
4,4′-Trimethylenedioxy-3,3′-dimethoxydibenzoic anhydride	3	2	0	14	12	5	0	0	0
Trimethylene isophthalate	3	2	1	0	0	2	0	0	0
Trimethylene phthalate	3	2	1	0	0	2	0	0	0
Trimethylene terephthalate	3	2	1	0	0	2	0	0	0
p-Xylylene glutarate	3	2	1	0	0	2	0	0	0
Ethylene *p*-(carboxyphenoxy)acetate	3	2	1	0	0	3	0	0	0
Ethylene-*p*-(carboxyphenylene)acetamide	3	2	1	0	2	0	2	0	0
p-Phenylene glutaramide	3	2	1	0	2	0	2	0	0
Trimethylene terephthalamide	3	2	1	0	2	0	2	0	0
p-Xylylene malonamide	3	2	1	0	2	0	2	0	0
m-Chlorobenzylglutamate	3	2	1	1	2	1	1	0	1
o-Chlorobenzylglutamate	3	2	1	1	2	1	1	0	1
p-Chlorobenzylglutamate	3	2	1	1	2	1	1	0	1
N-(*p*-Bromobenzoyl)-L-ornithine	3	2	1	1	3	0	2	0	1
N-(*p*-Chlorobenzoyl)-L-ornithine	3	2	1	1	3	0	2	0	1
N-(*p*-Fluorobenzoyl)-L-ornithine	3	2	1	1	3	0	2	0	1
Benzyl glutamate	3	2	1	1	3	1	1	0	0
4-Benzyloxycarbonyl-4-aminobutyric acid	3	2	1	1	3	1	1	0	0
Phenethylasparate	3	2	1	1	3	1	1	0	0
N-Benzoyl-L-ornithine	3	2	1	1	4	0	2	0	0
N-Benzyloxycarbonyl-2,4-diaminobutyric acid	3	2	1	1	4	1	2	0	0
Cyclopropylenedimethylene isophthalate	3	2	1	2	2	2	0	0	0
Cyclopropylenedimethylene terephthalate	3	2	1	2	2	2	0	0	0
Cyclopropylenedimethylene isophthalamide	3	2	1	2	4	0	2	0	0
Methylpiperazine isophthalamide	3	2	1	2	4	0	2	0	0
Methylpiperazine phthalamide	3	2	1	2	4	0	2	0	0
Methylpiperazine terephthalamide	3	2	1	2	4	0	2	0	0
N,*N*′-Dimethyltrimethylene terephthalamide	3	2	1	2	6	0	2	0	0
p-Phenylene(1,1-dimethyl)ethylene succinamide	3	2	1	3	8	0	2	0	0
N,*N*′-Diethyl-3,3′-dimethyl(methylenediphenylene) terephthalamide	3	2	1	16	18	0	2	0	0
4,4′-Trimethylenedibenzoic anhydride	3	2	2	0	0	1	0	0	0
Ethylene 4,4′-methylenedibenzoate	3	2	2	0	0	2	0	0	0
Trimethylene 2,2′-dibenzoate	3	2	2	0	0	2	0	0	0
Trimethylene 3,3′-dibenzoate	3	2	2	0	0	2	0	0	0
Trimethylene 4,4′-dibenzoate	3	2	2	0	0	2	0	0	0
3,3′-(Trimethylenedioxy)dibenzoic anhydride	3	2	2	0	0	3	0	0	0
4,4′-(Trimethylenedioxy)dibenzoic anhydride	3	2	2	0	0	3	0	0	0
Trimethylene 4,4′-oxydibenzoate	3	2	2	0	0	3	0	0	0
Ethylene 4,4′-(methylenediphenylene)diurethane	3	2	2	0	2	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Trimethylene 4,4′-sulfonyldibenzamide	3	2	2	0	2	2	2	1	0
Isopropylidenedimethylene methylenediphenylenediurethane	3	2	2	3	8	2	2	0	0
4,4′-Diphenyleneglutarate-butadiyne, 1,4-	3	2	2	4	0	2	0	0	0
2,4-Hexadiyne (4,4′-methylenediphenylene)diurethane	3	2	2	4	2	2	2	0	0
p-Xylylene dithiol-4,4′-methylenedibenzoate	3	2	3	0	0	0	0	2	0
N,N′-Diethyl(methylenediphenylene) terephthalamide	3	2	3	2	6	0	2	0	0
Alanylglycylglycylglycine	3	4	0	2	8	0	4	0	0
Alanylglutamylglycine	3	4	0	3	9	1	3	0	0
Isophthalic 4,4′-trimethylenedioxy-3,3′-dimethoxydibenzoic anhydride	3	4	1	14	12	6	0	0	0
Terephthalic 4,4′-trimethylenedioxy-3,3′-dimethoxydibenzoic anhydride	3	4	1	14	12	6	0	0	0
Isophthaloyl (*m*-carboxyphenoxybutyryl)dihydrazide	3	4	2	0	4	1	4	0	0
Isophthalic 4,4′-(trimethylenedioxy)dibenzoic anhydride	3	4	3	0	0	4	0	0	0
Terephthalic 4,4′-(trimethylenedioxy)dibenzoic anhydride	3	4	3	0	0	4	0	0	0
4	4	0	0	0	0	0	0	0	0
Tetramethylene sulfide	4	0	0	0	0	0	0	1	0
Tetramethylene disulfide	4	0	0	0	0	0	0	2	0
Tetrahydrofuran (tetramethylene oxide)	4	0	0	0	0	1	0	0	0
Tetramethylene sulfone	4	0	0	0	0	2	0	1	0
3,3-Bisazidomethyloxacylobutane	4	0	0	1	0	0	6	0	0
cyclopropylidenedimethylene oxide	4	0	0	1	0	1	0	0	0
3,3-Bisbromomethyloxacyclobutane	4	0	0	1	0	1	0	0	2
3,3-Bischloromethyloxacyclobutane	4	0	0	1	0	1	0	0	2
3,3-Bisfluoromethyloxacyclobutane	4	0	0	1	0	1	0	0	2
3,3-Bisiodomethyloxacyclobutane	4	0	0	1	0	1	0	0	2
Tetramethylene thiourea	4	0	0	1	2	0	2	1	0
3,3-Bishydroxyoxacyclobutane	4	0	0	1	2	1	0	0	0
5-Hydroxy-1-pentene	4	0	0	1	2	1	0	0	0
3,3-Bishydroxymethyloxacyclobutane	4	0	0	1	2	3	0	0	0
5-Amino-1-pentene	4	0	0	1	3	0	1	0	0
2,5-Tetramethylene-1,3,4-triazole	4	0	0	2	1	0	3	0	0
1,3-Cyclopenylene-*alt*-methylene	4	0	0	2	2	0	0	0	0
Vinyl cyclobutane	4	0	0	2	2	0	0	0	0
1,2-Cyclohexylene sulfide	4	0	0	2	2	0	0	1	0
1,3-Cyclohexylene sulfide	4	0	0	2	2	0	0	1	0
2,5-Tetramethylene-1-amino-1,3,4-triazole	4	0	0	2	2	0	4	0	0
1,2-Cyclohexene oxide	4	0	0	2	2	1	0	0	0
1,2-Cyclohexylene sulfone	4	0	0	2	2	2	0	1	0
1,3-Cyclohexylene sulfone	4	0	0	2	2	2	0	1	0
1-Hexene	4	0	0	2	4	0	0	0	0
n-Butylvinyl ether	4	0	0	2	4	1	0	0	0
Di-*n*-propylsilylene	4	0	0	2	6	0	0	0	1
Di-*n*-propylsiloxane	4	0	0	2	6	1	0	0	1
2-Propyl-1,3-butadiene, 1,4-	4	0	0	3	4	0	0	0	0
3,3-Diethyltrimethylene sulfide	4	0	0	3	6	0	0	1	0
3,3-Diethyloxacyclobutane	4	0	0	3	6	1	0	0	0
3,3-Diethyltrimethylene sulfone	4	0	0	3	6	2	0	1	0
1,3-Octadiene, 1,4-	4	0	0	4	6	0	0	0	0
4-Ethyl-1-hexene	4	0	0	4	8	0	0	0	0
5-Methyl-1-heptene	4	0	0	4	8	0	0	0	0
5-Trimethylsilyl-1-pentene	4	0	0	4	10	0	0	0	1
6,6-Dimethyl-1-heptene	4	0	0	5	10	0	0	0	0
5-Diisopropylamino-1-pentene	4	0	0	7	15	0	1	0	0
α-D-Triethylglucose, 1,4-	4	0	0	8	14	5	0	0	0
β-D-Triethylglucose, 1,4-	4	0	0	8	14	5	0	0	0
Di-1,4-naphthaleneoxytetramethylene oxide	4	0	0	20	12	2	0	0	0
Oxydiethyleneoxy-*p*-phenylene oxide	4	0	1	0	0	3	0	0	0
Tetramethylene *m*-phenylenedisulfonamide	4	0	1	0	2	4	2	2	0
Tetramethylene dithionisophthalate	4	0	1	2	0	2	0	2	0
2,2′-Tetramethylenedithiazole-*p*-phenylene	4	0	1	6	2	0	2	2	0
4,4′-(Oxydiphenylene)dithiotetramethylene disulfide	4	0	2	0	0	1	0	4	0
4,4′-Stilbenediyloxytetramethylene oxide	4	0	2	2	2	2	0	0	0
α-Methyl-4,4′-stilbenediyloxytetramethylene oxide	4	0	2	3	4	2	0	0	0
5-Hydroxyvaleric acid	4	1	0	0	0	1	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Tetramethylene carbonate	4	1	0	0	0	2	0	0	0
5-Aminovaleric acid	4	1	0	0	1	0	1	0	0
6-Amino-4-oxacaproic acid	4	1	0	0	1	1	1	0	0
Tetramethylene urea	4	1	0	0	2	0	2	0	0
1,4-Piperidine urethane	4	1	0	1	1	1	1	0	0
N-Butyrylethylene amine	4	1	0	1	3	0	1	0	0
Lysine	4	1	0	1	4	0	2	0	0
Lysine hydrobromide	4	1	0	1	5	0	2	0	1
Lysine hydrochloride	4	1	0	1	5	0	2	0	1
3-Aminocyclobutylenepropionic acid	4	1	0	2	3	0	1	0	0
1,4-Cyclohexylene urethane	4	1	0	2	3	1	1	0	0
6-Mercapto-4-methylcaproic acid	4	1	0	2	4	0	0	1	0
Butyl acrylate	4	1	0	2	4	1	0	0	0
3-Methyl-6-aminocaproic acid	4	1	0	2	5	0	1	0	0
6-Methyl-6-aminocaproic acid	4	1	0	2	5	0	1	0	0
2-*n*-Butyl-2-methyl-3-aminopropionic acid	4	1	0	3	7	0	1	0	0
3-*n*-Pentylhydroxybenzoic acid	4	1	0	7	6	1	0	0	0
p-(Aminoethylene)phenylenepropionic acid	4	1	1	0	1	0	1	0	0
p-(Aminomethylene)phenylenebutyric acid	4	1	1	0	1	0	1	0	0
4,4′-Cyclopentylidenediphenylene carbonate	4	1	2	1	0	2	0	0	0
4,4′-Heptylidenediphenylene carbonate	4	1	2	3	6	2	0	0	0
Adipic anhydride	4	2	0	0	0	1	0	0	0
Thiodipropionic anhydride	4	2	0	0	0	1	0	1	0
(Ethylenedithio)diacetic anhydride	4	2	0	0	0	1	0	2	0
Ethylene succinate	4	2	0	0	0	2	0	0	0
Tetramethylene oxalate	4	2	0	0	0	2	0	0	0
Trimethylene malonate	4	2	0	0	0	2	0	0	0
Tetramethylene thiodicarboxylate	4	2	0	0	0	2	0	1	0
Tetramethylene dithiodicarboxylate	4	2	0	0	0	2	0	2	0
Tetramethylene Trithiodicarboxylate	4	2	0	0	0	2	0	3	0
Tetramethylene tetrathiodicarboxylate	4	2	0	0	0	2	0	4	0
Ethylene oxydiacetate	4	2	0	0	0	3	0	0	0
Oxydiethylene oxalate	4	2	0	0	0	3	0	0	0
Sulfonyldipropionic anhydride	4	2	0	0	0	3	0	1	0
(Ethylenedisulfonyl)diacetic anhydride	4	2	0	0	0	5	0	2	0
Hydrazo adipamide	4	2	0	0	2	0	2	0	0
Methylene glutaramide	4	2	0	0	2	0	2	0	0
2,2-Bischloromethyltrimethylene oxalate	4	2	0	1	0	2	0	0	2
2-Chloroethylglutamate	4	2	0	1	2	1	1	0	1
*N*5-(2-Hydroxyethyl)glutamine	4	2	0	1	4	1	2	0	0
N,*N*-Lysylurea	4	2	0	1	4	1	2	0	0
Trimethylene cyclopropylenedicarboxamide	4	2	0	2	4	0	2	0	0
Methylethylene glutarate	4	2	0	2	4	2	0	0	0
Trimethylene cyclopropylenediurethane	4	2	0	2	4	2	2	0	0
1-Methyltrimethylene oxydiacetate	4	2	0	2	4	3	0	0	0
n-Butyl aspartate	4	2	0	2	5	1	1	0	0
n-Propylglutamate	4	2	0	2	5	1	1	0	0
Alanyl-5-aminovaleric acid	4	2	0	2	6	0	2	0	0
Methyl-*N*,*N*′-lysylurea	4	2	0	2	6	1	2	0	0
Tetramethylene-L-tartaramide	4	2	0	2	6	2	2	0	0
2,2-Dimethyltrimethylene succinate	4	2	0	3	6	2	0	0	0
2,5-Thiophenedipropionic anhydride	4	2	0	4	2	1	0	1	0
2,5-Furandipropionic anhydride	4	2	0	4	2	2	0	0	0
2,5-Pyrroledipropionic anhydride	4	2	0	4	3	1	1	0	0
Cyclopropylenedimethylene cyclopropylenedicarboxamide	4	2	0	4	6	0	2	0	0
Piperazine (3-methylcyclopropylene)dicarboxamide	4	2	0	4	6	0	2	0	0
Cyclopropylenedimethylene cyclopropylenediurethane	4	2	0	4	6	2	2	0	0
Tetramethylene 1,2-dimethoxysuccinate	4	2	0	4	8	4	0	0	0
D-Methionyl-L-methionine	4	2	0	4	10	0	2	2	0
Tetramethylene di-*O*-methyl-L-tartaramide	4	2	0	4	10	2	2	0	0
N-Methyl-2,5-pyrroledipropionic anhydride	4	2	0	5	5	1	1	0	0
1,6-Bis(ethylurethane)-2,4-hexadiynediol, 2,5-	4	2	0	6	8	2	2	0	0
3-Methyl-*m*-phenylene adipamide	4	2	0	7	8	0	2	0	0
4-Methyl-*m*-phenylene disiloxanylenedipropionamide	4	2	0	7	12	1	2	0	2
Isopropylidenedimethylene dimethylpiperazinedithiodicarboxylate	4	2	0	7	14	2	2	2	0

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Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
4-Methyl-1,3-phenylene tetramethyldisiloxanylenedipropionamide	4	2	0	11	20	1	2	0	2
4,4′-Tetramethylenedioxy-3,3′-dimethoxydibenzoic anhydride	4	2	0	14	12	5	0	0	0
Ethylene 3,3′-dimethoxy-4,4′-(ethylenedioxy)dibenzoate	4	2	0	14	12	6	0	0	0
4,4′-Tetrachloroisopropylidenediphenylene adipate	4	2	0	15	10	2	0	0	4
3,3′-Dimethylmethylenediphenylene tetramethyldisiloxanylenedipropionamide	4	2	0	18	26	1	2	0	2
Tetramethylene dithiolisophthalate	4	2	1	0	0	0	0	2	0
Tetramethylene dithiolterephthalate	4	2	1	0	0	0	0	2	0
Thiodiethylene dithiolterephthalate	4	2	1	0	0	0	0	3	0
Piperazine isophthalamide	4	2	1	0	0	0	2	0	0
Piperazine phthalamide	4	2	1	0	0	0	2	0	0
Piperazine terephthalamide	4	2	1	0	0	0	2	0	0
p-Phenylenedipropionic anhydride	4	2	1	0	0	1	0	0	0
(*p*-Phenylenedithio)dipropionic anhydride	4	2	1	0	0	1	0	2	0
(*p*-Xylylenedithio)diacetic anhydride	4	2	1	0	0	1	0	2	0
Ethylene *p*-phenylenediacetate	4	2	1	0	0	2	0	0	0
p-Phenylene adipate	4	2	1	0	0	2	0	0	0
Tetramethylene isophthalate	4	2	1	0	0	2	0	0	0
Tetramethylene phthalate	4	2	1	0	0	2	0	0	0
Tetramethylene terephthalate	4	2	1	0	0	2	0	0	0
p-Xylylene succinate	4	2	1	0	0	2	0	0	0
Oxydiethylene isophthalate	4	2	1	0	0	3	0	0	0
Oxydiethylene phthalate	4	2	1	0	0	3	0	0	0
Oxydiethylene terephthalate	4	2	1	0	0	3	0	0	0
(*p*-Xylylenedisulfonyl)diacetic anhydride	4	2	1	0	0	5	0	2	0
Tetramethylene *m*-carboxycarbanilate	4	2	1	0	1	2	1	0	0
Tetramethylene *p*-carboxycarbanilate	4	2	1	0	1	2	1	0	0
m-Phenylene adipamide	4	2	1	0	2	0	2	0	0
o-Phenylene adipamide	4	2	1	0	2	0	2	0	0
p-Phenylene adipamide	4	2	1	0	2	0	2	0	0
p-Phenyleneethylene succinamide	4	2	1	0	2	0	2	0	0
Tetramethylene isophthalamide	4	2	1	0	2	0	2	0	0
Tetramethylene terephthalamide	4	2	1	0	2	0	2	0	0
Trimethylene *p*-(carboxyphenylene)acetamide	4	2	1	0	2	0	2	0	0
p-Xylylene succinamide	4	2	1	0	2	0	2	0	0
m-Phenylene disiloxanylenedipropionamide	4	2	1	0	6	1	2	0	2
o-Phenylene disiloxanylenedipropionamide	4	2	1	0	6	1	2	0	2
p-Phenylene disiloxanylenedipropionamide	4	2	1	0	6	1	2	0	2
Ethylene 3-(*p*-nitro)glutarate	4	2	1	1	1	4	1	0	0
Phenylpropyl-L-aspartate	4	2	1	1	2	1	1	0	0
Phenethylglutamate	4	2	1	1	3	1	1	0	0
N-benzyloxycarbonylornithine	4	2	1	1	4	1	2	0	0
Adipoyl dithionisophthaloyldihydrazide	4	2	1	2	4	0	4	2	0
N,*N*′-Dimethyltetramethylene terephthalamide	4	2	1	2	6	0	2	0	0
2-Methylpentamethylene terephthalamide	4	2	1	2	6	0	2	0	0
m-Phenylene (tetramethyldisiloxanylene)dipropionamide	4	2	1	4	14	1	2	0	2
o-Phenylene (tetramethyldisiloxanylene)dipropionamide	4	2	1	4	14	1	2	0	2
p-Phenylene (tetramethyldisiloxanylene)dipropionamide	4	2	1	4	14	1	2	0	2
p-Phenylene dipropylcyclobutylenedicarboxylate	4	2	1	6	10	2	0	0	0
p-Phenylene dicyanodipropylcyclobutylenedicarboxylate	4	2	1	8	8	2	2	0	0
Tetramethyl-*p*-xylylene dithiol-*p*-phenylenediacetate	4	2	1	10	12	0	0	2	0
2,2′-Dipropyl-4,4′-biphenylene terephthalate	4	2	1	14	12	2	0	0	0
p-Phenylene-4′,4″-(3′,3″-dimethoxy)dibenzylidenimino adipate	4	2	1	16	14	4	2	0	0
p-Xylylene dithiol-*p*-phenylenediacetate	4	2	2	0	0	0	0	2	0
4,4′-Tetramethylenedibenzoic anhydride	4	2	2	0	0	1	0	0	0
4,4′-(Tetramethylenedithio)dibenzoic anhydride	4	2	2	0	0	1	0	2	0
4,4′-Biphenylene adipate	4	2	2	0	0	2	0	0	0
Ethylene 4,4′-ethylenedibenzoate	4	2	2	0	0	2	0	0	0
p-Phenylenediethylene terephthalate	4	2	2	0	0	2	0	0	0
Tetramethylene 2,2′-dibenzoate	4	2	2	0	0	2	0	0	0
Tetramethylene 3,3′-dibenzoate	4	2	2	0	0	2	0	0	0
Tetramethylene 4,4′-dibenzoate	4	2	2	0	0	2	0	0	0
p-Xylylene *p*-phenylenediacetate	4	2	2	0	0	2	0	0	0
Ethylene 4,4′-(ethylenedithio)dibenzoate	4	2	2	0	0	2	0	2	0
Oxydiethylene 2,2′-dibenzoate	4	2	2	0	0	3	0	0	0
Oxydiethylene 3,3′-dibenzoate	4	2	2	0	0	3	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Oxydiethylene 4,4′-dibenzoate	4	2	2	0	0	3	0	0	0
3,3′-(Tetramethylenedioxy)dibenzoic anhydride	4	2	2	0	0	3	0	0	0
4,4′-(Tetramethylenedioxy)dibenzoic anhydride	4	2	2	0	0	3	0	0	0
Tetramethylene 4,4′-oxydibenzoate	4	2	2	0	0	3	0	0	0
Ethylene 3,3′-(ethylenedioxy)dibenzoate	4	2	2	0	0	4	0	0	0
Ethylene 4,4′-(ethylenedioxy)dibenzoate	4	2	2	0	0	4	0	0	0
(Oxydiethylenedioxy)dibenzoic anhydride	4	2	2	0	0	4	0	0	0
4,4′-Biphenylene adipamide	4	2	2	0	2	0	2	0	0
3,4′-Oxydiphenylene adipamide	4	2	2	0	2	1	2	0	0
4,4′-Oxydiphenylene adipamide	4	2	2	0	2	1	2	0	0
Ethylene 4,4′-(ethylenediphenylene)diurethan	4	2	2	0	2	2	2	0	0
Trimethylene 4,4′-(methylenediphenylene)diurethan	4	2	2	0	2	2	2	0	0
Tetramethylene 4,4′-sulfonyldibenzamide	4	2	2	0	2	2	2	1	0
Tetramethylene 4,4′-phosphinylidenedibenzamide	4	2	2	0	3	1	2	0	1
4,4′-Biphenylene disiloxanylenedipropionamide	4	2	2	0	6	1	2	0	2
Tetramethylene 4,4′-(methylphosphinylidene)dibenzamide	4	2	2	1	5	1	2	0	1
1,4-Cyclohexylene 3,3′-dibenzamide	4	2	2	2	4	0	2	0	0
Cyclopropylenedimethylene 4,4′-methylenediphenylenediurethane	4	2	2	2	4	2	2	0	0
4,4′-Isopropylidenediphenylene dithioladipate	4	2	2	3	6	0	0	2	0
4,4′-Isopropylidenediphenylene adipate	4	2	2	3	6	2	0	0	0
Piperazine 2,4-diphenyl-1,3-cyclobutylenedicarboxamide	4	2	2	4	6	0	2	0	0
4,4′-Biphenylene (tetramethyldisiloxanylene)dipropionamide	4	2	2	4	14	1	2	0	2
4,4′-Isopropylidenediphenylene dithiol-1,3-cyclohexylenedicarboxylate	4	2	2	5	8	0	0	2	0
Methyl *p*-phenylene 4,4′-tetramethylenedioxydibenzoate	4	2	2	7	6	4	0	0	0
4,4′-Biphenylene-4″,4‴-(dimethoxy)dibenzylidenimino adipate	4	2	2	16	14	4	2	0	0
4,4′-Oxydiphenylene-4″,4‴-(dimethoxy)dibenzylidenimino adipate	4	2	2	16	14	5	2	0	0
p-Phenylene 4,4′-tetramethylenedioxydibenzoate	4	2	3	0	0	4	0	0	0
Tetramethylene 4,4′-(phenylphosphinylidene)dibenzamide	4	2	3	0	3	1	2	0	1
p-Phenylene-4,4′-dibenzylidenimino adipate	4	2	3	2	2	2	2	0	0
4,4′-Biphenylene-4″,4‴-dibenzylidenimino adipate	4	2	4	2	2	2	2	0	0
4,4′-Oxydiphenylene-4″,4‴-dibenzylidenimino adipate	4	2	4	2	2	3	2	0	0
Alanylglycylproline	4	3	0	3	7	0	3	0	0
Alanylprolylglycine	4	3	0	3	7	0	3	0	0
α-D-Glucotripropionate, 1,4-	4	3	0	8	14	5	0	0	0
β-D-Glucotripropionate, 1,4-	4	3	0	8	14	5	0	0	0
Alanyl(ethylglutamyl)glycine	4	4	0	4	11	1	3	0	0
Tetramethylene 3,3′,4,4′-oxydiphenylenetetracarboximide	4	4	0	12	6	1	2	0	0
Trimethylene *N,N*′-malonyldi(*p*-aminobenzoate)	4	4	2	0	2	2	2	0	0
3,4′-Oxydiethylenedioxydiphenylene 3,3′,4,4′-oxydiphenylenetetracarboximide	4	4	2	12	6	4	2	0	0
Isophthalic 4,4′-(tetramethylenedioxy)dibenzoic anhydride	4	4	3	0	0	4	0	0	0
Terephthalic 4,4′-(tetramethylenedioxy)dibenzoic anhydride	4	4	3	0	0	4	0	0	0
Tetramethylene (4,4′-terephthaloyldioxy)-dibenzoate	4	4	3	0	0	4	0	0	0
4,4′-(Isopropylidenediphenylene)dioxydiacetic *p*-phenylenedioxydiacetic an	4	4	3	3	6	4	0	0	0
Methylenediphenylenedisuccinimidediyliminomethylenediphenyleneamine	4	4	4	2	4	0	4	0	0
4,4′-(Oxydiphenylenedioxy)diphenylene carbonyldiphenylenetetracarboximide	4	6	2	12	4	3	2	0	0
Alanylglycylalanylglycylserylglycine	4	6	0	5	16	1	6	0	0
2,2′-Adipamidodibenzoic isophthalic anhydride	4	6	3	0	2	2	2	0	0
4,4′-Adipamidodibenzoic isophthalic anhydride	4	6	3	0	2	2	2	0	0
2,2′-Adipamidodibenzoic terephthalic anhydride	4	6	3	0	2	2	2	0	0
4,4′-Adipamidodibenzoic terephthalic anhydride	4	6	3	0	2	2	2	0	0
5	5	0	0	0	0	0	0	0	0
Pentamethylene	5	0	0	0	0	0	0	0	0
Pentamethylene sulfide	5	0	0	0	0	0	0	1	0
Methylenethiotetramethylene sulfide	5	0	0	0	0	0	0	2	0
Pentamethylene disulfide	5	0	0	0	0	0	0	2	0
Methyleneoxytetramethylene oxide	5	0	0	0	0	2	0	0	0
Pentamethylene sulfone	5	0	0	0	0	2	0	1	0
6-Aminothiocaproic acid	5	0	0	1	1	0	1	1	0
2,5-Pentamethylene-1,3,4-triazole	5	0	0	2	1	0	3	0	0
1,2-Cyclopentylene-*alt*-ethylene	5	0	0	2	2	0	0	0	0
Heptenamer	5	0	0	2	2	0	0	0	0
Vinyl cyclopentane	5	0	0	2	2	0	0	0	0
1,2-Dichloroheptamethylene	5	0	0	2	2	0	0	0	2

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Oxydiethylene 4,4′-dibenzoate	4	2	2	0	0	3	0	0	0
3,3′-(Tetramethylenedioxy)dibenzoic anhydride	4	2	2	0	0	3	0	0	0
4,4′-(Tetramethylenedioxy)dibenzoic anhydride	4	2	2	0	0	3	0	0	0
Tetramethylene 4,4′-oxydibenzoate	4	2	2	0	0	3	0	0	0
Ethylene 3,3′-(ethylenedioxy)dibenzoate	4	2	2	0	0	4	0	0	0
Ethylene 4,4′-(ethylenedioxy)dibenzoate	4	2	2	0	0	4	0	0	0
(Oxydiethylenedioxy)dibenzoic anhydride	4	2	2	0	0	4	0	0	0
4,4′-Biphenylene adipamide	4	2	2	0	2	0	2	0	0
3,4′-Oxydiphenylene adipamide	4	2	2	0	2	1	2	0	0
4,4′-Oxydiphenylene adipamide	4	2	2	0	2	1	2	0	0
Ethylene 4,4′-(ethylenediphenylene)diurethan	4	2	2	0	2	2	2	0	0
Trimethylene 4,4′-(methylenediphenylene)diurethan	4	2	2	0	2	2	2	0	0
Tetramethylene 4,4′-sulfonyldibenzamide	4	2	2	0	2	2	2	1	0
Tetramethylene 4,4′-phosphinylidenedibenzamide	4	2	2	0	3	1	2	0	1
4,4′-Biphenylene disiloxanylenedipropionamide	4	2	2	0	6	1	2	0	2
Tetramethylene 4,4′-(methylphosphinylidene)dibenzamide	4	2	2	1	5	1	2	0	1
1,4-Cyclohexylene 3,3′-dibenzamide	4	2	2	2	4	0	2	0	0
Cyclopropylenedimethylene 4,4′-methylenediphenylenediurethane	4	2	2	2	4	2	2	0	0
4,4′-Isopropylidenediphenylene dithioladipate	4	2	2	3	6	0	0	2	0
4,4′-Isopropylidenediphenylene adipate	4	2	2	3	6	2	0	0	0
Piperazine 2,4-diphenyl-1,3-cyclobutylenedicarboxamide	4	2	2	4	6	0	2	0	0
4,4′-Biphenylene (tetramethyldisiloxanylene)dipropionamide	4	2	2	4	14	1	2	0	2
4,4′-Isopropylidenediphenylene dithiol-1,3-cyclohexylenedicarboxylate	4	2	2	5	8	0	0	2	0
Methyl *p*-phenylene 4,4′-tetramethylenedioxydibenzoate	4	2	2	7	6	4	0	0	0
4,4′-Biphenylene-4″,4‴-(dimethoxy)dibenzylidenimino adipate	4	2	2	16	14	4	2	0	0
4,4′-Oxydiphenylene-4″,4‴-(dimethoxy)dibenzylidenimino adipate	4	2	2	16	14	5	2	0	0
p-Phenylene 4,4′-tetramethylenedioxydibenzoate	4	2	3	0	0	4	0	0	0
Tetramethylene 4,4′-(phenylphosphinylidene)dibenzamide	4	2	3	0	3	1	2	0	1
p-Phenylene-4,4′-dibenzylidenimino adipate	4	2	3	2	2	2	2	0	0
4,4′-Biphenylene-4″,4‴-dibenzylidenimino adipate	4	2	4	2	2	2	2	0	0
4,4′-Oxydiphenylene-4″,4‴-dibenzylidenimino adipate	4	2	4	2	2	3	2	0	0
Alanylglycylproline	4	3	0	3	7	0	3	0	0
Alanylprolylglycine	4	3	0	3	7	0	3	0	0
α-D-Glucotripropionate, 1,4-	4	3	0	8	14	5	0	0	0
β-D-Glucotripropionate, 1,4-	4	3	0	8	14	5	0	0	0
Alanyl(ethylglutamyl)glycine	4	4	0	4	11	1	3	0	0
Tetramethylene 3,3′,4,4′-oxydiphenylenetetracarboximide	4	4	0	12	6	1	2	0	0
Trimethylene *N*,*N*′-malonyldi(*p*-aminobenzoate)	4	4	2	0	2	2	2	0	0
3,4′-Oxydiethylenedioxydiphenylene 3,3′,4,4′-oxydiphenylenetetra-carboximide	4	4	2	12	6	4	2	0	0
Isophthalic 4,4′-(tetramethylenedioxy)dibenzoic anhydride	4	4	3	0	0	4	0	0	0
Terephthalic 4,4′-(tetramethylenedioxy)dibenzoic anhydride	4	4	3	0	0	4	0	0	0
Tetramethylene (4,4′-terephthaloyldioxy)-dibenzoate	4	4	3	0	0	4	0	0	0
4,4′-(Isopropylidenediphenylene)dioxydiacetic *p*-phenylenedioxydiacetic an	4	4	3	3	6	4	0	0	0
Methylenediphenylenedisuccinimidediyliminomethylenediphenyleneamine	4	4	4	2	4	0	4	0	0
4,4′-(Oxydiphenylenedioxy)diphenylene carbonyldiphenylenetetra-carboximide	4	6	2	12	4	3	2	0	0
Alanylglycylalanylglycylserylglycine	4	6	0	5	16	1	6	0	0
2,2′-Adipamidodibenzoic isophthalic anhydride	4	6	3	0	2	2	2	0	0
4,4′-Adipamidodibenzoic isophthalic anhydride	4	6	3	0	2	2	2	0	0
2,2′-Adipamidodibenzoic terephthalic anhydride	4	6	3	0	2	2	2	0	0
4,4′-Adipamidodibenzoic terephthalic anhydride	4	6	3	0	2	2	2	0	0
5	5	0	0	0	0	0	0	0	0
Pentamethylene	5	0	0	0	0	0	0	0	0
Pentamethylene sulfide	5	0	0	0	0	0	0	1	0
Methylenethiotetramethylene sulfide	5	0	0	0	0	0	0	2	0
Pentamethylene disulfide	5	0	0	0	0	0	0	2	0
Methyleneoxytetramethylene oxide	5	0	0	0	0	2	0	0	0
Pentamethylene sulfone	5	0	0	0	0	2	0	1	0
6-Aminothiocaproic acid	5	0	0	1	1	0	1	1	0
2,5-Pentamethylene-1,3,4-triazole	5	0	0	2	1	0	3	0	0
1,2-Cyclopentylene-*alt*-ethylene	5	0	0	2	2	0	0	0	0
Heptenamer	5	0	0	2	2	0	0	0	0
Vinyl cyclopentane	5	0	0	2	2	0	0	0	0
1,2-Dichloroheptamethylene	5	0	0	2	2	0	0	0	2

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
2,5-Pentamethylene-1-amino-1,3,4-triazole	5	0	0	2	2	0	4	0	0
1,4-Cyclohexyleneoxymethylene oxide	5	0	0	2	2	2	0	0	0
1-Heptene	5	0	0	2	4	0	0	0	0
n-Heptaldehyde	5	0	0	2	4	1	0	0	0
Vinyl cyclohexene	5	0	0	3	2	0	0	0	0
3,4-Dihydrocyclohexylidenedimethylene oxide	5	0	0	3	2	1	0	0	0
1,8-Nonadiyne, 1,9-	5	0	0	4	0	0	0	0	0
3,4-Dihydro-4-methylcyclohexylidenedimethylene oxide	5	0	0	4	4	1	0	0	0
3-Methylvinyl cyclohexane	5	0	0	4	6	0	0	0	0
4-Methylvinyl cyclohexane	5	0	0	4	6	0	0	0	0
2-Methoxyvinyl cyclohexane	5	0	0	4	6	1	0	0	0
3-Hexyl-2,5-thiophene	5	0	0	5	4	0	0	1	0
Di-1,4-naphthaleneoxypentamethylene oxide	5	0	0	20	12	2	0	0	0
Pentamethyleneoxy-*p*-phenylene oxide	5	0	1	0	0	2	0	0	0
Pentamethylene *m*-phenylenedisulfonamide	5	0	1	0	2	4	2	2	0
4,4′-(Methylenediphenylene)diethylene sulfide	5	0	2	0	0	0	0	1	0
4,4′-Stilbenediyloxypentamethylene oxide	5	0	2	2	2	2	0	0	0
α-methyl-4,4′-stilbenediyloxypentamethylene oxide	5	0	2	3	4	2	0	0	0
6-Mercaptocaproic acid	5	1	0	0	0	0	0	1	0
6-Hydroxycaproic acid	5	1	0	0	0	1	0	0	0
Pentamethylene carbonate	5	1	0	0	0	2	0	0	0
6-Aminocaproic acid (caprolactam)	5	1	0	0	1	0	1	0	0
Pentamethylene urethane	5	1	0	0	1	1	1	0	0
N-Valerylethylene amine	5	1	0	1	3	0	1	0	0
4-Aminocyclohexyleneacetic acid	5	1	0	2	3	0	1	0	0
4-Methyl-7-hydroxyenanthic acid	5	1	0	2	4	1	0	0	0
3-Methyl-7-aminoenanthic acid	5	1	0	2	5	0	1	0	0
4-Methyl-7-aminoenanthic acid	5	1	0	2	5	0	1	0	0
5-Methyl-7-aminoenanthic acid	5	1	0	2	5	0	1	0	0
6-Methyl-7-aminoenanthic acid	5	1	0	2	5	0	1	0	0
3-*n*-Hexylhydroxybenzoic acid	5	1	0	7	6	1	0	0	0
4,4′-Cyclohexylidene-2,2′-dimethyldiphenylene carbonate	5	1	0	15	12	2	0	0	0
p-(Aminoethylene)phenylenebutyric acid	5	1	1	0	1	0	1	0	0
p-(Aminomethylene)phenylenevaleric acid	5	1	1	0	1	0	1	0	0
N-4-(Methylthiophenoxy)butyrylethylene amine	5	1	1	1	3	1	1	1	0
4,4′-Cyclohexylidenediphenylene carbonate	5	1	2	1	0	2	0	0	0
Pimelic anhydride	5	2	0	0	0	1	0	0	0
Ethylene glutarate	5	2	0	0	0	2	0	0	0
Pentamethylene oxalate	5	2	0	0	0	2	0	0	0
Tetramethylene malonate	5	2	0	0	0	2	0	0	0
Trimethylene succinate	5	2	0	0	0	2	0	0	0
Oxydiethylene malonate	5	2	0	0	0	3	0	0	0
Trimethylene oxydiacetate	5	2	0	0	0	3	0	0	0
Hydrazo pimelamide	5	2	0	0	2	0	2	0	0
Methylene adipamide	5	2	0	0	2	0	2	0	0
Tetramethylene malonamide	5	2	0	0	2	0	2	0	0
(2,6-Dioxo-1,4-piperidinediyl)trimethylene	5	2	0	1	1	0	1	0	0
*N*5-(3-Hydroxypropyl)glutamine	5	2	0	1	4	1	2	0	0
Piperazine cyclopropylenedicarboxamide	5	2	0	2	2	0	2	0	0
Cyclopropylene piperazinediurea	5	2	0	2	4	0	4	0	0
Methylethylene adipate	5	2	0	2	4	2	0	0	0
Tetramethylene cyclopropylenediurethane	5	2	0	2	4	2	2	0	0
n-Butylglutamate	5	2	0	2	5	1	1	0	0
Alanyl-6-Aminocaproic acid	5	2	0	2	6	0	2	0	0
Piperazine (1-methylcyclopropylene)dicarboxamide	5	2	0	3	4	0	2	0	0
Ethylene 3,3′-dimethoxy-4,4′-(trimethylenedioxy)dibenzoate	5	2	0	14	12	6	0	0	0
3,3′-Dimethyl-4,4′-methylenediphenylene adipamide	5	2	0	14	14	0	2	0	0
N,N′-Diisopropyl-3,3′-dimethyl-methylenediphenylene adipamide	5	2	0	20	26	0	2	0	0
Pentamethylene dithiolisophthalate	5	2	1	0	0	0	0	2	0
Pentamethylene dithiolterephthalate	5	2	1	0	0	0	0	2	0
Pentamethylene isophthalate	5	2	1	0	0	2	0	0	0
Pentamethylene phthalate	5	2	1	0	0	2	0	0	0
Pentamethylene terephthalate	5	2	1	0	0	2	0	0	0
Trimethylene *p*-phenylenediacetate	5	2	1	0	0	2	0	0	0
Ethylene *p*-(carboxyphenoxy)butyrate	5	2	1	0	0	3	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Pentamethylene *m*-carboxycarbanilate	5	2	1	0	1	2	1	0	0
Pentamethylene *p*-carboxycarbanilate	5	2	1	0	1	2	1	0	0
Pentamethylene terephthalamide	5	2	1	0	2	0	2	0	0
p-Phenylene pimelamide	5	2	1	0	2	0	2	0	0
Tetramethylene *p*-(carboxyphenylene)acetamide	5	2	1	0	2	0	2	0	0
p-Xylylene glutaramide	5	2	1	0	2	0	2	0	0
3-Phenylpropylglutamate	5	2	1	1	3	1	1	0	0
N-Benzyloxycarbonyllysine	5	2	1	1	4	1	2	0	0
p-Phenylene(1,1-dimethyl)ethylene adipamide	5	2	1	3	8	0	2	0	0
N,N'-Dipropylmethylene-4,4'-dimethyldiphenylene terephthalamide	5	2	1	16	18	0	2	0	0
4,4'-Pentamethylenedibenzoic anhydride	5	2	2	0	0	1	0	0	0
4,4'-Methylenediphenylene adipate	5	2	2	0	0	2	0	0	0
Pentamethylene 2,2'-dibenzoate	5	2	2	0	0	2	0	0	0
Pentamethylene 3,3'-dibenzoate	5	2	2	0	0	2	0	0	0
Pentamethylene 4,4'-dibenzoate	5	2	2	0	0	2	0	0	0
Oxydiethylene 4,4'-methylenedibenzoate	5	2	2	0	0	3	0	0	0
3,3'-(Pentamethylenedioxy)dibenzoic anhydride	5	2	2	0	0	3	0	0	0
4,4'-(Pentamethylenedioxy)dibenzoic anhydride	5	2	2	0	0	3	0	0	0
Pentamethylene 4,4'-oxydibenzoate	5	2	2	0	0	3	0	0	0
Ethylene 4,4'-(trimethylenedioxy)dibenzoate	5	2	2	0	0	4	0	0	0
4,4'-Methylenediphenylene adipamide	5	2	2	0	2	0	2	0	0
3,4'-Oxydiphenylene pimelamide	5	2	2	0	2	1	2	0	0
4,4'-Oxydiphenylene pimelamide	5	2	2	0	2	1	2	0	0
Ethylene 4,4'-(trimethylenediphenylene)diurethane	5	2	2	0	2	2	2	0	0
Tetramethylene 4,4'-(methylenediphenylene)diurethane	5	2	2	0	2	2	2	0	0
Tetramethylene methylenediphenylenediaminodithiodicarboxylate	5	2	2	0	2	2	2	2	0
4,4'-Methylenediphenylene disiloxanylenedipropionamide	5	2	2	0	6	1	2	0	2
1,4-Cyclohexylene 3,3'-methylenedibenzamide	5	2	2	2	4	0	2	0	0
N,N'-Dimethyl-4,4'-methylenediphenylene adipamide	5	2	2	2	6	0	2	0	0
Tetramethylene 4,4'-propylenedibenzamide	5	2	2	2	6	0	2	0	0
Tetramethylene 4,4'-(propylenedioxy)dibenzamide	5	2	2	2	6	2	2	0	0
2,2-Diethyltrimethylene 4,4'-(methylenediphenylene)diurethane	5	2	2	3	8	2	2	0	0
1-Ethyl-2-propyltrimethylene (methylenediphenylene)diurethane	5	2	2	4	10	2	2	0	0
4,4'-Methylenediphenylene tetramethyldisiloxanylenedipropionamide	5	2	2	4	14	1	2	0	2
N,N'-Dipropyl-4,4'-methylenediphenylene terephthalamide	5	2	3	2	6	0	2	0	0
Glycyl-3-aminopropionic acid-3-aminopropionic acid	5	3	0	0	3	0	3	0	0
Glycylglycylproline	5	3	0	1	3	0	3	0	0
N,N'-Lysyl propylenediurea	5	3	0	3	10	1	4	0	0
Methyl-*N,N'*-lysyl propylenediurea	5	3	0	4	12	1	4	0	0
Tetramethylene (cyclopropylenedicarboxoyl)diurethane	5	4	0	2	4	2	2	0	0
Ethylene *N,N'*-trimethylenediterephthalamate	5	4	2	0	2	2	2	0	0
Isophthaloyl (*m*-carboxyphenoxycapryl)dihydrazide	5	4	2	0	4	1	4	0	0
(*p*-Phenylenedioxy)diacetic trimethylenedioxydibenzoic anhydride	5	4	3	0	0	6	0	0	0
6	6	0	0	0	0	0	0	0	0
Hexamethylene sulfide	6	0	0	0	0	0	0	1	0
Ethylenethiotetramethylene sulfide	6	0	0	0	0	0	0	2	0
Hexamethylene disulfide	6	0	0	0	0	0	0	2	0
(Ethylenedithio)tetramethylene disulfide	6	0	0	0	0	0	0	4	0
hexamethylene oxide	6	0	0	0	0	1	0	0	0
Methyleneoxypentamethylene oxide	6	0	0	0	0	2	0	0	0
Hexamethylene sulfone	6	0	0	0	0	2	0	1	0
Hexamethylene amine	6	0	0	0	1	0	1	0	0
7-Aminothioenanthic acid	6	0	0	1	1	0	1	1	0
Hexamethylene thiourea	6	0	0	1	2	0	2	1	0
2,5-Hexamethylene-1,3,4-triazole	6	0	0	2	1	0	3	0	0
3-Cyclopentylpropene	6	0	0	2	2	0	0	0	0
Octenamer	6	0	0	2	2	0	0	0	0
Vinyl cyclohexane	6	0	0	2	2	0	0	0	0
2,5-Hexamethylene-1-amino-1,3,4-triazole	6	0	0	2	2	0	4	0	0
1-Octene	6	0	0	2	4	0	0	0	0
Caprylaldehyde	6	0	0	2	4	1	0	0	0
Di-*n*-butylsilylene	6	0	0	2	6	0	0	0	1
n-Propyl-*n*-pentylsilylene	6	0	0	2	6	0	0	0	1
4-Methylcyclohexylidenedimethylene oxide	6	0	0	3	4	1	0	0	0
3,3-Bisethoxymethyloxacyclobutane	6	0	0	3	6	3	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
5-Diisobutylamino-1-pentene	6	0	0	7	15	0	1	0	0
Di-1,4-naphthaleneoxyhexamethylene oxide	6	0	0	20	12	2	0	0	0
Hexamethyleneoxy-*p*-phenylene oxide	6	0	1	0	0	2	0	0	0
Hexamethylene *m*-phenylenedisulfonamide	6	0	1	0	2	4	2	2	0
Benzylidenethiohexamethylene sulfide	6	0	1	1	2	0	0	2	0
Hexamethylene dithioterephthalamide	6	0	1	2	2	0	2	2	0
p-Methoxybenzylidenethiohexamethylene sulfide	6	0	1	2	4	1	0	2	0
4,4′-Stilbenediyloxyhexamethylene oxide	6	0	2	2	2	2	0	0	0
α-Methyl-4,4′-stilbenediyloxyhexamethylene oxide	6	0	2	3	4	2	0	0	0
7-Hydroxyenanthic acid	6	1	0	0	0	1	0	0	0
Hexamethylene carbonate	6	1	0	0	0	2	0	0	0
7-Aminoenanthic acid	6	1	0	0	1	0	1	0	0
Hexamethylene urea	6	1	0	0	2	0	2	0	0
N-Hexanoylethylene amine	6	1	0	1	3	0	1	0	0
N-Methyl-7-aminoenanthic acid	6	1	0	1	3	0	1	0	0
Vinylcyclohexyl ketone	6	1	0	2	2	0	0	0	0
(3-Aminomethylene)cyclohexyleneacetic acid	6	1	0	2	3	0	1	0	0
(1,3-Dimethyl-3-aminomethylene)cyclohexyleneacetic acid	6	1	0	4	7	0	1	0	0
p-(Aminoethylene)phenylenevaleric acid	6	1	1	0	1	0	1	0	0
4,4′-Nonylidenediphenylene carbonate	6	1	2	3	6	2	0	0	0
Ethylene dithioladipate	6	2	0	0	0	0	0	2	0
Suberic anhydride	6	2	0	0	0	1	0	0	0
(Ethylenedithio)dipropionic anhydride	6	2	0	0	0	1	0	2	0
Piperazine oxydiacetamide	6	2	0	0	0	1	2	0	0
Ethylene adipate	6	2	0	0	0	2	0	0	0
Hexamethylene oxalate	6	2	0	0	0	2	0	0	0
Tetramethylene succinate	6	2	0	0	0	2	0	0	0
Trimethylene glutarate	6	2	0	0	0	2	0	0	0
Barium suberate	6	2	0	0	0	2	0	0	1
Cadmium suberate	6	2	0	0	0	2	0	0	1
Calcium suberate	6	2	0	0	0	2	0	0	1
Lead suberate	6	2	0	0	0	2	0	0	1
Magnesium suberate	6	2	0	0	0	2	0	0	1
Manganese suberate	6	2	0	0	0	2	0	0	1
Stannous suberate	6	2	0	0	0	2	0	0	1
Zinc suberate	6	2	0	0	0	2	0	0	1
Hexamethylene dithiodicarboxylate	6	2	0	0	0	2	0	2	0
Ethylene 1,4-piperazinedicarboxylate	6	2	0	0	0	2	2	0	0
Oxydiethylene succinate	6	2	0	0	0	3	0	0	0
Tetramethylene oxydiacetate	6	2	0	0	0	3	0	0	0
(Ethylenedioxy)diethylene oxalate	6	2	0	0	0	4	0	0	0
Oxydiethylene oxydiacetate	6	2	0	0	0	4	0	0	0
(Ethylenedisulfonyl)dipropionic anhydride	6	2	0	0	0	5	0	2	0
Ethylene adipamide	6	2	0	0	2	0	2	0	0
Glycyl-6-aminocaproic acid	6	2	0	0	2	0	2	0	0
Hexamethylene oxamide	6	2	0	0	2	0	2	0	0
Hydrazo suberamide	6	2	0	0	2	0	2	0	0
Methylene pimelamide	6	2	0	0	2	0	2	0	0
Pentamethylene malonamide	6	2	0	0	2	0	2	0	0
Tetramethylene succinamide	6	2	0	0	2	0	2	0	0
Ethylene (ethylenedioxy)diacetamide	6	2	0	0	2	2	2	0	0
Aminoditrimethylene oxamide	6	2	0	0	3	0	3	0	0
Ethylene disiloxanylenedipropionamide	6	2	0	0	6	1	2	0	2
2,2-Bischloromethyltrimethylene succinate	6	2	0	1	0	2	0	0	2
*N*5-(4-Hydroxybutyl)glutamine	6	2	0	1	4	1	2	0	0
(Methylamino)ditrimethylene oxamide	6	2	0	1	5	0	3	0	0
1,4-Cyclohexylene dithiolsuccinate	6	2	0	2	2	0	0	2	0
Piperazine 1,3-cyclobutylenedicarboxamide	6	2	0	2	2	0	2	0	0
1,4-Cyclohexylenedimethylene oxalate	6	2	0	2	2	2	0	0	0
Ethylene 1,4-cyclohexylenedicarboxylate	6	2	0	2	2	2	0	0	0
Hexamethylene fumarate	6	2	0	2	2	2	0	0	0
2,5-Tetrahydrofurandipropionic anhydride	6	2	0	2	2	2	0	0	0
2,5-Tetrahydropyrroledipropionic anhydride	6	2	0	2	3	1	1	0	0
Methylethylene pimelate	6	2	0	2	4	2	0	0	0
Pentamethylene cyclopropylenediurethane	6	2	0	2	4	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
n-Amylglutamate	6	2	0	2	5	1	1	0	0
N,N'-Dimethyltetramethylene succinamide	6	2	0	2	6	0	2	0	0
Hexamethylene L-tartaramide	6	2	0	2	6	2	2	0	0
Hexafluoropentamethylene adipate	6	2	0	3	0	2	0	0	6
Hexafluoropentamethylene adipamide	6	2	0	3	2	0	2	0	6
Hexamethylene perfluoroglutaramide	6	2	0	3	2	0	2	0	6
N-Methyl-2,5-tetrahydropyrroledipropionic anhydride	6	2	0	3	5	1	1	0	0
2,2-Dimethyltrimethylene adipate	6	2	0	3	6	2	0	0	0
Isopropylidenedimethylene piperazinedithiodicarboxylate	6	2	0	3	6	2	2	2	0
Hexamethylene 2,2-dimethylmalonamide	6	2	0	3	8	0	2	0	0
2,4-Hexadiyne adipate	6	2	0	4	0	2	0	0	0
Hexamethylene 2,5-thiophenedicarboxamide	6	2	0	4	4	0	2	1	0
Hexamethylene 2,5-furandicarboxamide	6	2	0	4	4	1	2	0	0
2-Butene 4-octenediamide	6	2	0	4	6	0	2	0	0
Hexamethylene (3-methylcyclopropylene)dicarboxamide	6	2	0	4	8	0	2	0	0
Hexamethylene di-*O*-methyl-L-tartaramide	6	2	0	4	10	2	2	0	0
Tetramethylene (2,5-dimethylpiperazine)dithiodicarboxylate	6	2	0	4	10	2	2	2	0
Ethylene (Tetramethyldisiloxanylene)dipropionamide	6	2	0	4	14	1	2	0	2
Hexamethylene 2,3-pyridinedicarboxamide	6	2	0	5	5	0	3	0	0
Hexamethylene 2,4-pyridinedicarboxamide	6	2	0	5	5	0	3	0	0
Hexamethylene 2,5-pyridinedicarboxamide	6	2	0	5	5	0	3	0	0
Hexamethylene 2,6-pyridinedicarboxamide	6	2	0	5	5	0	3	0	0
Hexamethylene 3,4-pyridinedicarboxamide	6	2	0	5	5	0	3	0	0
Hexamethylene 3,5-pyridinedicarboxamide	6	2	0	5	5	0	3	0	0
N,N'-Dimethyl(hexafluoropentamethylene) adipamide	6	2	0	5	6	0	2	0	6
N,N'-Dimethylhexamethylene perfluoroglutaramide	6	2	0	5	6	0	2	0	6
Hexamethylene 2,5-dihydroxyterephthalamide	6	2	0	6	6	2	2	0	0
Hexamethylene methylterephthalamide	6	2	0	7	8	0	2	0	0
Hexamethylene 2,6-dimethyl-3,5-pyridinedicarboxamide	6	2	0	7	9	0	3	0	0
Hexamethylene 4-methyl-1,3-phenylenediurea	6	2	0	7	10	0	4	0	0
Hexamethylene 2,5-dimethylterephthalamide	6	2	0	8	10	0	2	0	0
N,N'-Diisopropyl(hexafluoropentamethylene) adipamide	6	2	0	9	14	0	2	0	6
N,N'-Diisopropylhexamethylene perfluoroglutaramide	6	2	0	9	14	0	2	0	6
Tetramethyl-*p*-xylylene dithioladipate	6	2	0	10	12	0	0	2	0
Hexamethylene 5-tert-butylisophthalamide	6	2	0	10	14	0	2	0	0
4-Methylphenylene diethyldimethyldisiloxanylenedipropionamide	6	2	0	11	20	1	2	0	2
1,4-Cyclohexylenedimethylene 2,6-naphthalate	6	2	0	12	8	2	0	0	0
Ethylene 3,3'-dimethoxy-4,4'-(tetramethylenedioxy)dibenzoate	6	2	0	14	12	6	0	0	0
Ethylene 3,3'-dimethoxy-4,4'-(oxydiethylene)dioxydibenzoate	6	2	0	14	12	7	0	0	0
Hexamethylene dithiolisophthalate	6	2	1	0	0	0	0	2	0
Hexamethylene dithiolterephthalate	6	2	1	0	0	0	0	2	0
p-Xylylene dithioladipate	6	2	1	0	0	0	0	2	0
(*p*-Xylylenedithio)dipropionic anhydride	6	2	1	0	0	1	0	2	0
Hexamethylene isophthalate	6	2	1	0	0	2	0	0	0
Hexamethylene phthalate	6	2	1	0	0	2	0	0	0
Hexamethylene terephthalate	6	2	1	0	0	2	0	0	0
Tetramethylene *p*-phenylenediacetate	6	2	1	0	0	2	0	0	0
p-Xylylene adipate	6	2	1	0	0	2	0	0	0
Ethylene *p*-(carboxyphenoxy)valerate	6	2	1	0	0	3	0	0	0
(Ethylenedioxy)diethylene isophthalate	6	2	1	0	0	4	0	0	0
(Ethylenedioxy)diethylene terephthalate	6	2	1	0	0	4	0	0	0
(*p*-Xylylenedisulfonyl)dipropionic anhydride	6	2	1	0	0	5	0	2	0
Hexamethylene *m*-carboxycarbanilate	6	2	1	0	1	2	1	0	0
Hexamethylene isophthalamide	6	2	1	0	2	0	2	0	0
Hexamethylene phthalamide	6	2	1	0	2	0	2	0	0
Hexamethylene terephthalamide	6	2	1	0	2	0	2	0	0
Pentamethylene *p*-(carboxyphenylene)acetamide	6	2	1	0	2	0	2	0	0
p-Phenyleneethylene adipamide	6	2	1	0	2	0	2	0	0
m-Phenylene suberamide	6	2	1	0	2	0	2	0	0
o-Phenylene suberamide	6	2	1	0	2	0	2	0	0
p-Phenylene suberamide	6	2	1	0	2	0	2	0	0
m-Xylylene adipamide	6	2	1	0	2	0	2	0	0
p-Xylylene adipamide	6	2	1	0	2	0	2	0	0
Oxyditrimethylene terephthalamide	6	2	1	0	2	1	2	0	0
m-Phenylene hexamethylenediurethane	6	2	1	0	2	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
p-Phenylene hexamethylenediurethane	6	2	1	0	2	2	2	0	0
Tetramethylene *p*-xylylenediurethane	6	2	1	0	2	2	2	0	0
Hexamethylene *m*-phenylenediurea	6	2	1	0	4	0	4	0	0
1,4-Cyclohexylenedimethylene isophthalate	6	2	1	2	2	2	0	0	0
1,4-Cyclohexylenedimethylene terephthalate	6	2	1	2	2	2	0	0	0
p-Xylylene 1,4-cyclohexylenedicarboxylate	6	2	1	2	2	2	0	0	0
1,4-Cyclohexylenedimethylene isophthalamide	6	2	1	2	4	0	2	0	0
N,N'-Dimethylhexamethylene terephthalamide	6	2	1	2	6	0	2	0	0
Hexamethylene naphthalenedicarboxamide	6	2	1	4	6	0	2	0	0
o-Phenylene (diethyldimethyldisiloxanylene)dipropionamide	6	2	1	4	14	1	2	0	2
p-Phenylene (diethyldimethyldisiloxanylene)dipropionamide	6	2	1	4	14	1	2	0	2
p-Phenylene dibutylcyclobutylenedicarboxylate	6	2	1	6	10	2	0	0	0
p-Phenylene dicyanodibutylcyclobutylenedicarboxylate	6	2	1	8	8	2	2	0	0
4,4'-Hexamethylenedibenzoic anhydride	6	2	2	0	0	1	0	0	0
Ethylene 4,4'-tetramethylenedibenzoate	6	2	2	0	0	2	0	0	0
Hexamethylene 2,2'-dibenzoate	6	2	2	0	0	2	0	0	0
Hexamethylene 3,3'-dibenzoate	6	2	2	0	0	2	0	0	0
Hexamethylene 4,4'-dibenzoate	6	2	2	0	0	2	0	0	0
p-Phenyleneditrimethylene terephthalate	6	2	2	0	0	2	0	0	0
Hexamethylene dithiol-4,4'-sulfonyldibenzoate	6	2	2	0	0	2	0	3	0
3,3'-(Hexamethylenedioxy)dibenzoic anhydride	6	2	2	0	0	3	0	0	0
4,4'-(Hexamethylenedioxy)dibenzoic anhydride	6	2	2	0	0	3	0	0	0
Hexamethylene 4,4'-oxydibenzoate	6	2	2	0	0	3	0	0	0
Oxydiethylene 4,4'-ethylenedibenzoate	6	2	2	0	0	3	0	0	0
(Ethylenedioxy)diethylene 2,2'-dibenzoate	6	2	2	0	0	4	0	0	0
(Ethylenedioxy)diethylene 3,3'-dibenzoate	6	2	2	0	0	4	0	0	0
(Ethylenedioxy)diethylene 4,4'-dibenzoate	6	2	2	0	0	4	0	0	0
Ethylene 4,4'-(ethylenedioxydimethylene)dibenzoate	6	2	2	0	0	4	0	0	0
Ethylene 3,3'-(tetramethylenedioxy)dibenzoate	6	2	2	0	0	4	0	0	0
Ethylene 4,4'-(tetramethylenedioxy)dibenzoate	6	2	2	0	0	4	0	0	0
Tetramethylene 4,4'-(ethylenedioxy)dibenzoate	6	2	2	0	0	4	0	0	0
Hexamethylene 4,4'-sulfonyldibenzoate	6	2	2	0	0	4	0	1	0
Ethylene 4,4'-(oxydiethylene)dioxydibenzoate	6	2	2	0	0	5	0	0	0
4,4'-Ethylenediphenylene adipamide	6	2	2	0	2	0	2	0	0
Hexamethylene 3,3'-dibenzamide	6	2	2	0	2	0	2	0	0
Hexamethylene 3,4'-dibenzamide	6	2	2	0	2	0	2	0	0
Hexamethylene 4,4'-dibenzamide	6	2	2	0	2	0	2	0	0
Hexamethylene 2,2'-dibenzamide	6	2	2	0	2	0	2	0	0
p-Phenylenediethylene *m*-phenylenediacetamide	6	2	2	0	2	0	2	0	0
3,4'-Oxydiphenylene suberamide	6	2	2	0	2	1	2	0	0
4,4'-Oxydiphenylene suberamide	6	2	2	0	2	1	2	0	0
Ethylene 4,4'-(tetramethylenediphenylene)diurethane	6	2	2	0	2	2	2	0	0
Pentamethylene 4,4'-(methylenediphenylene)diurethane	6	2	2	0	2	2	2	0	0
Hexamethylene 4,4'-sulfonyldibenzamide	6	2	2	0	2	2	2	1	0
Hexamethylene 3,3'-phosphinylidenedibenzamide	6	2	2	0	3	1	2	0	1
Hexamethylene 4,4'-phosphinylidenedibenzamide	6	2	2	0	3	1	2	0	1
Hexamethylene 4,4'-(hydroxyphosphinylidene)dibenzamide	6	2	2	0	3	2	2	0	1
Hexamethylene 4,4'-silylenedibenzamide	6	2	2	0	4	0	2	0	1
4,4'-Dithiodiphenylene hexamethylenediurea	6	2	2	0	4	0	4	2	0
Hexamethylene 4,4'-disiloxanylenedibenzamide	6	2	2	0	6	1	2	0	2
Hexamethylene 4,4'-tetrasiloxanylenedibenzamide	6	2	2	0	10	3	2	0	4
Hexamethylene 3,3'-(methylphosphinylidene)dibenzamide	6	2	2	1	5	1	2	0	1
Hexamethylene 4,4'-(methylphosphinylidene)dibenzamide	6	2	2	1	5	1	2	0	1
Hexamethylene 4,4'-vinylenedibenzamide	6	2	2	2	4	0	2	0	0
2-Ethylhexamethylene dithiol-4,4'-sulfonyldibenzoate	6	2	2	2	4	2	0	3	0
Hexamethylene 4,4'-ethylidenedibenzamide	6	2	2	2	6	0	2	0	0
Hexamethylene 4,4'-(dimethylsilylene)dibenzamide	6	2	2	2	8	0	2	0	1
Hexamethylene 4,4'-(methylvinylene)dibenzamide	6	2	2	3	6	0	2	0	0
Hexamethylene 4,4'-isopropylidenedibenzamide	6	2	2	3	8	0	2	0	0
4,4'-Isopropylidenediphenylene hexamethylenediurethane	6	2	2	3	8	2	2	0	0
4,4'-Dimethylheptamethylene sulfonyldibenzamide	6	2	2	3	8	2	2	1	0
Hexamethylene 4,4'-(tetramethyldisiloxanylene)dibenzamide	6	2	2	4	14	1	2	0	2
Hexamethylene 4,4'-(phenylphosphinylidene)dibenzamide	6	2	3	0	2	1	2	0	1
Hexamethylene tetramethyltetraphenyltetrasiloxanylenedibenzamide	6	2	6	4	14	3	2	0	4
Ethylene *N,N'*-lysyldiurea	6	3	0	1	6	1	4	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Ethylene methyl-*N*,*N*′-lysyldiurea	6	3	0	2	8	1	4	0	0
Glycylprolylhydroxyproline	6	3	0	3	5	1	3	0	0
Hexamethylene 4-oxo-4(H)-pyran-2,6-dicarboxamide	6	3	0	4	4	1	2	0	0
Hexamethylene 1,4-dihydro-4-oxo-2,6-pyridinedicarboxamide	6	3	0	4	5	0	3	0	0
(Phenylglycyl)prolylproline	6	3	1	3	5	0	3	0	0
Hexamethylene 4,4′-ketodibenzamide	6	3	2	0	2	0	2	0	0
Ethylene adipoyldiurethane	6	4	0	0	2	2	2	0	0
Adipoyl ethylenediurea	6	4	0	0	4	0	4	0	0
2-Hydroxytrimethylene adipoyldiurethane	6	4	0	1	4	3	2	0	0
Pentamethylene (cyclopropylenedicarboxoyl)diurethane	6	4	0	2	4	2	2	0	0
Hexamethylene pyromellitimide	6	4	0	6	2	0	2	0	0
Oxydisilyleneditrimethylene pyromellitimide	6	4	0	6	6	1	2	0	2
Tetramethyloxydisilyleneditrimethylene pyromellitimide	6	4	0	10	14	1	2	0	2
Hexamethylene 3,3′,4,4′-(oxydiphenylene)tetracarboximide	6	4	0	12	6	1	2	0	0
4,4′-(Tetramethylenedicarbonyl)diphenylene succinate	6	4	2	0	0	2	0	0	0
Trimethylene *N*,*N*′-glutaryldi(*p*-aminobenzoate)	6	4	2	0	2	2	2	0	0
Trimethylene *N*,*N*′-trimethylenediterephthalamate	6	4	2	0	2	2	2	0	0
D-Benzylglutamyl-L-benzylglutamate	6	4	2	2	6	2	2	0	0
3,4′-Ethylenedioxydiethylenedioxydiphenylene 3,3′4,4′-oxydiphenylenetet	6	4	2	12	6	5	2	0	0
4,4′-(Ethylenedioxydiethylenedioxy)diphenylene carbonyldiphenylenetetrac	6	5	2	12	4	4	2	0	0
Alanylglycylalanylglycylalanylglycylglutamylglycine	6	9	0	7	22	1	8	0	0
7	7	0	0	0	0	0	0	0	0
Heptamethylene	7	0	0	0	0	0	0	0	0
Heptamethylene disulfide	7	0	0	0	0	0	0	2	0
Tetramethylenethiotrimethylene sulfide	7	0	0	0	0	0	0	2	0
(Tetramethylenedithio)trimethylene disulfide	7	0	0	0	0	0	0	4	0
Hexamethyleneoxymethylene oxide	7	0	0	0	0	2	0	0	0
Cyclohexylidenedimethylene oxide	7	0	0	1	0	1	0	0	0
1,4-Piperidinediyltrimethylene	7	0	0	1	1	0	1	0	0
2,5-Heptamethylene-1,3,4-triazole	7	0	0	2	1	0	3	0	0
1,2-Cycloheptylene-*alt*-ethylene	7	0	0	2	2	0	0	0	0
3-Cyclohexylpropene	7	0	0	2	2	0	0	0	0
Vinyl cycloheptane	7	0	0	2	2	0	0	0	0
2,5-Heptamethylene-1-amino-1,3,4-triazole	7	0	0	2	2	0	4	0	0
1,4-Cyclohexylenedimethyleneoxymethylene oxide	7	0	0	2	2	2	0	0	0
1-Methyloctamethylene	7	0	0	2	4	0	0	0	0
1-Nonene	7	0	0	2	4	0	0	0	0
n-Nonaldehyde	7	0	0	2	4	1	0	0	0
n-Butyl-*n*-pentylsilylene	7	0	0	2	6	0	0	0	1
3-Octyl-2,5-thiophene	7	0	0	5	4	0	0	1	0
Di-1,4-naphthaleneoxyheptamethylene oxide	7	0	0	20	12	2	0	0	0
3-(4′-Octylphenyl)thiophene	7	0	1	5	4	0	0	1	0
4,4′-Ethylene-3-methyldiphenyleneoxypentamethylene oxide	7	0	1	7	6	2	0	0	0
4,4′-Stilbenediyloxyheptamethylene oxide	7	0	2	2	2	2	0	0	0
α-Methyl-4,4′-stilbenediyloxyheptamethylene oxide	7	0	2	3	4	2	0	0	0
8-Aminocaprylic acid	7	1	0	0	1	0	1	0	0
Heptamethylene urea	7	1	0	0	2	0	2	0	0
N-Cyclohexanecarbonylethylene amine	7	1	0	1	1	0	1	0	0
N-Heptanoylethylene amine	7	1	0	1	3	0	1	0	0
2,2-Dibutyl-3-hydroxypropionic acid	7	1	0	3	6	1	0	0	0
N,*N*-Dibutylacrylamide	7	1	0	3	7	0	1	0	0
Biphenyloxyhexamethylene acrylate	7	1	2	1	2	2	0	0	0
Azelaic anhydride	7	2	0	0	0	1	0	0	0
Ethylene pimelate	7	2	0	0	0	2	0	0	0
Pentamethylene succinate	7	2	0	0	0	2	0	0	0
Tetramethylene glutarate	7	2	0	0	0	2	0	0	0
Trimethylene adipate	7	2	0	0	0	2	0	0	0
Oxydiethylene glutarate	7	2	0	0	0	3	0	0	0
Pentamethylene oxydiacetate	7	2	0	0	0	3	0	0	0
(Ethylenedioxy)diethylene malonate	7	2	0	0	0	4	0	0	0
Hexamethylene malonamide	7	2	0	0	2	0	2	0	0
Hydrazo azelamide	7	2	0	0	2	0	2	0	0
Methylene suberamide	7	2	0	0	2	0	2	0	0
Pentamethylene oxydiacetamide	7	2	0	0	2	1	2	0	0
Tetramethylene trimethylenediurethane	7	2	0	0	2	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Trimethylene 1,4-cyclohexylenedicarboxylate	7	2	0	2	2	2	0	0	0
Cyclopropylenedimethylene piperazinediurethane	7	2	0	2	2	2	2	0	0
Hexamethylene cyclopropylenedicarboxamide	7	2	0	2	4	0	2	0	0
Piperazine 3-methyladipamide	7	2	0	2	4	0	2	0	0
Trimethylene 4-octenediamide	7	2	0	2	4	0	2	0	0
Hexamethylene 2,3-pyrazoledicarboxamide	7	2	0	2	4	0	4	0	0
Hexamethylene 2,4-pyrazoledicarboxamide	7	2	0	2	4	0	4	0	0
Methylethylene suberate	7	2	0	2	4	2	0	0	0
n-Hexylglutamate	7	2	0	2	5	1	1	0	0
Cyclopropylene hexamethylenediurea	7	2	0	2	6	0	4	0	0
3-Oxypropylhexamethylene oxamide	7	2	0	2	6	1	2	0	0
Hexamethylene (1-methylcyclopropylene)dicarboxamide	7	2	0	3	6	0	2	0	0
Hexamethylene (methylene-2,5-furan)dicarboxamide	7	2	0	4	4	1	2	0	0
Hexamethylene 4(H)-pyran-2,6-dicarboxamide	7	2	0	4	4	1	2	0	0
Hexamethylene 3,3′-dimethyl-4,4′-methylenediphenylenediurea	7	2	0	14	16	0	4	0	0
N,*N*′-diethyl-3,3′-dimethyl-4,4′-methylenediphenylene adipamide	7	2	0	16	18	0	2	0	0
Heptamethylene terephthalate	7	2	1	0	0	2	0	0	0
p-Phenylene azelate	7	2	1	0	0	2	0	0	0
p-Xylylene pimelate	7	2	1	0	0	2	0	0	0
Ethylene *p*-(carboxyphenoxy)caproate	7	2	1	0	0	3	0	0	0
Hexamethylene *p*-(carboxyphenoxy)acetate	7	2	1	0	0	3	0	0	0
Heptamethylene terephthalamide	7	2	1	0	2	0	2	0	0
Hexamethylene *p*-(carboxyphenylene)acetamide	7	2	1	0	2	0	2	0	0
p-Phenylene azelamide	7	2	1	0	2	0	2	0	0
m-Xylylene pimelamide	7	2	1	0	2	0	2	0	0
p-Xylylene pimelamide	7	2	1	0	2	0	2	0	0
p-Phenylene (methyl-1,4-piperazine)dipropionate	7	2	1	2	4	2	2	0	0
N,*N*′-Dibutyl-4,4′-(dimethylmethylene)diphenylene terephthalamide	7	2	1	16	18	0	2	0	0
Ethylene 4,4′-(pentamethylenedioxy)dibenzoate	7	2	2	0	0	4	0	0	0
Hexamethylene 3,3′-methylenedibenzamide	7	2	2	0	2	0	2	0	0
Hexamethylene 4,4′-methylenedibenzamide	7	2	2	0	2	0	2	0	0
3,4′-Oxydiphenylene azelamide	7	2	2	0	2	1	2	0	0
4,4′-Oxydiphenylene azelamide	7	2	2	0	2	1	2	0	0
Hexamethylene 4,4′-(methylenediphenylene)diurethane	7	2	2	0	2	2	2	0	0
Heptamethylene 4,4′-sulfonyldibenzamide	7	2	2	0	2	2	2	1	0
Hexamethylene 4,4′-(methylenediphenylene)diurea	7	2	2	0	4	0	4	0	0
N,*N*′-Diethyl(methylenediphenylene) adipamide	7	2	2	2	6	0	2	0	0
2-Butyl-2-ethyltrimethylene methylenediphenylenediurethane	7	2	2	3	8	2	2	0	0
N,*N*′-Dibutyl(methylenediphenylene) terephthalamide	7	2	3	2	6	0	2	0	0
N,*N*′-Lysyl trimethylenediurea	7	3	0	1	6	1	4	0	0
Glycylprolylproline	7	3	0	2	3	0	3	0	0
Hexamethylene propylenediurea	7	3	0	2	8	0	4	0	0
Methyl-*N*,*N*′-lysyl trimethylenediurea	7	3	0	2	8	1	4	0	0
α-D-Glucotributyrate, 1,4-	7	3	0	8	14	5	0	0	0
β-D-Glucotributyrate, 1,4-	7	3	0	8	14	5	0	0	0
Trimethylene adipoyldiurethane	7	4	0	0	2	2	2	0	0
Azelaoyl oxalodihydrazide	7	4	0	0	4	0	4	0	0
Pentamethylene *N*,*N*′-ethylenediterephthalamate	7	4	2	0	2	2	2	0	0
Tetramethylene *N*,*N*′-trimethylenediterephthalamate	7	4	2	0	2	2	2	0	0
Trimethylene *N*,*N*′-adipoyldi(*p*-benzoate)	7	4	2	0	2	2	2	0	0
Heptamethylene (4,4′-terephthaloyldioxy)dibenzoate	7	4	3	0	0	4	0	0	0
8	8	0	0	0	0	0	0	0	0
Octamethylene	8	0	0	0	0	0	0	0	0
Ethylenethiohexamethylene sulfide	8	0	0	0	0	0	0	2	0
Octamethylene disulfide	8	0	0	0	0	0	0	2	0
(Ethylenedithio)hexamethylene disulfide	8	0	0	0	0	0	0	4	0
Octamethylene oxide	8	0	0	0	0	1	0	0	0
1,4-Piperazinediethylene sulfone	8	0	0	0	0	2	2	1	0
2,5-Octamethylene-1,3,4-oxadiazole	8	0	0	2	0	1	2	0	0
2,5-Octamethylene-1,3,4-triazole	8	0	0	2	1	0	3	0	0
4-Cyclohexyl-1-butene	8	0	0	2	2	0	0	0	0
Decenamer	8	0	0	2	2	0	0	0	0
1,2-Dichlorodecamethylene	8	0	0	2	2	0	0	0	2
2,5-Octamethylene-1-amino-1,3,4-triazole	8	0	0	2	2	0	4	0	0
1-Decene	8	0	0	2	4	0	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Di-*n*-pentylsilylene	8	0	0	2	6	0	0	0	1
1,11-Dodecadiyne, 1,12-	8	0	0	4	0	0	0	0	0
5,7-Dodecadiynediol, 5,8-	8	0	0	4	2	2	0	0	0
Octamethylene 5,5′-dibenzimidazole	8	0	0	14	8	0	4	0	0
2,2′-Octamethylenedithiazole-*p*-phenylene	8	0	1	6	2	0	2	2	0
4,4′-Stilbenediyloxyoctamethylene oxide	8	0	2	2	2	2	0	0	0
α-methyl-4,4′-stilbenediyloxyoctamethylene oxide	8	0	2	3	4	2	0	0	0
1,12-Bis(*p*-toluylsulfonyl)-5,7-dodecadiynediol, 5,8-	8	0	2	6	6	6	0	2	0
9-Aminopelargonic acid	8	1	0	0	1	0	1	0	0
Octamethylene urea	8	1	0	0	2	0	2	0	0
N-Octanoylethylene amine	8	1	0	1	3	0	1	0	0
Octyl acrylate	8	1	0	2	4	1	0	0	0
Tetramethylene dithioladipate	8	2	0	0	0	0	0	2	0
Thiodiethylene dithioladipate	8	2	0	0	0	0	0	3	0
Piperazine adipamide	8	2	0	0	0	0	2	0	0
(Piperazinedicarbamoyl)dithiotetramethylene disulfide	8	2	0	0	0	0	2	4	0
Sebacic anhydride	8	2	0	0	0	1	0	0	0
Ethylene suberate	8	2	0	0	0	2	0	0	0
Hexamethylene succinate	8	2	0	0	0	2	0	0	0
Pentamethylene glutarate	8	2	0	0	0	2	0	0	0
Tetramethylene adipate	8	2	0	0	0	2	0	0	0
Trimethylene pimelate	8	2	0	0	0	2	0	0	0
Barium sebacate	8	2	0	0	0	2	0	0	1
Cadmium sebacate	8	2	0	0	0	2	0	0	1
Calcium sebacate	8	2	0	0	0	2	0	0	1
Lead sebacate	8	2	0	0	0	2	0	0	1
Magnesium sebacate	8	2	0	0	0	2	0	0	1
Manganese sebacate	8	2	0	0	0	2	0	0	1
Stannous sebacate	8	2	0	0	0	2	0	0	1
Zinc sebacate	8	2	0	0	0	2	0	0	1
Piperazine (ethylenedioxy)diacetamide	8	2	0	0	0	2	2	0	0
Hexamethylene oxydiacetate	8	2	0	0	0	3	0	0	0
Oxydiethylene adipate	8	2	0	0	0	3	0	0	0
(Ethylenedioxy)diethylene succinate	8	2	0	0	0	4	0	0	0
Heptamethylene malonamide	8	2	0	0	2	0	2	0	0
Hexamethylene succinamide	8	2	0	0	2	0	2	0	0
Hydrazo sebacamide	8	2	0	0	2	0	2	0	0
Octamethylene oxamide	8	2	0	0	2	0	2	0	0
Pentamethylene glutaramide	8	2	0	0	2	0	2	0	0
Tetramethylene adipamide	8	2	0	0	2	0	2	0	0
Hydrazo thiodivaleramide	8	2	0	0	2	0	2	1	0
Hexamethylene oxydiacetamide	8	2	0	0	2	1	2	0	0
Ethylene hexamethylenediiurethane	8	2	0	0	2	2	2	0	0
Tetramethylene tetramethylenediurethane	8	2	0	0	2	2	2	0	0
Ethylene (ethylenedithio)diethylenediurethane	8	2	0	0	2	2	2	2	0
Tetramethylene (1,4-piperazinedithio)dicarboxylate	8	2	0	0	2	2	2	2	0
Ethylene (ethylenediamino)dipropionamide	8	2	0	0	4	0	4	0	0
Ethylene hexamethylenediurea	8	2	0	0	4	0	4	0	0
Tetramethylene disiloxanylenedipropionamide	8	2	0	0	6	1	2	0	2
2,2-Bisbromomethyltrimethylene adipate	8	2	0	1	0	2	0	0	2
2,2-Bischloromethyltrimethylene adipate	8	2	0	1	0	2	0	0	2
2,2-(Bromomethylchloromethyl)trimethylene adipate	8	2	0	1	0	2	0	0	2
Piperazine 4-octenediamide	8	2	0	2	2	0	2	0	0
1,4-Cyclohexylene adipate	8	2	0	2	2	2	0	0	0
1,4-Cyclohexylenedimethylene succinate	8	2	0	2	2	2	0	0	0
Hexamethylene 3-hexenedioate	8	2	0	2	2	2	0	0	0
1,3-Cyclohexylene adipamide	8	2	0	2	4	0	2	0	0
1,4-Cyclohexylene adipamide	8	2	0	2	4	0	2	0	0
Tetramethylene 4-octenediamide	8	2	0	2	4	0	2	0	0
Ethylene 2,5-tetrahydrofurandipropionamide	8	2	0	2	4	1	2	0	0
Methylethylene azelate	8	2	0	2	4	2	0	0	0
2-Butenylene hexamethylenediurethane	8	2	0	2	4	2	2	0	0
1,4-Dioxanylene-2,5-dimethylene adipamide	8	2	0	2	4	2	2	0	0
Hexamethylene 1,4-dioxanylene-2,5-dicarboxamide	8	2	0	2	4	2	2	0	0
Tetramethylene 1,4-cyclohexylenediurethane	8	2	0	2	4	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylene propylmalonamide	8	2	0	2	6	0	2	0	0
Hexamethylene 2,5-dihydroxyadipamide	8	2	0	2	6	2	2	0	0
2-Methltrimethylene hexamethylenediurethane	8	2	0	2	6	2	2	0	0
Octamethylene L-tartaramide	8	2	0	2	6	2	2	0	0
2,2-Dimethyltrimethylene suberate	8	2	0	3	6	2	0	0	0
2,2-Dimethyltrimethylene hexamethylenediurethane	8	2	0	3	8	2	2	0	0
2,4-Hexadiyne hexamethylene diurethane	8	2	0	4	2	2	2	0	0
Hexamethylene 2,5-thiophenediacetamide	8	2	0	4	4	0	2	1	0
Octamethylene 2,5-thiophenedicarboxamide	8	2	0	4	4	0	2	1	0
Octamethylene 2,5-furandicarboxamide	8	2	0	4	4	1	2	0	0
1,4-Dimethyltetramethylene hexamethylenediurethane	8	2	0	4	10	2	2	0	0
Octamethylene di-*O*-methyl-L-tartaramide	8	2	0	4	10	2	2	0	0
Tetramethylene tetramethyldisiloxanylenedipropionamide	8	2	0	4	14	1	2	0	2
Octamethylene 2,4-pyridinedicarboxamide	8	2	0	5	5	0	3	0	0
Octamethylene 2,5-pyridinedicarboxamide	8	2	0	5	5	0	3	0	0
Octamethylene 2,6-pyridinedicarboxamide	8	2	0	5	5	0	3	0	0
Octamethylene 3,5-pyridinedicarboxamide	8	2	0	5	5	0	3	0	0
N,N'-Diethyl(hexafluoropentamethylene) adipamide	8	2	0	5	6	0	2	0	6
N,N'-Diethylhexamethyelne perfluoroglutaramide	8	2	0	5	6	0	2	0	6
N,N'-Dimethyltetramethylene tetramethyldisiloxanylenedipropionamide	8	2	0	6	18	1	2	0	2
3-Methyl-*m*-phenylene sebacamide	8	2	0	7	8	0	2	0	0
N,N'-Diisopropylethylene dimethyl(ethylenediamino)dipropionamide	8	2	0	8	20	0	4	0	0
4-Methyl-1,3-phenylene tetraethyldisiloxanylenedipropionamide	8	2	0	11	20	1	2	0	2
1,5-Naphthalene-4',4''-(dimethoxy)dibenzylidenimino sebacate	8	2	0	26	20	4	2	0	0
Hexamethylene dithiol-*p*-phenylenediacetate	8	2	1	0	0	0	0	2	0
Octamethylene terephthalate	8	2	1	0	0	2	0	0	0
p-Xylylene suberate	8	2	1	0	0	2	0	0	0
p-Phenylene 1,4-piperazinedipropionate	8	2	1	0	0	2	2	0	0
Ethylene *p*-(carboxyphenoxy)heptanoate	8	2	1	0	0	3	0	0	0
Hexamethylene *m*-phenylenediacetamide	8	2	1	0	2	0	2	0	0
Hexamethylene *p*-phenylenediacetamide	8	2	1	0	2	0	2	0	0
Octamethylene isophthalamide	8	2	1	0	2	0	2	0	0
Octamethylene phthalamide	8	2	1	0	2	0	2	0	0
Octamethylene terephthalamide	8	2	1	0	2	0	2	0	0
p-Phenylenediethylene adipamide	8	2	1	0	2	0	2	0	0
m-Phenylene sebacamide	8	2	1	0	2	0	2	0	0
o-Phenylene sebacamide	8	2	1	0	2	0	2	0	0
p-Phenylene sebacamide	8	2	1	0	2	0	2	0	0
m-Xylylene suberamide	8	2	1	0	2	0	2	0	0
p-Xylylene suberamide	8	2	1	0	2	0	2	0	0
Hexamethylene *p*-phenoxydiacetamide	8	2	1	0	2	1	2	0	0
p-Xylylene oxydibutyramide	8	2	1	0	2	1	2	0	0
(Ethylenedioxy)ditrimethylene terephthalamide	8	2	1	0	2	2	2	0	0
Hexamethylene (*p*-phenylenedioxy)diacetamide	8	2	1	0	2	2	2	0	0
Hexamethylene *p*-xylylenediurethane	8	2	1	0	2	2	2	0	0
p-Sulfonylphenylene sebacamide	8	2	1	0	2	2	2	1	0
Hexamethylene *p*-xylylenediurea	8	2	1	0	4	0	4	0	0
1,4-Cyclohexylenedimethylene *p*-phenylenediacetate	8	2	1	2	2	2	0	0	0
Sebacoyl dithionisophthaloyldihydrazide	8	2	1	2	4	0	4	2	0
Hexamethylene 3,3'-*p*-phenylenedibutyramide	8	2	1	4	10	0	2	0	0
m-Phenylene (tetraethyldisiloxanylene)dipropionamide	8	2	1	4	14	1	2	0	2
o-Phenylene (tetraethyldisiloxanylene)dipropionamide	8	2	1	4	14	1	2	0	2
p-Phenylene (tetraethyldisiloxanylene)dipropionamide	8	2	1	4	14	1	2	0	2
Hexamethylene 3,3'-dimethyl-3,3'-*p*-phenylenedibutyramide	8	2	1	6	14	0	2	0	0
p-Phenylene-4',4''-(3',3''-dimethoxy)dibenzylidenimino sebacate	8	2	1	16	14	4	2	0	0
Ethylene 4,4'-hexamethylenedibenzoate	8	2	2	0	0	2	0	0	0
4,4'-Hexamethylenediphenylenesuccinate	8	2	2	0	0	2	0	0	0
Octamethylene 4,4'-biphenylenedicarboxylate	8	2	2	0	0	2	0	0	0
p-Phenylenediethylene 3,3'-(*p*-phenylene)dipropionate	8	2	2	0	0	2	0	0	0
p-Phenyleneditetramethylene terephthalate	8	2	2	0	0	2	0	0	0
Hexamethylene 4,4'-(ethylenedioxy)dibenzoate	8	2	2	0	0	4	0	0	0
Hexamethylene 4,4'-(sulfonyldimethylene)dibenzoate	8	2	2	0	0	4	0	1	0
4,4'-Biphenylene sebacamide	8	2	2	0	2	0	2	0	0
4,4'-Methylenediphenylene azelamide	8	2	2	0	2	0	2	0	0
3,4'-Oxydiphenylene sebacamide	8	2	2	0	2	1	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
4,4′-Oxydiphenylene sebacamide	8	2	2	0	2	1	2	0	0
Heptamethylene 4,4′-(methylenediphenylene)diurethane	8	2	2	0	2	2	2	0	0
Hexamethylene 4,4′-(oxydiphenylene)dioxydiacetamide	8	2	2	0	2	3	2	0	0
Octamethylene 3,3′-phosphinylidenedibenzamide	8	2	2	0	3	1	2	0	1
Octamethylene 4,4′-phosphinylidenedibenzamide	8	2	2	0	3	1	2	0	1
Octamethylene 3,3′-(methylphosphinylidene)dibenzamide	8	2	2	1	5	1	2	0	1
Octamethylene 4,4′-(methylphosphinylidene)dibenzamide	8	2	2	1	5	1	2	0	1
N,*N*′-Diemthyl-4,4′-methylenediphenylene azelamide	8	2	2	2	6	0	2	0	0
4,4′-Isopropylidenediphenylene 1,4-piperazinedipropionate	8	2	2	3	6	2	2	0	0
1,12-Bis(phenylurethane)-5,7-dodecadiynediol, 5,8-	8	2	2	4	4	2	2	0	0
1,5-Naphthalene-4′,4″-dibenzylidenimino sebacate	8	2	2	12	8	2	2	0	0
4,4′-Biphenylene-4″,4‴-(dimethoxy)dibenzylidenimino sebacate	8	2	2	16	14	4	2	0	0
4,4′-Oxydiphenylene-4″,4‴-(dimethoxy)dibenzylidenimino sebacate	8	2	2	16	14	5	2	0	0
Octamethylene 4,4′-(phenylphosphinylidene)dibenzamide	8	2	3	0	3	1	2	0	1
p-Phenylene-4,4′,4″-dibenzylidenimino sebacate	8	2	3	2	2	2	2	0	0
4,4′-Biphenylene-4″,4‴-dibezylidenimino sebacate	8	2	4	2	2	2	2	0	0
4,4′-Oxydiphenylene-4″,4‴-dibenzylidenimino sebacate	8	2	4	2	2	3	2	0	0
l-1-Carboxypentamethylene adipamide	8	3	0	1	4	1	2	0	0
N,*N*′-Lysyl tetramethylenediurea	8	3	0	1	6	1	4	0	0
Methyl-*N*,*N*′-lysyl tetramethylenediurea	8	3	0	2	8	1	4	0	0
Octamethylene 1,4-dihydro-4-*oxo*-2,6-pyridinedicarboxamide	8	3	0	4	5	0	3	0	0
Lysyllysylvaline	8	3	0	6	17	0	5	0	0
4,4′-(Octamethylenedicarbonyl)diphenylene carbonate	8	3	2	0	0	2	0	0	0
Ethylene adipamide-*alt*-ethylene oxamide	8	4	0	0	4	0	4	0	0
Octamethylene bromopyromellitimide	8	4	0	6	1	0	2	0	1
Octamethylene pyromellitimide	8	4	0	6	2	0	2	0	0
Octamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide	8	4	0	12	6	1	2	0	0
Hexamethylene *N*,*N*′-ethylenediterephthlamate	8	4	2	0	2	2	2	0	0
Pentamethylene *N*,*N*′-trimethylenediterephthalamate	8	4	2	0	2	2	2	0	0
Hexamethylene *N*,*N*′-(*p*-xylylene)diterephthalamate	8	4	3	0	2	2	2	0	0
4,4′-(Oxydiethyleneoxydiethylenedioxy)diphenylene carbonyldiphenylenet	8	5	2	12	4	5	2	0	0
Alanylalanylglycylprolylprolylglycine	8	6	0	6	14	0	6	0	0
Alanylglycylalanylprolylglycylproline	8	6	0	6	14	0	6	0	0
(Alanylglycyl)4-glutamylglycine	8	?	0	9	26	1	10	0	0
9	9	0	0	0	0	0	0	0	0
Nonamethylene disulfide	9	0	0	0	0	0	0	2	0
Pentamethylenethiotetramethylenesulfide	9	0	0	0	0	0	0	2	0
Nonamethylene oxide	9	0	0	0	0	1	0	0	0
Pentamethylenesulfonyltetramethylene sulfone	9	0	0	0	0	4	0	2	0
2,5-Nonamethylene-1,3,4-oxadiazole	9	0	0	2	0	1	2	0	0
5-Cyclohexyl-1-pentene	9	0	0	2	2	0	0	0	0
1-Undecene	9	0	0	2	4	0	0	0	0
n-Pentyl-*n*-hexylsilylene	9	0	0	2	6	0	0	0	1
3-Decylthiophene	9	0	0	5	4	0	0	1	0
4,4′-Methylenedicyclohexylenethiourea	9	0	0	5	6	0	2	1	0
4,4′-Ethylene-3-methyldiphenyleneoxyheptamethylene oxide	9	0	1	7	6	2	0	0	0
4,4′-Heptamethylenedioxydiphenyleneoxy *p*-xylylene oxide	9	0	3	0	0	4	0	0	0
10-Hydroxycapric acid	9	1	0	0	0	1	0	0	0
10-Aminocapric acid	9	1	0	0	1	0	1	0	0
Nonamethylene urea	9	1	0	0	2	0	2	0	0
5-Hydroxy-2-(1,3-dioxane)caprylic acid	9	1	0	2	2	3	0	0	0
4-Hydroxymethylene-2-(1,3-dioxolane)caprylic acid	9	1	0	2	2	3	0	0	0
2-Methyl-11-aminoundecanoic acid	9	1	0	2	5	0	1	0	0
4,4′-Methylenedicyclohexyleneurea	9	1	0	4	6	0	2	0	0
3-*n*-Decylhydroxybenzoic acid	9	1	0	7	6	1	0	0	0
Undecanedioic anhydride	9	2	0	0	0	1	0	0	0
Ethylene azelate	9	2	0	0	0	2	0	0	0
Hexamethylene glutarate	9	2	0	0	0	2	0	0	0
Pentamethylene adipate	9	2	0	0	0	2	0	0	0
Tetramethylene pimelate	9	2	0	0	0	2	0	0	0
Trimethylene suberate	9	2	0	0	0	2	0	0	0
Oxydiethylene pimelate	9	2	0	0	0	3	0	0	0
(Ethylenedioxy)diethylene glutarate	9	2	0	0	0	4	0	0	0
hexamethylene glutaramide	9	2	0	0	2	0	2	0	0
Methylene sebacamide	9	2	0	0	2	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Octamethylene malonamide	9	2	0	0	2	0	2	0	0
Pentamethylene adipamide	9	2	0	0	2	0	2	0	0
Tetramethylene pimelamide	9	2	0	0	2	0	2	0	0
Hexamethylene trimethylenediurethane	9	2	0	0	2	2	2	0	0
Tetramethylene pentamethylenediurethane	9	2	0	0	2	2	2	0	0
Trimethylene hexamethylenediurethane	9	2	0	0	2	2	2	0	0
Trimethylene (ethylenedithio)diethylenediurethane	9	2	0	0	2	2	2	2	0
Hexamethylene trimethylenediurea	9	2	0	0	4	0	4	0	0
1,4-Cyclohexylenedimethylene glutarate	9	2	0	2	2	2	0	0	0
1,4-Cyclohexylenedimethylene glutaramide	9	2	0	2	4	0	2	0	0
Cyclopropylene sebacamide	9	2	0	2	4	0	2	0	0
Pentamethylene 4-octenediamide	9	2	0	2	4	0	2	0	0
Hexamethylene (methylene-2,5-tetrahydrofuran)dicarboxamide	9	2	0	2	4	1	2	0	0
Methylethylene sebacate	9	2	0	2	4	2	0	0	0
Methylethylene thiodivalerate	9	2	0	2	4	2	0	1	0
Cyclopropylenedimethylene hexamethylenediurethane	9	2	0	2	4	2	2	0	0
Methylethylene sulfonyldivalerate	9	2	0	2	4	4	0	1	0
n-Octylglutamate	9	2	0	2	5	1	1	0	0
Hexamethylene 2-butylmalonamide	9	2	0	2	6	0	2	0	0
Hexamethylene 3-methyladipamide	9	2	0	2	6	0	2	0	0
3-Methylehexamethylene adipamide	9	2	0	2	6	0	2	0	0
2,2-Dimethyltrimethylene azelate	9	2	0	3	6	2	0	0	0
3,3′-Dimethyl-4,4′-methylenediphenylene sebacamide	9	2	0	14	14	0	2	0	0
Hexamethylene (diethyldimethyl)methylenediphenylenediurea	9	2	0	16	20	0	4	0	0
N,N′-Diisoamyl-3,3′-diemthyl-4,4′-methylenediphenylene adipamide	9	2	0	20	26	0	2	0	0
Nonamethylene terephthalate	9	2	1	0	0	2	0	0	0
p-Xylylene azelate	9	2	1	0	0	2	0	0	0
Heptamethylene *p*-Phenylenediacetamide	9	2	1	0	2	0	2	0	0
Hexamethyelene (*p*-methylenephenylene)-diacetamide	9	2	1	0	2	0	2	0	0
m-Xylylene azelamide	9	2	1	0	2	0	2	0	0
p-Xylylene azelamide	9	2	1	0	2	0	2	0	0
Hexamethylene (methylene-*p*-phenoxy)diacetamide	9	2	1	0	2	1	2	0	0
p-Xylylene 5-oxasebacamide	9	2	1	0	2	1	2	0	0
Hexamethylene 3-Methyl-3,3′-*p*-phenylenedipropionamide	9	2	1	2	6	0	2	0	0
p-Phenylene(1,1-dimethyl)ethylene sebacamide	9	2	1	3	8	0	2	0	0
4,4′-Methylenediphenylene sebacamide	9	2	2	0	2	0	2	0	0
3,4′-Oxydiphenylene undecanediamide	9	2	2	0	2	1	2	0	0
4,4′-Oxydiphenylene undecanediamide	9	2	2	0	2	1	2	0	0
Hexamethylene 4,4′-(methylenediphenylene)dioxydiacetamide	9	2	2	0	2	2	2	0	0
Octamethylene 4,4′-(methylenediphenylene)diurethane	9	2	2	0	2	2	2	0	0
Nonamethylene 3,3′-phosphinylidenedibenzamide	9	2	2	0	3	1	2	0	1
Nonamethylene 4,4′-phosphinylidenedibenzamide	9	2	2	0	3	1	2	0	1
4,4′-Methylenediphenylene octamethylenediurea	9	2	2	0	4	0	4	0	0
Nonamethylene 3,3′-(methylphosphinylidene)dibenzamide	9	2	2	1	5	1	2	0	1
Nonamethylene 4,4′-(methylphosphinylidene)dibenzamide	9	2	2	1	5	1	2	0	1
N,N′-Dimethyl-4,4′-methylenediphenylene sebacamide	9	2	2	2	6	0	2	0	0
Nonamethylene 4,4′-(phenylphosphinylidene)dibenzamide	9	2	3	0	3	1	2	0	1
N,N′-Lysyl pentamethylenediurea	9	3	0	1	6	1	4	0	0
Methyl-*N,N*′-lysyl pentamethylenediurea	9	3	0	2	8	1	4	0	0
Adipoyl Pentamethylenediurea	9	4	0	0	4	0	4	0	0
Nonamethylene bromopyromellitimide	9	4	0	6	1	0	2	0	1
Nonamethylene pyromellitimide	9	4	0	6	2	0	2	0	0
Nonamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide	9	4	0	12	6	1	2	0	0
Ethylene *N,N*′-azelaoyldi(*p*-aminobenzoate)	9	4	2	0	2	2	2	0	0
Heptamethylene *N,N*′-ethylenediterephthalamate	9	4	2	0	2	2	2	0	0
Hexamethylene *N,N*′-trimethylenediterephthalamate	9	4	2	0	2	2	2	0	0
Pentamethylene *N,N*′-tetramethylenediterephthlalamate	9	4	2	0	2	2	2	0	0
10	10	0	0	0	0	0	0	0	0
Decamethylene	10	0	0	0	0	0	0	0	0
Decamethylene sulfide	10	0	0	0	0	0	0	1	0
Decamethylene disulfide	10	0	0	0	0	0	0	2	0
Hexamethylenethiotetramethylene sulfide	10	0	0	0	0	0	0	2	0
(Hexamethylenedithio)tetramethylene disulfide	10	0	0	0	0	0	0	4	0
Decamethylene oxide	10	0	0	0	0	1	0	0	0
Methyleneoxynonamethylene oxide	10	0	0	0	0	2	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylenesulfonyltetramethyloene sulfone	10	0	0	0	0	4	0	2	0
Decamethylene amine	10	0	0	0	1	0	1	0	0
2,5-Decamethylene-1,3,4-oxadiazole	10	0	0	2	0	1	2	0	0
2,5-Decamethylene-1,3,4-triazole	10	0	0	2	1	0	3	0	0
Dodecenamer	10	0	0	2	2	0	0	0	0
1,2-Dichlorododecamethylene	10	0	0	2	2	0	0	0	2
2,5-Decamethylene-1-amino-1,3,4-triazole	10	0	0	2	2	0	4	0	0
1-Dodecene	10	0	0	2	4	0	0	0	0
Decylvinyl ether	10	0	0	2	4	1	0	0	0
Di-*n*-hexylgermylene	10	0	0	2	6	0	0	0	1
Di-*n*-hexylsilyene	10	0	0	2	6	0	0	0	1
3,3-Dipentyltrimethylene sulfone	10	0	0	3	6	2	0	1	0
3,3′-Dihexyl-2,2′-bithiophene	10	0	0	10	8	0	0	2	0
Decamethyleneoxy-*p*-phenylene oxide	10	0	1	0	0	2	0	0	0
Benzylidenethiodecamethylene sulfide	10	0	1	1	2	0	0	2	0
4,4′-(Oxydiphenylene)dithiodecamethylene disulfide	10	0	2	0	0	1	0	4	0
4,4′-Octamethylenedioxydiphenyleneoxy-*p*-xylylene oxide	10	0	3	0	0	4	0	0	0
Bis-(Butylphenyl)azophenoxyethoxy phosphazene	10	0	4	2	6	4	5	0	1
Decamethylene carbonate	10	1	0	0	0	2	0	0	0
11-Aminoundecanoic acid	10	1	0	0	1	0	1	0	0
Decamethylene urea	10	1	0	0	2	0	2	0	0
N-Methyl-11-aminoundecanoic acid	10	1	0	1	3	0	1	0	0
Decyl acrylate	10	1	0	2	4	1	0	0	0
5-Hydroxymethylene-5-methyl-2-(1,3-dioxane)caprylic acid	10	1	0	3	4	3	0	0	0
N-Phenyl-11-aminoundecanoic acid	10	1	1	0	2	0	1	0	0
4,4′-decamethylenediphenylene carbonate	10	1	2	0	0	2	0	0	0
Hexamethylene dithioladipate	10	2	0	0	0	0	0	2	0
Piperazine suberamide	10	2	0	0	0	0	2	0	0
(Piperazinedicarbamoyl)dithiohexamethylene disulfide	10	2	0	0	0	0	2	4	0
Dodecanedioic anhydride	10	2	0	0	0	1	0	0	0
Decamethylene oxalate	10	2	0	0	0	2	0	0	0
Ethylene sebacate	10	2	0	0	0	2	0	0	0
Hexamethylene adipate	10	2	0	0	0	2	0	0	0
Pentamethylene pimelate	10	2	0	0	0	2	0	0	0
Tetramethylene suberate	10	2	0	0	0	2	0	0	0
Trimethylene azelate	10	2	0	0	0	2	0	0	0
Ethylene thiodivalerate	10	2	0	0	0	2	0	1	0
Ethylene 1,4-piperazinedipropionate	10	2	0	0	0	2	2	0	0
Oxydiethylene suberate	10	2	0	0	0	3	0	0	0
(Ethylenedioxy)diethylene adipate	10	2	0	0	0	4	0	0	0
Ethylene sulfonyldivalerate	10	2	0	0	0	4	0	1	0
Decamethylene oxamide	10	2	0	0	0	0	2	0	0
Ethylene sebacamide	10	2	0	0	2	0	2	0	0
Hexamethylene adipamide	10	2	0	0	2	0	2	0	0
Hydrazo dodecanediamide	10	2	0	0	2	0	2	0	0
Nonamethylene malonamide	10	2	0	0	2	0	2	0	0
Octamethylene succinamide	10	2	0	0	2	0	2	0	0
Pentamethylene pimelamide	10	2	0	0	2	0	2	0	0
Tetramethylene suberamide	10	2	0	0	2	0	2	0	0
Ethylene thiodivaleramide	10	2	0	0	2	0	2	1	0
Hexamethylene thiodipropionamide	10	2	0	0	2	0	2	1	0
(Hexamethylenedicarbamoyl)dithiotetramethylene disulfide	10	2	0	0	2	0	2	4	0
Ethylene 1,4-piperazinedipropionamide	10	2	0	0	2	0	4	0	0
Hexamethylene piperazinediurea	10	2	0	0	2	0	4	0	0
Piperazine (ethylenediamino)dipropionamide	10	2	0	0	2	0	4	0	0
Oxyditrimethylene adipamide	10	2	0	0	2	1	2	0	0
(Ethylenedioxy)diethylene adipamide	10	2	0	0	2	2	2	0	0
Hexamethylene (ethylenedioxy)diacetamide	10	2	0	0	2	2	2	0	0
(Tetramethylenedioxy)ditrimethylene oxamide	10	2	0	0	2	2	2	0	0
Tetramethylene Hexamethylenediurethane	10	2	0	0	2	2	2	0	0
Tetramethylene (thioditrimethylene)diurethane	10	2	0	0	2	2	2	1	0
Thiodiethylene hexamethylenediurethane	10	2	0	0	2	2	2	1	0
Ethylene (tetramethylenedithio)diethylenediurethane	10	2	0	0	2	2	2	2	0
Hexamethylene (1,4-piperazinedithio)dicarboxylate	10	2	0	0	2	2	2	2	0
Tetramethylene (ethylenedithio)diethylenediurethane	10	2	0	0	2	2	2	2	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Oxydiethylene hexamethylenediurethane	10	2	0	0	2	3	2	0	0
Phosphinideneditrimethylene adipamide	10	2	0	0	3	0	2	0	1
Hexamethylene tetramethylenediurea	10	2	0	0	4	0	4	0	0
Hexamethylene disiloxanylenedipropionamide	10	2	0	0	6	1	2	0	2
N-Methylhexamethylene adipamide	10	2	0	1	4	0	2	0	0
Hexamethylene dithiol-1,4-cyclohexylenedicarboxylate	10	2	0	2	2	0	0	2	0
1,4-Cyclohexylenedimethylene adipate	10	2	0	2	2	2	0	0	0
1,4-Cyclohexylene suberate	10	2	0	2	2	2	0	0	0
Hexamethylene 1,4-cyclohexylenedicarboxylate	10	2	0	2	2	2	0	0	0
hexamethylene 4-octenedioate	10	2	0	2	2	2	0	0	0
Octamethylene 3-hexenedioate	10	2	0	2	2	2	0	0	0
1,3-cyclohexylenedimethylene adipamide	10	2	0	2	4	0	2	0	0
Decamethylene fumaramide	10	2	0	2	4	0	2	0	0
Hexamethylene 1,4-cyclohexylenedicarboxamide	10	2	0	2	4	0	2	0	0
Hexamethylene 1,2-cyclohexylenedicarboxamide	10	2	0	2	4	0	2	0	0
Hexamethylene 1,3-cyclohexylenedicarboxamide	10	2	0	2	4	0	2	0	0
Hexamethylene 4-octenediamide	10	2	0	2	4	0	2	0	0
Tetramethylene 2,5-tetrahydrofurandipropionamide	10	2	0	2	4	1	2	0	0
1-Methyltrimethylene thiodivalerate	10	2	0	2	4	2	0	1	0
(1,4-Cyclohexylenedioxy)ditrimethylene oxamide	10	2	0	2	4	2	2	0	0
Hexamethylene 1,4-dioxanylene-2,5-diacetamide	10	2	0	2	4	2	2	0	0
1,4-Cyclohexylene (ethylenedithio)diethylenediurethane	10	2	0	2	4	2	2	2	0
Decamethylene 1,2-dihydroxysuccinate	10	2	0	2	4	4	0	0	0
1-Methyltrimethylene sulfonyldivalerate	10	2	0	2	4	4	0	1	0
Alanyl-11-Aminoundecanoic acid	10	2	0	2	6	0	2	0	0
N-*N*′-Dimethylhexamethylene adipamide	10	2	0	2	6	0	2	0	0
Hexamethylene pentylmalonamide	10	2	0	2	6	0	2	0	0
Piperazine *N*,*N*′-dimethyl(ethylenediamino)dipropionamide	10	2	0	2	6	0	4	0	0
1-Methyltrimethylene octamethylenediurethane	10	2	0	2	6	2	2	0	0
Decamethylene methylfumaramide	10	2	0	3	6	0	2	0	0
2,2-Dimethyltrimethylene sebacate	10	2	0	3	6	2	0	0	0
1,4-Cyclohexylenedimethylene dithiol-1,4-cyclohexylenedicarboxylate	10	2	0	4	4	0	0	2	0
Decamethylene 2,5-thiophenedicarboxamide	10	2	0	4	4	0	2	1	0
Hexamethylene 2,5-thiophenedipropionamide	10	2	0	4	4	0	2	1	0
Decamethylene 2,5-furandicarboxamide	10	2	0	4	4	1	2	0	0
Hexamethylene 2,5-furandipropionamide	10	2	0	4	4	1	2	0	0
1,4-Cyclohexylenedimethylene 1,4-Cyclohexylenedicarboxylate	10	2	0	4	4	2	0	0	0
Hexamethylene 2,5-pyrroledipropionamide	10	2	0	4	5	0	3	0	0
Decamethylene 2,3-dimethylfumaramide	10	2	0	4	8	0	2	0	0
Hexamethylene (tetramethyldisiloxanylene)dipropionamide	10	2	0	4	14	1	2	0	2
Decamethylene 2,4-pyridine dicarboxamide	10	2	0	5	5	0	3	0	0
Decamethylene 2,5-pyridine dicarboxamide	10	2	0	5	5	0	3	0	0
Decamethylene 2,6-pyridine dicarboxamide	10	2	0	5	5	0	3	0	0
Decamethylene 3,5-pyridine dicarboxamide	10	2	0	5	5	0	3	0	0
Hexamethylene (*N*-methyl-2,5-pyrrole)dipropionamide	10	2	0	5	7	0	3	0	0
1,12-Bis(ethylurethane)-5,7-dodecadiynediol, 5,8-	10	2	0	6	8	2	2	0	0
N,*N*′-diisopropylethylene 1,4-piperazinedipropionamide	10	2	0	6	14	0	4	0	0
Piperazine *N*,*N*′-diisopropyl(ethylenediamino)dipropionamide	10	2	0	6	14	0	4	0	0
Tetramethyl-*p*-xylylenedithiol sebacate	10	2	0	10	12	0	0	2	0
Decamethylene 3,3′-dimethyl-4,4′-biphenylenediurethane	10	2	0	14	14	2	2	0	0
Decamethylene dithiolterephthalate	10	2	1	0	0	0	0	2	0
p-Xylylene dithiolsebacate	10	2	1	0	0	0	0	2	0
Decamethylene isophthalate	10	2	1	0	0	2	0	0	0
Decamethylene terephthalate	10	2	1	0	0	2	0	0	0
p-Xylylene sebacate	10	2	1	0	0	2	0	0	0
Hexamethylene *p*-(carboxyphenoxy)valerate	10	2	1	0	0	3	0	0	0
Decamethylene *m*-carboxycarbanilate	10	2	1	0	1	2	1	0	0
Decamethylene *p*-carboxycarbanilate	10	2	1	0	1	2	1	0	0
Decamethylene isophthalamide	10	2	1	0	2	0	2	0	0
Decamethylene phthalamide	10	2	1	0	2	0	2	0	0
Decamethylene terephthalamide	10	2	1	0	2	0	2	0	0
Hexamethylene 3,3′-*p*-phenylenedipropionamide	10	2	1	0	2	0	2	0	0
Octamethylene *p*-phenylenediacetamide	10	2	1	0	2	0	2	0	0
p-Phenylene dodecanediamide	10	2	1	0	2	0	2	0	0
p-Phenyleneethylene sebacamide	10	2	1	0	2	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
m-Xylylene sebacamide	10	2	1	0	2	0	2	0	0
p-Xylylene sebacamide	10	2	1	0	2	0	2	0	0
p-Xylylene thiodivaleramide	10	2	1	0	2	0	2	1	0
p-Xylylene 5-oxaundecanediamide	10	2	1	0	2	1	2	0	0
p-Xylylene oxydivaleramide	10	2	1	0	2	1	2	0	0
Octamethylene *p*-xylylenediurethane	10	2	1	0	2	2	2	0	0
p-Xylylene octamethylenediurethane	10	2	1	0	2	2	2	0	0
Octamethylene *p*-xylylenediurea	10	2	1	0	4	0	4	0	0
(1,4-Cyclohexylenedioxy)ditrimethylene terephthalamide	10	2	1	2	4	2	2	0	0
4,4′-(Decamethylenedioxy)dichlorodiphenylene terephthalate	10	2	1	12	6	4	0	0	2
Decamethylene 2,2′-dibenzoate	10	2	2	0	0	2	0	0	0
Decamethylene 3,3′-debenzoate	10	2	2	0	0	2	0	0	0
Decamethylene 4,4′-debenzoate	10	2	2	0	0	2	0	0	0
p-Phenylenedipentamethylene terephthalate	10	2	2	0	0	2	0	0	0
4,4′-Ethylenediphenylene sebacamide	10	2	2	0	2	0	2	0	0
3,4′-Oxydiphenylene dodecanediamide	10	2	2	0	2	1	2	0	0
4,4′-Oxydiphenylene dodecanediamide	10	2	2	0	2	1	2	0	0
Decamethylene 4,4′-biphenylenediurethane	10	2	2	0	2	2	2	0	0
Hexamethylene 4,4′-(ethylenediphenylene)dioxydiacetamide	10	2	2	0	2	2	2	0	0
Nonamethylene 4,4′-(methylenediphenylene)diurethane	10	2	2	0	2	2	2	0	0
Decamethylene 3,3′-phosphinylidenedibenzamide	10	2	2	0	3	1	2	0	1
Decamethylene 4,4′-phosphinylidenedibenzamide	10	2	2	0	3	1	2	0	1
Decamethylene 3,3′-(methylphosphinylidene)dibenzamide	10	2	2	1	5	1	2	0	1
Decamethylene 4,4′-(methylphosphinylidene)dibenzamide	10	2	2	1	5	1	2	0	1
4,4′-Vinylenediphenylene dodecanedioate	10	2	2	2	2	2	0	0	0
Decamethylene 4,4′-ethylidenedibenzamide	10	2	2	2	6	0	2	0	0
N,N′-Diethyl(methylenediphenylene)azelamide	10	2	2	2	6	0	2	0	0
4,4′-Methylvinylene)diphenylene dodecanedioate	10	2	2	3	4	2	0	0	0
3,3′-(Decamethylenedioxy)diphenylene terephthalate	10	2	3	0	0	4	0	0	0
4,4′-(Decamethylenedioxy)diphenylene terephthalate	10	2	3	0	0	4	0	0	0
Decamethylene 4,4′-(phenylphosphinylidene)dibenzamide	10	2	3	0	3	1	2	0	1
(Decamethylenedioxy)diphenylenedioxydiphenylene terephthalate	10	2	5	0	0	6	0	0	0
Hexamethylene ketodipropionamide	10	3	0	0	2	0	2	0	0
Hexamethylene *N,N*′-lysyldiurea	10	3	0	1	6	1	4	0	0
Hexamethylene methyl-*N,N*′-lysyldiurea	10	3	0	2	8	1	4	0	0
Decamethylene 1,4-dihydro-4-oxo-2,6-pyridinedicarboxamide	10	3	0	4	5	0	3	0	0
α-D-Glucotrivalerate, 1,4-	10	3	0	8	14	5	0	0	0
β-D-Glucotrivalerate, 1,4-	10	3	0	8	14	5	0	0	0
Ethylene sebacoyldiurethane	10	4	0	0	2	2	2	0	0
Hexamethylene adipoyldiurethane	10	4	0	0	2	2	2	0	0
Ethylene oxamide-*alt*-ethylene suberamide	10	4	0	0	4	0	4	0	0
Ethylene sebacoyldiurea	10	4	0	0	4	0	4	0	0
Trimethylene adipamide-*alt*-trimethylene oxamide	10	4	0	0	4	0	4	0	0
2-Hydroxytrimethylene sebacoyldiurethane	10	4	0	1	4	3	2	0	0
Decamethylene bromopyromellitimide	10	4	0	6	1	0	2	0	1
Decamethylene pyromellitimide	10	4	0	6	2	0	2	0	0
Decamethylene 3,3′,4,4′-oxydiphenylenetetracarboximide	10	4	0	12	6	1	2	0	0
Hexamethylene *N,N*′-piperazinediterephthalamate	10	4	2	0	0	2	2	0	0
Heptamethylene *N,N*′-trimethylenediterephthalamate	10	4	2	0	2	2	2	0	0
Hexamethylene *N,N*′-tetramethylenediterephthalamate	10	4	2	0	2	2	2	0	0
Octamethylene *N,N*′-ethylenediterephthalamate	10	4	2	0	2	2	2	0	0
Pentamethylene *N,N*′-pentamethylenediterephthalamate	10	4	2	0	2	2	2	0	0
Tetramethylene *N,N*′-hexamethylenediterephthalamate	10	4	2	0	2	2	2	0	0
Trimethylene *N,N*′-azelaoyldi(*p*-aminobenzoate)	10	4	2	0	2	2	2	0	0
Decamethylene 4,4′-terephthaloyldioxydibenzoate	10	4	3	0	0	4	0	0	0
(Benzyloxycarbonyllysyl)(benzyloxycarbonyllysyl)valine	10	5	2	6	17	2	5	0	0
Alanylglycyl)5-glutamylglycine	10	?	0	11	30	1	12	0	0
11	11	0	0	0	0	0	0	0	0
Hexamethylenethiopentamethylene sulfide	11	0	0	0	0	0	0	2	0
Decamethyleneoxymethylene oxide	11	0	0	0	0	2	0	0	0
Hexamethylenesulfonylpentamethylenesulfone	11	0	0	0	0	4	0	2	0
Cyclohexylidenethiohexamethylene sulfide	11	0	0	1	0	0	0	2	0
1-Methyldodecamethylene	11	0	0	2	4	0	0	0	0
1-Tridecene	11	0	0	2	4	0	0	0	0
n-Hexyl-*n*-heptylsilylene	11	0	0	2	6	0	0	0	1

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
3-Dodecyl-2,5-thiophene	11	0	0	5	4	0	0	1	0
4,4′-Ethylene-3-methyldiphenyleneoxynonamethylene oxide	11	0	1	7	6	2	0	0	0
Hexamethylenethio-4,4′-methylenediphenylenediethylenesulfide	11	0	2	0	0	0	0	2	0
4,4′-Nonamethylenedioxydiphenyleneoxy *p*-xylylene oxide	11	0	3	0	0	4	0	0	0
12-Aminolauric acid	11	1	0	0	1	0	1	0	0
13-Amino-11-thiatridecanoic acid	11	1	0	0	1	0	1	1	0
13-Amino-12-thiatridecanoic acid	11	1	0	0	1	0	1	1	0
N-Methyl-12-aminolauric acid	11	1	0	1	3	0	1	0	0
N-Ethyl-11-aminoundecanoic acid	11	1	0	1	4	0	1	0	0
Vinyl laurate	11	1	0	2	4	1	0	0	0
Hexamethylene dithiolpimelate	11	2	0	0	0	0	0	2	0
Piperazine azelamide	11	2	0	0	0	0	2	0	0
Piperazine (trimethylenedithio)dipropionamide	11	2	0	0	0	0	2	2	0
Tridecanedioic anhydride	11	2	0	0	0	1	0	0	0
Decamethylene malonate	11	2	0	0	0	2	0	0	0
Hexamethylene pimelate	11	2	0	0	0	2	0	0	0
Pentamethylene suberate	11	2	0	0	0	2	0	0	0
Tetramethylene azelate	11	2	0	0	0	2	0	0	0
Trimethylene sebacate	11	2	0	0	0	2	0	0	0
Trimethylene thiodivalerate	11	2	0	0	0	2	0	1	0
Oxydiethylene azelate	11	2	0	0	0	3	0	0	0
(Ethylenedioxy)diethylene pimelate	11	2	0	0	0	4	0	0	0
Trimethylene sulfonyldivalerate	11	2	0	0	0	4	0	1	0
Decamethylene malonamide	11	2	0	0	2	0	2	0	0
Glycyl-11-aminoundecanoic acid	11	2	0	0	2	0	2	0	0
Heptamethylene adipamide	11	2	0	0	2	0	2	0	0
Hexamethylene pimelamide	11	2	0	0	2	0	2	0	0
Methylene dodecanediamide	11	2	0	0	2	0	2	0	0
Pentamethylene suberamide	11	2	0	0	2	0	2	0	0
Tetramethylene azelamide	11	2	0	0	2	0	2	0	0
Ethylene nonamethylenediurethane	11	2	0	0	2	2	2	0	0
Pentamethylene hexamethylenediurethane	11	2	0	0	2	2	2	0	0
Trimethylene octamethylenediurethane	11	2	0	0	2	2	2	0	0
Ethylene (pentamethylenedithio)diethylenediurethane	11	2	0	0	2	2	2	2	0
Pentamethylene (ethylenedithio)diethylenediurethane	11	2	0	0	2	2	2	2	0
Trimethylene (tetamethylenedithio)diethylenediurethane	11	2	0	0	2	2	2	2	0
Hexamethylene pentamethylenediurea	11	2	0	0	4	0	4	0	0
1,4-Cyclohexylenedimethylene pimelate	11	2	0	2	2	2	0	0	0
1,3-Cyclohexylene azelamide	11	2	0	2	4	0	2	0	0
1,4-Cyclohexylenedimethylene pimelamide	11	2	0	2	4	0	2	0	0
Cyclopropylenedimethylene sebacamide	11	2	0	2	4	0	2	0	0
Heptamethylene 4-octenediamide	11	2	0	2	4	0	2	0	0
Methylpiperazine 1,4-piperazinedipropionamide	11	2	0	2	4	0	4	0	0
Piperazine (methyl-1,4-piperazine)dipropionamide	11	2	0	2	4	0	4	0	0
Pentamethylene 2,5-tetrahydrofurandipropionamide	11	2	0	2	4	1	2	0	0
1,4-Cyclohexylene (trimethylenedithio)diethylenediurethane	11	2	0	2	4	2	2	2	0
Hexamethylene 2-hexylmalonamide	11	2	0	2	6	0	2	0	0
2-Butyl-2-ethyltrimethylene hexamethylenediurethane	11	2	0	3	8	2	2	0	0
Decamethylene (methylene-2,5-furan)dicarboxamide	11	2	0	4	4	1	2	0	0
N,N′-dibutyl-3,3′-dimethyl-4,4′-methylenediphenylene adipamide	11	2	0	16	18	0	2	0	0
N,N′-dipropylhexamethylene dimethylmethylenediphenylenediurea	11	2	0	16	20	0	4	0	0
Hexamethylene (diemthyldipropyl)methylenediphenylenediurea	11	2	0	16	20	0	4	0	0
Hexamethylene *p*-(carboxyphenoxy)caproate	11	2	1	0	0	3	0	0	0
p-Phenylenediethylene azelamide	11	2	1	0	2	0	2	0	0
Undecamethylene terephthalamide	11	2	1	0	2	0	2	0	0
p-Xylylene undecanediamide	11	2	1	0	2	0	2	0	0
p-Xylylene 5-oxadodecanediamide	11	2	1	0	2	1	2	0	0
p-Xylylene 6-oxadodecanediamide	11	2	1	0	2	1	2	0	0
Decamethylene 3,3′-methylenedibenzamide	11	2	2	0	2	0	2	0	0
Decamethylene 4,4′-methylenedibenzamide	11	2	2	0	2	0	2	0	0
4,4′-Methylenediphenylene dodecanediamide	11	2	2	0	2	0	2	0	0
Decamethylene 4,4′-(methylenediphenylene)diurethane	11	2	2	0	2	2	2	0	0
Hexamethylene 4,4′-(trimethylenediphenylene)dioxydiacetamide	11	2	2	0	2	2	2	0	0
Decamethylene 4,4′-(methylenediphenylene)diurea	11	2	2	0	4	0	4	0	0
N,N′-diethyl(methylenediphenylene) sebacamide	11	2	2	2	6	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Tetraoxa-8,10-octadecadiyne (4,4′-methylenediphenylene)diurethane	11	2	2	4	2	6	2	0	0
Trimethylene sebacoyldiurethane	11	4	0	0	2	2	2	0	0
Ethylene azelamide-*alt*-ethylene oxamide	11	4	0	0	4	0	4	0	0
Undecamethylene pyromellitimide	11	4	0	6	2	0	2	0	0
Heptamethylene *N,N′*-tetramethyleneditherephthalamate	11	4	2	0	2	2	2	0	0
Hexamethylene *N,N′*-pentamethyleneditherephthalamate	11	4	2	0	2	2	2	0	0
Nonmethylene *N,N′*-ethyleneditherephthalamate	11	4	2	0	2	2	2	0	0
Octamethylene *N,N′*-trimethyleneditherephthalamate	11	4	2	0	2	2	2	0	0
Pentamethylene *N,N′*-hexamthyleneditherephthalamate	11	4	2	0	2	2	2	0	0
Tetramethylene *N,N′*-azelaoyldi(*p*- aminobenzoate)	11	4	2	0	2	2	2	0	0
Trimethylene *N,N′*-sebacoyldi(*p*-aminobenzoate)	11	4	2	0	2	2	2	0	0
Alanylglycylprolylprolylglycylproline	11	6	0	5	10	0	6	0	0
Alanylprolylglycylprolylprolylglycine	11	6	0	5	10	0	6	0	0
12	12	0	0	0	0	0	0	0	0
Dodecamethylene	12	0	0	0	0	0	0	0	0
(Decamethylenedithio)ethylene disulfide	12	0	0	0	0	0	0	4	0
(Octamethylenedithio)tetramethylene disulfide	12	0	0	0	0	0	0	4	0
Dodecamethylene oxide	12	0	0	0	0	1	0	0	0
1-Tetradecene	12	0	0	2	4	0	0	0	0
Octamethylene tetramethylenedithiourea	12	0	0	2	4	0	4	2	0
Dodecylvinyl ether	12	0	0	2	4	1	0	0	0
Di-*n*-heptylsilylene	12	0	0	2	6	0	0	0	1
4,4′-decamethylenedioxydiphenyleneoxy *p*-xylylene oxide	12	0	3	0	0	4	0	0	0
13-Aminotridecanoic acid	12	1	0	0	1	0	1	0	0
N-Allyl-11-aminoundecanoic acid	12	1	0	1	1	0	1	0	0
N-Dodecanoylethylene amine	12	1	0	1	3	0	1	0	0
4-Hydroxytetramethyelne-2-(1,3-dioxolane)caprylic acid	12	1	0	2	2	3	0	0	0
Dodecyl acrylate	12	1	0	2	4	1	0	0	0
n-Dodecyl acrylamide	12	1	0	2	5	0	1	0	0
Hexamethylene dithiolsuberate	12	2	0	0	0	0	0	2	0
Tetramethylene dithiolsebacate	12	2	0	0	0	0	0	2	0
Piperazine sebacamide	12	2	0	0	0	0	2	0	0
Piperazine 1,4-piperazinedipropionamide	12	2	0	0	0	0	4	0	0
Tetradecanedioic anhydride	12	2	0	0	0	1	0	0	0
Decamethylene succinate	12	2	0	0	0	2	0	0	0
Hexamethylene suberate	12	2	0	0	0	2	0	0	0
Octamethylene adipate	12	2	0	0	0	2	0	0	0
Pentamethylene azelate	12	2	0	0	0	2	0	0	0
Tetramethylene sebacate	12	2	0	0	0	2	0	0	0
Trimethylene undecanedioate	12	2	0	0	0	2	0	0	0
Tetramethylene thiodivalerate	12	2	0	0	0	2	0	1	0
Decamethylene oxydiacetate	12	2	0	0	0	3	0	0	0
Oxydiethylene sebacate	12	2	0	0	0	3	0	0	0
Oxydiethylene thiodivalerate	12	2	0	0	0	3	0	1	0
(Ethylenedioxy)diethylene suberate	12	2	0	0	0	4	0	0	0
Tetramethylene sulfonyldivalerate	12	2	0	0	0	4	0	1	0
Oxydiethylene sulfonyldivalerate	12	2	0	0	0	5	0	0	0
Decamethylene succinamide	12	2	0	0	2	0	2	0	0
Dodecamethylene oxamide	12	2	0	0	2	0	2	0	0
Ethylene doecanediamide	12	2	0	0	2	0	2	0	0
Glycyl-12-aminododecanoic acid	12	2	0	0	2	0	2	0	0
Heptamethylene pimelamide	12	2	0	0	2	0	2	0	0
Hexamethylene suberamide	12	2	0	0	2	0	2	0	0
Octamethylene adipamide	12	2	0	0	2	0	2	0	0
Pentamethylene azelamide	12	2	0	0	2	0	2	0	0
Tetramethylene sebacamide	12	2	0	0	2	0	2	0	0
Hexamethylene thiodibutyramide	12	2	0	0	2	0	2	1	0
Dithiodiethylene sebacamide	12	2	0	0	2	0	2	2	0
(Hexamethylenedicarbamoyl)dithiohexamethylene disulfide	12	2	0	0	2	0	2	4	0
Hexamethylene 1,4-piperazinediacetamide	12	2	0	0	2	0	4	0	0
Hexamethylene oxydibutyramide	12	2	0	0	2	1	2	0	0
Ethylene decamethylenediurethane	12	2	0	0	2	2	2	0	0
(Ethylenedioxy)ditrimethylene adipamide	12	2	0	0	2	2	2	0	0
Hexamethylene hexamethylenediurethane	12	2	0	0	2	2	2	0	0
Tetramethylene octamethylenediurethane	12	2	0	0	2	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Ethylene (hexamethylenedithio)diethylenediurethane	12	2	0	0	2	2	2	2	0
Hexamethylene (ethylenedithio)diethylenediurethane	12	2	0	0	2	2	2	2	0
Tetramethylene (tetramethylenedithio)diethylenediurethane	12	2	0	0	2	2	2	2	0
Triemthylene (pentamethylenedithio)diethylenediurethane	12	2	0	0	2	2	2	2	0
(Ethylenedioxy)diethylene 1,4-piperazinediacetamide	12	2	0	0	2	2	4	0	0
Octamethylene disiloxanylenedipropionamide	12	2	0	0	6	1	2	0	2
1,4-Cyclohexylenedimethylene suberate	12	2	0	2	2	2	0	0	0
1,4-Cyclohexylene sebacate	12	2	0	2	2	2	0	0	0
Decamethylene 3-hexenedioate	12	2	0	2	2	2	0	0	0
Octamethylene 4-octenedioate	12	2	0	2	2	2	0	0	0
1,3-Cyclohexylenedimethylene suberamide	12	2	0	2	4	0	2	0	0
1,4-Cyclohexylenedimethylene suberamide	12	2	0	2	4	0	2	0	0
1,3-Cyclohexylene sebacamide	12	2	0	2	4	0	2	0	0
Hexamethylene 1,2-cyclohexylenediacetamide	12	2	0	2	4	0	2	0	0
Octamethylene 4-octenediamide	12	2	0	2	4	0	2	0	0
Hexamethylene 2,5-tetrahydrofurandipropionamide	12	2	0	2	4	1	2	0	0
1,4-Cyclohexylene octamethylenediurethane	12	2	0	2	4	2	2	0	0
1,4-Dioxanylene-2,5-dimethylene sebacamide	12	2	0	2	4	2	2	0	0
1,4-Cyclohexylenedimethylene ethylenedithiodiethylenediurethane	12	2	0	2	4	2	2	2	0
1,4-Cyclohexylene (tetramethylenedithio)diethylenediurethane	12	2	0	2	4	2	2	2	0
Hexamthylene 2,5-pyrrolidinedipropionamide	12	2	0	2	5	0	3	0	0
Hexamethylene heptylmalonamide	12	2	0	2	6	0	2	0	0
Hexamethylene (*N*-methyl-2,5-pyrrolidine)dipropionamide	12	2	0	3	7	0	3	0	0
Hexamethylene (diethyldimethyldisiloxanylene)dipropionamid	12	2	0	4	14	1	2	0	2
Octamethylene (tetramethyldisiloxanylene)dipropionamide	12	2	0	4	14	1	2	0	2
N,*N*′-Dibutyl(hexafluoropentamethylene) adipamide	12	2	0	5	6	0	2	0	6
N,*N*′-Dibutylhexamethylene perfluoroglutaramide	12	2	0	5	6	0	2	0	6
Dodecamethylene 3,3′-dimethyl-4,4′-biphenylenediurethane	12	2	0	14	14	2	2	0	0
p-Xylylene Dodecanedioate	12	2	1	0	0	2	0	0	0
Ethylene *p*-(carboxyphenoxy)undecanoate	12	2	1	0	0	3	0	0	0
Decamethylene *p*-phenylenediacetamide	12	2	1	0	2	0	2	0	0
Dodecamethylene terephthalamide	12	2	1	0	2	0	2	0	0
Ocatmethylene *p*-phenylenedipropionamide	12	2	1	0	2	0	2	0	0
p-Phenylenediethylene sebacamide	12	2	1	0	2	0	2	0	0
p-Xylylene dodecanediamide	12	2	1	0	2	0	2	0	0
p-Phenylenediethylene thiodivaleramide	12	2	1	0	2	0	2	1	0
p-Xylylene thiodicaproamide	12	2	1	0	2	0	2	1	0
p-Xylylene 6-oxatridecanediamide	12	2	1	0	2	1	2	0	0
p-Xylylene oxydicaproamide	12	2	1	0	2	1	2	0	0
Decamethylene (*p*-phenylenedioxy)diacetamide	12	2	1	0	2	2	2	0	0
Decamethylene *p*-xylylenediurethane	12	2	1	0	2	2	2	0	0
p-Phenylenediethylene octamethylenediurethane	12	2	1	0	2	2	2	0	0
p-Phenyleneditrimethylene hexamethylenediurethane	12	2	1	0	2	2	2	0	0
(*p*-Phenylenedioxy)diethylene octamethylenediurethane	12	2	1	0	2	4	2	0	0
Decamethylene *p*-xylylenediurea	12	2	1	0	4	0	4	0	0
(1,4-Cyclohexylenedixoy)ditrimethylene *p*-phenylenedioxydiacetamide	12	2	1	2	4	4	2	0	0
Decamethylene 4,4′-(ethylenedioxy)dibenzoate	12	2	2	0	0	4	0	0	0
Hexamethylene 4,4′-(hexamethylenedisulfonyl)dibenzoate	12	2	2	0	0	6	0	2	0
Dodecamethylene 4,4′-biphenylenediurethane	12	2	2	0	2	2	2	0	0
4,4′-(Ethylenedioxydiphenylene)ditrimethylene adipamide	12	2	2	0	2	2	2	0	0
(1,4-Cyclohexylenedioxy)ditrimethylene ethylenedioxydibenzamide	12	2	2	2	4	4	2	0	0
Decamethylene isopropylidenedi-*p*-phenylenedioxydiacetamide	12	2	2	3	8	2	2	0	0
6-Aminocaproyl-5-aminovaleryl-3-aminopropionic acid	12	3	0	0	3	0	3	0	0
3-Aminopropyl-5-aminovaleryl-6-aminocaproic acid	12	3	0	0	3	0	3	0	0
Hexamethylene 5-pyrrolidonylidenedipropionamide	12	3	0	1	3	0	2	0	0
Decamethylene 3-carboxylglutaramide	12	3	0	1	4	1	2	0	0
Adipoyl octamethylenediurea	12	4	0	0	4	0	4	0	0
Ethylene oxamide-*alt*-ethylene sebacamide	12	4	0	0	4	0	4	0	0
Tetramethylene adipamide-*alt*-tetramethylene oxamide	12	4	0	0	4	0	4	0	0
Trimethylene oxamide-*alt*-trimethylene suberamide	12	4	0	0	4	0	4	0	0
Dodecamethylene bromopyromellitimide	12	4	0	6	1	0	2	0	1
Dodecamethylene pyromellitimide	12	4	0	6	2	0	2	0	0
Dodecamethylene 1,4,5,8-naphthalenetetracarboximide	12	4	0	10	4	0	2	0	0
Ethylene *N*,*N*′-terephthaloyldi(6-aminocaproate)	12	4	1	0	2	2	2	0	0
Decamethylene *N*,*N*′-ethylenediterephthalamate	12	4	2	0	2	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Ethylene *N,N'*-dodecanedioyldi(*p*-aminobenzoate)	12	4	2	0	2	2	2	0	0
Heptamethylene *N,N'*-pentamethylenediterephthalamate	12	4	2	0	2	2	2	0	0
Hexamethylene *N,N'*-hexamethylenediterephthalamate	12	4	2	0	2	2	2	0	0
Hexamethylene *N,N'*-suberoyldi(*p*-aminobenzoate)	12	4	2	0	2	2	2	0	0
Nonamethylene *N,N'*-glutaryldi(*p*-aminobenzoate)	12	4	2	0	2	2	2	0	0
Nonamethylene *N,N'*-trimethylenediterephthalamate	12	4	2	0	2	2	2	0	0
Octamethylene *N,N'*-tetramethylenediterephthalamate	12	4	2	0	2	2	2	0	0
(Alanylglycyl)6-glutamylglycine	12	?	0	13	34	1	14	0	0
13	13	0	0	0	0	0	0	0	0
(Nonamethylenedithio)tetramethylene disulfide	13	0	0	0	0	0	0	4	0
1-Pentadecene	13	0	0	2	4	0	0	0	0
3-Tetradecyl-2,5-thiophene	13	0	0	5	4	0	0	1	0
4,4'-Ethylene-3-methyldiphenyleneoxyundecamethylene oxide	13	0	1	7	6	2	0	0	0
4,4'-Undecamethylenedioxydiphenyleneoxy *p*-xylylene oxide	13	0	3	0	0	4	0	0	0
Vinyl myristate	13	1	0	2	4	1	0	0	0
Hexamethylene dithiolazelate	13	2	0	0	0	0	0	2	0
Decamethylene glutarate	13	2	0	0	0	2	0	0	0
Hexamethylene azelate	13	2	0	0	0	2	0	0	0
Pentamethylene sebacate	13	2	0	0	0	2	0	0	0
Trimethylene dodecandioate	13	2	0	0	0	2	0	0	0
Pentamethylene thiodivalerate	13	2	0	0	0	2	0	1	0
(Ethylenedioxy)diethylene azelate	13	2	0	0	0	4	0	0	0
Pentamethylene sulfonyldivalerate	13	2	0	0	0	4	0	1	0
Deamethylene glutaramide	13	2	0	0	2	0	2	0	0
Dodecamethylene malonamide	13	2	0	0	2	0	2	0	0
Heptamethylene suberamide	13	2	0	0	2	0	2	0	0
Hexamethylene azelamide	13	2	0	0	2	0	2	0	0
Nonamethylene adipamide	13	2	0	0	2	0	2	0	0
Pentamethylene sebacamide	13	2	0	0	2	0	2	0	0
Tetramethylene undecanediamide	13	2	0	0	2	0	2	0	0
Hexamethylene 5-oxasebacamide	13	2	0	0	2	1	2	0	0
Heptamethylene hexamethylenediurethane	13	2	0	0	2	2	2	0	0
Tetramethylene nonamethylenediurethane	13	2	0	0	2	2	2	0	0
Pentamethylene (tetramethylenedithio)diethylenediurethane	13	2	0	0	2	2	2	2	0
Tetramethylene (pentamethylenedithio)diethylenediurethane	13	2	0	0	2	2	2	2	0
Trimethylene (hexamethylenedithio)diethylenediurethane	13	2	0	0	2	2	2	2	0
Heptamethylene hexamethylenediurea	13	2	0	0	4	0	4	0	0
Nonamethylene disiloxanylenedipropionamide	13	2	0	0	6	1	2	0	2
1,4-Cyclohexylenedimethylene azelate	13	2	0	2	2	2	0	0	0
1,4-Cyclohexylenedimethylene azelamide	13	2	0	2	4	0	2	0	0
Nonamethylene 4-octenediamide	13	2	0	2	4	0	2	0	0
Decamethylene (methylene-2,5-tetrahydrofuran)dicarboxamide	13	2	0	2	4	1	2	0	0
Heptamethylene 2,5-tetrahydrofurandipropionamide	13	2	0	2	4	1	2	0	0
Decamethylene 3-methyladipate	13	2	0	2	4	2	0	0	0
1,4-Cyclohexylenedimethylene trimethylenedithiodiethylenediurethane	13	2	0	2	4	2	2	2	0
1,4-Cyclohexylene (pentamethylenedithio)diethylenediurethane	13	2	0	2	4	2	2	2	0
Dodecyl glutamate	13	2	0	2	5	1	1	0	0
Hexamethylene 2-octylmalonamide	13	2	0	2	6	0	2	0	0
3-Methylhexamethylene sebacamide	13	2	0	2	6	0	2	0	0
Tetramethylene 4,4'-methylenedicyclohexylenediurethane	13	2	0	4	6	2	2	0	0
p-Phenylenediethylene undecanediamide	13	2	1	0	2	0	2	0	0
p-Xylylene tridecanediamide	13	2	1	0	2	0	2	0	0
p-Xylylene 5-oxatetradecanediamide	13	2	1	0	2	1	2	0	0
Dodecamethylene 4,4'-(methylenediphenylene)diurethane	13	2	2	0	2	2	2	0	0
Dodecamethylene 4,4'-(methylenediphenylene)diurea	13	2	2	0	4	0	4	0	0
N,N'-Lysyl nonamethylenediurea	13	3	0	1	6	1	4	0	0
Methyl-*N,N'*-lysyl nonamethylenediurea	13	3	0	2	8	1	4	0	0
β-D-Glucotricaproate, 1,4-	13	3	0	8	14	5	0	0	0
Pentamethylene sebacoyldiurea	13	4	0	0	4	0	4	0	0
Tetramethylene oxamide-*alt*-tetramethylene pimelamide	13	4	0	0	4	0	4	0	0
Trimethylene azelamide-*alt*-trimethylene oxamide	13	4	0	0	4	0	4	0	0
Tridecamethylene pyromellitimide	13	4	0	6	2	0	2	0	0
Decamethylene *N,N'*-trimethylenediterephthalamate	13	4	2	0	2	2	2	0	0
Heptamethylene *N,N'*-hexamethylenediterephthalamate	13	4	2	0	2	2	2	0	0
Nonamethylene *N,N'*-adipoyldi(*p*-aminobenzoate)	13	4	2	0	2	2	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Nonamethylene *N,N'*-tetramethylenediterephthalamate	13	4	2	0	2	2	2	0	0
Octamethylene *N,N'*-pentamethylenediterephthalamate	13	4	2	0	2	2	2	0	0
Undecamethylene *N,N'*-ethylenediterephthalamate	13	4	2	0	2	2	2	0	0
14	14	0	0	0	0	0	0	0	0
Tetradecamethylene sulfide	14	0	0	0	0	0	0	1	0
(Decamethylenedithio)tetramethylene disulfide	14	0	0	0	0	0	0	4	0
(Hexamethylenedithio)ocatamethylene disulfide	14	0	0	0	0	0	0	4	0
1-Hexadecene	14	0	0	2	4	0	0	0	0
Hexamethylene octamethylenedithiourea	14	0	0	2	4	0	4	2	0
Di-*n*-octylsilylene	14	0	0	2	6	0	0	0	1
3,3'-Dioctyl-2,2'-bithiophene	14	0	0	10	8	0	0	2	0
3,3''-Dioctyl-2,2':5',2''-terthiophene	14	0	0	14	10	0	0	3	0
4,4'-Dodecamethylenedioxydiphenyleneoxy *p*-xylylene oxide	14	0	3	0	0	4	0	0	0
N-Piperazinyl-11-aminoundecanoic acid	14	1	0	0	1	0	3	0	0
Tetradecyl acrylate	14	1	0	2	4	1	0	0	0
n-Tetradecyl acrylamide	14	1	0	2	5	0	1	0	0
Decamethylene dithioladipate	14	2	0	0	0	0	0	2	0
Hexamethylene dithiolsebacate	14	2	0	0	0	0	0	2	0
Decamethylene adipate	14	2	0	0	0	2	0	0	0
Hexamethylene sebacate	14	2	0	0	0	2	0	0	0
Octamethylene suberate	14	2	0	0	0	2	0	0	0
Hexamethylene thiodivalerate	14	2	0	0	0	2	0	1	0
(Ethylenedioxy)diethylene sebacate	14	2	0	0	0	4	0	0	0
(Ethylenedioxy)diethylene thiodivalerate	14	2	0	0	0	4	0	1	0
Hexamethylene sulfonyldivalerate	14	2	0	0	0	4	0	1	0
(Ethylenedioxy)diethylene sulfonyldivalerate	14	2	0	0	0	6	0	0	0
Decamethylene adipamide	14	2	0	0	2	0	2	0	0
Dodecamethylene succinamide	14	2	0	0	2	0	2	0	0
Heptamethylene azelamide	14	2	0	0	2	0	2	0	0
Hexamethylene sebacamide	14	2	0	0	2	0	2	0	0
Nonamethylene pimelamide	14	2	0	0	2	0	2	0	0
Octamethylene suberamide	14	2	0	0	2	0	2	0	0
Pentamethylene undercanediamide	14	2	0	0	2	0	2	0	0
Tetramethylene dodecanediamide	14	2	0	0	2	0	2	0	0
Ethylene thiodienanthamide	14	2	0	0	2	0	2	1	0
Hexamethylene thiodivaleramide	14	2	0	0	2	0	2	1	0
Hexamethylene 5-oxaundecanediamide	14	2	0	0	2	1	2	0	0
Hexamethylene oxydivaleramide	14	2	0	0	2	1	2	0	0
Decamethylene tetramethylenediurethane	14	2	0	0	2	2	2	0	0
Hexamethylene (tetramethylenedioxy)dipropionamide	14	2	0	0	2	2	2	0	0
Octamethylene hexamethylenediurethane	14	2	0	0	2	2	2	0	0
Hexamethylene sulfonyldivaleramide	14	2	0	0	2	2	2	1	0
Thioditetramethylene hexamethylenediurethane	14	2	0	0	2	2	2	1	0
Hexamethylene (tetramethylenedithio)diethylenediurethane	14	2	0	0	2	2	2	2	0
Pentamethylene (pentamethylenedithio)diethylenediurethane	14	2	0	0	2	2	2	2	0
Tetramethylene (hexamethylenedithio)diethylenediurethane	14	2	0	0	2	2	2	2	0
1,4-Piperazinediethylene hexamethylenediurethane	14	2	0	0	2	2	4	0	0
Oxyditetramethylene hexamethylenediurethane	14	2	0	0	2	3	2	0	0
Decamethylene phosphinylidenedipropionamide	14	2	0	0	3	1	2	0	1
Hexamethylene octamethylenediurea	14	2	0	0	4	0	4	0	0
Decamethylene disiloxanylenedipropionamide	14	2	0	0	6	1	2	0	2
Hexamethylene 6-hydroxyundecanediamide	14	2	0	1	4	1	2	0	0
(Ethylenedioxy)diethylene 6-hydroxyundecanediamide	14	2	0	1	4	3	2	0	0
Decamethylene (methylphosphinylidene)dipropionamide	14	2	0	1	5	1	2	0	1
1,4-Cyclohexylenedimethylene sebacate	14	2	0	2	2	2	0	0	0
Decamethylene 4-octenedioate	14	2	0	2	2	2	0	0	0
Dodecamethylene 3-hexenedioate	14	2	0	2	2	2	0	0	0
1,4-Cyclohexylenedimethylene sebacamide	14	2	0	2	4	0	2	0	0
Decamethylene 4-octenediamide	14	2	0	2	4	0	2	0	0
Octamethylene 2,5-tetrahydrofurandipropionamide	14	2	0	2	4	1	2	0	0
1,4-Cyclohexylenedimethylene octamethylenediurethane	14	2	0	2	4	2	2	0	0
(1,4-Cyclohexylenedioxy)ditrimethylene adipamide	14	2	0	2	4	2	2	0	0
1,4-Cyclohexylenedimethylene tetramethylenedithiodiethylenediurethane	14	2	0	2	4	2	2	2	0
1,4-Cyclohexylene (hexamethylenedithio)diethylenediurethane	14	2	0	2	4	2	2	2	0
Hexamethylene nonylmalonamide	14	2	0	2	6	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylene octamethylenediurethane	14	2	0	2	6	2	2	0	0
Decamethylene 2,5-Furandipropionamide	14	2	0	4	4	1	2	0	0
4,4′-Methylenedicyclohexylene pimelamide	14	2	0	4	6	0	2	0	0
Decamethylene (tetramethyldisiloxanylene)dipropionamide	14	2	0	4	14	1	2	0	2
Hexamethylene (tetraethyldisiloxanylene)dipropionamide	14	2	0	4	14	1	2	0	2
Hexamethylene 4,4′-(*p*-xylylenedisulfonyl)dibutyrate	14	2	1	0	0	6	0	2	0
Decamethylene *p*-phenylenedipropionamide	14	2	1	0	2	0	2	0	0
Dodecamethylene *p*-phenylenediacetamide	14	2	1	0	2	0	2	0	0
p-Phenylenediethylene dodecanediamide	14	2	1	0	2	0	2	0	0
Tetradecamethylene terephthalamide	14	2	1	0	2	0	2	0	0
m-Xylylene tetradecanediamide	14	2	1	0	2	0	2	0	0
p-Xylylene tetradecanediamide	14	2	1	0	2	0	2	0	0
p-Phenylenediethylene thiodicaproamide	14	2	1	0	2	0	2	1	0
p-Xylylene thiodienanthamide	14	2	1	0	2	0	2	1	0
p-Xylylene 6-oxapentadecanediamide	14	2	1	0	2	1	2	0	0
p-Xylylene oxydienanthamide	14	2	1	0	2	1	2	0	0
Dodecamethylene *p*-xylylenediurethane	14	2	1	0	2	2	2	0	0
Dodecamethylene *p*-xylylenediurea	14	2	1	0	4	0	4	0	0
Decamethylene 4,4′-(ethylenediphenylene)dioxydiacetamide	14	2	2	0	2	2	2	0	0
(1,4-Cyclohexylenedioxy)ditrimethylene tetramethylenedioxydibenzamide	14	2	2	2	4	4	2	0	0
(1,4-Cyclohexylenedioxy)ditrimethylene oxydiethylenedioxydibenzamide	14	2	2	2	4	5	2	0	0
Decamethylene adipoyldiurethan	14	4	0	0	2	2	2	0	0
Hexamethylene sebacoyldiurethane	14	4	0	0	2	2	2	0	0
Pentamethylene adipamide-*alt*-pentamethylene oxamide	14	4	0	0	4	0	4	0	0
Tetramethylene oxamide-*alt*-tetramethylene suberamide	14	4	0	0	4	0	4	0	0
Trimethylene oxamide-*alt*-trimethylene sebacamide	14	4	0	0	4	0	4	0	0
Tetramethylene *N,N*′-terephthaloyldi(6-aminocaproate)	14	4	1	0	2	2	2	0	0
Decamethylene *N,N*′-tetramethylenediterephthalamate	14	4	2	0	2	2	2	0	0
Dodecamethylene *N,N*′-ethylenediterephthalamate	14	4	2	0	2	2	2	0	0
Ethylene *N,N*′-dodecamethylenediterephthalamate	14	4	2	0	2	2	2	0	0
Nonamethylene *N,N*′-pentamethylenediterephthalamate	14	4	2	0	2	2	2	0	0
Octamethylene *N,N*′-hexamethylenediterephthalamate	14	4	2	0	2	2	2	0	0
Tetramethylene *N,N*′-dodecanedioyldi(*p*-aminobenzoate)	14	4	2	0	2	2	2	0	0
Trimethylene *N,N*′-tridecanedioyldi(*p*-aminobenzoate)	14	4	2	0	2	2	2	0	0
Undecamethylene *N,N*′-trimethylenediterephthalamate	14	4	2	0	2	2	2	0	0
15	15	0	0	0	0	0	0	0	0
(Hexamethylenedithio)nonamethylene disulfide	15	0	0	0	0	0	0	4	0
Methyleneoxytetradecamethylene oxide	15	0	0	0	0	2	0	0	0
3-Hexadecyl-2,5-thiophene	15	0	0	5	4	0	0	1	0
Vinyl palmitate	15	1	0	2	4	1	0	0	0
Decamethylene pimelate	15	2	0	0	0	2	0	0	0
Heptamethylene sebacate	15	2	0	0	0	2	0	0	0
Pentamethylene dodecanedioate	15	2	0	0	0	2	0	0	0
Trimethylene tetradecanedioate	15	2	0	0	0	2	0	0	0
6-Aminocaproic acid-*alt*-11-aminoundecanoic acid	15	2	0	0	2	0	2	0	0
Heptamethylene sebacamide	15	2	0	0	2	0	2	0	0
Hexamethylene undecanediamide	15	2	0	0	2	0	2	0	0
Octamethylene azelamide	15	2	0	0	2	0	2	0	0
Undecamethylene adipamide	15	2	0	0	2	0	2	0	0
Hexamethylene 5-oxadodecanediamide	15	2	0	0	2	1	2	0	0
(Ethylenedioxy)diethylene undecanediamide	15	2	0	0	2	2	2	0	0
(Ethylenedioxy)ditrimethylene azelamide	15	2	0	0	2	2	2	0	0
Nonamethylene hexamethylenediurethane	15	2	0	0	2	2	2	0	0
Nonamethylene hexamethylenediurethane	15	2	0	0	2	2	2	0	0
Tetramethylene undecamethylenediurethane	15	2	0	0	2	2	2	0	0
Hexamethylene (pentamethylenedithio)diethylenediurethane	15	2	0	0	2	2	2	2	0
Pentamethylene (hexamethylenedithio)diethylenediurethane	15	2	0	0	2	2	2	2	0
Hexamethylene nonamethylenediurea	15	2	0	0	4	0	4	0	0
4,4′-(Trimethylenedipiperidenediyl)dicarbamoyldithiotetramethylene disul	15	2	0	2	2	0	2	4	0
Nonamethylene 2,5-tetrahydrofurandipropionamide	15	2	0	2	4	1	2	0	0
1,4-Cyclohexylenedimethylene pentamethylenedithiodiethylenediurethane	15	2	0	2	4	2	2	2	0
Tetramethylene (trimethylenedipiperidene)dithiodicarboxylate	15	2	0	2	4	2	2	2	0
Hexamethylene 2-decylmalonamide	15	2	0	2	6	0	2	0	0
Tetramethylene dodecylmalonamide	15	2	0	2	6	0	2	0	0
4,4′-Methylenedicyclohexylene suberamide	15	2	0	4	6	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Nonamethylene (diethyldimethyldisiloxanylene)dipropionamide	15	2	0	4	14	1	2	0	2
N,N′-dihexyl-3,3′-dimethyl-4,4′-methylenediphenylene adipamide	15	2	0	16	18	0	2	0	0
p-Phenylenediethylene tridecanediamide	15	2	1	0	2	0	2	0	0
p-Xylylene pentadecanediamide	15	2	1	0	2	0	2	0	0
p-Xylylene 5-oxahexadecanediamide	15	2	1	0	2	1	2	0	0
4,4′Methylenediphenylene tetradecamethylenediurea	15	2	2	0	4	0	4	0	0
Pentamethylene oxamide-*alt*-Pentamethylene pimelamide	15	4	0	0	4	0	4	0	0
Tetramethylene azelamide-*alt*-tetramethylene oxamide	15	4	0	0	4	0	4	0	0
Decamethylene *N,N′*-pentamethylenediterephthalamate	15	4	2	0	2	2	2	0	0
Dodecamethylene *N,N′*-trimethylenediterephthalamate	15	4	2	0	2	2	2	0	0
Nonamethylene *N,N′*-hexamethylenediterephthalamate	15	4	2	0	2	2	2	0	0
Tridecamethylene *N,N′*-ethylenediterephthalamate	15	4	2	0	2	2	2	0	0
Undecamethylene *N,N′*-tetramethylenediterephthalamate	15	4	2	0	2	2	2	0	0
16	16	0	0	0	0	0	0	0	0
(Decamethylenethio)hexamethylene sulfide	16	0	0	0	0	0	0	2	0
(Decamethylenedithio)hexamethylene disulfide	16	0	0	0	0	0	0	4	0
(Tetramethylenedioxy)dihexamethylene oxide	16	0	0	0	0	3	0	0	0
Decamethyleneaminohexamethylene amine	16	0	0	0	2	0	2	0	0
1-Octadecene	16	0	0	2	4	0	0	0	0
Octamethylene octamethylenedithiourea	16	0	0	2	4	0	4	2	0
Di-*n*-nonylsilylene	16	0	0	2	6	0	0	0	1
Tetracosatetrayne	16	0	0	8	2	0	0	0	0
17-Aminoheptadecanoic acid	16	1	0	0	1	0	1	0	0
Hexadecyl acrylate	16	1	0	2	4	1	0	0	0
n-Hexadecyl acrylamide	16	1	0	2	5	0	1	0	0
Hexadecyl methacrylate	16	1	0	3	6	1	0	0	0
Octadecanedioic anhydride	16	2	0	0	0	1	0	0	0
Decamethylene suberate	16	2	0	0	0	2	0	0	0
Dodecamethylene adipate	16	2	0	0	0	2	0	0	0
Nonamethylene azelate	16	2	0	0	0	2	0	0	0
Decamethylene suberamide	16	2	0	0	2	0	2	0	0
Dodecamethylene adipamide	16	2	0	0	2	0	2	0	0
Heptamethylene undecanediamide	16	2	0	0	2	0	2	0	0
Hexamethylene dodecanediamide	16	2	0	0	2	0	2	0	0
Nonamethylene azelamide	16	2	0	0	2	0	2	0	0
Octamethylene sebacamide	16	2	0	0	2	0	2	0	0
Pentamethylene tridecanediamide	16	2	0	0	2	0	2	0	0
Hexamethylene oxydicaproamide	16	2	0	0	2	1	2	0	0
Decamethylene hexamethylenediurethane	16	2	0	0	2	2	2	0	0
(Ethylenedioxy)ditrimethylene sebacamide	16	2	0	0	2	2	2	0	0
Hexamethylene decamethylenediurethane	16	2	0	0	2	2	2	0	0
Hexamethylene (hexamethylenedioxy)dipropionamide	16	2	0	0	2	2	2	0	0
Octamethylene octamethylenediurethane	16	2	0	0	2	2	2	0	0
Oxydipentamethylene oxydibutyramide	16	2	0	0	2	2	2	0	0
Pentamethylene undecamethylenediurethane	16	2	0	0	2	2	2	0	0
Hexamethylene (hexamethylenedithio)diethylenediurethane	16	2	0	0	2	2	2	2	0
Dodecamethylene phosphinylidenedipropionamide	16	2	0	0	3	1	2	0	1
Decamethylene hexamethylenediurea	16	2	0	0	4	0	4	0	0
Dodecamethylene (methylphosphinylidene)dipropionamide	16	2	0	1	5	1	2	0	1
1,4-Cyclohexylenedimethylene dodecanedioate	16	2	0	2	2	2	0	0	0
Dodecamethylene 4-octenedioate	16	2	0	2	2	2	0	0	0
Tetradecamethylene 3-hexenedioate	16	2	0	2	2	2	0	0	0
1,3-Cyclohexylenedimethylene dodecanediamide	16	2	0	2	4	0	2	0	0
Decamethylene 2,5-tetrahydrofurandipropionamide	16	2	0	2	4	1	2	0	0
1,4-Cyclohexylenedimethylene hexamethylenedithiodiethylenediurethane	16	2	0	2	4	2	2	2	0
Hexamethylene undecylmalonamide	16	2	0	2	6	0	2	0	0
Pentamethylene dodecylmalonamide	16	2	0	2	6	0	2	0	0
Tetraoxa-8,10-octadecadiyne hexamethylenediurethane	16	2	0	4	2	6	2	0	0
4,4′-Bicyclohexylene sebacate	16	2	0	4	4	2	0	0	0
4,4′-Methylenedicyclohexylene azelamide	16	2	0	4	6	0	2	0	0
Hexamethylene *p*-(carboxyphenoxy)undecanoate	16	2	1	0	0	3	0	0	0
Dodecamethylene *p*-phenylenedipropionamide	16	2	1	0	2	0	2	0	0
p-Phenylenediethylene tetradecanediamide	16	2	1	0	2	0	2	0	0
Tetradecamethylene *p*-phenylenediacetamide	16	2	1	0	2	0	2	0	0
p-Xylylene hexadecanediamide	16	2	1	0	2	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
p-Phenylenediethylene thiodienanthamide	16	2	1	0	2	0	2	1	0
p-Xylylene 6-oxaheptadecanediamide	16	2	1	0	2	1	2	0	0
Tetradecamethylene *p*-xylylenediurea	16	2	1	0	4	0	4	0	0
N,N′-Dimethyl-*p*-xylylene hexadecanediamide	16	2	1	2	6	0	2	0	0
(1,4-Cyclohexylenedioxy)ditrimethylene hexamethylenedioxydibenzamide	16	2	2	2	4	4	2	0	0
β-D-Glucotriheptylate, 1,4-	16	3	0	8	14	5	0	0	0
Ethylene *N,N′*-adipoyldi(6-aminocaproate)	16	4	0	0	2	2	2	0	0
Hexamethylene adipamide-*alt*-hexamethylene oxamide	16	4	0	0	4	0	4	0	0
Octamethylene sebacoyldiurea	16	4	0	0	4	0	4	0	0
Pentamethylene oxamide-*alt*-pentamethylene suberamide	16	4	0	0	4	0	4	0	0
Tetramethylene oxamide-*alt*-tetramethylene sebacamide	16	4	0	0	4	0	4	0	0
1,12-Bis(*n*-Butoxycarbonylmethylurethane)-5,7-dodecadiynediol	16	4	0	6	8	4	2	0	0
Hexamethylene *N,N′*-terephthaloyldi(6-aminocaproate)	16	4	1	0	2	2	2	0	0
Decamethylene *N,N′*-hexamethylenediterephthalamate	16	4	2	0	2	2	2	0	0
Dodecamethylene *N,N′*-tetramethylenediterephthalamate	16	4	2	0	2	2	2	0	0
Ethylene *N,N′*-hexadecanedioyldi(*p*-aminobenzoate)	16	4	2	0	2	2	2	0	0
Hexamethylene *N,N′*-dodecanedioyldi(*p*-aminobenzoate)	16	4	2	0	2	2	2	0	0
Nonamethylene *N,N′*-azelaoyldi(*p*-aminobenzoate)	16	4	2	0	2	2	2	0	0
Pentamethylene *N,N′*-tridecanedioyldi(*p*-aminobenzoate)	16	4	2	0	2	2	2	0	0
Tetradecamethylene *N,N′*-ethylenediterephthalamate	16	4	2	0	2	2	2	0	0
Tridecamethylene *N,N′*-trimethylenediterephthalamate	16	4	2	0	2	2	2	0	0
Undecamethylene *N,N′*-pentamethylenediterephthalamate	16	4	2	0	2	2	2	0	0
L-1-Carboxypentamethylene adipamide	16	6	0	2	8	2	4	0	0
17	17	0	0	0	0	0	0	0	0
Hexamethylenethioundecamethylene sulfide	17	0	0	0	0	0	0	2	0
(Pentamethylenedioxy)dihexamethylene oxide	17	0	0	0	0	3	0	0	0
18-Aminostearic acid	17	1	0	0	1	0	1	0	0
Vinyl stearate	17	1	0	2	4	1	0	0	0
Decamethylene azelate	17	2	0	0	0	2	0	0	0
Decamethylene azelamide	17	2	0	0	2	0	2	0	0
Nonamethylene sebacamide	17	2	0	0	2	0	2	0	0
Pentamethylene tetradecanediamide	17	2	0	0	2	0	2	0	0
Hexamethylene 5-oxatetradecanediamide	17	2	0	0	2	1	2	0	0
Oxydipentamethylene 5-oxasebacamide	17	2	0	0	2	2	2	0	0
(Octylphosphinidene)ditrimethylene adipamide	17	2	0	1	5	0	2	0	1
Hexamethylene 2-dodecylmalonamide	17	2	0	2	6	0	2	0	0
4,4′-Bicyclohexylene undecanedioate	17	2	0	4	4	2	0	0	0
4,4′-Methylenedicyclohexylene sebacamide	17	2	0	4	6	0	2	0	0
Nonamethylene (tetraethyldisiloxanylene)dipropionamide	17	2	0	4	14	1	2	0	2
p-Phenylenediethylene pentadecanediamide	17	2	1	0	2	0	2	0	0
p-Xylylene heptadecanediamide	17	2	1	0	2	0	2	0	0
Hexadecamethylene 4,4′-(methylenediphenylene)diurethane	17	2	2	0	2	2	2	0	0
Hexamethylene oxamide-*alt*-hexamethylene pimelamide	17	4	0	0	4	0	4	0	0
Pentamethylene azelamide-*alt*-pentamethylene oxamide	17	4	0	0	4	0	4	0	0
Dodecamethylene *N,N′*-pentamethylenediterephthalamate	17	4	2	0	2	2	2	0	0
Nonamethylene *N,N′*-sebacoyldi(*p*-aminobenzoate)	17	4	2	0	2	2	2	0	0
Tetradecamethylene *N,N′*-trimethylenediterephthalamate	17	4	2	0	2	2	2	0	0
Tridecamethylene *N,N′*-tetramethylenediterephthalamate	17	4	2	0	2	2	2	0	0
Trimethylene *N,N′*-hexadecanedioyldi(*p*-aminobenzoate)	17	4	2	0	2	2	2	0	0
Undecamethylene *N,N′*-hexamethylenediterephthalamate	17	4	2	0	2	2	2	0	0
18	18	0	0	0	0	0	0	0	0
Di-*n*-decylsilylene	18	0	0	2	6	0	0	0	1
3,3′-Didecyl-2,2′-bithiophene	18	0	0	10	8	0	0	2	0
N-octadecanoylethylene amine	18	1	0	1	3	0	1	0	0
Octadecyl acrylate	18	1	0	2	4	1	0	0	0
Octadecyl acrylamide	18	1	0	2	5	0	1	0	0
Octadecyl methacrylate	18	1	0	3	6	1	0	0	0
Decamethylene dithiolsebacate	18	2	0	0	0	0	0	2	0
Decamethylene sebacate	18	2	0	0	0	2	0	0	0
Dodecamethylen suberate	18	2	0	0	0	2	0	0	0
Octamethylene dodecanedioate	18	2	0	0	0	2	0	0	0
Tetradecamethylene adipate	18	2	0	0	0	2	0	0	0
Decamethylene thiodivalerate	18	2	0	0	0	2	0	1	0
Decamethylene sulfonyldivalerate	18	2	0	0	0	4	0	1	0
Decamethylene sebacamide	18	2	0	0	2	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylene tetradecanediamide	18	2	0	0	2	0	2	0	0
Nonamethylene undecanediamide	18	2	0	0	2	0	2	0	0
Octamethylene dodecanediamide	18	2	0	0	2	0	2	0	0
Hexamethylene thiodienanthamide	18	2	0	0	2	0	2	1	0
Hexamethylene 6-oxapentadecanediamide	18	2	0	0	2	1	2	0	0
Hexamethylene oxydienanthamide	18	2	0	0	2	1	2	0	0
Decamethylene octamethylenediurethane	18	2	0	0	2	2	2	0	0
Dodecamethylene hexamethylenediurethane	18	2	0	0	2	2	2	0	0
Octamethylene decamethylenediurethane	18	2	0	0	2	2	2	0	0
Oxydipentamethylene 5-oxaundecanediamide	18	2	0	0	2	2	2	0	0
Oxydiepentamethylene oxydivaleramide	18	2	0	0	2	2	2	0	0
Aminodihexamethylene suberamide	18	2	0	0	3	0	3	0	0
Decamethylene octamethylenediurea	18	2	0	0	4	0	4	0	0
Dodecamethylene hexamethylenediurea	18	2	0	0	4	0	4	0	0
Hexadecamethylene 3-hexenedioate	18	2	0	2	2	2	0	0	0
Tetradecamethylene 4-octenedioate	18	2	0	2	2	2	0	0	0
Heptamethylene dodecylmalonamide	18	2	0	2	6	0	2	0	0
Hexamethylene tridecylmalonamide	18	2	0	2	6	0	2	0	0
4,4′-Ethylenedicyclohexylene sebacamide	18	2	0	4	6	0	2	0	0
4,4′-Methylenedicyclohexylene undecanediamide	18	2	0	4	6	0	2	0	0
Octadecamethylene terephthalate	18	2	1	0	0	2	0	0	0
Octadecamethylene terephthalamide	18	2	1	0	2	0	2	0	0
p-Phenylenediethylene hexadecanediamide	18	2	1	0	2	0	2	0	0
Tetradecamethylene *p*-phenylenedipropionamide	18	2	1	0	2	0	2	0	0
p-Xylylene octadecanediamide	18	2	1	0	2	0	2	0	0
p-Xylylene thiodipelargonamide	18	2	1	0	2	0	2	1	0
p-Xylylene oxydipelargonamide	18	2	1	0	2	1	2	0	0
Hexadecamethylene *p*-xylylenediurethane	18	2	1	0	2	2	2	0	0
N,N′-Dimethyl-*p*-xylylene octadecanediamide	18	2	1	2	6	0	2	0	0
Decamethylene sebacoyldiurethane	18	4	0	0	2	2	2	0	0
Tetramethylene *N,N*′-adipoyldi(6-aminocaproate)	18	4	0	0	2	2	2	0	0
Hexamethylene oxamide-*alt*-hexamethylene suberamide	18	4	0	0	4	0	4	0	0
Pentamethylene oxamide-*alt*-pentamethylene sebacamide	18	4	0	0	4	0	4		0
Octamethylene *N,N*′-terephthaloyldi(6-aminocaproate)	18	4	1	0	2	2	2	0	0
Dodecamethylene *N,N*′-hexamethylenediterephthalamate	18	4	2	0	2	2	2	0	0
Hexamethylene *N,N*′-dodecamethylenediterephthalamate	18	4	2	0	2	2	2	0	0
Octamethylene *N,N*′-dodecanedioyldi(*p*-aminobenzoate)	18	4	2	0	2	2	2	0	0
Tetradecamethylene *N,N*′-tetramethylenediterephthalamate	18	4	2	0	2	2	2	0	0
Tetramethylene *N,N*′-hexadecanedioyldi(*p*-aminobenzoate)	18	4	2	0	2	2	2	0	0
Tridecamethylene *N,N*′-pentamethylenediterephthalamate	18	4	2	0	2	2	2	0	0
19	19	0	0	0	0	0	0	0	0
Methyleneoxyoctadecamethylene oxide	19	0	0	0	0	2	0	0	0
10,12-Pentacosadiynoic acid, 10,13-	19	1	0	5	2	1	0	0	0
Trimethylene octadecanedioate	19	2	0	0	0	2	0	0	0
Undecamethylene sebacamide	19	2	0	0	2	0	2	0	0
Hexamethylene 5-oxahexadecanediamide	19	2	0	0	2	1	2	0	0
Oxydipentamethylene 5-oxadodecanediamide	19	2	0	0	2	2	2	0	0
Oxydipentamethylene 6-oxadodecanediamide	19	2	0	0	2	2	2	0	0
Tetramethylene (pentamethylenedisulfonyl)dicaproamide	19	2	0	0	2	4	2	2	0
Hexamethylene (trimethylenedisulfonyl)diaminodicaproamide	19	2	0	0	4	4	4	0	0
Hexamethylene 2-tetradecylmalonamide	19	2	0	2	6	0	2	0	0
Octamethylene dodecylmalonamide	19	2	0	2	6	0	2	0	0
4,4′-Methylenedicyclohexylene dodecanédiamide	19	2	0	4	6	0	2	0	0
p-Phenylenediethylene heptadecanediamide	19	2	1	0	2	0	2	0	0
4,4′-Methylenediphenylene octadecamethylenediurea	19	2	2	0	4	0	4	0	0
β-D-Glucotricaprylate, 1,4-	19	3	0	8	14	5	0	0	0
Hexamethylene azelamide-*alt*-hexamethylene oxamide	19	4	0	0	4	0	4	0	0
Pentamethylene *N,N*′-hexadecanedioyldi(*p*-aminobenzoate)	19	4	2	0	2	2	2	0	0
Tetradecamethylene *N,N*′-pentamethylenediterephthalamate	19	4	2	0	2	2	2	0	0
Tridecamethylene *N,N*′-hexamethylenediterephthalamate	19	4	2	0	2	2	2	0	0
20	20	0	0	0	0	0	0	0	0
1-Docosene	20	0	0	2	4	0	0	0	0
Di-*n*-undecylsilylene	20	0	0	2	6	0	0	0	1
Eicosamethylene oxalate	20	2	0	0	0	2	0	0	0
Hexadecamethylene adipate	20	2	0	0	0	2	0	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Tetradecamethylene suberate	20	2	0	0	0	2	0	0	0
Decamethylene dodecandiamide	20	2	0	0	2	0	2	0	0
Dodecamethylene sebacamide	20	2	0	0	2	0	2	0	0
Hydrazo docosanediamide	20	2	0	0	2	0	2	0	0
Nonamethylene tridecanediamide	20	2	0	0	2	0	2	0	0
Octamethylene tetradecanediamide	20	2	0	0	2	0	2	0	0
Hexamethylene 6-oxaheptadecanediamide	20	2	0	0	2	1	2	0	0
Decamethylene decamethylenediurethane	20	2	0	0	2	2	2	0	0
Oxydipentamethylene 6-oxatridecanediamide	20	2	0	0	2	2	2	0	0
Oxydipentamethylene oxydicaproamide	20	2	0	0	2	2	2	0	0
Hexamethylene (tetramethylenedisulfonyl)dicaproamide	20	2	0	0	2	4	2	2	0
Pentamethylene (pentamethylenedisulfonyl)dicaproamide	20	2	0	0	2	4	2	2	0
Tetramethylene (hexamethylenedisulfonyl)dicaproamide	20	2	0	0	2	4	2	2	0
Hexamethylene tetradecamethylenediurea	20	2	0	0	4	0	4	0	0
Hexadecamethylene 4-octenedioate	20	2	0	2	2	2	0	0	0
Hexamethylene pentadecylmalonamide	20	2	0	2	6	0	2	0	0
Nonamethylene dodecylmalonamide	20	2	0	2	6	0	2	0	0
Hexamethylene 9,10-dihydroxyoctadecanediamide	20	2	0	2	6	2	2	0	0
Ethylene tetraoxa-3,9-spiro(5.5)hendecanedicaprylate	20	2	0	3	2	6	0	0	0
Ethylene 4,4′-(oxydimethylene)di-2-(1,3-dioxolane)caprylate	20	2	0	4	4	7	0	0	0
4,4′-Ethylenedicyclohexylene dodecanediamide	20	2	0	4	6	0	2	0	0
4,4′-Methylenedicyclohexylene tridecanediamide	20	2	0	4	6	0	2	0	0
Eicosamethylene isophthalate	20	2	1	0	0	2	0	0	0
Eicosamethylene phthalate	20	2	1	0	0	2	0	0	0
Eicosamethylene terephthalate	20	2	1	0	0	2	0	0	0
Octadecamethylene *p*-phenylenediacetamide	20	2	1	0	2	0	2	0	0
p-Phenylenediethylene octadecanediamide	20	2	1	0	2	0	2	0	0
p-Phenylenediethylene thiodipelargonamide	20	2	1	0	2	0	2	1	0
Octadecamethylene *p*-xylylenediurea	20	2	1	0	4	0	4	0	0
N,N′-Diethyl-*p*-xylylene octadecanediamide	20	2	1	2	6	0	2	0	0
Eicosamethylene 3,3′-dibenzoate	20	2	2	0	0	2	0	0	0
Eicosamethylene 4,4′-dibenzoate	20	2	2	0	0	2	0	0	0
Octadecamethylene 4,4′-(ethylenedioxy)dibenzoate	20	2	2	0	0	4	0	0	0
Hexamethylene *N,N*′-adipoyldi(6-aminocaproate)	20	4	0	0	2	2	2	0	0
Hexamethylenedi(6-hydroxycaproamide) adipate	20	4	0	0	2	2	2	0	0
Hexamethylene oxamide-*alt*-hexamethylene sebacamide	20	4	0	0	4	0	4	0	0
Decamethylene *N,N*′-terephthaloyldi(6-aminocaproate)	20	4	1	0	2	2	2	0	0
Decamethylene *N,N*′-dodecanedioyldi(*p*-aminobenzoate)	20	4	2	0	2	2	2	0	0
Nonamethylene *N,N*′-tridecanedioyldi(*p*-aminobenzoate)	20	4	2	0	2	2	2	0	0
Tetradecamethylene *N,N*′-hexamethylenediterephthalamate	20	4	2	0	2	2	2	0	0
21	21	0	0	0	0	0	0	0	0
22-Aminodocosanoic acid	21	1	0	0	1	0	1	0	0
10,12-Heptacosadiynoic acid, 10,13-	21	1	0	5	2	1	0	0	0
Eicosamethylene malonate	21	2	0	0	0	2	0	0	0
Decamethylene tridecanediamide	21	2	0	0	2	0	2	0	0
Pentamethylene octadecanediamide	21	2	0	0	2	0	2	0	0
Oxydipentamethylene 5-Oxatetradecanediamide	21	2	0	0	2	2	2	0	0
Hexamethylene (pentamethylenedisulfonyl)dicaproamide	21	2	0	0	2	4	2	2	0
Pentamethylene (hexamethylenedisulfonyl)dicaproamide	21	2	0	0	2	4	2	2	0
Decamethylene dodecylmalonamide	21	2	0	2	6	0	2	0	0
Hexamethylene 2-hexadecylmalonamide	21	2	0	2	6	0	2	0	0
4,4′-Methylenedicyclohexylene tetradecanediamide	21	2	0	4	6	0	2	0	0
Nonamethylene *N,N*′-tetradecanedioyldi(*p*-aminobenzoate)	21	4	2	0	2	2	2	0	0
22	22	0	0	0	0	0	0	0	0
(Decamethylenedioxy)dihexamethylene oxide	22	0	0	0	0	3	0	0	0
Di-*n*-dodecylsilylene	22	0	0	2	6	0	0	0	1
Docosyl acrylate	22	1	0	2	4	1	0	0	0
N-Docosyl acrylamide	21	1	0	2	5	0	1	0	0
Eicosamethylene succinate	22	2	0	0	0	2	0	0	0
Hexadecamethylene suberate	22	2	0	0	0	2	0	0	0
Eicosamethylene oxydiacetate	22	2	0	0	0	3	0	0	0
Decamethylene tetradecanediamide	22	2	0	0	2	0	2	0	0
Dodecamethylene dodecanediamide	22	2	0	0	2	0	2	0	0
Hexamethylene octadecanediamide	22	2	0	0	2	0	2	0	0
Tetradecamethylene sebacamide	22	2	0	0	2	0	2	0	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylene oxydipelargonamide	22	2	0	0	2	1	2	0	0
Dodecamethylene decamethylenediurethane	22	2	0	0	2	2	2	0	0
Hexadecamethylene hexamethylenediurethane	22	2	0	0	2	2	2	0	0
Oxydipentamethylene 6-oxapentadecanediamide	22	2	0	0	2	2	2	0	0
Oxydipentamethylene oxydienanthamide	22	2	0	0	2	2	2	0	0
Hexamethylene (hexamethylenedisulfonyl)dicaproamide	22	2	0	0	2	4	2	2	0
Decamethylene dodecamethylenediurea	22	2	0	0	4	0	4	0	0
N,N′-Dimethylhexamethylene octadecanediamide	22	2	0	2	6	0	2	0	0
Hexamethylene heptadecylmalonamide	22	2	0	2	6	0	2	0	0
Octadecamethylene *p*-phenylenedipropionamide	22	2	1	0	2	0	2	0	0
p-Xylylene docosanediamide	22	2	1	0	2	0	2	0	0
p-Xylylene thiodiundecanoamide	22	2	1	0	2	0	2	1	0
Eicosamethylene 3-(*p*-nitrophenyl)glutarate	22	2	1	1	1	4	1	0	0
Octamethylene *N,N′*-adipoyldi(6-aminocaproate)	22	4	0	0	2	2	2	0	0
Heptamethylene oxamide-*alt*-heptamethylene sebacamide	22	4	0	0	4	0	4	0	0
Hexamethylene oxamide-*alt*-hexamethylene sebacamide	22	4	0	0	4	0	4	0	0
Dodecamethylene *N,N′*-terephthaloyldi(6-aminocaproate)	22	4	1	0	2	2	2	0	0
Dodecamethylene *N,N′-dodecanedioyldi(*p-aminobenzoate)	22	4	2	0	2	2	2	0	0
23	23	0	0	0	0	0	0	0	0
10,12-Nonacosadiynoic acid, 10,13-	23	1	0	5	2	1	0	0	0
Eicosamethylene glutarate	23	2	0	0	0	2	0	0	0
Oxydipentamethylene 5-oxahexadecanediamide	23	2	0	0	2	2	2	0	0
Eicosamethylene 3-methyladipate	23	2	0	2	4	2	0	0	0
Hexamethylene 2-octadecylmalonamide	23	2	0	2	6	0	2	0	0
Nonamethylene *N,N′*-hexadecanedioyldi(*p*-aminobenzoate)	23	4	2	0	2	2	2	0	0
24	24	0	0	0	0	0	0	0	0
(Tetramethylenedioxy)didecamethylene oxide	24	0	0	0	0	3	0	0	0
Eicosamethylene adipate	24	2	0	0	0	2	0	0	0
Hexamethylene eicosanediamide	24	2	0	0	2	0	2	0	0
Octamethylene octadecanediamide	24	2	0	0	2	0	2	0	0
Tetradecamethylene dodecanediamide	24	2	0	0	2	0	2	0	0
Tridecamethylene tridecanediamide	24	2	0	0	2	0	2	0	0
Dodecamethylene dodecamethylenediurethane	24	2	0	0	2	2	2	0	0
Oxydipentamethylene 6-oxaheptadecanediamide	24	2	0	0	2	2	2	0	0
Decamethylene (tetramethylenedisulfonyl)dicaproamide	24	2	0	0	2	4	2	2	0
Tetramethylene (decamethylenedisulfonyl)dicaproamide	24	2	0	0	2	4	2	2	0
Oxydiethylenedioxydiethylenedioxydiethylene hexamethylenediurethane	24	2	0	0	2	7	2	0	0
Decamethylene tetradecamethylenediurea	24	2	0	0	4	0	4	0	0
Hexamethylene octadecamethylenediurea	24	2	0	0	4	0	4	0	0
Hexamethylene tetraoxa-3,9-spiro(5.5)hendecanedicaprylamide	24	2	0	3	4	4	2	0	0
Hexamethylene 4,4′-(oxydimethylene)di-dioxolanecaprylamide	24	2	0	4	6	5	2	0	0
p-Phenylenediethylene docosanediamide	24	2	1	0	2	0	2	0	0
p-Phenylenediethylene thiodiundecanoamide	24	2	1	0	2	0	2	1	0
Decamethylene *N,N′*-adipoyldi(6-aminocaproate)	24	4	0	0	2	2	2	0	0
Octamethylene oxamide-*alt*-octamethylene sebacamide	24	4	0	0	4	0	4	0	0
Dodecamethylene *N,N′*-dodecamethylenediterephthalamate	24	4	2	0	2	2	2	0	0
25	25	0	0	0	0	0	0	0	0
(Pentamethylenedioxy)didecamethylene oxide	25	0	0	0	0	3	0	0	0
Eicosamethylene pimelate	25	2	0	0	0	2	0	0	0
Decamethylene (pentamethylenedisulfonyl)dicaproamide	25	2	0	0	2	4	2	2	0
Pentamethylene (decamethylenedisulfonyl)dicaproamide	25	2	0	0	2	4	2	2	0
β-D-Glucotricaprate	25	3	0	8	14	5	0	0	0
26	26	0	0	0	0	0	0	0	0
(Hexamethylenedioxy)didecamethylene oxide	26	0	0	0	0	3	0	0	0
Di-*n*-tetradecylsilylene	26	0	0	2	6	0	0	0	1
4,4′-Decamethylenedipiperazine sebacamide	26	2	0	0	0	0	4	0	0
Decamethylene octadecanedioate	26	2	0	0	0	2	0	0	0
Eicosamethylene suberate	26	2	0	0	0	2	0	0	0
Decamethylene octadecanediamide	26	2	0	0	2	0	2	0	0
Hexamethylene docosanediamide	26	2	0	0	2	0	2	0	0
Octadecamethylene sebacamide	26	2	0	0	2	0	2	0	0
Octamethylene eicosanediamide	26	2	0	0	2	0	2	0	0
Hexadecamethylene decamethylenediurethane	26	2	0	0	2	2	2	0	0
Oxydipentamethylene oxydipelargonamide	26	2	0	0	2	2	2	0	0
Decamethylene (hexamethylenedisulfonyl)dicaproamide	26	2	0	0	2	4	2	2	0

Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylene (decamethylenedisulfonyl)dicaproamide	26	2	0	0	2	4	2	2	0
Dodecamethylene *N,N'*-adipoyldi(6-aminocaproate)	26	4	0	0	2	2	2	0	0
Nonamethylene oxamide-*alt*-nonamethylene sebacamide	26	4	0	0	4	0	4	0	0
27	27	0	0	0	0	0	0	0	0
Eicosamethylene azelate	27	2	0	0	0	2	0	0	0
28	28	0	0	0	0	0	0	0	0
Eicosamethylene sebacate	28	2	0	0	2	0	0	0	0
Eicosamethylene thiodivalerate	28	2	0	0	0	2	0	1	0
Eicosamethylene sulfonyldivalerate	28	2	0	0	0	4	0	1	0
Decamethylene eicosanediamide	28	2	0	0	2	0	2	0	0
Dodecamethylene octadecanediamide	28	2	0	0	2	0	2	0	0
Octamecamethylene dodecanediamide	28	2	0	0	2	0	2	0	0
Octamethylene docosanediamide	28	2	0	0	2	0	2	0	0
Decamethylene octadecamethylenediurea	28	2	0	0	4	0	4	0	0
Decamethylene oxamide-*alt*-decamethylene sebacamide	28	4	0	0	4	0	4	0	0
30	30	0	0	0	0	0	0	0	0
Decamethylene docosanediamide	30	2	0	0	2	0	2	0	0
Tetradecamethylene octadecanediamide	30	2	0	0	2	0	2	0	0
Decamethylene (decamethylenedisulfonyl)dicaproamide	30	2	0	0	2	4	2	2	0
p-Phenylene 2,5-di-*n*-hexadecyloxyterephthalate	30	2	1	8	8	4	0	0	0
Undecamethylene oxamide-*alt*-undecamethylene sebacamide	30	4	0	0	4	0	4	0	0
β-D-Glucotrilaurate	31	3	0	8	14	5	0	0	0
Dodecamethylene docosanediamide	32	2	0	0	2	0	2	0	0
Dodecamethylene oxamide-*alt*-dodecamethylene sebacamide	32	4	0	0	4	0	4	0	0
Octadecamethylene octadecanediamide	34	2	0	0	2	0	2	0	0
Tetradecamethylene docosanediamide	34	2	0	0	2	0	2	0	0
β-D-Glucotrimyristate	37	3	0	8	14	5	0	0	0
Octadecamethylene docosanediamide	38	2	0	0	2	0	2	0	0
β-D-Glucotripalmitate	43	3	0	8	14	5	0	0	0

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Constitutional Base Unit Poly-	CH_2	CO	C_6H_4	C	H	O	N	S	X
Hexamethylene (decamethylenedisulfonyl)dicaproamide	26	2	0	0	2	4	2	2	0
Dodecamethylene *N,N′*-adipoyldi(6-aminocaproate)	26	4	0	0	2	2	2	0	0
Nonamethylene oxamide-*alt*-nonamethylene sebacamide	26	4	0	0	4	0	4	0	0
27	27	0	0	0	0	0	0	0	0
Eicosamethylene azelate	27	2	0	0	0	2	0	0	0
28	28	0	0	0	0	0	0	0	0
Eicosamethylene sebacate	28	2	0	0	2	0	0	0	0
Eicosamethylene thiodivalerate	28	2	0	0	0	2	0	1	0
Eicosamethylene sulfonyldivalerate	28	2	0	0	0	4	0	1	0
Decamethylene eicosanediamide	28	2	0	0	2	0	2	0	0
Dodecamethylene octadecanediamide	28	2	0	0	2	0	2	0	0
Octamecamethylene dodecanediamide	28	2	0	0	2	0	2	0	0
Octamethylene docosanediamide	28	2	0	0	2	0	2	0	0
Decamethylene octadecamethylenediurea	28	2	0	0	4	0	4	0	0
Decamethylene oxamide-*alt*-decamethylene sebacamide	28	4	0	0	4	0	4	0	0
30	30	0	0	0	0	0	0	0	0
Decamethylene docosanediamide	30	2	0	0	2	0	2	0	0
Tetradecamethylene octadecanediamide	30	2	0	0	2	0	2	0	0
Decamethylene (decamethylenedisulfonyl)dicaproamide	30	2	0	0	2	4	2	2	0
p-Phenylene 2,5-di-*n*-hexadecyloxyterephthalate	30	2	1	8	8	4	0	0	0
Undecamethylene oxamide-*alt*-undecamethylene sebacamide	30	4	0	0	4	0	4	0	0
β-D-Glucotrilaurate	31	3	0	8	14	5	0	0	0
Dodecamethylene docosanediamide	32	2	0	0	2	0	2	0	0
Dodecamethylene oxamide-*alt*-dodecamethylene sebacamide	32	4	0	0	4	0	4	0	0
Octadecamethylene octadecanediamide	34	2	0	0	2	0	2	0	0
Tetradecamethylene docosanediamide	34	2	0	0	2	0	2	0	0
β-D-Glucotrimyristate	37	3	0	8	14	5	0	0	0
Octadecamethylene docosanediamide	38	2	0	0	2	0	2	0	0
β-D-Glucotripalmitate	43	3	0	8	14	5	0	0	0

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Glass Transition Temperatures of Polymers

Rodney J. Andrews, Eric A. Grulke
Chemical and Materials Engineering, University of Kentucky, Lexington, KY 40506-0046, USA

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A. INTRODUCTION

Amorphous (noncrystalline) polymeric solids are either glasses or rubbers. A glassy polymer lacks long range order, and is below the temperature at which molecular motions take place on the time scale of the experiment. A rubbery polymer is above the temperature at which molecular motions take place on the time scale of the experiment. The glass transition temperature, T_g, is the critical temperature that separates glassy behavior from rubbery behavior. Many amorphous solids, including polymers, organic liquids, biomaterials, some metals and alloys, and inorganic oxide glasses, exhibit glass transition temperatures.

The dramatic change in the local movement of polymer chains at T_g leads to large changes in a host of physical properties. These properties include density, specific heat, mechanical modulus, mechanical energy absorption, dielectric coefficients, acoustical properties, viscosity, and the rate of gas or liquid diffusion through the polymer, to name a few. Any of these properties can be used, at least in a crude manner, to determine T_g.

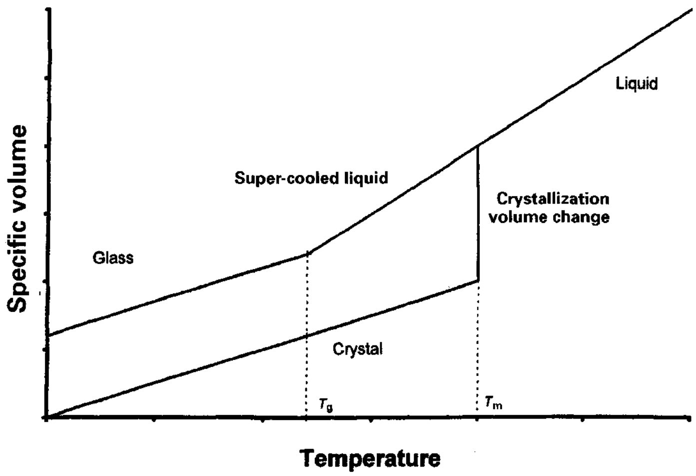

Figure 1.

1. Example of a Property Change at T_g

A classic method for determining T_g is dilatometry, in which the specific volume of the polymer is measured as a function of temperature. Figure 1 compares the specific volume vs. temperature curves for two idealized samples: a 100% amorphous material and a 100% crystalline material. Both materials follow the same path as their liquids are cooled from the melt. At the melting temperature, T_m, the crystallizing material orders into its crystal habit and exhibits a discontinuous decrease in specific volume. Below T_m, this solid has a reduction in specific volume with decreasing temperature, but the slope of this line, the volumetric thermal expansion coefficient, is less than the slope of the liquid line.

The amorphous material does not crystallize as the temperature falls below T_m, but continues to contract with a thermal expansion coefficient similar to the molten liquid: it acts as a supercooled liquid. At T_g, large-scale molecular motion (often considered to be the movement of 20–50 carbon atoms along a chain) becomes greatly reduced, the chain segments no longer rearrange rapidly in experimental time, and further cooling does not result in a similar volume change. Below T_g, the thermal expansion coefficient is similar to that of the crystalline solid. T_g can be defined as the temperature at the intersection of the two line segments. The specific volume is not discontinuous at T_g, as would be the case for the melting point, but the slope dV/dT, is. Therefore, T_g is sometimes referred to as a second-order transition, as compared to the melting point, which is a first-order transition. Both the primary property, specific volume, and its differential, the volumetric thermal expansion coefficient, change at T_g and can be used to identify the event.

Most polymer samples are either completely amorphous or partially crystalline. Figure 2 shows the specific volume vs. temperature curve for a semicrystalline polymer. The crystallizable fraction becomes ordered as it cools to T_m. Below the melting point, the amorphous material continues to contract as though it were a subcooled liquid, while the crystalline portion has a smaller thermal

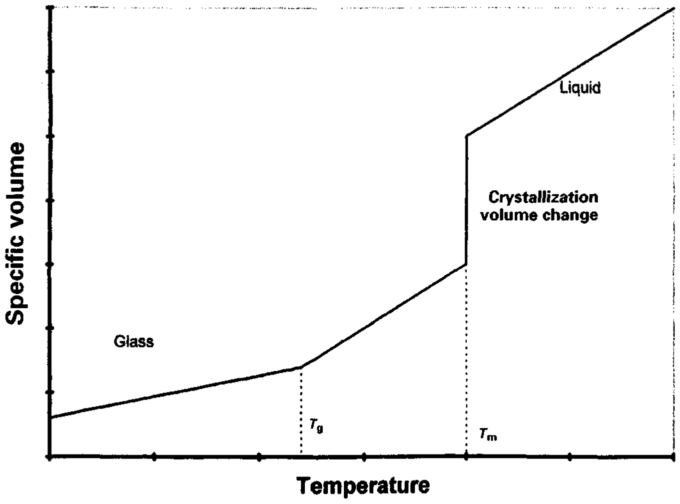

Figure 2.

expansion coefficient and contributes less to the volumetric decrease. Rapid amorphous phase motion stops at the glass transition temperature, and both solid components have similar thermal expansion coefficients below this temperature.

2. T_g: A "Non-Equilibrium" Transition

The glass transition temperature is not a fundamental thermodynamic property like the melting point because it is not thermodynamically stable, it is not defined by state variables, and its measurement is highly dependent on the time scale of the experiment used to determine its value. For example, experiments in which temperature or a deforming force is changed rapidly give higher T_g values than experiments in which conditions are changed slowly. Sample age and history affect the measurements as well.

The thermodynamic transition issue has been studied by a number of researchers. Staverman (1210) and Breuer and Rehage (1211) have concluded that T_g is not a true second-order transition because the glassy state is not completely defined by the normal state variables, p, V and T. Ehrenfest (1212) derived the following relationship that should hold for a true second-order transition:

$$\frac{dT_g}{dp} = \frac{T_g V(T_g)\Delta\alpha}{\Delta C_p} = \frac{\Delta\kappa}{\Delta\alpha}$$

where T_g is the glass transition temperature, p is the pressure, $V(T_g)$ is the molar volume at T_g, $\Delta\alpha$ is the thermal expansion coefficient difference (rubber to glass) at T_g, ΔC_p is the molar heat capacity difference, and $\Delta\kappa$ is the compressibility difference. Available data for a number of polymer systems show large deviations from the above equation for well-studied polymers, including polystyrene (1211), poly(isobutylene), poly(vinyl acetate), poly(vinyl chloride) and poly(methyl methacrylate) (1213,1214). The glass transition temperature is thought to be a kinetically controlled phenomenon (1215–1218).

B. T_g MEASUREMENT METHODS

The classical method of mercury dilatometer requires moderate amounts of sample, and time to permit thermal equilibrium to be achieved. Instruments that are easier to use and require only milligram quantities of sample are the thermal mechanical analyzer (TMA), the dynamic mechanical analyzer (DMA), and the differential scanning calorimeter (DSC). A TMA deforms a sample under a static load as the temperature is changed. At very low loads, it measures the specific volume change of the sample. A DMA measures the response of the material to an oscillating deformation. A DSC measures the change in sample enthalpy with time, dH/dt, for a known temperature program, dT/dt. The ratio of these two quantities gives dH/dT (also the specific heat capacity), which is a derivative measurement for T_g. (Experimental heat capacity curves of amorphous and semicrystalline polymers are given in the Heat Capacity chapter of this Handbook.) DSC is the most commonly used method for measuring the glass transition temperature of non-crosslinked polymers. All of these instruments can be interfaced to computers for data acquisition, test control, data reduction, and analysis.

The interpretation of T_g data can be controversial (1069–1071). The rate at which the sample is cooled or heated will affect the result. If the specific volume experiment of Fig. 2 was repeated for various cooling rates, T_g would occur at lower temperatures as the cooling rate is lowered, the transition region would become sharper, and a denser polymer would be produced. When a sample is allowed to remain below its glass transition temperature over a long period of time (aging), its density will increase. This process is called annealing; the rate of densification increases with annealing temperature.

1. Data Interpretation

The previous history of a sample will affect the measurement of T_g, unless the material's "memory" is erased by heating it well above the transition. The sample is heated well above its expected T_g, cooled to the original temperature, and reheated along a temperature profile to find the glass transition temperature of the material with minimal history. Some information can be inferred from the first heat, including residual stresses in the material, the presence of low-boiling diluents, etc.

The process of heating a polymer solid to find T_g often gives a curve similar to Fig. 1 and will produce a melt with the same density as that of the cooling experiment. However, in heating experiments, chain motions dominate the change in properties, and sudden property changes can occur near the transition temperature. At temperatures much higher than T_g, the property response once again becomes linear with temperature. In DSC measurements, sudden expansions can lead to an endothermic peak past the T_g. This endothermic peak has also been called enthalpy overshoot, and is thought to relate to the difference between the rate of temperature increase and the rate of increase of

chain mobility around T_g. The size of this overshoot depends on the annealing of the sample and the heating rate.

In a direct property measurement experiment (Fig. 1 is an example), it is common practice to ignore the kinetic effects of the transition region and to define T_g as the intersection of the two straight lines. For this case, the same T_g is found both on heating and cooling at a given polymer density. In an experiment that measures the differential of a property (DSC for example), integrating the curve gives the change in enthalpy from before to after the transition region, to which the simple intersection method of Fig. 1 can be applied, giving a T_g that is independent of heating rate (1079–1081). This method is well-known with inorganic glasses.

In DSC experiments, T_g is usually determined either by the onset point, the intersection of the initial straight line and the transition region straight line, or by the midpoint of the transition region (inflection point). The integration method's T_g is the same as the midpoint T_g if there is no endotherm, and is closer to the onset T_g if there is an endotherm. Moreover, it is common to measure T_g upon heating without any mention of previous thermal history or the heating rate. Because of these practices, the T_g values reported in this article should be considered as approximate by the reader. Authors reporting T_g should describe the thermal history of their measurements and also consider the integration method of determining T_g.

The classical methods of T_g measurement discussed previously can be quite insensitive for some polymers, e.g., highly crosslinked polymers. A penetration probe, on the other hand, is very sensitive and can determine T_g even on a thin film. But this method depends on the force of the penetrator and does not measure T_g in a fundamental way. Softening temperature methods are popular and are part of various ASTM standards.

2. Oscillating Load Methods

The measurement of the material response to an oscillating load gives a direct measure of the sample's modulus. The measurement of the lag of the material response (phase shift) to the mechanical forcing function gives a measure of the damping, or loss factor, of the sample. This last quantity is called the tan δ peak value. Dielectric thermal analysis is done by using an oscillating electric field as the forcing function. At T_g, there is often an order of magnitude change in the modulus and a large maximum in tan δ. This α-transition is distinguished from other thermal transitions (β, γ, etc.) by being the most dominant and occurring at the highest temperature. An onset point, a midpoint, or a change in modulus by a certain amount have all been used to mark the glass transition temperature. The tan δ maximum clearly specifies a thermal transition. However, it is necessary to independently determine that it is a glass transition and not another of the many transitions that appear in oscillating deformation methods. A classical T_g measured at a low programmed temperature rate (1 deg/min) may correspond to a tan δ measurement at a low frequency of measurement (1 Hz). The "loading rate" of a DMA experiment is the oscillating frequency, and T_g increases with frequency (analogous to the increase in T_g with heating rate in a DSC experiment). It is possible to measure a tan δ maximum at constant temperature while the frequency is being scanned and there is an inverse relationship between temperature and frequency. Even at a reasonably low frequency (10 Hz), a tan δ T_g can easily be 20–30°C greater than a classical one.

C. OTHER FACTORS AFFECTING T_g

Though the factors that govern T_g have been known for some years, there is still a wide variation in values for particular polymers. Polymer T_g's are sensitive to parameters which may or may not have been evaluated by the authors. Published values should be reviewed considering all the factors which affect T_g. The main factors affecting T_g values are polymer structure, sample crystallinity, diluent types and concentrations, molecular weight distributions, previous thermal history of the sample, and system pressure. More detailed treatments are given in reviews (6,48,49,1241–1249).

1. Structure

Within families of similar polymers, increasing chain stiffness and interchain cohesion increase the glass transition temperature. Copolymers may have one or multiple T_g's, depending on the ordering of monomers along the chain. The glass transition temperatures of copolymers may be higher, lower, or in between those of the homopolymers of their comonomers.

Most polymer structures are idealized and presumed from the characteristics of the reactants rather than proven by chemical and structural analysis. Structural uncertainties can arise both from the multiplicity of chemical reactions occurring during polymerization (especially those taken to high conversions), downstream processing, and from the structure of the reactants themselves. For example, a polymer with an asymmetric in-chain tetravalent atom can produce several stereoregular forms.

Alternatively, a polymer containing a residual double bond in the repeating unit could be in a *cis*, or *trans* conformation. Polymers of 1,3-dienes can have various combinations of *cis*, *trans*, 1,2- or 1,4-structures. Variations in these structural features can greatly effect the T_g values. Despite these uncertainties, the data are often useful if they can be regarded as pertaining to a polymer with reproducible properties.

2. Crystallinity/Crosslinking

Some workers suggest that the presence of crystallinity does not appreciably affect T_g. However, steric constraints imposed by crystalline regions on neighbouring amorphous polymer segments might result in an increase in T_g because

of the reduced mobility of these segments. In samples with crystallinity and moderate fractions of high molecular weight chains, tie molecules (long chains that have segments in more than one crystallite) provide physical crosslinking and increase T_g.

Some polymer families, such as the methacrylates and α-chloroacrylates, show high dependencies of T_g on tacticity. Intermolecular bonding can affect T_g either by increasing the cohesive energy of chain segments, or by decreasing the backbone degrees of freedom of chain segments. This last concept has been used (1240) to aid group contribution models.

As crystallinity increases, polymer T_g's may be little affected (50), may increase (51,52) (at least for isothermal crystallization (53)) or may decrease (51,54). T_g values selected in this work are the highest quoted on the sample with the lowest degree of crystallinity, other factors being equal.

In general, the presence of crosslinks in a sample increases its T_g relative to an uncrosslinked sample. This effect can be independent of the chemical composition of the crosslinking agent, caused by the restricted motion of chain segments near crosslinking sites. However, the crosslinking agent can behave similarly to a second monomer, inducing either an increase or a decrease in T_g due to the copolymer effect.

3. Diluents

Much of the variation in published T_g data is caused by the use of impure samples. Common impurities are unpolymerized monomer, low molecular weight polymer, solvents, and water. Great care should be taken to remove such impurities. Their presence in small concentrations can lead to a shift (48,98–103) in T_g of over 40°C and sometimes the occurrence of "diluent transitions", for example "water peaks". Preferred values are from publications that describe the precautions taken to exclude diluents and the residual levels of these diluents. Few references contain this information and most values should be regarded as only provisional.

4. Molecular Weight

The T_g of a homopolymer generally increases with increasing molecular weight up to a limiting value, known as the limiting or persistent T_g value (48,104,105). The reverse may hold for polymers with particular end-groups (106), or where crystallinity decreases with increasing molecular weight (107). For some polymers, T_g's are independent of molecular weight (108).

Many data, especially on condensation polymers, are for polymers of rather low molecular weight and it seems likely that higher T_g values would be obtained if higher molecular weight samples were tested. Many polymers are not properly characterized with respect to molecular weight and few have reported molecular weight distributions. In many cases, the only measure of molecular weight is a viscosity value, which itself can be very dependent on solvent–polymer interactions and, to some extent on the temperature. Usually, the highest viscosities and the highest molecular weight polymers are associated with the most reliable data.

The classical model for the effect of molecular weight on T_g is (1219–1226)

$$T_g = T_g^{\infty} - \frac{A}{\bar{M}_n}$$

This model suggests that the glass transition temperature reaches a limiting value when the number average molecular weight of the polymer is large. Cowie and Toporowski (1220) have shown that there is no further increase in T_g when the molecular weight is above a critical value, which is similar to the critical molecular weight for viscosity.

5. Thermal History

We have previously discussed in detail how thermal history (cooling rate, annealing time, and temperature), as well as the method of T_g measurement affects the reported T_g.

6. Pressure

Increasing pressure increases T_g in a linear relationship. A simple model is (Refs. 1227–1230)

$$T_g(p) = T_g(0) + sp$$

where $T_g(p)$ is the glass transition temperature as a function of pressure, p is pressure, and s is the linear pressure coefficient. This coefficient is 0.2 K/MPa for flexible aliphatic chains, and 0.55 K/MPa for semirigid aromatic chains (1231–1233). The effect of pressure on T_g can be important in some processing applications, such as injection molding. A different method for modeling the effect of temperature takes into account *pVT* data near T_g (1235–1237), giving an equation that includes the bulk modulus of the polymer glass.

D. ESTIMATION METHODS FOR THE GLASS TRANSITION TEMPERATURE

Several researchers have developed group contribution methods for correlating polymer properties, including the glass transition temperature (1238–1240). These techniques emphasize quantitative modeling of the various effects of polymer structure on T_g, and are a valuable aid to interpreting experimental data and estimating glass transition temperatures for new materials.

E. CLASSIFICATION, NOMENCLATURE, AND ABBREVIATIONS

Over 10000 papers contain glass transition data (43). This section of *Polymer Handbook* represents a fraction of these

data. Most of the data in the tables are for linear homopolymers. In general, the polymers contain no additives or diluents, and are thought to have low or no branching.

Polymers are subdivided into principle classes by the composition of their repeating chain segment: acyclic carbon polymers, carbocyclic polymers, acyclic heteroatom polymers, heterocyclic polymers, and copolymers. All entries are placed in the most senior class their structure commands (109,110) and appear in only one class. The subclasses and their entries are organized in alphabetical order.

1. Naming Conventions

With the exception of common polymers with accepted trivial names, the polymers are named substantially according to the ACS recommendations for polymer nomenclature (110) in conjunction with IUPAC rules (109); less common polymers are cross-referenced from the trivial to the systematic name. Systematic names are not given for all the polymers in order to save space. Substitutive nomenclature is generally used for simple radicals, but for long combinations of radicals replacement nomenclature has been used to provide a much shorter name (as for some fluorocrylates with ether side chains).

When sequences of radicals have repeated, the repeating sequence has been written once and prefixed "di", "tri", etc. as appropriate, for example, di(oxyethylene) for the sequence $-O-CH_2-CH_2-O-CH_2-CH_2-$. Note that the diradical "di(oxyethylene)" must be distinguished from the diradical "dioxyethylene" which has the structure, $-O-O-CH_2-CH_2-$, and also the diradical "ethylenedioxy" which has the structure, $-O-CH_2-CH_2-O-$ (IUPAC rule C205.2). The principle underlying the last-named diradical has not generally been extended to the naming of polymers in this section, *i.e.*, diradicals of structure –X–Y –X– are not named YdiX, with the exception of alkanedioyl diradicals, because of the difficulty of locating indexed polymer names in which the diradicals are not named from left to right. Many polymers are derivatives of the diradical "propylene" $-CH(CH_3)-CH_2-$; the substituted diradical "propylene" is used in naming polymers instead of "1-methylethylene" which could be preferred.

Polymer names are tabulated in alphabetical order within each subsection, but

1. prefixes like *sec*-, *tert*-, including designated atoms and the numbers showing locations of substituents are ignored except as secondary and tertiary indicators of order. For example, poly(ethylene 2,6-naphthalate) appears before poly(ethylene 1,4-terephthalate); poly(4-*p*-anisoylstyrene) appears before poly(4-benzoylstyrene).
2. multiplying prefixes for various substituents, such as dimethyl or trimethyl, are observed in alphabetical ordering rather than being grouped together as in the 3rd edition of this Handbook.
3. the locations of substituents in otherwise identical polymers are taken as tertiary indicators of order: the numbers are arranged in increasing order at the first point of difference. Thus, 2,3,8- comes before 2,4,1-.

Comments may include information as to the instrument of measurement and, whenever possible, information regarding the method of DSC measurement (e.g., onset), conditions of measurement, thermal history, and whether measurements were made as a function of a particular variable such as molecular weight (*f*(MW)).

2. Abbreviations

HR	Heating rate
CR	Cooling rate
0CR	Zero cooling rate
Xp	Extrapolate
TH	Thermal history
DSC	Differential scanning calorimeter
TMA	Thermal mechanical analyzer
DTA	Differential thermal analysis
DMA	Dynamic mechanical analyzer
MW	Molecular weight
f( )	Function of a variable
Mdpt	Midpoint
Intg	Integration

F. TABLES OF GLASS TRANSITION TEMPERATURES OF POLYMERS

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
1.1. POLY(ACRYLICS) AND POLY(METHACRYLICS)				
1.1.1. POLY(ACRYLIC ACID) AND POLY(ACRYLIC ACID ESTERS)				
Poly(acrylic acid)	9003-01-4	379		720,811–818
		348		1293
Poly(1-adamantyl acrylate)		426		1401,1349
Poly(adamantyl crotonate)		507		1349
Poly(adamantyl sorbate)		388		1349
Poly(benzyl acrylate)		279		746,1447

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(4-biphenylyl acrylate)		~383		819
Poly(4-butoxycarbonylphenyl acrylate)		286		746
Poly(butyl acrylate)	9003-49-0	219	Mechanical method	1, 23,634,775, 802–822
		224		1401
Poly(*sec*-butyl acrylate) conventional		251		823,824
		253		1401
syndiotactic		253		
isotactic		250		
Poly(*tert*-butyl acrylate)		380, 316	Conflicting data	746,824,825,1401
		346		
		304		1432
Poly(2-*tert*-butylphenyl acrylate)		345		826
Poly(4-*tert*-butylphenyl acrylate)		344		826
Poly(cesium acrylate)		447	Extrapolated from DSC data on water plasticized samples	817
Poly[3-chloro-2,2-bis(chloromethyl)propyl acrylate]		319		746
Poly(2-chlorophenyl acrylate)		326		746
Poly(4-chlorophenyl acrylate)		331		826
Poly(2,4-dichlorophenyl acrylate)		333		746
Poly(4-cyanobenzyl acrylate)		317		746
Poly(2-cyanobutyl acrylate)	25154-80-7	384–396	Dilatomer, 10 deg/min HR, DTA, *f*(polymerization)	1088
Poly(2-cyanoisobutyl acrylate)	26809-38-1	324	Dilatomer, 10 deg/min HR	1089
Poly(4-cyanobutyl acrylate)		233–238	No experimental details	827
Poly(2-cyanoethyl acrylate)	25067-30-5	277		746,820
		388	Dilatomer, 10 deg/min HR	1090
Poly(2-cyanoheptyl acrylate)	26936-29-8	389	DTA	1092
Poly(2-cyanohexyl acrylate)	26877-39-4	358	Dilatomer, 10 deg/min HR	1093
Poly(cyanomethyl acrylate)		433	Dilatomer, 10 deg/min HR, DTA, *f*(polymerization)	1087
Poly(2-cyanomethyl acrylate)		296	No experimental details	820
Poly(5-cyano-3-oxapentyl acrylate)		250	No experimental details	820
Poly(4-cyanophenyl acrylate)		363		746
Poly(2-cyanoisopropyl acrylate)	25931-02-6	339	Dilatomer, 10 deg/min HR	1091
Poly(4-cyano-3-thiabutyl acrylate)		249		828
Poly(6-cyano-3-thiahexyl acrylate)		215		828
Poly(6-cyano-4-thiahexyl acrylate)		215		828
Poly(8-cyano-7-thiaoctyl acrylate)		214		828
Poly(5-cyano-3-thiapentyl acrylate)		223		828
Poly(cyclododecyl acrylate)	56710-66-8	310	DSC, onset, HR, 32 deg/min, quenched	1086
Poly(cyclohexyl acrylate) conventional		292		824
syndiotactic		289		
isotactic		285		
Poly(1,2:3,4-di-*O*-isopropylidene-α-D-galactopyranos-6-*O*-yl acrylate)		371		11,842
Poly(3,5-dimethyladamantyl acrylate)		379	DSC heating rate; data corrected (sci)	849,850
		378		1401,1349
Poly(3,5-dimethyladamantyl crotonate)		432		1349
Poly(3-dimethylaminophenyl acrylate)		320		746
Poly(1,3-dimethylbutyl acrylate)		258	Brittle point	823
Poly[2,2-difluoro-2-(2-heptafluorotetrahydrofuranyl) ethyl acrylate]		275	Brittle temperature	830
Poly(dodecyl acrylate)		270	Brittle point	821,829
Poly(2-ethoxycarbonylphenyl acrylate)		303		746
Poly(3-ethoxycarbonylphenyl acrylate)		297		746
Poly(4-ethoxycarbonylphenyl acrylate)		310		746
Poly(2-ethoxyethyl acrylate)		223		830
Poly(3-ethoxypropyl acrylate)		218		830,831
Poly(ethyl acrylate) conventional		249		23,634,775
	9003-32-1	251		1401
syndiotactic		249		820,821,824
isotactic		248		832, 833

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(2-ethylbutyl acrylate)		223	Brittle point	823
Poly(2-ethylhexyl acrylate)	9003-77-4	223	Brittle point	821
Poly(ferrocenylethyl acrylate)		430	No experimental details	834
Poly(ferrocenylmethyl acrylate)		470–483	DSC heating rate	835
Poly(3-fluoroalkyl α-fluoroacrylate)		398		1263
Poly(4-fluoroalkyl α-fluoroacrylate)		368		1263
Poly(5-fluoroalkyl α-fluoroacrylate)		374		1263
Poly(8-fluoroalkyl α-fluoroacrylate)		338		1263
Poly(17-fluoroalkyl α-fluoroacrylate)		388		1263
Poly(fluoromethyl acrylate)		288	Estimated T_g	838
Poly(furfuryl acrylate)		321		1279
Poly(1H, 1H-heptafluorobutyl acrylate)		243		155,836,837
Poly(5,5,6,6,7,7,7-heptafluoro-3-oxaheptyl acrylate)		228		830
Poly(2,2,3,3,5,5,5-heptafluoro-4-oxapentyl acrylate)		218		830,837
Poly(heptafluoro-2-propyl acrylate)		278–283	No details on sample or measurement	839
Poly(heptyl acrylate)		213	Brittle point	821,1401
Poly(2-heptyl acrylate)		235	Brittle point	823
Poly(hexadecyl acrylate)		308	Brittle point	23,821,840,841
Poly(1H,1H,3H-hexafluorobutyl acrylate)		251		836
Poly(hexyl acrylate)		216	Brittle point	823
				1401
Poly(3-hydroxyalkanoate)		293		1451
Poly(isobornyl acrylate) conventional		367		824
syndiotactic		369		
isotactic		363		
Poly(isobutyl acrylate)		249	Brittle point	823
		230		1401
Poly(isopropyl acrylate) conventional		267–270		746,823,824
syndiotactic		271–284		
isotactic		262		
Poly(magnesium acrylate)		673	Estimated from copolymer data	843
Poly(3-methoxybutyl acrylate)		217		844
Poly(2-methoxycarbonylphenyl acrylate)		319		746
Poly(3-methoxycarbonylphenyl acrylate)		311		746
Poly(4-methoxycarbonylphenyl acrylate)		340		746
Poly(2-methoxyethyl acrylate)		223		830
Poly(4-methoxyphenyl acrylate)		324		826
Poly(3-methoxypropyl acrylate)		198		830
Poly(methyl acrylate) conventional	9003-21-8	283		18,22,23,81
		284	Dilatomer	1094
		290		1343
		282		1401,1432
head to tail		278		576,720,775–777
head to head		304		821,824,831,841, 845–848
Poly(2-methylbutyl acrylate)		241	Brittle point	823,1401
Poly(3-methylbutyl acrylate)		228	Brittle point	823
Poly(2-methyl-7-ethyl-4-undecyl acrylate)		253	Brittle point	823
Poly(2-methylpentyl acrylate)		235	Brittle point	823
Poly(2-naphthyl acrylate)		358		826
Poly(neopentyl acrylate)		295		746,1401
Poly(1H,1H-nonafluoro-4-oxahexyl acrylate)		224		830
Poly(1H,1H-nonafluoropentyl acrylate)		236		836
Poly(nonyl acrylate)		215	Brittle point	821
		184		1401
Poly(octyl acrylate)	25266-13-1	208	Brittle point	821,841,1401
Poly(2-octyl acrylate)		228	Brittle point	823
Poly(1H,1H,5H-octafluoropentyl acrylate)		238		836
Poly(pentabromobenzyl acrylate)		453		1447
Poly(pentachlorophenyl acrylate)		420		746
Poly(1H,1H-pentadecafluorooctyl acrylate)		256	Crystalline	836
Poly(1H,1H-pentafluoropropyl acrylate)		247		836
Poly(*n*-pentyl acrylate)		216		1401

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(3-pentyl acrylate)		267		746,823
Poly(phenyl ethyl)acrylate		270		746
Poly(phenyl acrylate)		330		746,826
Poly(potassium acrylate)		467	Extrapolated from data on water plasticized samples	817
Poly(propyl acrylate)		236	Brittle point	23,592,832,836, 851, 852
		228		1401
Poly(sodium acrylate)		503	Estimated from copolymer data	817,843
Poly(tertural acrylate)		321		1279
Poly(tetradecyl acrylate)		297	Brittle point; probably 1st order transition	23,821
Poly(7,7,8,8-tetrafluoro-3,6-dioxaoctyl acrylate)		233		830
Poly(4,4,5,5-tetrafluoro-3-oxapentyl acrylate)		251		830
Poly(3-thiabutyl acrylate)		213		831
Poly(4-thiahexyl acrylate)		197		831
Poly(5-thiahexyl acrylate)		203		831
Poly(3-thiapentyl acrylate)		202		831
Poly(4-thiapentyl acrylate)		208		831
Poly(*m*-tolyl acrylate)		298		826
Poly(*o*-tolyl acrylate)		325		826
Poly(*p*-tolyl acrylate)		316		826
Poly(2,2,2-trifluoroethyl acrylate)		263		836
Poly(5,5,5-trifluoro-3-oxapentyl acrylate)		235		830
Poly(3,3,5-trimethylcyclohexyl acrylate)		288		1401
Poly(1H,1H-tridecafluoro-4-oxaoctyl acrylate)		205		830
Poly(1H,1H-undecafluorohexyl acrylate)		234		836
Poly(1H,1H-undecafluoro-4-oxahexyl acrylate)		205		830
Poly(zinc acrylate)		694		1261
1.1.2. POLY(ACRYLAMIDES)				
Poly(acrylamide)	9003-05-8	438	No experimental details	820
Poly(*N*-butylacrylamide)		319	Mechanical method	853
Poly(*N*-*sec*-butylacrylamide)		390	No experimental details	820
Poly(*N*-*tert*-butylacrylamide)		401	No experimental details	820
Poly(*N*,*N*-dibutylacrylamide)		333	Softening point, amorphous	854
Poly(*N*,*N*-diisopropylacrylamide)		~393	Softening point, almost amorphous	854
Poly(*N*,*N*-dimethylacrylamide)	26793-34-0	362		746
Poly(*N*-dodecylacrylamide)		198–320	Conflicting data, 198 K more probable in amorphous sample	820,853
Poly(isodecylacrylamide)		313	No experimental details	820
Poly(isohexylacrylamide)		344	No experimental details	820
Poly(isononylacrylamide)		325	No experimental details	820
Poly(isooctylacrylamide)		339	No experimental details	820
Poly(*N*-isopropylacrylamide)	25189-55-3	358, 403	Conflicting data	820,855
Poly([*N*-(1-methylbutyl)acrylamide)		380	No experimental details	820
Poly(*N*-methyl-*N*-phenylacrylamide)		~453	Softening point, amorphous	854
Poly(morpholylacryamide), [Poly(morpholinocarbonylethylene)]		420		9,856
Poly(*N*-octadecylacrylamide)		162	Mechanical method	853
Poly(*N*-octylacrylamide)		220		853
Poly(piperidylacrylamide)		381		9,856
1.1.3. POLY(METHACRYLIC ACID) AND POLY(METHACRYLIC ACID ESTERS)				
Poly(acrylonitrile methacrylate)		383		1362
Poly(adamantyl methacrylate)		414	DSC heating rate	849
		456		1349
		456/532		1401
Poly(benzyl methacrylate)	25085-83-0	327		746
Poly(2-bromoethyl methacrylate)		325		746
Poly(2-*tert*-butylaminoethyl methacrylate)		306		746,857

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(4-*tert*-butylcyclohexyl methacrylate)	34903-89-4	356	DSC, *f*(HR)	1096
		403–451		1286
Poly(butyl methacrylate)	9003-63-8	293	~286 to 308 K	22,69,272,695, 720,775,822,824, 847,858–862, 1359,1367
		300		1272
		307		1254
		328	298 K elsewhere	1342
		297		1401
		294		1255
		299		1413
isotactic		249		824
syndiotactic		328		1342,1555
Poly(*sec*-butyl methacrylate)		333		746,863,1401
Poly(*tert*-butyl methacrylate) atactic		391	Maximum value	746,847,864
		395		1254
		380		1401
syndiotactic		387	Maximum value	
isotactic		280		
Poly(4-*tert*-butylphenyl methacrylate)	29696-27-3	371	DSC, *f*(HR)	1104
Poly(2-chloroethyl methacrylate)		~365	Likely to be slightly high	262
Poly(2-cyanoethyl methacrylate)		364		746,865
Poly(4-cyanomethylphenyl methacrylate)		~401		746
Poly(4-cyanophenyl methacrylate)		428		746
Poly(cyclobutyl methacrylate)		351		1401
Poly(cyclodecyl methacrylate)		331		1401
Poly(cyclododecyl methacrylate)		329		1401
Poly(cyclohexyl methacrylate) atactic		356		263,353,820,824
	25768-50-7	377		1401
		406		1254
isotactic		324		847,862
Poly(cyclooctyl methacrylate)		346		1401
Poly(cyclooctylmethyl methacrylate)		326		1401
Poly(cyclopentyl methacrylate)		348		1401
Poly(2-decanhydronapthyl methacrylate)		418		1401
Poly(decyl methacrylate)		203		23,821,840,846
Poly(diethylaminoethyl methacrylate)		~289–297		857
Poly(1,2:3,4-di-*O*-isopropylidene-α-D-galactopyranos-6-*O*-yl methacrylate)		399		11,842
Poly(3,5-dimethyladamantyl methacrylate)		469	Temperature reported as corrected	849,850
		467		1401,1349
Poly(dimethylaminoethyl methacrylate)		292		746
Poly(3,3-dimethylbutyl methacrylate)		~318	Vicat softening point 332 K	863
		318		1401
Poly(3,3-dimethyl-2-butyl methacrylate)		~381	Vicat softening poing 396 K	863
		381		1401
Poly(1H,1H,7H-dodecafluoroheptyl methacrylate)		286	Mechanical method	876
Poly(dodecanidiol dimethacrylate)		277		1528
Poly(dodecyl methacrylate)		208	Conflicting data	1,821,858,866, 867
Poly(2-ethylhexyl methacrylate)	25719-51-1	263	Brittle point	821
Poly(ethyl methacrylate)	9003-42-3	–	DSC, onset, 16 deg/min HR, quenched, *f*(MW)	1095
atactic		338	Data covers range 320–343 K	22,69,286,352, 353,521,695,821, 824,857,858,860, 862,868–874, 1342,1401,1363, 1545,1432
		339		1315
		352		1552
		362		1254

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
		331		1359
		330		1360
		344		1413
		359	with 25% wt. of chromaphore I-doped polymer	1418
		378	with 25% wt. of chromaphore II-doped polymer	1418
		348		1438
		347	DSC	1484
isotactic		285		824
syndiotactic		339		847
Poly(2-ethylsulfinylethyl methacrylate)		298		746
Poly(ferrocenylethyl methacrylate)		482	No experimental details	834
Poly(ferrocenylmethyl methacrylate)		~458–468	DSC heating rate	835
Poly(3-fluoroalkyl methacrylate)		355		1263
Poly(4-fluoroalkyl methacrylate)		353		1263
Poly(5-fluoroalkyl methacrylate)		350		1263
Poly(8-fluoroalkyl methacrylate)		320		1263
Poly(17-fluoroalkyl methacrylate)		310		1263
Poly(glycidyl methacrylate)		347		1269
		336		1360
Poly(1H,1H-heptafluorobutyl methacrylate) syndiotactic		~330		875
Poly(1H,1H,9H-hexadecafluorononyl methacrylate)		258	Mechanical method	876
Poly(hexadecyl methacrylate)	25986-80-5	288	Brittle point, sample probably crystalline-may be T_m	821,866
Poly(hexyl methacrylate)	25087-17-6	268		695,846, 858,877, 1251,1443
		273		1401
			DSC	1484
		270		1416
		274		1413
Poly(2-hydropropyl methacrylate)	25249-16-5	328, 359	Conflicting data	746,878–880
80% isotactic		311	DSC, dry Xp	1098
58% syndiotactic		393	DSC, dry Xp	1199
Poly(2-hydropropyl methacrylate)		349		846,878
Poly(2-hydroxyethyl methacrylate)		358		1279
Poly(D,L-isobornyl methacrylate)		396/464/443		1401
Poly(isobornyl methacrylate)	64114-51-8	383		824
		423		1508
Poly(isobutyl methacrylate) random		326		746,821,824
isotactic		281		846,881
80% syndiotactic, 20% isotactic		326		
Poly(isobutyl methacrylate)	9011-15-8	326		1401
		337		1438
Poly(isopropyl methacrylate) atactic		354		746,824,862
	26655-94-7	358		1401
isotactic		300		
syndiotactic		358		
Poly(2,3-*O*-isopropylidene-D,L-glyceritol-1-*O*-yl methacrylate)		335	Heating rate: 20 K/min	842
Poly(magnesium methacrylate)		~763	Xp value	843
Poly(methacrylic acid)	54193-36-1	501	Xp data from plasticized samples	882
Poly(methacrylic anhydride) see Section 4.27				
Poly(4-methoxycarbonylphenyl methacrylate)		379		746
Poly(methacrylate)	9003-21-8	273		1255
Poly(methyl methacrylate)	9011-14-7			1102,1112,1101, 1107,1108
			DSC, onset, 16 deg/min HR, quenched, *f*(MW)	1101
			Dilatomer, CR 3 deg/h; creep relaxation, quenched	1109
		378		1432,1315, 1401,1288,1318

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
		379		1320,1300
		400		1343
		387		1365
			Aldrich chemicals	1547
		391		1552
		384	DSC	1277
		373		1359,1508,1531
		390		1363,1545
		367		1413,1457
		382	DSC	1489
		423		1533
		395		1254
atactic		378		1106
				1,17,22,25–27, 69,78,79,81,190, 201,263,286,287, 317,318,352–354, 400,614,684,698, 720,775,777–779, 789,804,821,824, 846,858,860,862, 880,883–895
		379		1271
		380		1255
isotactic		311		6,122,720,824, 847,884,886,890, 895–901
		323		1255
		325		1271
		319		1432
		373		1254
syndiotactic		378		122,720,824,847, 890,895,896,898, 900,901
		414		1256
		403		1254
heterotactic		372	DSC, rapid cooling, 10 deg/min HR, onset point, M_n^∞	1103
plasticized with 5% dibutylphthalate		363		1254
plasticized with 10% dibutylphthalate		355		1254
plasticized with 25% dibutylphthalate		373		1254
with bis(2-ethylhexyl phthalate)		200–398	DS	1557
		252–373	PCS	1557
Poly[(2-nitrosoethyl) methacrylate]		328		903
Poly(octadecyl methacrylate)	25639-21-8	173		1,720,904
Poly(1H,1H,5H-octafluoropentyl methacrylate)		309	Mechanical method	876
Poly(octyl methacrylate)		203, 253	Conflicting data	23,695,821,840, 846,858
		253		1401
Poly(3-oxabutyl methacrylate)		289		846,857
Poly(3-oxa-5-hydroxypentyl methacrylate)		278–280	Mechanical method	880
Poly(pentyl methacrylate)		268	Brittle point	821
				1401
Poly(neopentyl methacrylate)	34903-87-2	299-312	DSC, *f*(HR)	1105
		299		1401
Poly(phenethyl methacrylate)		299		746
Poly(phenyl methacrylate)		383		353,746,820,847, 863,875,1334
		407		1254
Poly(propyl methacrylate)		308	Conflicting data, 308–345 K reported	22,262,272,821, 847,857, 858,860, 1432
		308		1401
		332		1254

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
		319		1413
			DSC	1484
Poly(sodium methacrylate)		~583	Xp value	410,547,616
Poly(3-tetracyclododecyl methacrylate)		477		1401
Poly(tetradecyl methacrylate)		201–264	Conflicting data	843
Poly(1,1,1-trifluoro-2-propyl methacrylate)		354	Vicat softening temperature	863
Poly(3,3,5-trimethylcyclohexyl methacrylate)		398		1401
Poly(3,5,5-trimethylhexyl methacrylate)		274		867
Poly(trimethylsilyl methacrylate) isotactic		341	Heating rate: 15 K/min	902
syndiotactic		400	Weak T_g for syndiotactic polymer	
Poly(2,3-xylenyl methacrylate)		398		1334
Poly(2,6-xylenyl methacrylate)		440		1334
1.1.4. POLY(METHACRYLAMIDES)				
Poly(4-butoxycarbonylphenylmethacrylamide)		401	Softening point	905
Poly(*N-tert*-butylmethacrylamide)		433	No experimental details	820
Poly(4-carboxyphenylmethacrylamide)		473	Softening point	905
Poly(4-ethoxycarbonylphenylmethacrylamide)		441	Softening point	905
Poly(4-methoxycarbonylphenylmethacrylamide)		453	Softening point	905
1.1.5. OTHER α-AND β-SUBSTITUTED POLY(ACRYLICS) AND POLY(METHACRYLICS)				
Poly(butyl butoxycarbonylmethacrylate)		298		906
Poly(butyl chloroacrylate)		330	Vicat softening point	863
Poly(*sec*-butyl chloroacrylate)		347	Vicat softening point	863
Poly(butyl cyanoacrylate)		358		907
Poly(cyclohexyl chloroacrylate)		387	Vicat softening point	863
Poly(dibutyl itaconate) see Poly(butylbutoxycarbonylmethacrylate)				
Poly(ethyl chloroacrylate)		366	Vicat softening point	832,863, 908,909
10% isotactic		308	Calculated for infinite M_n; heating rate: 20 K/min	
100% syndiotactic		404	Calculated for infinite M_n; heating rate: 20 K/min	
Poly(ethyl ethoxycarbonylmethacrylate)		325	Intrinsic vicosity only 0.24 dL/g	906
Poly(ethyl ethacrylate)		300		746
Poly(ethyl fluoromethacrylate)		316		910
Poly(hexyl hexyloxycarbonylmethacrylate)		269	Intrinsic vicosity only 0.24 dL/g	906
Poly[(1-heptoxycarbonyl-1-heptoxycarbonylmethylene)ethylene]	28451-56-1	188, 250	DSC, onset, 20 deg/min HR	1110
Poly(isobutyl chloroacrylate)		363		832,911
Poly(isopropyl chloroacrylate)		363	Vicat softening point	832,863
Poly[(1-methoxycarbonyl-1-methoxycarbonylmethylene)ethylene]		372	DSC, onset, 20 deg/min HR	1110
Poly(methyl chloroacrylate)		413	Vicat softening point	863
Poly(methyl β-chloroacrylate)		416	No measurement details	820
Poly(methyl fluoroacrylate)		404	No details on samples or measurement	820,912
Poly(methyl fluoromethacrylate)		357	No experimental details	820,910
Poly(methyl phenylacrylate) atactic		391		913
isotactic		397		
Poly(propyl chloroacrylate)		344	Vicat softening point	832,863
1.2. POLY(ALKENES)				
Poly(butene-1) see Poly(ethylethylene)	9003-28-5			
Poly(butylethylene)		223		1,272,574, 629–633
Poly(*tert*-butylethylene)		337	Softening point, highly crystalline sample	631
Poly(cyclohexylethylene) atactic		393		634–639
isotactic		406	Dynamic method	640
Poly(2-cyclohexylethylene)		313	Mechanical method	634

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly[(cyclohexylmethyl)ethylene]		348	Mechanical method	634
Poly(3-cyclohexylpropylethylene)		248	Softening point, comparative data reported	631
Poly(cyclopentylethylene)		348	Dynamic method	634
Poly[(cyclopentylmethyl)ethylene]		333	Mechanical method	634
Poly(decylethylene), poly(1-decene)	25189-70-2	237		629,632,641
Poly(3,3-dimethylbutylethylene)		326	Softening point	631
Poly(1,1-dimethylethylene), poly(isobutane)	9003-27-4	200		1,23,24,58,61, 216,223,695–704
		205	Volumetric measurements	1252
		195		1255
		202		1288
		170–370		1540
		203		1549
		199		1432
Poly(4,4-dimethylpentene-1) see Poly(neopentylethylene)				
Poly(4,4-dimethylpentylethylene)		313	Softening point, crystalline sample	631
Poly(1,1-dimethyltetramethylene)		253	Dynamic method	706
Poly(1,1-dimethyltrimethylene)		263	Dynamic method	706–709
Poly(dodecylethylene), poly(1-dodecene)	25067-08-7	241		629,632,641,1078
Poly(ethylene)	9002-88-4	–		
		195		1255
		275		1254
		190		1287
		148	Conflicting interpretations of data; branch point transition at 252 K	1,6,16,28, 61,80,191, 223,238,261, 262,272,317, 318,344,349, 395,396,469, 521–523,574, 589,592,608,629, 641–676
		About 148	DSC,10/deg/min HR	1080
		222–240	WLF fit of volume relaxation	1076
–C–		163		1432
–C– and –C–C–		248		1432
Poly(ethylene) [Poly(methylene)]	9002-88-4	155		489,897,598,574, 694
Poly(ethyl ethylene)		235–240	Calorimeter	1073
		249	Wide spread in reported values	1,61,67,273,349, 395,397,574,629, 632,641,645,646, 677–680
		522		1541
Poly(1-ethyl-1-methyltetramethylene)		~250	DTA heating rate	681
Poly(ethyl-2-propylene)		268	Dynamic method	682
Poly(furylene ethylene)		293		1477
Poly(heptylethylene), poly(1-heptene)	25511-64-2	226	Dynamic method	629
Poly(1-hexene)	25067-06-5	About 215	Calorimeter	1072
Poly(hexyldecylethylene)		328	Dynamic method, stereoregular sample; may be first-order transition	629,641,683
Poly(hexylethylene)		208–228	Conflicting data	1,574,629,632
Poly(hydroxymethylene)		407	DSC, onset, 6 deg/min HR, dry, *f*(water)	1085
Poly(isobutylene) see Poly(1,1-dimethylethylene)	9003-27-4			
Poly(isobutylethylene)		302	Reported values range from 297 to 333 K	1,51,675,684–692
		313		1330
		300 ± 1		1356
		302		1432
		573		1451

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(isohexylethylene)		239	Softening point	631
Poly(isopentylethylene)		259	Softening point	631
Poly(isopropylethylene) atactic		323	Dynamic method	634,641,685,691, 692
isotactic		367	Dilatometry; suggested transition crystal/crystal type	693
Poly(1-methyloctamethylene)		215	Heating rate: 4–8 K/min	705
Poly(4-methylpentene-1) see Poly(isobutylethylene)	25068-26-2			
Poly(neopentylethylene)		332	Softening point, crystalline sample	631
Poly(nonylethylene)		236		632
Poly(octylethylene), poly(1-octene)	25511-67-5	232		629,632,641
Poly(pentene-1)		238		1356
		511		1541
Poly(pentylethylene)		242	Dynamic method	629
Poly(propylene) atactic	9003-07-0	–		1084
		238		1320
		~260	Conflicting data; most values reported range 258 to 270 K	1,6,15,80,122, 191,223, 261,272, 273,282,318,326, 394–397,469,574, 615,629,632,641, 645,640,659,666, 668,675,677,678, 684,710–726,1255
		266	DSC, onset, *f*(MW)	1082
		253		1271
		267	Light scattering under terminal mode	1452
			Light scattering under segmental mode	1452
		170–370		1540
		243		1432
		263		1499
isotactic	25085-53-4	–		1083
		~265	Most values range 238 to 260 K	
		272	DSC, onset, quenched, *f*(MW)	1081
syndiotactic (c)		~265	Most values range 263 to 267 K	
Poly(propylethylene)		~233	Conflicting data	1,272,574,595, 629,630,632,645, 685,727
Poly(propyl-2-propylene)		300	Dynamic method	682
Poly(tetradecylethylene)		246		629,632,641
Poly(2,5-thienylene ethylene)		298		1477
		353		1477
Poly(1,1,2-trimethyltrimethylene)		310		682
1.3. POLY(DIENES)				
EPDM, maleated		236		1455
Natural rubber see Poly(isoprene) *cis*				
Neoprene see Poly(1-chloro-1-butenylene)				
Poly(1-bromo-1-butenylene)		241	DSC, annealed	1077
Poly(butadiene)s see Poly(1-butylene)s and Poly(vinylethylene)				
Poly(1,2-butadiene)		293		1432
		258		1337
ionically-terminated		273		1337
Poly(1,3-butadiene) *cis*		170–370		1540
Poly(1,4-butadiene)	9903-17-2	218		1432
cis		170		1285
Poly(1-butenylene) *cis*		164	DSC, onset, HR 20 deg/min, quenched	1075
		171		26,61,574–597

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
trans		215	Wide spread in published data	580,583,585–587, 589,594,595,598, 599
Poly(1-butyl-1-butenylene)		192	Dynamic method	600
Poly(1-*tert*-butyl-1-butenylene)		293		80,348,601,602
Poly(2-chloro-1,3-butadiene) see Poly(1-chloro-1-butenylene)				
Poly(1-chloro-1-butenylene) *cis*		253		603
trans		233		1,24,604–611
Poly(2-chloro-1,4,4-trifluoro-1-butenylene)		256	No experimental details	587
Poly(chloroprene)	9010-98-4	227		1360
Poly(1-decyl-1-butenylene)		220		1
Poly(endo-dicyclopentadiene)		370		1486
Poly(exo-dicyclopentadiene)		339		1486
Poly(1,2-dimethyl-1-butenylene)		262		576
Poly(1-ethyl-1-butenylene)		197		600,612
Poly(1-heptyl-1-butenylene)		190		80,601
Poly(isoprene) *cis*	9003-31-0, 104389-31-3	200		349,388,394,464, 469,574,591,594, 595,613–623
		203		1255,1271
		204		1432,1309
trans	104389-32-4	266		1255
		206–218	DSC, Mdpt, *f*(HR,TH)	1079
		207	DSC, onset, 20 deg/min HR	1074
		215		514,581,589,594, 608,617,624,1329
protonated		215		1495
Poly(isoprene), gutta percha		311		1323
Poly(1-isopropyl-1-butenylene)		221		600,601,612
Poly(4-methoxy-1-butenylene)		256		591
Poly(4-methoxycarbonyl-3-methyl-1-butenylene)		326	Dynamic method	625
Poly(methyl sorbate) see Poly(4-methoxycarbonyl-3-methyl-1-butenylene)				
Poly(norbornene)	25038-76-0	304		1295
		337–313	With increase in spacer length	1405
Poly(octafluoro-4-methyl-1-butenylene)		270	DSC heating rate	97
Poly(1-pentenylene) *cis*		159	Heating rate: 16 K/min	626
trans		183	DTA heating rate	594
Poly(1-phenyl-1-butenylene)		~283	Low molecular weight	584
Poly(1-propyl-1-butenylene)		196		600
Poly[5-(1,1,3,3-tetramethyl-1,3-disilabutyl)norbornene]		297		1295
Poly(1,4,4-trifluoro-1-butenylene)		238	Slightly crystalline	587
Poly(5-trimethylsilylnorbornene)		386		1295
Poly(vinylethylene) atactic		269	Published values range from 245 to 283 K	585,586,592,597, 627,628
	9003-17-2	304–294	With increase in spacer length	1405
		258	DSC	1354
		249 ± 1		1356
		261	Volumetric measurements	1252
		276		1329
cis	40022-03-5	171		1255
deuterated		186		1495
diol		205		1258
diol (crosslinked)		199		1326
diol 50%, Poly(propylene oxide) diol 50%		211		1258
diol 80%, Poly(propylene oxide) diol 20%		213		1258
high		250	DSC	1559
		258	DSC	1559
		264	DSC	1559
		274	DSC	1354,1559
low		268	DSC	1354,1559
		261	DSC	1559
protonated		182		1495
PVE-0		272		1550

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
PVE-5		276		1550
PVE-11		279		1550
PVE-22		282		1550
PVE-44		285		1550
PVE-66		287		1550
trans	25038-44-2	215		1255
1.4. POLY(STYRENES)				
Poly(4-acetylstyrene)		389	Mechanical method	728
Poly(4-*p*-anisoylstyrene)		376	Mechanical method	728
Poly(4-benzoylstyrene)		371	Mechanical method	728
Poly[(2-benzoyloxymethyl)styrene]		345	Mechanical method	729
Poly[3-(4-biphenylyl)styrene]		~471	Softening point	730
Poly[4-(4-biphenylyl)styrene]		593	Softening point	730
Poly(5-bromo-2-butoxystyrene)		320	Mechanical method	731
Poly(5-bromo-2-ethoxystyrene)		353	Mechanical method	731
Poly(5-bromo-2-isopentyloxystyrene)		310	Mechanical method; low viscosity	731
Poly(5-bromo-2-isopropoxystyrene)		308	Mechanical method	731
Poly(5-bromo-2-methoxystyrene)		359	Mechanical method	731
Poly(5-bromo-2-pentyloxystyrene)		322	Mechanical method; low viscosity	731
Poly(5-bromo-2-propoxystyrene)		327	Mechanical method; low viscosity	731
Poly(4-bromostyrene)	24936-50-3	391		732–734
		414–430	DSC, Mdpt, *f*(TH)	1124
Poly(2-butoxycarbonylstyrene)		339	Mechanical method	735
Poly(4-butoxycarbonylstyrene)		349	Mechanical method	728
Poly(-[(2-butoxyethoxy)methyl]styrene)		<235		736
Poly(2-butoxymethylstyrene)		340	Mechanical method	729
Poly(4-butoxymethylstyrene)		<283		736
Poly[4-(*sec*-butoxymethyl)styrene]		313	Dynamic method	736
Poly(4-butoxystyrene)		~320	Mechanical method	736,737
Poly(5-*tert*-butyl-2-methylstyrene)		360		732
Poly(4-butylstyrene)		279		736,738,739
Poly(4-*sec*-butylstyrene)		359	Softening point	739
Poly(*tert*-butylstyrene)		422		1523
Poly(4-*tert*-butylstyrene)	26009-55-2	399–404	DSC, Mdpt, X. 1 deg/min, *f*(CR)	1122
Poly(4-butyrylstyrene)		347	Mechanical method	728
Poly(2-carboxystyrene)		450	Mechanical method	742
Poly(4-carboxystyrene)		386	Mechanical method	728
Poly(4-chloro-3-fluorostyrene)		395		732
Poly(4-chloro-2-methylstyrene)		418		732
Poly(4-chloro-3-methylstyrene)		387		732
Poly(2-chlorostyrene)		392		732
Poly(3-chlorostyrene)		363		732
Poly(4-chlorostyrene)	24991-47-7	383		83,732–734
		388–401	DSC, Mdpt, *f*(TH)	1123
		298		1423
Poly(4-cyanostyrene)		393	Sample thought to be crosslinked	746
Poly(4-decylstyrene)		208		738
Poly(2,4-dichlorostyrene)		406		732,743
Poly(2,5-dichlorostyrene)		379		44,732,744
Poly(2,6-dichlorostyrene)		440		83,569,745
Poly(3,4-dichlorostyrene)		401		732,744
Poly[4-(2-diethylaminoethoxycarbonyl)styrene hydrochloride]		347	Mechanical method	728
Poly(4-diethylcarbamoylstyrene)		375	Mechanical method	728
Poly(2,5-difluorostyrene)		374	Softening point	83
Poly(2,4-diisopropylstyrene)		~435	Softening point	83
Poly(2,5-diisopropylstyrene)		441	Softening point	83

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(2-dimethylaminocarbonylstyrene)		463	Mechanical method; low viscosity	742
Poly(4-dimethylaminocarbonylstyrene)		398	Mechanical method	728
Poly[2-(2-dimethylaminoethoxycarbonyl)styrene]		342	Mechanical method	735
Poly[4-(2-dimethylaminoethoxycarbonyl)styrene]		373	Mechanical method	728
Poly[4-(2-dimethylaminoethoxycarbonyl)styrene hydrochloride]		355	Mechanical method	728
Poly(2,4-dimethylstyrene)		385		122,732,739,749, 768
Poly(2,5-dimethylstyrene)		416	DTA heating rate	732
Poly(3,4-dimethylstyrene)		384	DTA heating rate	732
Poly(3,5-dimethylstyrene)		377		749
Poly(4-dodecylstyrene)		221		738
Poly(2-ethoxycarbonylstyrene)		391	Mechanical method	735
Poly(4-ethoxycarbonylstyrene)		367	Mechanical method	728
Poly[4-(2-ethoxymethyl)styrene]		273	Dynamic method	736
Poly(2-ethoxymethylstyrene)		347	Mechanical method; low viscosity	729
Poly(4-ethoxystyrene)		~359	Mechanical method	737
Poly[4-(1-ethylhexyloxymethyl)styrene]		250		736
Poly(2-ethylstyrene)		376	Softening point	739
Poly(3-ethylstyrene)		~303	Softening point	739
Poly(4-ethylstyrene)		300, <351	Conflicting data	736,738,739
Poly(2-fluoro-5-methylstyrene)		384	Mechanical method	748
Poly(4-fluorostyrene)		368		732–734,749–751
Poly(4-hexadecylstyrene)		278		738
Poly(4-hexanoylstyrene)		339	Mechanical method	728
Poly(2-hexyloxycarbonylstyrene)		318	Mechanical method	735
Poly(4-hexyloxycarbonylstyrene)		339	Mechanical method	728
Poly(4-hexyloxymethylstyrene)		253	Dynamic method	736
Poly(4-hexylstyrene)		246		738
Poly[4-(4-hydroxybutoxymethyl)styrene]		293	Dynamic method	736
Poly[4-(2-hydroxybutoxymethyl)styrene]		319	Dynamic method	736
Poly[4-(1-hydroxyiminoethyl)styrene]		407	Mechanical method	728
Poly(4-[(1-hydroxyimino)-2-phenethyl]styrene)		384	Mechanical method	728
Poly[4-(1-hydroxy-3-dimethylaminopropyl)styrene]		316	Mechanical method; low viscosity	754
Poly[4-(1-hydroxy-1-methylbutyl)styrene]		~403	Softening point	754
Poly[4-(1-hydroxy-1-methylethyl)styrene]		~438	Softening point	754
Poly[4-(1-hydroxy-1-methylhexyl)styrene]		~364	Softening point	754
Poly[4-(1-hydroxy-1-methylpentyl)styrene]		~356	Softening point	754
Poly[4-(1-hydroxy-1-methylpropyl)styrene]		~459	Softening point	754
Poly(2-hydroxymethylstyrene)		433		1
Poly(3-hydroxymethylstyrene)		398	Dynamic method	1
Poly(4-hydroxymethylstyrene)		413		1
Poly[4-(1-hydroxy-3-morpholinopropyl)styrene]		323	Mechanical method; low viscosity	754
Poly[4-(1-hydroxy-3-piperidinopropyl)styrene]		327	Mechanical method; low viscosity	754
Poly(4-hydroxystyrene)		433		1423
Poly(4-iodostyrene)		429		733,734
Poly(2-isobutoxycarbonylstyrene)		400	Mechanical method	735
Poly(4-isobutoxycarbonylstyrene)		363	Mechanical method	728
Poly(2-isopentyloxycarbonylstyrene)		341	Mechanical method	735
Poly(2-isopentyloxymethylstyrene)		351	Mechanical method; low viscosity	729
Poly(4-isopentyloxystyrene)		~330	Mechanical method	737
Poly(2-isopropoxycarbonylstyrene)		419	Mechanical method	735
Poly(4-isopropoxycarbonylstyrene)		368	Mechanical method	728
Poly(2-isopropoxymethylstyrene)		361	Mechanical method; low viscosity	729
Poly(4-isopropylstyrene)		306	Softening point	739
Poly(2-methoxycarbonylstyrene)		403	Mechanical method; low viscosity	742
Poly(4-methoxycarbonylstyrene)		386	Mechanical method	728

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(2-methoxymethylstyrene)		362	Mechanical method; low viscosity	729
Poly(4-methoxymethylstyrene)		350	Dynamic method	736
Poly(4-methoxy-2-methylstyrene)		~358	Softening point	755
Poly(2-methoxystyrene)		~348	Softening point	755
Poly(4-methoxystyrene)		~362	Mechanical method	737,755–757
Poly(2-methylaminocarbonylstyrene)		462	Mechanical method	742
Poly(α-methylstyrene)	25014-31-7	293	DSC, onset, 20 deg/min HR	1130
		371–375	DSC, Mdpt, 20 deg/min HR, *f*(TH)	1135
		453		1549,1432
		443		1324
		455	DSC	1277
Poly(2-methylstyrene)		409		63,732,739,749,755
Poly(3-methylstyrene)		370	DTA heating rate	732,739,749,766
Poly(4-methylstyrene)	24936-41-2	366, 374	Conflicting data	732,739,756,766,767
		382		1423
Poly(4-methoxystyrene)	24936-44-5	386	DSC, Mdpt, 320 deg/min CR, 1 deg/min HR, *f*(TH, HR, M_n)	1140
Poly(4-morpholinocarbonylstyrene)		400	Mechanical method	728
Poly[4-(3-morpholinopropionyl)styrene]		314	Mechanical method	754
Poly(4-nonadecylstyrene)		305		1
Poly(4-nonylstyrene)		220		738
Poly(4-octadecylstyrene)		305		738
Poly(4-octanoylstyrene)		323	Mechanical method	728
Poly[4-(octyloxymethyl)styrene]		231	Dynamic method	736
Poly(2-octyloxystyrene)		286		769
Poly(4-octylstyrene)		228		738
Poly[4-(pentadexafluoroheptyl)styrene]		320	Heating rate 32 K/min, *f*(TH)	747
Poly(2,3,4,5,6-pentafluorostyrene)		378	Heating rate: 5–20 K/min	97
Poly(2-pentyloxycarbonylstyrene)		365	Mechanical method	735
Poly(2-pentyoxymethylstyrene)		320	Mechanical method	729
Poly(perfluorostyrene)		467	Heating rate: 5–20 K/min	97
Poly(2-phenethyloxymethylstyrene)		336	Mechanical method; low viscosity	729
Poly(2-phenoxycarbonylstyrene)		397	Mechanical method; low viscosity	742
Poly(4-phenoxystyrene)		~373	Softening point	83
Poly(4-phenylacetylstyrene)		351	Mechanical method	728
Poly(2-phenylaminocarbonylstyrene)		464	Mechanical method; low viscosity	742
Poly(4-phenylstyrene)		434	Extrapolated to zero rate	763, 770
Poly(4-piperidinocarbonylstyrene)		387	Mechanical method	728
Poly[4-(3-piperidinopropionyl)styrene]		311	Mechanical method	754
Poly(4-propionylstyrene)		375	Mechanical method	728
Poly(2-propoxycarbonylstyrene)		381	Mechanical method	735
Poly(4-propoxycarbonylstyrene)		365	Mechanical method	728
Poly(2-propoxymethylstyrene)		370	Mechanical method; low viscosity	729
Poly(4-propoxymethylstyrene)		295	Dynamic method	736
Poly(4-propoxystyrene)		343	Mechanical method	737
Poly(4-propoxysulfonylstyrene) isotactic		490	DTA heating rate	771
Poly(styrene) alkylated		356		1521
amorphous		373		1506
crosslinked		373		1352
deuterated PS		378		1495
isotactic and atactic	9003-53-6	373		9,17,21,22,25,47,51, 57,63,64,72,78,79,188, 190,191,261,263,317,318, 344,350–352,394,397, 399,469,524,569,576,619, 628,630,635,637,640,646, 647,684,699,731–734, 746,750,766,768,

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
				772–810,1125, 1133,1138,1139,1141, 1254,1276,1288, 1308,1318,1324,1423, 1432,1523,1549,1255
			DSC	1489
			DSC, onset, 16 deg/min HR, quenched, *f*(MW)	1126
			DSC, Mdpt, 20 deg/min HR, *f*(MW)	1129
			DSC, Intg, *f*(HR, CR, MW)	1143
			DSC, Intg, *f*(HR, CR)	1144
			Dilatometer, CR 3 deg/h; creep relaxation, quenched	1148
		368	Dilatometer, 2.5 deg/min CR	1145
		371	DSC, onset, HR 32 deg/min, quenched	1132
		371	DTA, DSC, onset, 1 deg/min HR, *f*(HR)	1147
		371–377	DSC, penetration, onset MP, zero HR	1146
		373	DSC, Intg, OHR, 10 deg/min CR	1142
		376	DSC, Mdpt, 1 deg/min X HR, TH, *f*(MW)	1128
		377	DSC, onset, 20 deg/min HR after similar cool, *f*(MW)	1149
		382	DSC, onset, 20 deg/min HR	1130
		364		1271
		374	GPC	1284
		377	PCS	1309
		378	NR and SE	1319
		380		1433
		374		1437
		400		1530
		401	DSC	1530
		170–370		1540
p-cyanobenzyl		365		1253
p-cyanobiphenyl		370		1253
sulfonated syndiotactic		433–463		1322
Poly(4-tetradecylstyrene)		237		738
Poly(4-*p*-toluoylstyrene)		372	Mechanical method	728
Poly(α, β, β-trifluorostyrene)		475	Heating rate: 5–20 K/min; values up to 513 K reported	83,97,114,752, 753
Poly{3-[bis(trimethylsiloxy)boryl]styrene}		308	Refractive index	1136
Poly{4-[bis(trimethylsiloxy)boryl]styrene}		357	Refractive index	1136
Poly(2,4,5-trimethylstyrene)		~409	Softening point	83
Poly(2,4,6-trimethylstyrene)		~435	Softening point	83
Poly(4-[bis(trimethylstannyl)methyl]styrene)		413		1556,1347
Poly(4-valerylstyrene)		343	Mechanical method	728
1.5. POLY(VINYL ALCOHOL) AND POLY(VINYL KETONES)				
Poly(1-acetyl-1-fluoroethylene)		415		923
Poly(benzoylethylene)		314, 347	Conflicting data	924,925
Poly(4-bromo-3-methoxybenzoylethylene)		317	Mechanical data	924
Poly(4-*tert*-butylbenzoylethylene)		377		925
Poly(4-chlorobenzoylethylene)		310, 362	Conflicting data	924,925
Poly(3,4-dimethylbenzoylethylene)		315	Mechanical data	924
Poly(4-ethylbenzoylethylene)		325		924,925
Poly(4-isopropylbenzoylethylene)		336		925
Poly(4-methoxybenzoylethylene)		319	Mechanical data	924
Poly(phenyl vinyl ketone) see Poly(benzoylethylene)	26742-84-7			
Poly(4-propylbenzoylethylene)		317		925

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(*p*-toluoylethylene)		344		924,925
Poly(vinyl alcohol) [Poly(hydroxyethylene)]	9002-89-5	358	Dynamic method	1,191,202,216, 230,261,573,926, 927
			From hydrolysis of poly(vinyl acetate)	1424
		308		1498
		350		1513
1.6. POLY(VINYL ESTERS)				
Poly[(2-acetoxybenzoyloxy)ethylene]		333		29,925
Poly(4-acetoxybenzoyloxyethylene)		~349		29,925
Poly(acetoxyethylene) [Poly(vinyl acetate)]	9003-20-7	305		1,9,12,19,22,62, 187,216,223,230, 286,352,354,399, 400,573,593,695, 775,777,792,816, 840,845,888,926, 928,932,1016, 1034–1044,1121, 1302,1320,1288
		302		1432
		590		1317
		315		1339,1516
		304		1513
		303		1255
		311		1437,1468
		313	DSC	1489
Poly[(1-acetylindazol-3-ylcarbonyloxy)ethylene]		423	Heating rate: 20 K/min-"onset" value	1045
Poly(4-benzoylbutyryloxyethylene)		318	DTA heating rate	1046
Poly(benzoyloxyethylene)		344		29,354,755,820, 925,1047,1048
Poly(3-bromobenzoyloxyethylene)		331		29,925
Poly(4-bromobenzoyloxyethylene)		365		29,925,1047,1048
Poly[(*tert*-butoxycarbonylamino)ethylene]		393	DTA heating rate	1049
Poly(4-*tert*-butylbenzoyloxyethylene)		374		29,925,1050
Poly(4-butyryloxybenzoyloxyethylene)		334		29,925
Poly(2-chlorobenzoyloxyethylene)		335		29,925,1048
Poly(3-chlorobenzoyloxyethylene)		338		29,925,1048
Poly(4-chlorobenzoyloxyethylene)		357		29,925,1047,1048
Poly(cyclohexanoyloxyethylene)		349	Mechanical method, heating rate: 30 K/h	1043
Poly(cyclohexylacetoxyethylene)		298	Mechanical method, heating rate: 30 K/h	1043
Poly(4-cyclohexylbutyryloxyethylene)		~263	Mechanical method, heating rate: 30 K/h	1043
Poly(cyclopentanoyloxyethylene)		309	Mechanical method, heating rate: 30 K/h	1043
Poly(cyclopentylacetoxyethylene)		270	Mechanical method, heating rate: 30 K/h	1043
Poly(3,3-dimethyl-3-phenylpropionyloxyethylene)		293	Mechanical method, heating rate: 30 K/h	1043
Poly[(2,2-dimethylvaleryloxy)ethylene]		283	Mechanical method	1043
Poly(4-ethoxybenzoyloxyethylene)		343		29,925
Poly(4-ethylbenzoyloxyethylene)		326		29,925
Poly(2-ethyl-2-methylpropylene terephthalate)		340		1532
		328–338		1532
Poly[(2-ethyl-2,3,3-trimethylbutyryloxy)ethylene]		388	Mechanical method	1043
Poly(formyloxyethylene)		310	~60% syndiotactic diads	593
		306	50% syndiotactic diads	
Poly[(heptafluorobutyryloxy)ethylene]		300		1051
Poly(3-hydroxybutyrate)		277		1262
		278 ± 2		1536
		223		1494

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(isonicotinoyloxyethylene)		372	From polyvinyl alcohol	29,288,1053
Poly(4-isopropylbenzoyloxyethylene)		342		29,925
Poly[(2-isopropyl-2,3-dimethylbutyryloxy)ethylene]		393	Mechanical method	1043
Poly[(2-methoxybenzoyloxy)ethylene]		338		29,925
Poly[(3-methoxybenzoyloxy)ethylene]		~317		29,925
Poly[(4-methoxybenzoyloxy)ethylene]		360		29,757,925, 1047,1048
Poly[(2-methylbenzoyloxy)ethylene]		321		29,820,925,1048
Poly[(3-methylbenzoyloxy)ethylene]		324		29,925,1048
Poly[(4-methylbenzoyloxy)ethylene]		343		29,925,1047,1048
Poly[(1-methylcyclohexanoyloxy)ethylene]		359	Mechanical method, heating rate: 30 K/h	1043
Poly(nicotinoyloxyethylene)		360	From polyvinyl alcohol	29,1053
Poly(nitratoethylene)		307		903
Poly[(3-nitrobenzoyloxy)ethylene]		366		29,925
Poly[(4-nitrobenzoyloxy)ethylene]		395		29,925
Poly(nonadecafluorodecanoyloxy)ethylene]		253–255		1051
Poly[(nonafluorovaleryloxy)ethylene]		288–293		1051
Poly(octamethylene *p,p'*-dibenzoate)		315		1519
Poly[(pentadecafluorooctanyloxy)ethylene]		258–263		1051
Poly[(pentafluoropropionyloxy)ethylene]		315		1051
Poly[(4-phenylbenzoyloxy)ethylene]		358		29,925
Polyl(pivaloyloxyethylene)		359	Mechanical method	1043
Poly[(4-propionyloxybenzoyloxy)ethylene]		346		29,925
Poly(propionyloxyethylene)		283	Mechanical method	1043
Poly[(2,2,3,3-tetramethylvaleryloxy)ethylene]		363	Mechanical method	1043
Poly[(2,2,3,4-tetramethylvaleryloxy)ethylene]		323	Mechanical method	1043
Poly[(2,2,4,4-tetramethylvaleryloxy)ethylene]		328	Mechanical method	1043
Poy[(4-*p*-toluoylbutyryloxy)ethylene]		313	DTA heating rate	1046
Poly(triethylene glycol *p,p'*-dibenzoate)		293	Annealed	1505
Poly[(trifluoroacetoxy)ethylene]		~319, <348	Conflicting data	1051,1052
Poly[(3-trimethylsilylbenzoyloxy)ethylene]		353	DTA heating rate	1054
Poly[(4-trimethylsilylbenzoyloxy)ethylene]		408	DTA heating rate	1054,1055
Poly[(undecafluorocyclohexylcarbonyloxy)ethylene]		327		1051
Poly[(undecafluorohexanoyloxy)ethylene]		264	Plasticizer may be present	1051
Poly(vinyl acetate) see Poly(acetoxyethylene)	9003-20-7			
Poly(vinyl formate) see Poly(formyloxyethylene)				
Poly(vinyl-4-isopropylbenzoate) see Poly(4-isopropyl benzoyloxyethylene)				
Poly(4-(11-(vinyloxy)undecyloxy)-4-cyanophenylbenzoate)		310		1548
Poly(4-(11-(vinyloxy)undecyloxy)-4-ethoxyphenylbenzoate)		310		1548
1.7. POLY(VINYL ETHERS) AND POLY(VINYL THIOETHERS)				
Poly(butoxyethylene)		218		1,832,866,914–918
		217		1432
Poly(*sec*-butoxyethylene)		253		866,914
Poly(*tert*-butoxyethylene)		361		1,918
Poly(butylthioethylene)		253		866
Poly(butyl vinyl ether) see Poly(butoxyethylene)				
Poly(chlorotrifluoroethylene)	9002-83-9	325		1470
Poly(cyclohexyloxyethylene)		354	Softening point	918
Poly(decyloxyethylene)		~183, 211	Conflicting data, independent DSC data supports higher value	866,914,916,917
Poly(2,2-dimethylbutoxyethylene)		282	Mechanical method	918
Poly(1,1-difluoro-2-trifluoromethoxyethylene)		263–273	Estimated from copolymer data	457
Poly(1,2-difluoro-1-trifluoromethoxyethylene)		263–273	Estimated from copolymer data	457
Poly(dodecafluorobutoxyethylene)		263–273	T_g estimated from copolymer data	457
Poly(ethoxyethylene)		230		1,223,521,573, 832,866,914–920
	25104-37-4	240		1432
Poly[(2-ethylhexyloxy)ethylene]		207		866,915
Poly(ethylthioethylene)		266	Viscosity only 0.2 dl/g	866

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(2-furyloxirane)		288		1419
Poly[(heptafluoro-2-propoxy)ethylene]		~328–338		839
Poly(hexafluoromethoxyethylene)		268	DTA heating rate	457
Poly(hexyloxyethylene)		199		866,914-918,1432
Poly(isobutoxyethylene)		254		1,223,573,832, 866,914,916–918, 920,922
Poly(isopropenyl methyl ether) see Poly(2-methoxy propylene)				
Poly(isopropoxyethylene)		270		832,866,914,918
		261		1432
Poly(methoxyethylene)		242		1,223,805,866, 914–918,920,1255
			NR and SE	1319
		246	GPC	1284
		228		1300
		245		1308
		248		1348
		251		1495,1432
		191		1502
		199		1502
		247		1516
Poly(2-methoxypropylene)		340		866
Poly(methylthioethylene)		272		866
Poly(neopentyloxyethylene)		~424	Softening point	918
Poly(octyloxyethylene)		194		866,914–917
Poly(pentyloxyethylene)		207		866,915
Poly(propoxyethylene)		224		832,915
Poly(2,2,2-trifluoroethoxytrifluoroethylene)		308	DTA heating rate	457,921
Poly[1,1-bis(trifluoromethoxy)difluoroethylene]		213	Poorly defined DTA endotherms	457
Poly(vinyl methyl ether) see Poly(methoxyethylene)	9003-09-2			
Poly(4-vinyl phenol)	24979-70-2	429		1457
Poly(*p*-vinyl phenol)		428		1552

1.8. POLY(VINYL HALIDES) AND POLY(VINYL NITRILES)

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(1-acetoxy-1-cyanoethylene)		420	Heating rate: 8 K/min	255
Poly(acrylonitrile) [poly(cyanoethylene)]	25014-41-9	398	Dielectric, 1 Hz, *f*(Hz)	1113
		370		1,7,26,80,191, 202,393,400,521, 525,576,752,772, 779,787,928–941
		355–413		1382
Poly(chlorotrifluoroethylene)	9002-83-9	~325	By "static" methods	66,80,191,261, 349,355
		373	By mechanical methods even at low frequencies	396,401,521,647, 893,945–961
Poly(1,1-dichloroethylene), poly(vinylidene chloride)		255		1,6,62,80,216,521, 524,648,942–944
Poly(1,1-dichloro-2-fluoroethylene)		~320	[η] only 0.035 dl/g	962
Poly(1,2-dichloro-1,2-difluoroethylene)		350	Heating rate: 5–20 K/min, high pressure, radiation synthesis	97
Poly(1,1-difluoroethylene), poly(vinylidene fluoride)	24937-79-9	–		1118
		~233		401,963–970
		223		1321
		235	DSC	1333
Poly(1,2-difluoroethylene)		371	DTA heating rate	114,457,971
	9002-84-0	200		1287
Poly(ethylene), chlorinated	63231-66-3, 110028-31-4	281	48 wt.% Cl	1325
Poly(hexafluoropropylene)		425	Heating rate: 5–20 K/min	97,984,1006
Poly[(heptafluoropropyl)ethylene]		331	Heating rate: 5–20 K/min, high pressure, radiation synthesis	97

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(2-iodoethylethylene)		343	Dynamic method	1009
Poly(9-iodononylethylene)		267	Dynamic method	1009
Poly(3-iodopropylethylene)		~303	Dynamic method	1009
Poly(methacrylonitrile)		393		1
Poly[(pentafluoroethyl)ethylene]		314	Heating rate: 5–20 K/min, high pressure, radiation synthesis	97
Poly(tetradecafluoropentylethylene)		503?	Heating rate: 5–20 K/min, high pressure, radiation synthesis, value uncertain	97
Poly(tetrafluoroethylene) [poly(difluoromethylene)]	9002-84-0	390		1117
		160, 400	Much data, some conflicting	1,6,66,190,191, 253,261,355,256, 296,521,522,641, 651,659,891,893, 914,921,952, 972–1005
Poly(2,3,3,3-tetrafluoropropylene)		315	Heating rate: 5–20 K/min, high pressure, radiation synthesis	97
Poly(trifluoroethylene)		304	Quoted value, DTA?	457
Poly(3,3,3-trifluoropropylene)		300		97,914,1007,1008
Poly(vinyl chlorate)		347		1271
Poly(vinyl chloride)	9002-86-2	–		1112,1115,1116
		–	Dilatometer, CR 3 deg/h; creep relaxation, quenched	1119
		354	Increasing syndiotactic content increases T_g to 371 K	1,21,52,78,80, 104,188,191, 230,286,349, 353,354,356, 469,608,696, 720,772,777, 787,798,861, 926,942,944, 972,1010–1031
		366	Dekryptonation, *f*(MW)	1114
		371	DSC, 20 deg/min HR, M_n infinity, onset, varied annealing	1120
		359		1325
		357		1335
		363		1432
		342		1398
		353		1255
		347		1288
		361		1489
chlorinated	68648-82-8	408	67 wt.% Cl	1325
with Poly(butyl methacrylate) (30/70)		313	Semi-IPNs	1359
with Poly(butyl methacrylate) (50/50)		315	Blend	1359
with Poly(butyl methacrylate) (50/50)		323	Semi-IPNs	1359
with Poly(ethyl methacrylate) (30/70)		343	Semi-IPNs	1359
with Poly(ethyl methacrylate) (50/50)		325	Blend	1359
with Poly(ethyl methacrylate) (50/50)		343	Semi-IPNs	1359
with Poly(methyl methacrylate) (30/70)		370	Semi-IPNs	1359
with Poly(methyl methacrylate) (50/50)		363	Blend	1359
with Poly(methyl methacrylate) (50/50)		366	Semi-IPNs	1359
with Poly(methyl methacrylate) (80/20)		364		1446
H-H Poly(vinyl chloride)		348	DSC	1299
		352	DMA	1299
Poly(vinyl fluoride)	24981-14-4	314	Mechanical method	521,1032,1033
Poly(vinylidene chloride) see Poly(1,1-dichloroethylene)	9002-85-1			

1.9. OTHERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(1,1-bis[(1-adamantyloxy)carbonyl]-2-vinylcyclopropane)		307		1492
Poly(benzylethylene)		333		631,634,1056

TABLE 1. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(*N*-carbazolylethylene)	25067-59-8	500	DSC, 10 deg/min HR, X to infinite MW	1127
		500		1330
		357, 423, 481	Conflicting values reported	1,272,573,845
Poly[dimethylamino(ethoxy)phosphinylethylene]		305		1057
Poly[dimethylamino(phenoxy)phosphinylethylene]		300		1057
Poly(4,4-dimethyl-oxazolonylethylene)		365	DTA heating rate; low viscosity	1058
Poly(4,4-dimethyl-oxazolonyl-2-propylene)		380, 438	Conflicting data	1058,1059
Poly(2,4-dimethyl-1,3,5-triazinylethylene)		350		820
Poly(diphenylphosphinylethylene)		453		1065
Poly(ferrocenylethylene)		457–467	DSC heating rate	835
Poly(β-hydroxyvalerate)		257		1355
		262		1355
Poly(indazol-2-ylethylene)		331, 298	Two values for different preparations, heating rate: 20 K/min	1045
Poly(isopropyl benzene)		126		1271
Poly(indene)		473		1501
Poly(3-methyl hexane)		90		1271
Poly(3-methyl pentane)		80		1271
Poly(2-methyl pentane)		76		1271
Poly[(2-methyl-5-pyridyl)ethylene]		403	Mechanical method	1060–1062
Poly[(2-methyl-6-pyridyl)ethylene]		365	Heating rate 20 K/min	1061
Poly(1-naphthylethylene)		432	Values range from 323 to 453 K	83,755, 763,1063
Poly(2-naphthylethylene)		424	Extrapolated to zero heating rate	770
Poly(phenethylethylene)		283	Crystalline sample	631,634,1056,1064
Poly(phenethylmethylethylene)		245	Softening point	631
Poly(1,1-bis(phenoxycarbonyl)-2-vinylcyclopropane)		349–357		1535
Poly(phenylacetylene) see Poly(phenylvinylene)				
Poly(phenylvinylene)		393	Crystalline	1066
Poly(phthalimidoethylene)		497	No experimental details	820
Poly(2-pyridylethylene)		377		1061,1062,1067
Poly(4-pyridylethylene)	9017-40-7	415		1061,1062,1272
		433	Molar concentration 5%	1305
		456	Molar concentration 10%	1305
Poly(*N*-pyrrolidinylethylene)	9003-39-8	327		573
		359		1,4,907
		448	DSC, onset, Xp to dry	1150
Poly(*o*-terphenyl)		233		1271
		243		1271
Poly(*m*-tolylmethylethylene)		313	Crystalline sample	1056
Poly(*o*-tolylmethylethylene)		353	Crystalline sample	1056
Poly(*p*-tolylmethylethylene)		338	Crystalline sample	1056
Poly(2,4,6-tribromophenyl acetate)		423		1269
Poly(vinyl carbazole) see Poly(*N*-carbazolylethylene)				
Poly(vinyltrimethylgermanium)		463	Mechanical method	1068
Poly(vinylpyridine) see Poly(pyridylethylene)				
Poly(vinyl pyrrolidine) see Poly(*N*-pyrrolidinylethylene)				

TABLE 2. MAIN-CHAIN CARBOCYCLIC POLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
2.1. POLY(PHENYLENES)				
Poly(3,3′-biphenylylenehexafluorotrimethylene)		324	Heating rate: 32 K/min, η_{inh} only 0.05 dl/g	563
Poly(2-bromo-1,4-phenylene ethylene)		353	Mechanical method	564
Poly(2-chloro-1,4-phenylene ethylene)		343	Mechanical method, heating rate: 1.5 K/min	300,564,565
Poly(2-cyano-1,4-phenylene ethylene)		363	Mechanical method	564
Poly(2,5-dichloro-1,4-phenylene ethylene)		613	Softening point, no measurement details	565
Poly(2,5-dimethyl-1,4-phenylene ethylene)		373	Mechanical method, heating rate: 1.5 K/min	566
Poly(2-ethyl-1,4-phenylene ethylene)		298	Mechanical method	564
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-*p,p,m,p,p*-quinquephenylylenedecamethylene)		453	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-4, 4⁗-*p*-quinquephenylylenedecamethylene)		508	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-*p,p,m,p,p*, quinquephenylylenehexamethylene)		488	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-4, 4⁗-*p*-quinquephenylylenehexamethylene)		523	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-*p,p,m,p,p*-quinquephenylylenetetradecamethylene)		433	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-4,4⁗-*p*-quinquephenylylenetetradecamethylene)		458	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-*p,p,m,p,p*-quinquephenylylenetetramethylene)		453	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-4, 4‴-*p*-quinquephenylylenetetramethylene)		478	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-*p,p,m,p,p*-quinquephenylylenetrimethylene)		513	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2′,3′,6′,2‴,3‴,5‴-hexaphenyl-4,4‴-quinquephenylylenetrimethylene)		563	Heating rate: 20 K/min, structure may contain more *m*-links	568
Poly(2-methyl-1,4-phenylene ethylene)		328	Mechanical method, heating rate: 1.5K/min	564,565
Poly(1,4-phenylenetrichloroethylene)		433	Polymer contains small amount of different structure, mechanical method; heating rate: 1.5K/min	565
Poly(1,4-phenylene ethylene)		~353	Mechanical method, variable data	300,564, 565,567
Poly(1,3-phenylenehexafluorotrimethylene)		303	Heating rate: 32 K/min, η_{inh} only 0.1 dl/g	148
Poly(1,4-phenylene-1-phenylethylene)		428	Softening point, no experimental details	565
Poly(trimethyl-phenylene ether)		483		1432
2.2. OTHERS				
Poly(acenaphthylene)	25036-01-5	487–618	Conflicting data reported	31,83,566, 569–571
		628–649	DSC, onset, 32 deg/min HR after cooling from above T_g	1151
Poly(5-chlorononafluoro-1,3-cyclohexylene-difluoromethylene)		420	Heating rate: 5-20 K/min, high pressure, radiation synthesis, ring structure unproven	97

TABLE 2. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(cyclobutene) erythro di-isotactic		293	Degree of polymerization 150	572
erythro di-syndiotactic		273	Degree of polymerization 15	
Poly(decafluoro-1,3-cyclohexylenedifluoromethylene)		374?	Heating rate: 5–20 K/min	97
Poly(dodecafluoro-1,3-cycloheptylenedifluoromethylene)		471?	Heating rate: 5–20 K/min, high pressure, radiation synthesis, data queried in original paper, ring structure unproven	97
Poly(hexafluoro-1,3-cyclobutylenedifluoromethylene)		395	Heating rate: 5–20 K/min, high pressure, radiation synthesis, ring structure unproven; [η] only 0.03 dl/g	97
Poly(indenylene)		358		573
Poly(octafluoro-1,3-cyclohexylenedifluoromethylene)		390	Heating rate: 5–20 K/min, high pressure, radiation synthesis, ring structure unproven	97
Poly(1,4-naphthyleneethylene)		433	Mechanical method	565

TABLE 3. MAIN-CHAIN ACYCLIC HETEROATOM POLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
3.1. MAIN-CHAIN –C–O–C– POLYMERS				
3.1.1. POLY(ANHYDRIDES)				
Poly(oxycarbonyl-1,4-phenylenehexafluorotrimethylene-1,4-phenylenecarbonyl)		271		433
Poly(oxycarbonyl-1,4-phenyleneisopropylidene-1,4-phenylenecarbonyl)		333		247
Poly(oxycarbonyl-1,4-phenylenemethylene-1,4-phenylenecarbonyl)		395		247
Poly(oxycarbonyl-1,4-phenylenepentamethylene-1,4-phenylenecarbonyl)		321	Amorphous	247
		319	Crystalline	
Poly(oxycarbonyl-1,4-phenylenetetramethylene-1,4-phenylenecarbonyl)		319		247
Poly(oxycarbonyl-1,4-phenylenethiotetramethylenethio-1,4-phenylenecarbonyl)		335		247
Poly(oxyisophthaloyl)		403	Dynamic mechanical method	398,444
3.1.2. POLY(CARBONATES)				
Bisphenol A + 2,2-(fm-biphenyl carboxylate)		421		1432
Bisphenol A + Carboxylate		420		1432
Bisphenol A + Terephthalate + Isophthalate 50/50		468		1432
Bisphenol A of 4,4′-(2,2′-propylidene)-diphenol		313		1431
Bisphenol AP + 2,2-(fm-biphenyl carboxylate)		445		1432
Bisphenol AP + Carboxylate		460		1432
Bisphenol AP + Terephthalate + Isophthalate		516		1432
Bisphenol A-based homopoly(formal)		361	Elsewhere 367 K	1311
Bisphenol AF-based homopoly(formal)		396		1311
Cyclohexane-bisphenol-poly(carbonate)		458		1353
Norbanane-bisphenol-poly(carbonate)		506		1353
Poly(1,4-cyclohexanecarbonate)		411		1393
Poly(2-hydroxypropyl ether Bisphenol A)		370		1516
Polyarylate of Bisphenol A (1 mol), isophthalic acid (0.5 mol) and terephthalic acid (0.5 mol)		472		1254
Polyarylate of Bisphenol A (1 mol), isophthalic acid (0.7 mol) and terephthalic acid (0.3 mol)		466		1254
Polyarylate of Bisphenol A and isophthalic acid		457		1254

TABLE 2. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(cyclobutene) erythro di-isotactic		293	Degree of polymerization 150	572
erythro di-syndiotactic		273	Degree of polymerization 15	
Poly(decafluoro-1,3-cyclohexylenedifluoromethylene)		374?	Heating rate: 5–20 K/min	97
Poly(dodecafluoro-1,3-cycloheptylenedifluoromethylene)		471?	Heating rate: 5–20 K/min, high pressure, radiation synthesis, data queried in original paper, ring structure unproven	97
Poly(hexafluoro-1,3-cyclobutylenedifluoromethylene)		395	Heating rate: 5–20 K/min, high pressure, radiation synthesis, ring structure unproven; [η] only 0.03 dl/g	97
Poly(indenylene)		358		573
Poly(octafluoro-1,3-cyclohexylenedifluoromethylene)		390	Heating rate: 5–20 K/min, high pressure, radiation synthesis, ring structure unproven	97
Poly(1,4-naphthyleneethylene)		433	Mechanical method	565

TABLE 3. MAIN-CHAIN ACYCLIC HETEROATOM POLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
3.1. MAIN-CHAIN -C-O-C- POLYMERS				
3.1.1. POLY(ANHYDRIDES)				
Poly(oxycarbonyl-1,4-phenylenehexafluorotrimethylene-1,4-phenylenecarbonyl)		271		433
Poly(oxycarbonyl-1,4-phenyleneisopropylidene-1,4-phenylenecarbonyl)		333		247
Poly(oxycarbonyl-1,4-phenylenemethylene-1,4-phenylenecarbonyl)		395		247
Poly(oxycarbonyl-1,4-phenylenepentamethylene-1,4-phenylenecarbonyl)		321	Amorphous	247
		319	Crystalline	
Poly(oxycarbonyl-1,4-phenylenetetramethylene-1,4-phenylenecarbonyl)		319		247
Poly(oxycarbonyl-1,4-phenylenethiotetramethylenethio-1,4-phenylenecarbonyl)		335		247
Poly(oxyisophthaloyl)		403	Dynamic mechanical method	398,444
3.1.2. POLY(CARBONATES)				
Bisphenol A + 2,2-(fm-biphenyl carboxylate)		421		1432
Bisphenol A + Carboxylate		420		1432
Bisphenol A + Terephthalate + Isophthalate 50/50		468		1432
Bisphenol A of 4,4′-(2,2′-propylidene)-diphenol		313		1431
Bisphenol AP + 2,2-(fm-biphenyl carboxylate)		445		1432
Bisphenol AP + Carboxylate		460		1432
Bisphenol AP + Terephthalate + Isophthalate		516		1432
Bisphenol A-based homopoly(formal)		361	Elsewhere 367 K	1311
Bisphenol AF-based homopoly(formal)		396		1311
Cyclohexane-bisphenol-poly(carbonate)		458		1353
Norbanane-bisphenol-poly(carbonate)		506		1353
Poly(1,4-cyclohexanecarbonate)		411		1393
Poly(2-hydroxypropyl ether Bisphenol A)		370		1516
Polyarylate of Bisphenol A (1 mol), isophthalic acid (0.5 mol) and terephthalic acid (0.5 mol)		472		1254
Polyarylate of Bisphenol A (1 mol), isophthalic acid (0.7 mol) and terephthalic acid (0.3 mol)		466		1254
Polyarylate of Bisphenol A and isophthalic acid		457		1254

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Polycarbonate		423		1250,1340,1353
		420		1432
		297	In vacuum of 297 K	1442
		418	DSC	1442
		420	DSC	1489
Polycarbonate of Bisphenol A see Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)	24936-68-3			
Poly(2-methoxycyanurate) of Bisphenols F and A		433		1546
Poly(oxycarbonyloxy-2,6-dibromo-1,4-phenylene-isopropylidene-3,5-dibromo-1,4-phenylene)		430		333,334
Poly(oxycarbonyloxy-2-chloro-6-methyl-1,4-phenylene-isopropylidene-3-chloro-5-methyl-1,4-phenylene)		427	Mechanical method, heating rate: 1 K/min	335
Poly(oxycarbonyloxy-2-chloro-1,4-phenylene-cyclohexylidene-3-chloro-1,4-phenylene)		443–452	Mechanical method, heating rate: 1 K/min	335
Poly(oxycarbonyloxy-2-chloro-1,4-phenylene-isopropylidene-3-chloro-1,4-phenylene)		420	Mechanical method	334,335
Poly(oxycarbonyloxy-2-cyclohexyl-1,4-phenylene-isopropylidene-1,4-phenylene)		405		338
Poly(oxycarbonyloxy-2,6-dichloro-1,4-phenylene-cyclohexylidene-3,5-dichloro-1,4-phenylene)		436		334
Poly(oxycarbonyloxy-2,6-dichloro-1,4-phenylene isopropylidene-3,5-dichloro-1,4-phenylene)		453, 493, 504	Conflicting data	334,336,337
Poly(oxycarbonyloxyhexamethylene)		230	Low molecular weight sample	339
Poly(oxycarbonyloxy-2-isopropyl-1,4-phenylene-isopropylidene-1,4-phenylene)		385	No experimental details	338
Poly(oxycarbonyloxy-2-methoxy-1,4-phenylene isopropylidene-1,4-phenylene)		418	No experimental details	338
Poly(oxycarbonyloxy-2,2,3,3,4,4,5,5-octafluorohexamethylene)		232	DTA heating rate	339
Poly[oxycarbonyloxy-1,3-(2,2,4,4-tetra-methylcyclobutylene)]		~500, <433, 418	Conflicting data	340–342
Poly(oxycarbonyloxy-2-methyl-1,4-phenylene-cyclohexylidene-3-methyl-1,4-phenylene)		408	Mechanical method	335,343
Poly(oxycarbonyloxy-2-methyl-1,4-phenylene-isopropylidene-3-methyl-1,4-phenylene)		368, 373, 418, 363–383	Conflicting data	334–336,343
Poly(oxycarbonyloxy-2-methyl-1,4-phenyleneisopropylidene-1,4-phenylene)		413		338
Poly(oxycarbonyloxy-2-methyl-1,4-phenylenemethylene-3-methyl-1,4-phenylene)		324	Mechanical method	335
Poly[oxycarbonyloxy-4,6-dimethyl-1,2-phenylene-methylene-3,5-dimethyl-1,2-phenylene]		410	No experimental details	338
Poly(oxycarbonyloxy-3-methyl-1,4-phenylenebenzylidene-2-methyl-1,4-phenylene)		455	Mechanical method	335
Poly(oxycarbonyloxy-1,4-phenylenebenzylidene-1,4-phenylene)		394		335,338
Poly(oxycarbonyloxy-1,4-phenylene-1,1-butylidene-1,4-phenylene)		396		344
Poly(oxycarbonyloxy-1,4-phenylene-2,2-butylidene-1,4-phenylene)		407		335,344
Poly[oxycarbonyloxy-1,4-phenylene(cyano) phenylmethylene-1,4-phenylene]		411		345
Poly(oxycarbonyloxy-1,4-phenylenecyclohexylidene-1,4-phenylene)		448		334,335,344
Poly(oxycarbonyloxy-1,4-phenylenecyclopentylidene-1,4-phenylene)		440		334,346
Poly(oxycarbonyloxy-1,4-phenylene-1,3-dichloro-1,1,3,3-tetrafluoro-2,2-propylidene-1,4-phenylene)		456	DTA heating rate	337
Poly(oxycarbonyloxy-1,4-phenyleneethylidene-1,4-phenylene)		403		344
Poly(oxycarbonyloxy-1,4-phenylenefluoren-9-ylidene-1,4-phenylene)		653	Heating rate: 10 K/min	347
Poly(oxycarbonyloxy-1,4-phenylenehexafluoro-2,2-propylidene-1,4-phenylene)		449	DTA heating rate	337
Poly(oxycarbonyloxy-1,3-phenylenehexafluorotrimethylene-1,3-phenylene)		319		148

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxycarbonyloxy-1,4-phenylene-4,4-heptylidene-1,4-phenylene)		421		334
Poly(oxycarbonyloxy-1,4-phenyleneisobutylidene-1,4-phenylene)		422		344
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,3-phenyleneisopropylidene-1,4-phenylene)		393	No experimental details	338
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)	24936-68-3			1162
			Dielectric	1163
		About 417	DSC, onset, HR 10 deg/min	1161
		418		78,102,131,145, 230,233,262,263, 287,317–319,321, 335–337, 344, 348–378
		419–420	DSC, Mdpt, 10 deg/min HR, TSD, 2 deg/min HR, *f*(crystallinity)	1164
		428		1254
		417		1259
		421		1297
		420	DSC	1264
		435	No experimental details	338
Poly(oxycarbonyloxy-1,4-phenylenemethylene-1,4-phenylene)		420	No experimental details	338,367
Poly[oxycarbonyloxy-1,4-phenylene (methyl)phenylmethylene-1,4-phenylene]		449		334,336
Poly(oxycarbonyloxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene)		318		247
Poly(oxycarbonyloxy-1,4-phenylenediphenylmethylene-1,4-phenylene)		394		334
Poly(oxycarbonyloxy-1,4-phenylene-2,2-pentylidene-1,4-phenylene)		410		334
Poly[di(oxyethylene)oxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene]		314		247
Poly(oxymethyleneoxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene)		357		247
Poly[di(oxymethylene)oxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene]		325	Amorphous	247
Poly(oxypentamethyleneoxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene)		326		247
Poly(oxy-1,3-phenylenecarbonyloxycarbonyl-1,3-phenyleneoxypentamethylene)		334		247
Poly(oxy-1,3-phenylenecarbonyloxycarbonyl-1,3-phenyleneoxytetramethylene)		<293		247
3,3,5-trimethyl cyclohexane-1-polycarbonate		508		1353
Poly(oxytetramethyleneoxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene)		348		247
Poly(oxytrimethyleneoxy-1,3-phenylenecarbonyl-oxycarbonyl-1,3-phenylene)		326		247
Poly(oxytrimethyleneoxy-1,4-phenylenecarbonyl-oxycarbonyl-1,4-phenylene)		368		247
3.1.3. POLY(ESTERS)				
Polyarylate of terephthalic acid		471		1254
Poly(bisphenol A terephthalate) see Poly(oxyterephthaloyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)				
Poly(butylene adipate)		223		1331
Poly(butylene isophthalate)		291		1331
Poly(butylene 2,6-naphthalate)		321		1542
Poly(butylene naphthalate)		512		1461

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(butylene 1,4-terephthalate)		499		1461
Poly(butylene terephthalate)		304		1331
Poly(diethyl phthalate)		180		1271
Poly[(1,2-diethoxycarbonyl)ethylene]		286	Dilatomer	1158
Poly[(1,2-dimethoxycarbonyl)ethylene]		367	Dilatomer	1159
Poly(dimethyl phthalate)		192		1271
Poly[di(oxyethylene)oxyadipoyl]		227		
Poly[di(oxyethylene)oxyazelaoyl]		205		
Poly[di(oxyethylene)oxydodecanedioyl])		202		96
Poly[di(oxyethylene)oxyglutary]		226		96
Poly[di(oxyethylene)oxyheptylmalonyl]		215		96
Poly[di(oxyethylene)oxymalonyl]		244		96
Poly[di(oxyethylene)oxymethylmalonyl]		244		96
Poly[di(oxyethylene)oxynonylmalonyl]		214		96
Poly[di(oxyethylene)oxyoctadecanedioyl]		205		96
Poly[di(oxyethylene)oxyoxalyl]		265		96
Poly[di(oxyethylene)oxypentylmalony]		226		96
Poly[di(oxyethylene)oxypimeloyl]		213		96
Poly[di(oxyethylene)oxypropylmalonyl]		235		96
Poly[di(oxyethylene)oxysebacoyl]		199		96
Poly[di(oxyethylene)oxysuberoyl]		212		96
Poly[di(oxyethylene)oxysuccinyl]		244		96
Poly[di(oxy-1,4-phenylene)oxyisophthaloyl]		446	Heating rate: 20 K/min	313
Poly[di(oxy-1,4-phenylene)oxy-5-pentyloxyisophthaloyl]		399	Heating rate: 20 K/min	313
Poly[(1,2-dipropoxycarbonyl)ethylene]		262	Dilatomer	1160
Poly(oxy-2,6-diphenyl-1,4-phenylenemethylene-3,5-diphenyl-1,4-phenyleneoxysebacoyl)		365	Heating rate: 8 K/min	371
Polyesters of 3-phenyl-4,4′-biphenyl dicarboxylic acid, aromatic		398–443		1409
Poly(ethylene adipate) see Poly(oxyethyleneoxyadipoyl)	24938-37-2			
Poly(ethylene naphthalate)		534		1461
Poly(ethylene 2,6-naphthalate)		398		1542
Poly(ethylene 2,6-naphthalene-dicarboxylate)		398		1341,1554
Poly(ethylene 1,4-terephthalate)		526		1461
Poly(ethylene terephthalate) see Poly(oxyethyleneoxyterephthaloyl)	25038-59-9			
Poly(lactic acid)		327		1427
Poly(oxyadipoyloxy-2,6-dichloro-1,4-phenylene-isopropylidene-3,5-dichloro-1,4-phenylene)		383	No measurement details	380
Poly(oxyadipoyloxy-3,3′,5,5′-tetramethyl-4,4′-biphenylylene)		381	Heating rate: 8 K/min	371
Poly(oxyadipoyloxydecamethylene)		217		96,381
Poly(oxyadipoyloxy-2,6-dimethyl-1,4-phenylene isopropylidene-3,5-dimethyl-1,4-phenylene)		366	Heating rate: 8 K/min	371
Poly(oxyadipoyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)		341		382
Poly(oxyadipoyloxy-2,6-diphenyl-1,4-phenylenemethylene-3,5-diphenyl-1,4-phenylene)		388		305,371
Poly(oxy-2-butenyleneoxysebacoyl) *cis*		232		383
trans		233		
Poly(oxy-5-butyl-1,3-phenyleneoxyisophthaloyl)		359		384
Poly(oxy-2-butynyleneoxysebacoyl)		246		383,429
Poly(oxycarbonyl-3,3′-biphenylylenecarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)		460	Heating rate: 8 K/min	386
Poly(oxycarbonyl-1,4-cyclohexylenecarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene) *trans*		423	Heating rate: 20 K/min	42
Poly(oxycarbonyl-1,5-dimethylpentamethylene)		240	Torsion pendulum	1173
Poly(oxycarbonyl-3-methylpentamethylene)		220	Torsion pendulum	1172
Poly(oxycarbonyl-2,6-naphthylene-carbonyloxydecamethylene)		287	No measurement details	387
Poly(oxycarbonylpentamethylene)		213	Torsion pendulum	1170
Poly(oxycarbonyl-1,3-phenyleneoxy-1,3-phenylenecarbonyloxy-2,2,3,3,4,4-hexafluoropentamethylene)		293		148

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxydibutyltinoxyadipoyl)		383	Heating rate: 20 K/min	385
Poly(oxydibutyltinoxyfumaroyl)		459	Heating rate: 20 K/min	385
Poly(oxydibutyltinoxyterephthaloyl)		588	Heating rate: 20 K/min	385
Poly(oxy-2,6-dimethyl-1,4-phenyleneisopropylidene-3,5-dimethyl-1,4-phenyleneoxysebacoyl)		318	Heating rate: 8 K/min	371
Poly(oxy-2,5-dimethylterephthaloyloxy-1,4-phenylenisopropylidene-1,4-phenylene)		457	Mechanical method	366
Poly(oxyethyleneoxycarbonyl-1,4-cyclohexylenecarbonyl) *trans*		291	Heating rate: 20 K/min	42
Poly(oxyethyleneoxycarbonyl-2,2′-dimethyl-4,4′-biphenylylenecarbonyl)		346		391
Poly(oxyethyleneoxycarbonyl-1,4-naphthylenecarbonyl)		337		393
Poly(oxyethyleneoxycarbonyl-1,5-naphthylenecarbonyl)		344	Amorphous	393
		351	Crystalline	
Poly(oxyethyleneoxycarbonyl-2,6-naphthylenecarbonyl)		386		387,393
Poly(oxyethyleneoxycarbonyl-2,7-naphthylenecarbonyl)		392		393
Poly(oxyethyleneoxycarbonyl-1,4-phenylene-*sec*-butylidene-1,4-phenylenecarbonyl)		~380		165
Poly(oxyethyleneoxycarbonyl-1,1,3-trimethylindan-3,5-ylene-1,4-phenylenecarbonyl)		427	DTA heating rate	392
Poly(oxyethyleneoxyisophthaloyl)		324		393
Poly(oxyethyleneoxyterephthaloyl)	25038-59-9			1166
		333–358	Dielectric, *f*(annealing)	1165
		334	DSC, onset, *X*p zero HR, f(annealing)	1168
		335–350	DSC, onset, *f*(HR, draw ratio)	1167
		342		1,42,61,78,94, 183,202,233,261, 262,272,319,344, 349,352–354,360, 362,371,381,388, 389,393–418
		359		1169
		355		1254
		355–357	DSC	1338
		337		1432
amorphous		333–349		1383
Poly(oxy-5-ethyl-1,3-phenyleneoxyisophthaloyl)		395		384
Poly(oxyglutaryloxy-2,2,3,3,4,4-hexafluoropentamethylene)		218–223	Brittle point	422
Poly(oxyglutaryloxy-2,2,3,3,4,4,5,5-octafluorohexamethylene)		218–223	Brittle point	422
Poly(oxy-3-heptafluoropropylglutaryloxy-2,2,3,3,4,4-hexafluoropentamethylene)		243–248	Brittle point	422
Poly(oxy-2,2,3,3,4,4-hexafluoropenta-methyleneoxyadipoyl)		216		419–423
Poly(oxy-2,2,3,3,4,4-hexafluoropentamethyleneoxycarbonyl-3,3′-biphenylylenecarbonyl)		318		148
Poly(oxy-2,2,3,3,4,4-hexafluoropenta-methyleneoxycarbonyl-1,3-phenylenedecafluoropentamethylene-1,3-phenylenecarbonyl)		301	Heating rate: 32 K/min; η_{inh} low	148
Poly(oxy-2,2,3,3,4,4-hexafluoropentamethyleneoxycarbonyl-1,3-phenylenehexafluorotrimethylene-1,3-phenylenecarbonyl)		290		148
Poly(oxy-2,2,3,3,4,4-hexafluoropentamethyleneoxy-3,6-dithiaoctanedioyl)		~233	Brittle point	422
Poly(oxy-3-heptafluoropropylglutaryloxy-2,2,3,3,4,4,5,5-octafluorohexamethylene)		~248	Brittle point	422
Poly(oxyhexamethyleneoxycarbonyl-2,6-naphthylenecarbonyl)		317	No measurement details	387
Poly(oxy-5-hexyl-1,3-phenyleneoxyisophthaloyl)		335		384
Poly(3-hydroxybutyrate)		233		1278
Poly(4-hydroxybutyrate)		223	NMR	1494
Poly(oxyisophthaloyloxy-4,4′-biphenylylene)		437, 583	Conflicting data	131,424

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TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxyisophthaloyloxy-2,2,3,3,4,4-hexafluoropentamethylene)		298	Heating rate: 32 K/min; η_{inh} 0.14 dl/g only	386,425
Poly(oxyisophthaloyloxy-2-methyl-1,4-phenylene isopropylidene-3-methyl-1,4-phenylene)		438	Dynamic method	366
Poly(oxyisophthaloyloxy-2,6-dimethyl-1,4-phenylene isopropylidene-3,5-dimethyl-1,4-phenylene)		498	Heating rate: 8 K/min	371
Poly(oxyisophthaloyloxy-2-methyl-1,4-phenylene methylene-3-methyl-1,4-phenylene)		418	Mechanical method	369
Poly(oxyisophthaloyloxy-2,6-dimethyl-1,4-phenylene methylene-3,5-dimethyl-1,4-phenylene)		461	Mechanical method	369
Poly(oxyisophthaloyloxy-1,4-phenylenebenzylidene-1,4-phenylene)		433		426
Poly(oxyisophthaloyloxy-1,4-phenylenecyclohexylidene-1,4-phenylene)		400		145
Poly(oxyisophthaloyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)		462	Heating rate: 8 K/min	145,369,371,427
Poly(oxyisophthaloyloxy-1,4-phenylenemethylene-1,4-phenylene)		423	Heating rate: 20 K/min	313
Poly(oxymethylene-1,4-cyclohexylenemethylene-oxycarbonyl-*trans*-1,4-cyclohexylenecarbonyl)		325	Heating rate: 20 K/min	42
Poly(oxy-5-methyl-1,3-phenyleneoxyisophthaloyl)		426		384
Poly(oxyneopentyleneoxycarbonyl-1,4-cyclohexylenecarbonyl) *trans*		303	Heating rate: 20 K/min	42
Poly(oxyneopentyleneoxyterephthaloyl)		341	Heating rate: 20 K/min	42
Poly(oxy-5-nonyl-1,3-phenyleneoxy-2-fluoroisophthaloyl)		307		432
Poly(oxy-5-nonyl-1,3-phenyleneoxy-5-fluoroisophthaloyl)		293		255
Poly(oxy-5-nonyl-1,3-phenyleneoxyisophthaloyl)		304		384
Poly(oxy-2,2,3,3,4,4,5,5-octafluorohexamethyleneoxy-3,6-dithiaoctanedioyl)		~235	Brittle point	422
Poly(oxy-5-octyl-1,3-phenyleneoxyisophthaloyl)		314		384
Poly[oxy-5-(pentadecafluoroheptyl)isophthaloyloxy-2,2,3,3,4,4-hexafluoropentamethylene]		300	Heating rate: 32 K/min; η_{inh} only 0.10 dl/g	386
Poly(oxypentamethyleneoxyadipoyl)		204		96
Poly(oxypentamethyleneoxycarbonyl-2,6-naphthylenecarbonyl)		311	No measurement details	387
Poly(oxypentamethyleneoxyterephthaloyl)		283	DTA heating rate	411
Poly(oxy-5-pentyloxyisophthaloyloxy-4,4′-biphenylene)		411	Heating rate: 20 K/min	313
Poly(oxy-2-pentyloxyisophthaloyloxy-2,2,3,3,4,4-hexafluoropentamethylene)		290	DTA heating rate; η_{inh} only 0.12 dl/g	425
Poly(oxy-4-pentyloxyisophthaloyloxy-2,2,3,3,4,4-hexafluoropentamethylene)		282	DTA heating rate; η_{inh} only 0.25 dl/g	425
Poly(oxy-5-pentyloxyisophthaloyloxy-2,2,3,3,4,4-hexafluoropentamethylene)		243	DTA heating rate	425
Poly(oxy-5-pentyloxyisophthaloyloxy-1,4-phenylenemethylene-1,4-phenylene)		383	Heating rate: 20 K/min; η_{inh} only 0.13	313
Poly(oxy-1,4-phenylenefluoren-9-ylidene-1,4-phenyleneoxysebacoyl)		424	Heating rate: 10 K/min	347
Poly(oxy-1,3-phenylenehexafluorotrimethylene-1,3-phenyleneoxycarbonyl-1,3-phenylene-hexafluorotrimethylene-1,3-phenylenecarbonyl)		345		148
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxycarbonyl-1,4-phenylene-*sec*-butylidene-1,4-phenylenecarbonyl)		~480		165
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxycarbonyl-1,3-phenylene-hexafluorotrimethylene-1,3-phenylenecarbonyl)		389		433
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxysebacoyl)		280	Heating rate: 8 K/min	363,371,409
Poly[oxy-1,3-phenyleneoxy-5-(10H-eicosafluorodecyl) isophthaloyl]		356		432
Poly[oxy-1,3-phenyleneoxy-5-(pentadecafluoroheptyl)isophthaloyl]		374		432
Poly(oxy-1,3-phenyleneoxy-2-fluoroisophthaloyl)		393	Heating rate: 32 K/min	255

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly[oxy-1,3-phenyleneoxy-5-(heptafluoropropyl)isophthaloyl]		394	Sample of low η_{inh}	434
Poly(oxy-1,3-phenyleneoxyisophthaloyl)		411	Values range from 411 to 463 K	313,384,427, 435–437
Poly(oxy-1,3-phenyleneoxy-5-pentyloxyisophthaloyl)		269	Heating rate: 20 K/min; η_{inh} only 0.13	313
Poly(oxypimeloyloxy-3,3′,5,5′-tetramethyl-4,4′-biphenylylene)		369	Heating rate: 8 K/min	371
Poly(oxypimeloyloxy-2,6-dimethyl-1,4-phenylene-isopropylidene-3,5-dimethyl-1,4-phenylene)		357	Heating rate: 8 K/min	371
Poly(oxypimeloyloxy-2,6-diphenyl-1,4-phenylene-methylene-3,5-diphenyl-1,4-phenylene)		384	Heating rate: 8 K/min	371
Poly(oxypropyleneoxycarbonyl-2,6-naphthylenecarbonyl)		361	No measurement details	387
Poly(oxypropyleneoxyterephthaloyl)		341		389
Poly(oxy-5-propyl-1,3-phenyleneoxyisophthaloyl)		394		384
Poly(oxyterephthaloyloxy-2-butyl-1,4-phenylene isopropylidene-3-butyl-1,4-phenylene)		433		439
Poly(oxyterephthaloyloxy-2-*sec*-butyl-1,4-phenylene-isopropylidene-3-*sec*-butyl-1,4-phenylene)		373	Mechanical method	439
Poly(oxyterephthloyloxy-2-chloro-1,4-phenylene-isopropylidene-3-chloro-1,4-phenylene)		463	Mechanical method	439
Poly(oxyterephthloyloxy-2-isopropyl-1,4-phenylene-isopropylidene-3-isopropyl-1,4-phenylene)		403		439
Poly(oxyterephthaloyloxydecamethylene)		298, 268	Conflicting data	6,403,411
Poly(oxyterephthaloyloxyheptamethylene)		276	DTA heating rate	411
Poly(oxyterephthaloyloxyhexamethylene)		318, 264	Conflicting data	6,403,411
Poly(oxyterephthaloyloxynonamethylene)		308, 270	Conflicting data	6,403,411
Poly(oxyterephthaloyloxyoctamethylene)		318	Dynamic method	403
Poly(oxyterephthaloyloxypentamethylene)		318	Dynamic method	6,403
Poly(oxyterephthaloyloxymethylene-1,4-cyclohexylenemethylene) 70% *trans*		358	Heating rate: 20 K/min	42,440
Poly(oxyterephthaloyloxy-2-methyl-1,4-phenylene-isopropylidene-3-methyl-1,4-phenylene)		~428	Dilatometric method	366,439,411
		461	Dynamic method	
Poly(oxyterephthaloyloxy-2,6-dimethyl-1,4-phenylene-isopropylidene-3,5-dimethyl-1,4-phenylene)		498	Heating rate: 8 K/min	371
Poly(oxyterephthaloyloxy-1,4-phenylene) 9,9-anthronylidene-1,4-phenylene)		570	Heating rate: 10 K/min	347
Poly(oxyterephthaloyloxy-1,4-phenylenebenzylidene-1,4-phenylene)		473		426
Poly(oxyterephthaloyloxy-1,4-phenylene-cyclohexylmethylene-1,4-phenylene)		543	No measurement details	442
Poly(oxyterephthaloyloxy-1,4-phenylenefluoren-9-ylidene-1,4-phenylene)		654	Heating rate: 10 K/min	347
Poly(oxyterephthaloyloxy-1,4-phenylene-hexafluoroisopropylidene-1,4-phenylene)		534	Softening point	443
Poly(oxyterephthaloyloxy-1,4-phenylene-1,1-indanylidene-1,4-phenylene)		608	Heating rate: 10 K/min	347
Poly(oxyterephthaloyloxy-1,4-phenyleneisoproplyidene-1,4-phenylene)		478	DTA heating rate	363,369,371,382, 427,439,441,443
Poly(oxy-3,3′,5,5′-tetramethyl-4,4′-biphenylyleneoxysebacoyl)		330	Heating rate: 8 K/min	371
Poly(oxy-2,2,4,4-tetramethyl-1,3-cyclobutyleneoxycarbonyl-*trans*-1,4-cyclohexylenecarbonyl)		442	Heating rate: 20 K/min	42
Poly(oxy-2,2,4,4-tetramethyl-1,3-cyclobutylene oxyterephthaloyl) 60–68% *trans*		457	Heating rate: 20 K/min	42,319,428
Poly(oxytetramethyleneoxyadipoyl)		155	Transition at 194–206 K, 1st order (Ref. 243), rate: 10 K/min	80,96,243
Poly(oxytetramethyleneoxycarbonyl-1,4-cyclohexylenecarbonyl)		263	Heating rate: 20 K/min	42
Poly(oxytetramethyleneoxycarbonyl-2,6-naphthylenecarbonyl)		349	No measurement details	387
Poly(oxytrimethyleneoxycarbonyl-1,4-cyclohexylenecarbonyl) *trans*		267	Heating rate: 20 K/min	42

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxytrimethyleneoxycarbonyl-2,6-naphthylenecarbonyl)		346	No measurement details	387
Poly(oxytetramethyleneoxysebacoyl)		216	T_g decreases as intrinsic viscosity increases	1,383,429
Poly(oxytetramethyleneoxyterephthaloyl)		290, 353	Conflicting data	6,42,403,411
Poly(oxy-3,3′,5,5′-tetraphenyl-4,4′-biphenylylenesebacoyl)		371	Heating rate: 8 K/min	371
Poly(oxytrimethyleneoxyadipoyl)		214		96
Poly(oxytrimethyleneoxyterephthaloyl)		368, 308	Conflicting data	42,183,403,411
Poly(oxy-5-tridecyl-1,3-phenyleneoxyisophthaloyl)		291		384
Poly(oxy-5-undecyl-1,3-phenyleneoxyisophthaloyl)		295		384
Poly(resorcinol isophthalate) see Poly(oxy-1,3-phenyleneoxyisophthaloyl)				
Poly(trifluoro-chloroethylene)		352		1432
Poly(1,4,7-trioxy-3,3,5,5-tetrafluoro-heptamethylenecarbonyl-1,3-phenylene-hexafluorotrimethylene-1,3-phenylenecarbonyl)		303	Heating rate: 32 K/min	218
Poly(1,4,7-trioxy-3,3,5,5-tetrafluoro-heptamethyleneisophthaloyl)		301	Heating rate: 32 K/min; η_{inh} 0.23 only	218
Poly(1,4,7-trioxy-3,3,5,5-tetrafluoroheptamethylene-5-pentyloxyisophthaloyl)		287	Heating rate: 32 K/min; [η] only 0.24 dl/g	218
3.1.4. POLY(ETHER KETONES)				
Biphenylene-ether-ketone		454		1375
Methyl poly(aryl ether ether ketone)		418		1551
Poly(aryl ether ether ketone)		423		1291
		429		1291
Poly(aryl ether ketone)		491		1406
		495		1507
Poly(aryl ether ketone) of 1,8-bis(4-fluorobenzoyl) naphthalene and aromatic bisphenols		487–543		1525
Poly(ether ether ketone)		420		1344
		425		1472
		418	DSC with 10% crystallinity	1332
		430	DSC with 28% crystallinity	1332
		405		1260
		431		1432
Poly(ether ketone),fluorinated		428–496		1385
Poly(phenylene ether ether ketone), isopropyl subs		418		1399
Poly(phosphene oxide ether ketone)		473		1368
3.1.5. POLY(OXIDES)				
Poly(acetaldehyde) see Poly(oxyethylidene)				
Poly[3,3-bis(chloromethyl)oxacyclobutane] see Poly[oxy-2,2-bis(chloromethyl)trimethylene]				
Poly(1,2-dihydroxypropane)	25322-69-4	200		1281
Br-Poly(2,6-dimethyl-1,4-phenylene oxide), linear		481		1326
Poly(2,6-dimethyl-1,4-phenylene oxide) [PPO] see Poly(oxy-2,6-dimethyl-1,4-phenylene)	25134-01-4			
Poly[di(oxymethylene)oxy-2,2,3,3,4,4-hexafluoropentamethylene]		218		285
Poly[di(oxy-1,4-phenylene)carbonyl-1,4-phenylene]		433	Mechanical method	116
Poly(epichlorohydrin) see Poly[oxy(chloromethyl)ethylene]	24969-06-0			
Poly(ethylene oxide)s see Poly(oxyethylene)s	25322-68-3			
Poly(ethylene oxide) 1000		209		1266
Poly(ethylene oxide) 400		210		1266
Poly(ethylene oxide) 600		210		1266
Poly(formaldehyde) see Poly(oxymethylene)	9002-81-7			
Poly(methylene oxide) see Poly(oxymethylene)				
Poly(4,4-(2,7-napthalenedioxy) dibenzoic acid)		471		1374
Poly(oxacyclobutane) see Poly(oxytrimethylene)				
Poly(oxetane)s see Poly(oxytrimethylene)s				
Poly(oxy-2-acetoxytrimethyleneoxy-2,6-dichloro-1,4-phenyleneisopropylidene-3,5-dichloro-1,4-phenylene)		373		219
Poly(oxy-2-acetoxytrimethyleneoxy-1,4-pheylene)		322		219

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxy-2-acetoxytrimethyleneoxy-1,4-phenylene-1-ethyl-1,3-cyclohexylene-1,4-phenylene)		380		219
Poly(oxy-2-acetoxytrimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		333		219
Poly[oxy-2-acetoxytrimethyleneoxy-1,4-phenylenemethyl(phenyl)methylene-1,4-phenylene]		383		219
Poly[oxy(allyloxymethyl)ethylene]		195		220
Poly(oxy-2-benzoyloxytrimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		338		219
Poly[oxy-2-benzoyloxytrimethyleneoxy-1,4-phenylenemethyl(phenyl)methylene-1,4-phenylene]		399		219
Poly[oxy-2-(2-biphenylyl)-6-phenyl-1,4-phenylene]		484	DSC heating rate; low viscosity	221
Poly[oxy(bromomethyl)ethylene]		259	Heating rate: 20 K/min	222
Poly(oxybutadiene)		198	Structure not given	223,224
Poly[oxy(butoxymethyl)ethylene]		194	Heating rate: 10 K/min	220
Poly(oxybutylene)		185		1432
Poly(oxybutylethylene)		203	Heating rate: 10 K/min	220
Poly(oxy-*tert*-butylethylene)		308		223,225–227
Poly[oxy-2-(4-*tert*-butylphenyl)-6-phenyl-1,4-phenylene]		513	DSC heating rate	221
Poly[oxy-2-(chloroacetoxy)trimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene]		338		219
Poly[oxy-2-(2-chlorobenzoyloxy)trimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene]		339		219
Poly[oxy(chloromethyl)ethylene]		251	Heating rate: 20 K/min	222
		248		1345
Poly[oxy-2,2-bis(chloromethyl)trimethylene]		265		1,122,230–236
Poly(oxydecylethylene)		232		220,223
Poly(oxy-2,6-dimethoxy-1,4-phenylene)		440		260
Poly(oxy-1,1-dimethylethylene)		264		223
Poly(oxy-1,2,dimethylethylene) *trans*		277		223
Poly[oxy(2,6-dimethyl-1,4-phenylene)]	25134-01-4			1156
		482		102,114,202,262, 286–300
		483–507	DSC,DTA, confused by large endotherm, *f*(TH, filler)	1155
		493		1254
		483		1276
crosslinked		469		1326
Poly(oxydiphenoxymethyleneoxy-4,4′-biphenylene)		385	DSC heating rate	379
Poly(oxydiphenoxymethyleneoxy-3,3′-dimethyl-4,4′-biphenylylene)		398	DSC heating rate	379
Poly(oxydiphenoxymethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		365	DSC heating rate	379
Poly[oxy(ethoxymethyl)ethylene]		212		220
Poly(oxy-2-ethyl-2-chloromethyltrimethylene)		~293	Dynamic method	237
Poly(oxyethylene)	25322-68-3, 9004-74-4	232?	Conflicting data, values range from 158 to 223 K	107,223,234, 238–244
		–		1153
		–		1154
		206		1432,1287
		340		1316
		165		1255
		373		1422
		220		1271,1478
with dipivaloyl methane		340		1316
with neodymium nitrate		222		1316
Poly(oxyethylethylene)		203		220
Poly(oxyethylidene)		243		250,251
		253		1304
Poly[oxy-1-(heptafluoro-2-propoxymethyl)ethylene]		~230	DTA heating rate	258
Poly(oxy-2,2,3,3,4,4-hexafluoropentamethyleneoxy-4,4′-octafluorobiphenylylene)		314	Heating rate: 32 K/min	255

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxy-2,2,3,3,4,4-hexafluoro-pentamethyleneoxymethylene-1,4-phenylenemethylene)		247	Heating rate: 32 K/min	256
Poly(oxyhexylethylene)		206	Heating rate: 10 K/min	220
Poly[oxy(hexyloxymethyl)ethylene]		190		220
Poly(oxy-2-hydroxytrimethyleneoxy-2-chloro-1,4-phenyleneisopropylidene-3-chloro-1,4-phenylene)		358		259
Poly(oxy-2-hydroxytrimethyleneoxy-2,6-dichloro-1,4-phenyleneisopropylidene3,5-dichloro-1,4-phenylene)		388		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylene)		333		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylene-1-ethyl-1,4-cyclohexylene-1,4-phenylene)		413		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenyleneisobutylidene-1,4-phenylene)		368		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		373		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylene-5-isopropyl-2-methyl-1,2-cyclohexylene-1,4-phenylene)		448		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylene-1-methyl-1,4-cyclohexyleneisopropylidene-1,4-phenylene)		408		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylenemethylene-1,4-phenylene)		353		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylene-3,3-dimethyl-1,6-indanylene)		393		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylene-1,3,3-trimethyltrimethylene-1,4-phenylene)		348		259
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylenemethyl(phenyl)methylene-1,4-phenylene)		388		219
Poly[oxy(methoxymethyl)ethylene]		211	Heating rate: 10 K/min	220
Poly(oxymethylene)	9002-81-7			1152
		191	Values range from 188 to 263 K	1,6,68,191,230, 233,238,239, 261–271
		200		1432
		260		1254
		183		1304
		190		1287
Poly(oxypropylene)	25322-69-4	205		1304
		200		1394
diol		202		1314
diol-based urethane prepolymer		225		1258
Poly(oxymethyleneoxy-2,2,3,3,4,4-hexafluoropentamethylene)		220	Heating rate: 32 K/min	284
Poly(oxymethyleneoxy-2,2,3,3,4,4,5,5-octafluorohexamethylene)		220	Heating rate: 32 K/min	284
Poly(oxymethylene-1,3-phenylenemethyleneoxy-2,2,3,3,4,4-hexafluoropentamethylene)		238		256
Poly(oxymethylene-1,4-phenyleneoxy-1,4-phenylenemethyleneoxy-2,2,3,3,4,4-hexafluoropentamethylene)		279	Heating rate: 32 K/min; high rate effect	256
Poly(oxy-2-methyl-6-phenyl-1,4-phenylene)		428		299
Poly(oxy-1-methyltrimethylene)		223	Dynamic method	281
Poly(oxy-2-methyltrimethylene)		218	Dynamic method	281
Poly[oxy-2-(1-naphthyl)-6-phenyl-1,4-phenylene]		507	DSC heating rate; low viscosity	221
Poly(oxy-3-nitro-1,3-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		423	Mechanical method	116
Poly(oxyoctafluorotetramethylene)		~208	Heating rate: 10 K/min	254,257
Poly(oxy-1,3-phenylene)		~318	DTA heating rate; low viscosity	114,295
Poly(oxy-1,4-phenylene)		358	DTA heating rate	288,305–307
Poly(oxyphenylene)	9041-80-9	363		1432
Poly(oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-4-methyl-1,4-cyclohexylene-1,4-phenylene)		493	Mechanical method	116

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		428	Mechanical method	116
Poly(oxy-1,4-phenylene-2,2-dicyanotrimethylene-1,4-phenylene)		420	DTA heating rate	310
Poly[oxy-1,4-phenylene-(2-cyano)-2-phenyltrimethylene-1,4-phenylene]		416	Proposed structure; DTA heating rate	310
Poly[oxy-1,4-phenylene-2,2-di(ethoxycarbonyl)trimethylene-1,4-phenylene]		327	DTA heating rate	310
Poly(oxy-1,4-phenylenehexafluoro-2,2-propylidene-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene]		448	Mechanical method	116
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1,4-phenyleneazo-1,4-phenylene)		448	Mechanical method	116
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1,4-phenyleneterephthaloyl-1,4-phenylene)		438	Mechanical method	116
Poly(oxy-1,4-phenylenemethylenefluoroen-9-ylidenemethylene-1,4-phenylene)		411	Proposed structure; DTA heating rate	310
Poly(oxyphenylethylene)		313		220,223, 225,324
Poly(oxy-2,6-diphenyl-1,4-phenylene)		493		464,730,477
		498	DSC heating rate; low zero HR	1157
Poly[oxy-6-phenyl-2-(3′-*o*-terphenylyl)-1,4-phenylene]		485	DSC heating rate; low viscosity	221
Poly[oxy-6-phenyl-2-(*m*-tolyl)-1,4-phenylene]		492	DSC heating rate; low viscosity	221
Poly[oxy-6-phenyl-2-(*p*-tolyl)-1,4-phenylene]		491	DSC heating rate; low viscosity	221
Poly(oxy-2-propionyloxytrimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		331		219
Poly(oxypropylene)		198	Conflicting data	220,223,243, 251,269,273, 276,281, 326–332,1432
		201		1271
Poly[oxy-1-(2,2,3,3-tetrafluorocyclobutyl)ethylene]		248	Mechanical method, heating rate: 2 K/min	252
Poly(oxytetrafluoroethylene)		225	Low molecular weight	253,254
Poly(oxytetramethylene)	25190-06-1	189		237,238,243, 272–278,1287
		178		1304
Poly(oxy-2,2,2-trichloroethylethylene)		271	No measurement details	229
Poly(oxytrimethylene)		195		238,272,273, 278–281,1287
Poly(perfluorotrimethylene oxide)		172		1287
Poly(phenylene oxide)s see Poly(oxyphenylene)s	9041-80-9			
Poly(tetrahydrofuran) see Poly(oxytetramethylene)	25190-06-1			
Poly(trihydroxypropane)		347		1271
Poly[tri(oxy-1,4-phenylene)carbonyl-1,4-phenylene]		423	Mechanical method	116
3.1.6. POLY(URETHANES)				
Poly(oxy-2-butenylene oxycarbonyliminohexamethylene iminocarbonyl)		234		383
cis–trans		228		429
Poly(oxycarbonyliminodecamethylene iminocarbonyloxyhexadecamethylene)		307	Heating rate: 1 K/min	445
Poly(oxycarbonyliminohexamethylene iminocarbonyloxydecamethylene)		309	Heating rate: 1 K/min	445
Poly(oxycarbonyliminohexamethylene iminocarbonyloxyhexadecamethylene)		312	Heating rate: 1 K/min	445
Poly(oxycarbonyliminomethylene-1,4-phenylene methyleneiminocarbonyloxydecamethylene)		322	Heating rate: 1 K/min	445
Poly(oxycarbonyliminomethylene-1,4-phenylene methyleneiminocarbonyloxydodecamethylene)		318	Heating rate: 1 K/min	445
Poly(oxycarbonyliminomethylene-1,4-phenylene methyleneiminocarbonyloxyhexadecamethylene)		320	Heating rate: 1 K/min	445
Poly(oxycarbonylimino-4-methyl-1,3-phenylene iminocarbonyloxydecamethylene)		291	Heating rate: 10 K/min	446
Poly(oxycarbonylimino-4-methyl-1,3-phenylene iminocarbonyloxynonamethylene)		335	Heating rate: 10 K/min	446

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TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxycarbonylimino-4-methyl-1,3-phenylene iminocarbonyloxyoctamethylene)		337	Heating rate: 10 K/min	446
Poly(oxycarbonylimino-1,4-phenylenemethylene-1,4-phenylene iminocarbonyloxyhexadecamethylene)		313	Heating rate: 1 K/min	445
Poly(oxydecamethyleneoxycarbonyliminohexamethylene-iminocarbonyl)		328	Heating rate: 10 K/min	446
Poly(oxy-2,2-diethyltrimethyleneoxycarbonylimino-4-methyl-1,3-phenylene iminocarbonyl)		213		448
Poly(oxydodecamethyleneoxycarbonyliminodecamethylene iminocarbonyl)		307	Heating rate: 1 K/min	445
Poly(oxyethyleneoxycarbonyliminodecamethylene iminocarbonyl)		334		447
Poly(oxyethyleneoxycarbonyliminohexamethylene iminocarbonyl)		329	Heating rate: 10 K/min	446
Poly(oxyethyleneoxycarbonyliminononamethylene iminocarbonyl)		317		447
Poly(oxyethyleneoxycarbonylimino-4-methyl-1,3-phenylene iminocarbonyl)		326	Heating rate: 10 K/min	446,448
Poly(oxyethyleneoxycarbonylimino-1,4-phenylene ethylene-1,4-phenyleneiminocarbonyl)		390		447
Poly(oxyethyleneoxycarbonylimino-1,4-phenylene methylene-1,4-phenyleneiminocarbonyl)		412, 366	Conflicting data	446,447
Poly(oxyethyleneoxycarbonylimino-1,4-phenylene tetramethylene-1,4-phenyleneiminocarbonyl)		379		447
Poly(oxyethyleneoxycarbonylimino-1,4-phenylene trimethylene-1,4-phenyleneiminocarbonyl)		347		447
Poly(oxyheptamethyleneoxycarbonyliminohexamethylene iminocarbonyl)		328	Heating rate: 10 K/min	446
Poly(oxy-2,2,3,3,4,4-hexafluoropentamethylene oxycarbonyliminohexamethyleneiminocarbonyl)		289	DTA heating rate	449
Poly(oxy-2,2,3,3,4,4-hexafluoropentamethylene oxycarbonylimino-2,2,3,3,4,4,5,5-octafluoro hexamethyleneiminocarbonyl)		298	DTA heating rate	449
Poly(oxydecamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		321	Heating rate: 1 K/min	445,446
Poly(oxydodecamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		316	Heating rate: 1 K/min	445
Poly(oxyheptamethyleneoxycarbonylimino-4-methyl-1,3-phenyleneiminocarbonyl)		334	Heating rate: 10 K/min	446
Poly(oxyheptamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		357	Heating rate: 10 K/min	446
Poly(oxyhexamethyleneoxycarbonylimino-4-methyl-1,3-phenyleneiminocarbonyl)		305	Heating rate: 10 K/min	446
Poly(oxyhexamethyleneoxycarbonliminomethylene-1,4-phenylenemethyleneiminocarbonyl)		329	Heating rate: 1 K/min	445
Poly(oxyhexamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		324	Heating rate: 1 K/min	445,446
Poly(oxymethylene-5-*tert*-butyl-1,3-phenylenemethylene oxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		387	DTA heating rate	453
Poly(oxymethylene-1,3-phenylenemethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		379	Viscosity only 0.20	453
Poly(oxyneopentyleneoxycarbonylimino-4-methyl-1,3-phenyleneiminocarbonyl)		241	DTA heating rate	448
Poly(oxynonamethyleneoxycarbonyliminohexamethylene iminocarbonyl)		331	Heating rate: 10 K/min	446
Poly(oxynonamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		345	Heating rate: 10 K/min	446
Poly(oxyhexamethyleneoxycarbonyliminohexamethylene iminocarbonyl)		332	Heating rate: 10 K/min	446
Poly(oxyhexamethyleneoxycarbonylimino-2,2,3,3,4,4,5,5-octafluorohexamethyleneiminocarbonyl)		278	DTA heating rate	451,452
Poly(oxy-2,2,3,3,4,4,5,5-octafluorohexamethylene oxycarbonyliminohexamethyleneiminocarbonyl)		271	DTA heating rate	451,452

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxy-2,2,3,3,4,4,5,5-octafluorohexamethylene oxycarbonylimino-2,2,3,3,4,4,5,5-octafluoro-hexamethyleneiminocarbonyl)		293	DTA heating rate	449
Poly(oxyoctamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		352	Heating rate: 10 K/min	446
Poly(oxypentamethyleneoxycarbonyliminohexamethylene iminocarbonyl)		331, 281	Conflicting data	446,449
Poly(oxypentamethyleneoxycarbonylimino-4-methyl-1,3-phenyleneiminocarbonyl)		325	Heating rate: 10 K/min	446
Poly(oxypentamethyleneoxycarbonylimino-2,2,3,3,4,4,5,5-octafluorohexamethyleneiminocarbonyl)		306	DTA heating rate	449
Poly(oxypentamethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		368	Heating rate: 10 K/min	446
Poly(oxy-2,2,3,3-tetrafluorotetramethylene oxycarbonyliminohexamethyleneiminocarbonyl)		282	DTA heating rate	450
Poly(oxy-2,2,3,3-tetrafluorotetramethylene oxycarbonylimino-2,2,3,3,4,4,5,5-octafluoro-hexamethyleneiminocarbonyl)		311	DTA heating rate	450
Poly(oxytetramethyleneoxycarbonyliminohexamethylene iminocarbonyl)		215, 253, 303, 273, 332	Conflicting data	160,261,344,429, 446
Poly(oxytetramethyleneoxycarbonylimino-4-methyl-1,3-phenyleneiminocarbonyl)		315	Heating rate: 10 K/min	446,454
Poly(oxytetramethyleneoxycarbonylimino-2,2,3,3,4,4,5,5-octafluorohexamethyleneiminocarbonyl)		306	DTA heating rate	450
Poly(oxytetramethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		382	Heating rate: 10 K/min	446
Poly(oxytrimethyleneoxycarbonyliminohexamethyleneimino carbonyl)		328	Heating rate: 10 K/min	446
Poly(oxytrimethyleneoxycarbonylimino-4-methyl-1,3-phenyleneiminocarbonyl)		345, 213	Conflicting data	446,448
Poly(oxytrimethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		392	Heating rate: 10 K/min	446

3.2. MAIN-CHAIN O-HETEROATOM POLYMERS

3.2.1. NITROSO-POLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(2-bromotetrafluoroethyliminotetrafluoroethylene)		256	Heating rate: 15 K/min	455
Poly(oxy-1,1-difluoroethyliminotetrafluoroethylene)		238	No measurement details	456
Poly(oxytrifluoromethyliminotetrafluoroethylene)		219		423,457–462
Polymer from trifluoronitrosomethane and bromotrifluoroethylene		276	Heating rate: 15 K/min	455,461
Polymer from trifluoronitrosomethane and chlorotrifluoroethylene		248–253		423
Polymer from trifluoronitrosomethane and perfluorobutadiene		266, 230	Heating rate: 15 K/min conflicting data	455,461
Polymer from trifluoronitrosomethane and 1,1,2-trifluorobutadiene		218	No measuremetnt details	456
Polymer from trifluoronitrosomethane and trifluoromethyl trifluorovinyl ether		268	DSC heating rate	457
Polymer from trifluoronitrosomethane and trifluoromethyl trifluorovinyl sulfide		225	No measurement details	461
Polymer from trifluoronitrosomethane and hexafluoropropylene		264	No measurement details	456

3.2.2. POLY(SILOXANES)

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(ethylene) - poly(dimethylsiloxane) 50 : 50, linear		154		1327
Poly(dimethylsiloxane)-1		150		1320
Poly(dimethylsiloxane)-3		150		1320
Poly(dimethylsiloxane)-5		150		1320
Poly(dimethylsiloxane)-7		150		1320
Poly(dimethylsiloxane) see Poly(oxydimethylsilylene)	9016-00-6			
Poly[di(oxydimethylsilylene)-1,4-phenylenedimethylsilylene]		210	DSC heating rate	478

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(disiloxane)		269		1313
		331		1313
Poly(methylphenylsilylenemethylene)		301		1417
Poly(oxydimethylsilylene)	9016-00-6	146		1,6,223,243,467, 469–474,1478
		129–150		1476
		150		1255
		143		1441
Poly(oxydimethylsilylene-2,4,5,6-tetrafluorophenylenedimethylsilylene)		245	No measurement details	463
Poly(oxydimethylsilyleneoxypentylene oxyisophthaloyloxyneopentylenedimethylsilylene)		221		430
Poly(oxydimethylsilyleneoxypentylene oxyterephthaloyloxyneopentylenedimethylsilylene)		238		431
Poly(oxydimethylsilyleneoxydimethylsilylene-2,4,5,6-tetrafluorophenylenedimethylsilylene)		212	No measurement details	463
Poly(oxydimethylsilyleneoxy-1,4-phenylene)		363	Mechanical method	468,476
Poly(oxydimethylsilyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		318	Mechanical method	468,476
Poly(oxydimethylsilylene-1,3-phenylenehexafluorotrimethylene-1,3-phenylenedimethylsilylene)		265	Heating rate: 32 K/min	148
Poly(oxydimethylsilylene-1,3-phenylenetetrafluoroethylene-1,3-phenylenedimethylsilylene)		271	Heating rate: 32 K/min; crystalline samples	477
Poly(oxydimethylsilylene-1,4-phenyleneoxy-1,4-phenylenedimethylsilylene)		293	Heating rate: 8 K/min	301
Poly[oxydi(pentafluorophenyl)silylenedi-(oxydimethylsilylene)]		231	No experimental details	463
Poly(oxydiphenylsilyleneoxydimethylsilylene-1,4-phenylenedimethylsilylene)		~273	DSC heating rate	478
Poly(oxydiphenylsilylene-1,3-phenylene)		~331	DTA heating rate	114
Poly[oxymethylchlorotetrafluorophenylsilylenedi-(oxydimethylsilylene)]		198	No experimental details	463
Poly(oxymethylpentafluorophenylsilylene)		248	No measurement details; [η] only 0.2 dl/g	463
Poly[oxymethylpentafluorophenylsilylenedi-(oxydimethylsilylene)]		190	No measurement details	463
Poly(oxymethylpentafluorophenylsilyleneoxydimethylsilylene)		208	No measurement details; [η] only 0.24 dl/g	463
Poly[oxy(methyl)phenylsilylene]		187		467
Poly(oxymethyl-3,3,3-trifluoropropylsilylene)		<193		421,423,464,465, 466
Poly[oxy(methyl)-3,3,3-trifluoropropylsilylene-3,3-difluoropentamethylene(methyl)-3,3,3-trifluoropropylsilylene]		235	DSC heating rate	466
Poly[oxy(methyl)-3,3,3-trifluoropropylsilylene ethyldodecafluorohexamethyleneethylene(methyl)-3,3,3-trifluoropropylsilylene]		249	DSC heating rate	466
Poly[oxy(methyl)-3,3,3-trifluoropropylsilylene ethyleneeicosafluorodecamethyleneethylene(methyl)-3,3,3-trifluoropropylsilylene]		262	DSC heating rate	466
Poly[oxy(methyl)-3,3,3-trifluoropropylsilylene ethylenehexadecafluorooctamethyleneethylene-(methyl)-3,3,3-trifluoropropylsilylene]		245	DSC heating rate	466
Poly[oxy(methyl)-3,3,3-trifluoropropylsilylene ethyleneoctafluorotetramethyleneethylene(methyl)-3,3,3-trifluoropropylsilylene]		248	DSC heating rate	466
Poly[oxy(methyl)-3,3,3-trifluoropropysilylene-3,3,4,4-tetrafluorohexamethylene(methyl)-3,3,3-trifluoropropylsilylene]		246	DSC heating rate	466
Poly[oxy(methyl)phenylsilyleneoxy-1,4-phenylene]		368	Low viscosity	468
Poly[oxy(methyl)phenylsilyleneoxy 1,4-phenyleneisopropylidene-1,4-phenylene]		331	Low viscosity	468
Poly[oxy-1,3-phenyleneoxy-5-(triphenylsiloxydimethylsilyl)isophthaloyl]		376	Heating rate: 32 K/min	438

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly[oxytri(dimethylsilylenoxy)(methyl)phenylsilylene-1,3-phenylene(methyl)phenylsilylene]		231	DTA heating rate	302
Poly[penta(oxydiethylsilylene)-1,4-phenylenedimethylsilylene]		193	DSC heating rate	302
Poly[penta(oxydiethylsilylene)-1,4-phenyleneoxy-1,4-phenylenedimethylsilylene]		208	DTA heating rate	302
Poly[tetra(oxydimethylsilylene)-1,4-phenyleneoxy-1,4-phenylenedimethylsilylene]		221	DTA heating rate	302
Poly[tetra(oxydimethylsilylene)-1,3-phenylenedimethylsilylene]		198	DSC heating rate	302
Poly[tetra(oxydimethylsilylene)-1,4-phenylenedimethylsilylene]		201	DSC heating rate	302
Poly(tetrasiloxane)		257		1313
Poly(1-trimethylsilyl-1-propane)		623		1538
Poly[tri(oxydimethylsilylene)oxy(methyl)-2-phenylethylsilylene]		171		475
Poly[tri(oxydimethylsilylene)oxy(methyl)phenylsilylene]		201		475
Poly[tri(oxydimethylsilylene)oxy(methyl)trimethylsiloxysilylene]		148		475
Poly[tri(oxydimethylsilylene)-1,4-phenylenedimethylsilylene]		211	DSC heating rate	302
Poly[tri(oxydimethylsilylene-1,4-phenyleneoxy)-1,4-phenylenedimethylsilylene]		236	DTA heating rate	302
Poly(trisiloxane)		287		1313
3.2.3. POLY(SULFONATES)				
Poly(4,4′-cyclopentylidene diphenylene toluene-2,4-disulfonate)		407		1407
Poly(oxysulfonyl-1,3-phenylenecarbonyl-1,3-phenylenesulfonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)		395	Mechanical method	361
Poly(oxysulfonyl-1,3-phenylenesulfonyloxy-1,4-phenyleneisoproplyidene-1,4-phenylene)		~385	Not well defined; mechanical method	361
3.3. MAIN-CHAIN –C–(S)$_n$–C– AND –C–S–N– POLYMERS				
3.3.1. POLY(SULFIDES)				
Poly(dithiodecamethylene)		208	DTA heating rate	489
Poly(dithioethylene)		246	Mechanical method	248,249
Poly(dithiohexamethylene)		199		248
Poly(dithiomethylene-1,4-phenylenemethylene)		296	DTA heating rate	249,489
Poly(dithiopentamethylene)		201		248
Poly(oxycarbonyloxy-2-methyl-1,4-phenylenethio-3-methyl-1,4-phenylene)		340	No experimental details	338
Poly(oxycarbonyloxy-1,4-phenylenethio-1,4-phenylene)		~383	DTA heating rate	367
Poly(oxyethylenedithioethylene)		220	Mechanical method	248,249
Poly(oxyethylenetetrathioethylene)		233		248
Poly(oxymethyleneoxyethylenedithioethylene)		214		248,249,283
Poly(oxymethyleneoxytetramethylenedithiotetramethylene)		197		248
Poly(oxytetramethylenedithiotetramethylene)		197		248,249
Poly(phenylene sulfide)		359		1497
		383		1432
10% *m*-phenylene		347		1497
Poly(*p*-phenylene sulfide)		353		1290
		365	Under reactants (diiodobenzene and phenyl ethylene)	1454
		363		1488
Poly(*p*-phenylene sulfide) + HX1000,amorphous LCP		445		1396
Poly(*p*-phenylene sulfide) + HX4000, amorphous LCP		433		1396
Poly(tetrathiodecamethylene)		197	DTA heating rate	489
Poly(tetrathioethylene)		249		248,249
Poly(tetrathiomethylene-1,4-phenylenemethylene)		276	DTA heating rate	489
Poly[thio-1-(allyloxymethyl)ethylene]		213		220
Poly(thiocarbonyl fluoride) see Poly(thiodifluoromethylene)				

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(thio-1,2-cyclohexylene)		~256, ~228	Conflicting data	479,480
Poly(thio-1,3-cyclohexylene)		221	DTA heating rate	480
Poly(thioethylene)	24936-67-2	223	DTA, quenched possibly	1174
		~253	Interpretation difficult	481–483
Poly(thiodifluoromethylene)		155		484–486
Poly(thio-2,2-dimethylene) Poly(thioisobutylene)	26373-01-3	259	DTA, quenched	1175
Poly(thio-1-ethylethylene)		218		220
Poly(thio-2-ethyl-2-methyltrimethylene)		~223		160
Poly(thiomethylene)		218	No measurement details	482
Poly(thio-1-methyltrimethylene)		214	DSC heating rate	490
Poly(thioneopentylene)		233	Heating rate: 20 K/min	160,480
Poly(thio-1,4-phenylene)		370	DSC heating rate	305,307, 493,494
Poly(thiopropylene)		226		220,482,483, 495,496
Poly(thiotrimethylene)		~228	Conflicting data	480,487,488
Poly(trithiodecamethylene)		203	DTA heating rate	489
Poly(trithiomethylene-1,4-phenylenemethylene)		291	DTA heating rate	489
Thiokols see Poly(thiomethylene)s				
3.3.2. POLY(SULFONES) AND POLY(SULFONAMIDES)				
Camphorquinone in poly(sulfone)		458		1316
Poly(aryl ether sulfone)		520		1507
		393–433		1378
Poly[di(oxy-1,4-phenylene)sulfonyl-1,4-phenylene]		483	Mechanical method	116
Poly(ether ether sulfone)		483		1270
Poly(ether sulfone)		498		1432,1487
Poly(ether sulfone ketone), aromatic		440–479		1514
Poly(oxy-2-acetoxytrimethyleneoxy-1,4-phenylenesulfonyl-1,4-phenylene)		403		219
Poly(oxy-4,4′-biphenylyleneoxy-1,4-phenylenesulfonyl-1,4-phenylene)		503	Mechanical method	116
Poly[oxycarbonyldi(oxy-1,4-phenylene)sulfonyl-1,4-phenyleneoxy-1,4-phenylene]		~478	Mechanical method	228
Poly(oxycarbonylneopentylenesulfonylneopentylene)		323		160
Poly(oxy-2-hydroxytrimethyleneoxy-1,4-phenylenesulfonyl-1,4-phenylene)		428		219
Poly(oxyneopentylenesulfonylneopentyleneoxycarbonylimino hexamethyleneiminocarbonyl)		303		160
Poly(oxy-5-pentyloxyisophthaloyloxy-1,4-phenylenesulfonyl-1,4-phenylene)		443	Heating rate: 20 K/min; η_{inh} only 0.11	313
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1,4-phenylene-sulfonylmethyliminotetramethylene-methyliminosulfonyl-1,4-phenylene)		393	Mechanical method	116
Poly(oxy-1,4-phenylenesulfinyl-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)		478	Mechanical method	116
Poly(oxy-1,4-phenylenesulfinyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		438	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-4,4′-biphenylylenesulfonyl-1,4-phenylene)		533		184
Poly(oxy-1,4-phenylenesulfonyl-2,7-naphthylenesulfonyl-1,4-phenylene)		523		184
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene)		487	Calculated T_g for infinite molecular weight: 511K (Ref. 316)	116,184, 314–316
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-2-chloro-1,4-phenyleneisopropylidene-3-chloro-1,4-phenylene)		478	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-2,6-dimethyl-1,4-phenyleneisopropylidene-3,5-dimethyl-1,4-phenylene)		508	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)		478	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenecyclohexylidene-1,4-phenylene)		478	Mechanical method	116

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneethylidene-1,3-cyclohexylene-1,4-phenylene)		503	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyl (1,4-phenylene)neoxy-1,4-phenylenehexafluoro -2,2-propylidene-1,4-phenylene)		478	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneisobutylidene-1,4-phenylene)		473	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		449		102,116,262, 287,316–323
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenemethylene-1,4-phenylene)		453	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenemethylphenylmethylene-1,4-phenylene)		473	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylene-2,2-norbornylene-1,4-phenylene)		523	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenediphenylmethylene-1,4-phenylene)		503	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenethio-1,4-phenylene)		448	Mechanical method	116
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxyterephthaloyl)		522	Heating rate: 20 K/min	313
Poly(oxyterephthaloyloxyneopentylene sulfonylneopentylene)		378	? DTA heating rate; η low	160
Poly(oxytetramethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)		413	Mechanical method	116
Poly(sulfone)	25135-51-7	459		1320
		460		1432
Polysulfone of Bisphenol A and diphenylene sulfone		459		1254
Poly(sulfonyl-1,2-cyclohexylene)		401	Heating rate: 20 K/min	480
Poly(sulfonyl-1,3-cyclohexylene)		381	Heating rate: 20 K/min	480
Poly(sulfonylneopentylene)		386	Heating rate: 20 K/min	160,480
Poly(sulfonyl-1,4-phenylenemethylene-1,4-phenylene)		497	Heating rate: 40 K/min calculated T_g at infinite molecular weight; 511 K	316
Poly[tri(oxy-1,4-phenylene)sulfonyl-1,4-phenylene]		453	Mechanical method	116
3.3.3. POLY(THIOESTERS)				
Poly(thio-3-methyl-6-oxohexamethylene)		293	DTA heating rate	497
Poly(thio-1-methyl-3-oxotrimethylene)		285		498
Poly(thio-6-oxohexamethylene)		292	DTA heating rate	499
3.4. MAIN-CHAIN –C–N–C– POLYMERS				
3.4.1. POLY(AMIDES)				
Nylon		323		1320
Nylon 3 [Poly(imino-1-oxotrimethylene)]		384	Crystalline, DTA heating rate	502
Nylon 4,6 [Poly(iminotetramethyleneiminoadipoyl)]	50327-22-5	316	Dynamic method	503
Nylon 5,6 [Poly(iminopentamethyleneiminoadipoyl)]		318	Heating rate: 2 K/min	504,505
Nylon 6 [Poly(imino-1-oxohexamethylene)]	25038-54-4	–		1181,1193
		373	Dilatomer, dry	1187
		313–360	Conflicting data, values ~313–325 K	1,75,101,122, 187,191,261, 262,318,394, 396,399,416, 506–520
		228		1366
27% crys.		326–327	DSC, torsion tester, TH	1176
Nylon 6,2 [Poly(iminooxalyliminohexamethylene)]		427–432	DSC, TMA, DTA, annealed	1188
Nylon 6,6 [Poly(iminoadipoyliminohexamethylene)]	32131-17-2	~323	Conflicting data, most values about 323 K	6,75,78,161, 170,171,191, 234,261,262, 272,317,326, 344,381,388,

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
				394,396,399, 506,510,521, 522–533
27% crys.		330–331	DSC, torsion tester, TH	1177
		341		1254
Nylon 6,7 [Poly(iminohexamethyleneiminopimeloyl)]		331		492,506
Nylon 6,8 [Poly(iminohexamethyleneiminosuberoyl)]		330	Heating rate: 0.5 K/min	506
Nylon 6,9 [Poly(iminohexamethyleneiminoazelaoyl)]	28757-63-3	331		521
Nylon 6,10 [Poly(iminohexamethyleneiminosebacoyl)]	9008-66-6	323	Variable data below 323 K	75,161,167,191, 399,503,505,506, 528,534,535
19% crys.		318	DSC, torsion tester, TH	1178
Nylon 6,12 [Poly(iminohexamethyleneiminododecanedioyl)]	24936-74-1	319	Heating rate: 0.5 K/min	506,535,536
Nylon 7 [Poly(imino-1-oxoheptamethylene)]		–		1183
		325		191,506,537,538
Nylon 7,6 [Poly(iminoadipoyliminoheptamethylene)]		318, 333	Conflicting data	282,492,505,506
Nylon 7,7 [Poly(iminopimeloyliminoheptamethylene)]		328	Heating rate: 0.5 K/min	506
Nylon 8 [Poly(imino-1-oxooctamethylene)]		323		1184,538
Nylon 8,2 Poly[(iminooxalyliminooctamethylene)]46% crys.		373	Penetration, quenched	1190
		359	Penetration, annealed	1189
Nylon 8,6 [Poly(iminoadipoyliminooctamethylene)]		318	Heating rate: 2 K/min	505
Nylon 8,10 [Poly(iminooctamethyleneiminodecanedioyl)]		333	Heating rate: 2 K/min	505
Nylon 8,12 [Poly(iminoctamethyleneiminododecanedioyl)]		323	Dynamic method	535
Nylon 8,22 [Poly(iminooctamethyleneiminodocosanedioyl)]		321	Dynamic method	535
Nylon 9 [Poly(imino-1-oxononamethylene)]	25035-03-4, 25748-72-5	–		1182
		319		506,537,538
Nylon 9,6 [Poly(iminoadipoyliminononamethylene)]		318	Estimated	504
Nylon 10 [Poly(imino-1-oxodecamethylene)]		315		538
Nylon 10,2 54% crys.		330	DSC, TMA, annealed	1191
Nylon 10,6 [Poly(iminoadipoyliminodecamethylene)]		313	Heating rate: 2 K/min	505
Nylon 10,10 [Poly(iminosebacoyliminodecamethylene)]		333, 319	Conflicting data	505,506
Nylon 10,12 [Poly(iminodecamethyleneiminododecanedioyl)]		322	Dynamic method	535
Nylon 11 [Poly(imino-1-oxoundecamethylene)]	25035-04-5			1185
19% crys.		315	DSC, torsion tester, TH	1179
		316, 365	Transitions affected by thermal history and relaxation effects	538
		333–343		1483
Nylon 12 [Poly(imino-1-oxododecamethylene)]	24937-16-4	–		1186
26% crys.		313–316	DSC, torsion tester, TH	1180
		314	Affected by thermal history and relaxation effects	75,520,538
Nylon 12,2 33% crys.		330–333	DSC, TMA	1192
Nylon 12,18 [Poly(iminododecamethyleneiminooctadecanedioyl)]		323	Dynamic method	535
Nylon 13 [Poly(imino-1-oxotridecamethylene)]		314		538
Nylon 14,18 [Poly(iminotetradecamethyleneiminooctadecanedioyl)]		321	Dynamic method	535
Nylon 18,18 [Poly(iminooctadecanedioyliminooctadecamethylene)]		323	Dynamic method	535,536
Polyamide of 1,7-bis(aminophenoxy)napthalene and dicarboxylic acid		412–536		1491
Polyamide of 2,4′-biphenyldiamine		521–557		1511
Polyamide of bis(4-carboxyphenyl)phenylphosphene oxide		498–527		1445
Poly(amide-sulfonamide)		>523		1510
Poly(*N*,*N*′-bis(4′-amino-4-biphenylene isophthalamide))		498–508		1392
Poly(γ-benzyl L-glutamate)		~288	Dynamic method	273
Poly(butyliminohexafluoroglutaryl butyliminohexamethylene)		~293	Brittle point	539
Poly(butylimino-2,2,3,3,4,4-hexafluoropentamethylenebutyliminoadipoyl)		283–288	Brittle point	539
Poly(ε-caprolactam) see Nylon 6	25038-54-4			
Poly(3,4-dibenzyl terephthalamide)		476		1408
		518–600		1429
Poly[di(oxyethylene)oxycarbonyliminohexamethyleneimino carbonyl]		272	Heating rate: 1–2 K/min	245
Poly(ethyliminohexafluoroglutarylethyliminohexamethylene)		~278	Brittle point	539

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(ethylimino-2,2,3,3,4,4-hexafluoropentamethyleneethyliminoadipoyl)		293	Brittle point	539
Poly(hexamethylene adipamide) see Nylon 6,6	32131-17-2			
Poly(hydroxyamide ether)		363–406		1439
Poly(iminoadipoylimino-1,4-cyclohexylenemethylene) 1,4-cyclohexylene) 98% *trans/trans*, 2% *cis/trans*		458	T_g depends on *cis/trans* isomer content	540
Poly(iminoadipoyliminomethylene-2,5-dimethyl-1,4-phenylenemethylene)		343	DTA heating rate	303
Poly(iminoadipoyliminotrimethylenefluoren-9-ylidenetrimethylene)		393	Mechanical method, heating rate: 1 K/min	78,161
Poly(iminoadipoyliminotrimethyleneisobutylphosphinidene trimethylene)		344	DTA heating rate	492
Poly(iminoadipoyliminotrimethylenemethyliminotrimethylene)		278		492
Poly(iminoadipoyliminotrimethylenemethylphosphinylidene-tetramethylene)		332	DTA heating rate	492
Poly(iminoadipoyliminotrimethylenemethylphosphinylidene trimethylene)		332	DTA heating rate	492
Poly(iminoadipoyliminotrimethyleneoctylphosphinylidene trimethylene)		285	DTA heating rate	492
Poly[iminoadipoyliminotrimethylene-(phenylphosphinidene)trimethylene]		322		492
Poly[iminoadipoyliminotrimethylene-(phenylphosphinylidene)trimethylene]		328		492
Poly[imino-5-*tert*-butylisophthaloylimino-(2,5-dimethylhexamethylene)]		422	DTA heating rate	453
Poly[imino-5-*tert*-butylisophthaloylimino-(3,4-dimethylhexamethylene)]		446	DTA heating rate	453
Poly(imino-5-*tert*-butylisophthaloyliminohexamethylene)		436	DTA heating rate	453
Poly(imino-5-*tert*-butylisophthaloyliminomethylene-1,4-cyclohexylenemethylene)		509	DTA heating rate	453
Poly(imino-5-*tert*-butylisophthaloyliminomethylene-1,3-phenylenemethylene)		465	DTA heating rate	453
Poly(imino-5-*tert*-butylisophthaloyliminomethylene-1,4-phenylenemethylene)		477	DTA heating rate	453
Poly(iminocarbonyl-1,3-adamantylenecarbonyliminohexamethylene)		~385	Values from 378 to 393 K obtained	255
Poly(iminocarbonyl-2,2-biphenylylenecarbonyliminotrimethylenefluoroen-9-ylidenetrimethylene)		438	Mechanical method, heating rate: 1 K/min	78,161
Poly(iminocarbonyl-1,4-cyclohexylenemethylene)		466	DTA heating rate	517
Poly(iminocarbonyl-1,4-phenylene-2-oxoethyleneiminohexamethylene)		377	Heating rate: 20 K/min	541
Poly(imino-1,4-cyclohexylenemethylene-1,4-cyclohexyleneiminododecanedioyl) 98% *trans/trans*, 2% *cis/trans*		408	T_g depends on *cis/trans* isomer content	540
Poly(imino-1,4-cyclohexylenemethylene-1,4-cyclohexyleneiminosebacoyl) 98% *trans/trans*, 2% *cis/trans*		417	T_g depends on *cis/trans* isomer content	540
Poly(imino-2,2-dimethylpentamethyleneiminoadipoyl)		350	DTA heating rate	542
Poly(imino-2,2-dimethylpentamethyleneiminoazelaoyl)		336	DTA heating rate	542
Poly(imino-2,2-dimethylpentamethyleneiminopimeloyl)		344	DTA heating rate	542
Poly(imino-2,2-dimethylpentamethyleneiminoterephthaloyl)		430	DTA heating rate	308
Poly(iminoethylene-1,4-phenyleneethyleneimino-1,16-dioxohexadecamethylene)		358	Dynamic method	536
Poly(iminoethylene-1,4-phenyleneethyleneimino-1,18-dioxooctadecamethylene)		348	Dynamic method	536
Poly(iminoethylene-1,4-phenyleneethyleneimino-1,14-dioxotetradecamethylene)		366	Dynamic method	536
Poly(iminoethylene-1,4-phenyleneethyleneimino-1,11-dioxoundecamethylene)		369	Dynamic method	536
Poly(iminoethylene-1,4-phenyleneethyleneiminosebacoyl)		378	Dynamic method	536
Poly(iminoglutarylimino-2,2-dimethylpentamethylene)		355	DTA heating rate	542
Poly(iminohexamethyleneiminocarbonyl-2,2′-biphenylenecarbonyl)		400	Mechanical method, heating rate: 1 K/min	78,161

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(iminohexamethyleneiminocarbonyl-1,4-phenylene-2,2-butylidene-1,4-phenylenecarbonyl)		427–437		165
Poly(iminohexamethyleneimino-4-methylpimeloyl)		323		521
Poly(iminohexamethyleneimino-1-oxotrimethylenefluoren-9-ylidene-3-oxotrimethylene)		395	Mechanical method, heating rate: 1 K/min	78,161
Poly(iminohexamethyleneimino-1-oxotrimethylene-phenylphosphinothioylidene-3-oxotrimethylene)		316		492
Poly(iminohexamethyleneimino-1-oxotrimethylenephenylphosphinylidene-3-oxotrimethylene)		302		492
Poly(iminoisophthaloylimino-4,4′-biphenylylene)		558	DTA heating rate	311,312
Poly(iminoisophthaloylimino-3,4-dimethylhexamethylene)		398	DSC heating rate	453
Poly(iminoisophthaloylimino-2,2-dimethylpentamethylene)		426	DTA heating rate	308
Poly(iminoisophthaloyliminohexamethylene)		390		78,161,255,543
Poly(iminoisophthaloyliminomethylene-1,4-cyclohexylenemethylene)		481	DSC heating rate	453
Poly(iminoisophthaloyliminomethylene-1,3-phenylenemethylene)		438	Mechanical method, heating rate: 1 K/min	78,161,453
Poly(iminoisophthaloyliminooctamethylene)		388	Dynamic method	544
Poly(iminoisophthaloylimino-1,4-phenylenemethylene-1,4-phenylene)		<500	Dynamic method	311
Poly(iminoisophthaloyliminotrimethylenefluoren-9-ylidenetrimethylene)		448	Mechanical method	78,161
Poly(iminomesaconoyliminodecamethylene)		347	Heating rate: 16 K/min	545
Poly(iminomesaconoyliminohexamethylene)		367	Heating rate: 16 K/min	545
Poly(iminomesaconoyliminomethylene-1,3-phenylenemethylene)		408	Heating rate: 16 K/min	545
Poly(imino-3-methyladipoyliminohexamethylene)		290	DTA heating rate	492
Poly(iminomethylene-5-*tert*-butyl-1,3-cyclohexylenemethyleneiminoisophthaloyl)		482	DSC heating rate	453
Poly(iminomethylene-5-*tert*-butyl-1,3-phenylenemethyleneiminoadipoyl)		382	DTA heating rate	453
Poly(iminomethylene-5-*tert*-butyl-1,3-phenylenemethyleneiminoisophthaloyl)		461	DSC heating rate	453
Poly(iminomethylene-1,3-cyclohexylenemethyleneimino-5-*tert*-butylisophthaloyl)		473	DTA heating rate	453
Poly(iminomethylene-1,3-cyclohexylenemethyleneiminoisophthaloyl)		453	DSC heating rate	453
Poly[iminomethylene(2,5-dimethyl-1,4-phenylene)methyleneiminosuberoyl]		351	DTA heating rate	303
Poly(iminomethylene-1,3-phenylenemethyleneiminoadipoyl)		346	Mechanical method, heating rate: 1 K/min	78
Poly(iminomethylene-1,3-phenylenemethyleneiminocarbonyl-2,2′-biphenylenecarbonyl)		432	Mechanical method, heating rate: 1 K/min	78
Poly[iminomethylene-1,4-phenylenemethyleneiminocarbonyl (1,3,3-trimethyl-5-oxopentamethyl)]		398	No experimental details	381
Poly(iminomethylene-1,4-phenylenemethyleneiminododecanedioyl)		378		491,536
Poly(iminomethylene-1,4-phenylenemethyleneiminooctadecanedioyl)		348	Dynamic method	536
Poly(iminomethylene-1,3-phenylenemethyleneimino-1-oxotrimethylenefluoren-9-ylidene-3-oxotrimethylene)		423	Mechanical method, heating rate: 1 K/min	78,161
Poly(iminomethylene-1,4-phenylenemethyleneiminopentadecanedioyl)		363	Dynamic method	536
Poly(iminomethylene-1,4-phenylenemethyleneiminosebacoyl)		388	Dynamic method	536
Poly(iminomethylene-1,4-phenylenemethyleneiminotridecanedioyl)		373	Dynamic method	536
Poly(iminomethylene-1,4-phenylenemethyleneiminoundecanedioyl)		380		491,536
Poly(iminomethylene-1,3,3-trimethyl-1,5-cyclohexyleneiminoadipoyl)		433	No experimental details	381
Poly(iminomethylene-1,3,3-trimethyl-cyclohexyleneiminoterephthaloyl)		473	No experimental details	381

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(imino-5-methylisophthaloyliminohexamethylene)		393		255
Poly(imino-1-methyl-3-oxotrimethylene)		369	Crystalline; DTA heating rate	502
Poly(imino-1,5-naphthyleneiminoisophthaloyl)		598	DTA heating rate	312
Poly(imino-1,5-naphthyleneiminoterephthaloyl)		578	Heating rate: 10 K/min	312
Poly(iminooctamethyleneimino-1-oxoethylene-1,4-phenylene-2-oxoethylene)		383	Dynamic method	536
Poly(iminooxalylimino-2,2-dimethylpentamethylene)		382	DTA heating rate	542
Poly(imino-1-oxoethylene-1,4-phenylene-2-oxoethyleneiminooctadecamethylene)		351	Dyamic method	536
Poly(imino-1-oxotrimethylenefluoren-9-ylidene-3-oxotrimethyleneiminotrimethylenefluoren-9-ylidenetrimethylene)		438	Mechanical method, heating rate: 1 K/min	78
Poly(imino-1-oxotrimethylene-1,4-phenylene-3-oxotrimethyleneiminododecamethylene)		358	Dynamic method	536
Poly(imino-1-oxotrimethylene-1,4-phenylene-3-oxotrimethyleneiminooctadecamethylene)		338	Dynamic method	536
Poly(iminopentamethyleneiminocarbonyl-1,4-phenylene-2-oxoethylene)		376	Heating rate: 20 K/min	541
Poly(iminopentamethyleneiminoterephthaloyl)		~500	Dynamic method	518
Poly(imino-1,3-phenyleneiminocarbonyl-1,3-adamantylenecarbonyl)		580	Heating rate: 32 K/min	255
Poly(imino-1,3-phenyleneiminoisophthaloyl)		553	Mechanical method, heating rate: 2 K/min	311,518,546
Poly(imino-1,4-phenyleneiminoisophthaloyl)		<500	Dynamic method	311
Poly(imino-1,3-phenyleneimino-5-methylisophthaloyl)		578	Heating rate: 32 K/min	255
Poly(imino-1,3-phenyleneiminosebacoyl)		383	Dynamic method	544
Poly(imino-1,3-phenyleneiminoterephthaloyl)		<500	Dynamic method	311
Poly(imino-1,4-phenyleneiminoterephthaloyl)		618	Heating rate: 10 K/min	311,312
Poly(iminoterephthaloylimino-4,4′-biphenylylene)		613	DTA heating rate	311,312
Poly(iminoterephthaloylimino-3-ethylhexamethylene)		403	DSC heating rate	381
Poly(iminoterephthaloylimino-3-isopropylhexamethylene)		416	DSC heating rate	381
Poly(iminoterephthaloyliminododecamethylene)		393	Dynamic method	543,547
Poly(iminoterephthaloyliminoheptamethylene)		470	Dynamic method	518
Poly(iminoterephthaloyliminohexamethylene)		413	No experimental details	381
Poly(iminoterephthaloyliminononamethylene)		388	No experimental details	381
Poly(iminoterephthaloyliminomethylene-2,5-dimethyl-1,4-phenylenemethylene)		498	DTA heating rate	303
Poly(iminoterephthaloylimino-4,4-dimethylheptamethylene)		425	No experimental details	381
Poly(iminoterephthaloylimino-1,4,4-trimethylheptamethylene)		423	DTA heating rate	548
Poly(iminoterephthaloylimino-2,2,4-trimethylheptamethylene)		418	DSC heating rate	262,381
Poly(iminoterephthaloylimino-2,4,4-trimethylheptamethylene)		421, 432	Two different samples; DSC heating rate	381
Poly(iminoterephthaloylimino-1,4-phenylenemethylene-1,4-phenylene)		<500	Dynamic method	311
Poly[imino(tetrachloroterephthaloyl)iminohexamethylene]	71164-49-3	569	DSC, HR 16 deg/min, *f*(MW)	1194
Poly(iminotetramethyleneiminocarbonyl-1,4-phenylene-2,2-butylidene-1,4-phenylenecarbonyl)		446–455		165
Poly(iminotetramethyleneiminocarbonyl-1,4-phenylene-2-oxoethylene)		357	Heating rate: 20 K/min	541
Poly(iminotrimethylenefluoren-9-ylidenetrimethyleneiminosebacoyl)		358	Mechanical method, heating rate: 1 K/min	78, 161
Poly(iminotrimethyleneiminocarbonyl-1,4-phenylene-2-oxoethylene)		382	Heating rate: 20 K/min	541
Poly(imino-2,2,4-trimethylpentamethyleneiminoadipoyl)		338	No measurement details	381
Poly(isopropyliminohexafluoroglutarylisopropyliminohexamethylene)		~293	Brittle point	539
Poly(isopropylimino-2,2,3,3,4,4-hexafluoropentamethyleneisopropyliminoadipoyl)		303–308	Brittle point	539
Poly(methyliminohexafluoroglutarylmethyliminohexamethylene)		298–303	Brittle point	539

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(methylimino-2,2,3,3,4,4-hexafluoro-pentamethylenemethyliminoadipoyl)		298–303	Brittle point	539
Poly(2-methylpentamethylene terephthalamide) amorphous		416		435
crystalline		424		1435
drawn fiber		453		1435
Poly(1,3,4-oxidiazole-amide)		498–545		1388
Poly(oxytrimethyleneiminoadipoyliminotrimethylene)		307		282
Poly(oxy-3-oxotrimethyleneiminomethylene-2,5-dimethyl-1,4-phenylenemethyleneimino-1-oxotrimethylene)		353	DTA heating rate	303
Poly(oxy-5-oxopentamethyleneiminomethylene-1,4-phenylenemethyleneimino-1-oxopentamethylene)		343	Estimated from copolymer data	304
Poly(oxy-1,4-phenylenecarbonylimino-2,2-dimethyl-pentamethyleneiminocarbonyl-1,4-phenylene)		428	DTA heating rate	308
Poly(oxy-1,4-phenylenecarbonylimino-1,4-phenylenesulfonyl-1,4-phenyleneiminocarbonyl-1,4-phenylene)		571	Softening point	309
Poly(oxy-1,4-phenyleneiminoisophthaloylimino-1,4-phenylene)		463, 554	Conflicting data	130,311,312
Poly(oxy-1,4-phenyleneiminoterephthaloylimino-1,4-phenylene)		613	Heating rate: 10 K/min	311,312
Poly(*p*-phenylene terephthalamide) Kevlar		508		1432
Poly(*N*-phenyl-2-hydroxytrimethylene amine)		343		1400
Poly(phenylquinoxaline-imide-amide)		557–581		1389
Poly(sulfonyl-1,3-phenyleneiminoadipoylimino-1,3-phenylene)		413	DTA heating rate	500,501
Poly(sulfonyl-1,3-phenyleneiminoadipoylimino-1,4-phenylene)		467	DTA heating rate	500,501
Poly(sulfonyl-1,3-phenyleneiminoazelaoylimino-1,3-phenylene)		398	DTA heating rate	500,501
Poly(sulfonyl-1,4-phenyleneiminoazelaoylimino-1,4-phenylene)		451	DTA heating rate	500,501
Poly(sulfonyl-1,3-phenyleneiminocarbonyl-1,4-naphthylenecarbonylimino-1,3-phenylene)		<573	Softening point; mechanical method	309
Poly(sulfonyl-1,4-phenyleneiminocarbonyl-1,4-naphthylenecarbonylimino-1,4-phenylene)		<573	Softening point; mechanical method	309
Poly(sulfonyl-1,4-phenyleneiminocarbonyl-1,4-phenylenemethylene-1,4-phenylenecarbonylimino-1,4-phenylene)		<573	Softening point	309
Poly(sulfonyl-1,3-phenyleneiminododecanedioylimino-1,3-phenylene)		380	DTA heating point	500,501
Poly(sulfonyl-1,4-phenyleneiminododecanedioylimino-1,4-phenylene)		433	DTA heating point	500,501
Poly(sulfonyl-1,3-phenyleneiminoisophthaloylimino-1,3-phenylene)		573–593	Softening point; mechanical method	309
Poly(sulfonyl-1,4-phenyleneimino-2-methoxy-isophthaloylimino-1,4-phenylene)		568–583	Softening point	309
Poly(sulfonyl-1,4-phenyleneiminopimeloylimino-1,4-phenylene)		436	DTA heating point	500,501
Poly(sulfonyl-1,3-phenyleneiminosebacoylimino-1,3-phenylene)		385	DTA heating point	500,501
Poly(sulfonyl-1,4-phenyleneiminosebacoylimino-1,4-phenylene)		444	DTA heating point	500,501
Poly(sulfonyl-1,3-phenyleneiminosuberoylimino-1,3-phenylene)		398	DTA heating point	500,501
Poly(sulfonyl-1,4-phenyleneiminosuberoylimino-1,4-phenylene)		453	Softening point	500,501
Poly(sulfonyl-1,4-phenyleneiminoterephthaloyl-1,4-phenylenecarbonylimino-1,4-phenylene)		590	Softening point; mechanical method	309
Poly(terephthalamide), pendant ester		451–490		1462
Poly(thio-11-oxoundecamethyleneiminoethylene-1,4-phenyleneethyleneimino-1-oxoundecamethylene)		331	Dynamic method; low viscosity	491
Poly(thio-3-oxotrimethyleneiminohexamethyleneimino-1-oxotrimethylene)		287–300		492

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(thio-7-oxoheptamethyleneiminomethylene-1,4-phenylenemethyleneimino-1-oxoheptamethylene)		338	Dynamic method	491
Poly(thio-5-oxopentamethyleneiminomethylene-1,4-phenylenemethyleneimino-1-oxopentamethylene)		343	Dynamic method	491
Poly(tridecanolactone)		237		1361,1544
Poly[tri(oxyethylene)oxycarbonyliminohexamethyleneimino carbonyl]		260		246
3.4.2. POLY(ANILINES)				
Poly(aniline)		373		1298
Poly(4-(methacryloyloxy)acetanilide)		471		1526
Poly(4-(2-methacryloyloxy)ethyloxy)acetanilide)		585		1526
Poly(4-(6-methacryloyloxy)hexyloxy)acetanilide)		318		1526
Poly(2-methyl-4-nitro-[*N,N*-bis(2-hydroxyethyl)]-aniline)		371		1280
Poly(2′-methyl-4′-nitrophenylazo)-[*N,N*-bis(2-hydroxyethyl)]-aniline)		410		1280
Poly(4′-nitrophenylazo)-[*N,N*-bis(2-hydroxyethyl)]-aniline)		404		1280
Poly([2(4′-nitrophenylethylenyl)]-[*N,N*-bis(2-hydroxyethyl)]-aniline)		394		1280
Poly(4-tricyanovinyl-[*N,N*-bis(2-hydroxyethyl)]-aniline)		398		1280
3.4.3. POLY(IMIDES)				
Phenylethynyl-terminated imide, cured		522		1458
Phenylethynyl-terminated imide, uncured oligomer (6300 M_w)		491		1458
Poly(imide) of 3,3-bis [4-(4′-aminophenoxy)phenyl]phthalimidime with bis(trimellitimide)		540–595		1493
Poly(ester-amide-imide) of phenyltrimellitimide		373–403		1467
Poly(ester imide)		364		1534
Poly(ether imide)		473		1432
		538		1376
		485		1254
Poly(bis(*p*-ethynylphenyl)pyromellitimide)		>713		1303
Poly(4-(4-fluorobenzoyl)-*N*-(4-hydroxyphenyl)phthalimide)		570		1558
Poly([4-(*N,N*-bis(2-hydroxyethyl)amino)-benzylidene] imidazolidine-2-dione)		451		1280
Poly(imide)		495		1432
Poly(imide), di-*t*-butyl subs		515–571		1373
nanofoam		>673		1372
PMR-15		613		1453
Poly(imides) of 4,4′-diaminotriphenylmethane, aromatic		533–593		1466
Poly(imide) of 4,4′-oxidiphthalic anhydride and 2,2′-dimethyl-4-4′-diaminobiphenyl diamine		571		1434
Poly(methacryl-methyl-imide)		>423		1397
Poly[4,4′-oxydiphenylene oxydiphthalimide)		543		1448
3.4.4. POLY(IMINES)				
Poly(acetyliminoethylene)		~353	Mechanical method	549
Poly(acetyliminotrimethylene)		~303	Mechanical method; low viscosity	550
Poly(benzoyliminoethylene)		378	Mechanical method	549
Poly(benzoyliminotrimethylene)		345	Mechanical method	550
Poly(butyryliminoethylene)		~303	Mechanical method	549
Poly(dodecanoyliminoethylene)		~283	Mechanical method-apparent T_g	549
Poly[(pentadecafluorooctanoylimino)trimethylene]		298	Mechanical method	550
Poly(heptanoyliminoethylene)		~283	Mechanical method-apparent T_g	549
Poly(hexanoyliminoethylene)		~283	Mechanical method-apparent T_g	549
Poly(hexanoyliminotrimethylene)		257	Mechanical method	550
Poly(isobutyryliminoethylene)		~303	Mechanical method	549
Poly(isovaleryliminoethylene)		~303	Mechanical method	549
Poly(3-methoxycarbonylpropyionyliminoethylene)		304	Mechanical method	551
Poly(2-naphthyliminoethylene)		403	Mechanical method	549
Poly(octadecanoyliminoethylene)		~283	Mechanical method-apparent T_g	549

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TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(octanoyliminoethylene)		~283	Mechanical method-apparent T_g	549
Poly(propionyliminoethylene)		~343	Mechanical method	549
Poly(propionyliminotrimethylene)		281	Mechanical method; low viscosity	550
Poly(valeryliminoethylene)		~286	Mechanical method	549
3.4.5. POLY(UREAS)				
Poly(di(aminophenyl)acetylene diurea)		508–583		1421
Poly(urethane), hemicyanine dye		394		1456
PU-30		233	Soft microphase	1268
		364	Hard microphase	1268
PU-40		230	Soft microphase	1268
		356	Hard microphase	1268
PU-50		230	Soft microphase	1268
		353	Hard microphase	1268
PU-60		232	Soft microphase	1268
		351	Hard microphase	1268
PU-70		239	Soft microphase	1268
		346	Hard microphase	1268
Poly(urethane)s, shape-memory		283–323		1496
Poly(ureylenemethylene-1,4-phenylenemethyleneureylenedecamethylene)		328	Heating rate: 1 K/min	445
Poly(ureylenemethylene-1,4-phenylenemethyleneureylenehexamethylene)		345	Heating rate: 1 K/min	445
Poly(ureylenemethylene-1,4-phenylenemethyleneureyleneoctadecamethylene)		325	Heating rate: 1 K/min	445
Poly(ureylenemethylene-1,4-phenylenemethyleneureyleneoctamethylene)		341	Heating rate: 1 K/min	445
Poly(ureylenemethylene-1,4-phenylenemethyleneureylenetetradecamethylene)		327	Heating rate: 1 K/min	445
Poly(ureylenedecamethyleneureylenetetradecamethylene)		313	Heating rate: 1 K/min	445
Poly(ureylenehexamethyleneureylenedodecamethylene)		322	Heating rate: 1 K/min	445
Poly(ureylenehexamethyleneureylene-1,4-phenylenemethylene-1,4-phenylene)		328	Heating rate: 1 K/min	445
Poly(ureylenehexamethyleneureylenetetradecamethylene)		320	Heating rate: 1 K/min	445
Poly(ureyleneoctamethyleneureylene-1,4-phenylenemethylene-1,4-phenylene)		323	Heating rate: 1 K/min	445
Poly(ureylene-1,4-phenylenemethylene-1,4-phenyleneureylenedecamethylene)		319	Heating rate: 1 K/min	445
Poly(ureylene-1,4-phenylenemethylene-1,4-phenyleneureylenedodecamethylene)		324	Heating rate: 1 K/min	445
Poly(ureylene-1,4-phenylenemethylene-1,4-phenyleneureyleneoctadecamethylene)		321	Heating rate: 1 K/min	445
3.5. POLY(PHOSPHAZENES)				
Aminoorganosiloxane poly(phosphazene)		190–251		1441
Poly[(amino)thionylphosphazene]		233–355		1450
Poly[bis(4-benzylphenoxy)phosphazene]		286		1518
Poly[bis(2,3-bis(2-*n*-butoxyethoxy)propoxy)phosphazene]		187		1422
Poly(bis(*t*-butyl-*p*-phenoxyphosphazene))		323		1296
Poly(chloro-2,2,2-trifluoroethoxyphosphazene) (average structure)		213	Heating rate: 20 K/min; probably branched structure	552
Poly(dichlorophosphazene)	26085-02-9	210	DTA heating rate	553
Poly(diethoxyphosphazene)		189	DTA heating rate	553
Poly[bis(dimethylamino)phosphazene]		233	Heating rate: 20 K/min	552
Poly(dimethoxyphosphazene)		197	DTA heating rate	553
Poly[bis(2,3-dimethoxypropoxy)phosphazene]		194		1422
Poly[bis(dimethylamino)phosphazene]		269	Dynamic mechanical method	554
Poly(diphenoxyphosphazene)		265	DTA heating rate	553
Poly[bis(ethylamino)phosphazene]		303	DTA heating rate	554
Poly[bis(4-fluorophenoxy)phosphazene]		259	Heating rate: 20 K/min	552
Poly[bis(1H,1H-pentafluoropropoxy)phosphazene]		198, 218		557
Poly[bis(2-methoxyethoxy)phosphazene]		192		1422
Poly[bis((methoxyethoxy)ethoxy)phosphazene]		189		1449,1441

TABLE 3. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly[bis(methylphenoxy)phosphazene]		269		1441
Poly[bis(2-(2-(2-(2-(2-(2-(2-methoxyethoxy) ethoxy)ethoxy)ethoxy)ethoxy)ethoxy)ethoxy)phosphazene]		198		1422
Poly[bis(2-(2-(2-(2-(2-(2-methoxyethoxy) ethoxy)ethoxy)ethoxy)ethoxy)ethoxy)phosphazene]		197		1422
Poly[bis(2-(2-(2-(2-(2-methoxyethoxy) ethoxy)ethoxy)ethoxy)ethoxy)phosphazene]		194		1422
Poly[bis(2-(2-(2-(2-methoxyethoxy) ethoxy)ethoxy)ethoxy)phosphazene]		193		1422
Poly[bis(2-(2-(2-methoxyethoxy) ethoxy)ethoxy)phosphazene]		193		1422
Poly[bis(2,3-bis(2-(2-(2-methoxyethoxy) ethoxy)ethoxy)propoxy)phosphazene]		191		1422
Poly[bis(2-(2′-methoxyethoxy)ethoxy)phosphazene]		189		1422
Poly[bis(2-(2-methoxyethoxy)ethoxy)phosphazene]		189		1422
Poly[bis(2,3-bis(2-(2-methoxyethoxy) ethoxy)propoxy)phosphazene]		192		1422
Poly[bis(2,3-bis(2-methoxyethoxy)propoxy)phosphazene]		192		1422
Poly(organophosphazene), ethyleneoxy subs		203–217		1449
Poly[bis(2,3-bis(2-*sec*-propoxyethoxy) propoxy)phosphazene]		196		1422
Poly[bis(phenylamino)phosphazene]		364	DTA heating rate	554
Poly(phosphazene)s		168		1441
fluorinated		311–367		1512
Poly[bis(piperidino)phosphazene]		292		554
Poly[bis(trifluoroethoxy)phosphazene]		210		1441
Poly[bis(2,2,2-trifluoroethoxy)phosphazene]		203		552,555,556
Poly[bis(3-trifluoromethylphenoxy)phosphazene]		238	Heating rate: 20 K/min	552
3.6. POLY(SILANES) AND POLY(SILAZANES)				
Poly(carbosilazanes)		198–253		1370
Poly(di-*n*-butylsilylenemethylene)		243		1440
Poly(di-*n*-hexylsilylenemethylene)		217		1440
Poly[(4-dimethylaminophenyl)methylsilylenetrimethylene]		267		558
Poly[(4-dimethylaminophenyl)phenylsilylenetrimethylene]		325		558
Poly(1,1-dimethylsilazane)		191		560,561
Poly(dimethylsilylenemethylene)		173	No measurement details	562
		186		1440
Poly(dimethylsilylenetrimethylene)		203		559
Poly(di-*n*-pentylsilylenemethylene)		218		1440
Poly(di-*n*-propylsilylenemethylene)		323		1440
Poly(di-*p*-tolysilylenetrimethylene)		311	Mechanical method	558
Poly[(methyl)phenylsilylenetrimethylene]		243	No measurement details	559
Poly(silethylene)		328		1313
Poly(silethylene glycol)		204		1478
Poly(siloxyethylene glycol)		220–373	Increases with Si content	1478
Poly(silylethylene)		>653		1395
Poly(vinyl trimethyl silane)		378–417		1295

TABLE 4. MAIN-CHAIN HETEROCYCLIC POLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
4.1. CARBOHYDRATES				
Acetoxypropyl cellulose	9004-39-1	257		1358
Amylose hexanoate (2.9)		315	Heating rate: 5–10 K/min	189
Amylose triacetate		440	Heating rate: 5–10 K/min	189
Amylose tributyrate		365	Heating rate: 5–10 K/min	189
Amylose tripropionate		406	Heating rate: 5–10 K/min	189
Amylose valerate: (2.8)		330	Heating rate: 5–10 K/min	189
Cellulose	9004-34-6	243–433	Conflicting data	190–200

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Cellulose acetate	9004-35-7	473		1320
Cellulose eicosanoate		407		388,1464
Cellulose laurate		367		1464
Cellulose triacetate	9012-09-3	322–751	Conflicting data; depend on acetate and water content and degree of crystallinity	1,21,93,143,188, 191,197,201–214
Cellulose tributyrate	39320-16-6	388		1,206,215
Cellulose tridecanoate		321		215
Cellulose triheptanoate		320		215
Cellulose trihexanoate		237		215
Cellulose nitrate	9004-70-0	326, 339	Conflicting data	18,21,188,201, 216,217
Cellulose tripropionate		400		215
Cellulose trivalerate		338		215
Cyanoethyl cellulose	9004-41-5	453	Dynamic method	197
Ethyl cellulose	9004-57-3	316		1,201
Methyl cellulose	9004-67-5	423	Dynamic method	197
Poly(1,4-butanediol succinate)		346		1527
Starch acetate, dry		438–458		1469
humid		368–408		1469
Triphenylmethyl cellulose		426	Dynamic method	197
4.2. LIQUID CRYSTALS				
LC Poly(acrylate)		294		1463
LC Poly(butadiene) + *p*-nitrostilbene		287–304		1405
LC Poly(hydroquinone terephthalate), *t*-butyl		458		1480
LC Poly(norborene) + *p*-nitrostilbene		317–337		1405
LC Polylster		333		1499
4.3. NATURAL POLYMERS				
Amorphous silk fibroinchains		453		1364
Collagen		308		1498
Gelatin		343		1498
4.4. POLY(ACETALS)				
Poly(1,3-dioxa-4,6-cyclohexylenemethylene)		378		1,187
Poly(1,3-dioxa-2-propyl-4,6-cyclohexylenemethylene)	63148-65-2	322		1,188
Poly(2-ethyl-1,3-dioxa-4,6-cyclohexylenemethylene)		345		1
Poly(2-isopropyl-1,3-dioxa-4,6-cyclohexylenemethylene)		329		1
Poly(2-methyl-1,3-dioxa-4,6-cyclohexylenemethylene)		355		1
Poly(vinyl acetal) see Poly(2-methyl-1,3-dioxa-4,6-cyclohexylenemethylene)				
Poly(vinyl butyral) see Poly(1,3-dioxa-2-propyl-4,6-cyclohexylenemethylene)	63148-65-2			
Poly(vinyl pentanal acetal)		327		1524
4.5. POLY(ANHYDRIDES)				
Poly(amide imide) of biphenyltetracarboxylic dianhydride		493–563		1404
Poly(3,3′,4,4′-benzophene tetracarboxylic dianhydride)		597		1350
Poly(3,3′,4,4′-biphenyl tetracarboxylic dianhydride)		616		1350
Poly(2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride)		597		1350
Poly(methacrylic anhydride)		432	Vicat softening point	186
Poly(3,3′,4,4′-oxydiphthalic anyhydride)		536		1350
Poly(pyromellitic dianhydride) Kapton		635		1350
		693		1320
Poly(N,N,N′,N′-tetraglycidyl-4-4′-diaminodiphenylmethane hexahydrophthalic anhydride)		479		1381
Poly(N,N,N′,N′-tetraglycidyl-4-4′-diaminodiphenylmethane tetrahydrophthalic anhydride)		457		1381

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
4.6. POLY(BENZIMIDAZOLES)				
Poly(2,6-benzimidazolediyl-6,2-benzimidazolediylocatamethylene)		507	No experimental details	112
Poly(2,5-benzimidazolediyl-6,2-benzimidazolediylpentamethyleneimino-4-diethylamino-1,3,5-triazinediyliminopentamethylene)		463	Heating rate: 2 K/min	142
Poly(2,5-benzimidazolediyl-5,2-benzimidazolediyl-1,3-phenylene)		703	T_g increased after storage at 773 K	143
Poly(2,5-benzimidazolediyl-6,2-benzimidazolediyl-1,4-phenyleneimino-4-diphenylamino-1,3,5-triazinediylimino-1,4-phenylene)		602	Heating rate: 2 K/min; η_{inh} only 0.21 dl/g	142
Poly(2,6-benzimidazolediyl-6,2-benzimidazolediyltrimethylene)		548	No experimental details	112
Poly(2,6-benzimidazole-diylsulfonyl-5,2-benzimidazolediyl-1,3-phenylene)		~560	DTA heating rate	114
Poly(5,5′-bibenzimidazole-2,2′-biphenylylene)		663	Mechanical method	144
4.7. POLY(BENZOTHIAZINOPHENOTHIAZINES)				
Poly(7,7′-[1″,4″-dihydro-(2,3H)benzothiazino (2′,3′-b)hexahydro(1,2,3,4H)phenothiazine]diyl)		483	Dynamic method	117
4.8. POLY(BENZOTHIAZOLES)				
Poly(2,6-benzothiazolediyl-6,2-benzothiazolediyloctamethylene)		511	No method	112
Poly(2,6-benzothiazolediyl-6,2-benzothiazolediyl-1,3-phenylene)		768	Dynamic method	118
4.9. POLY(BENZOXAZINES)				
Polybenzoxazine B-b		408		1410
Polybenzoxazine B-e		453		1410
Polybenzoxazine B-ip		413		1410
Polybenzoxazine B-m		453		1410
Polybenzoxazine B-p		403		1410
4.10. POLY(BENZOXAZOLES)				
Poly(arylene ether benzoxazole)		>573		1539
Poly(benzoxazole)		328–370		1346
Poly(2,6-benzoxazolediyl-6,2-benzoxazolediyloctamethylene)		326	No method	112
Poly(benzoxazole-5,2-diylhexamethylenebenzoxazole-2,5-diyliminosebacoylimino)		359	Heating rate: 20 K/min	113
Poly(benzoxazole-5,2-diylhexamethylenebenzoxazole-2,5-diyliminosuberoylimino)		350	Heating rate: 20 K/min	113
Poly(benzoxazole-5,2-diyloctamethylenebenzoxazole-2,5-diyliminoadipoylimino)		358	Heating rate: 20 K/min	113
Poly(benzoxazole-5,2-diyloctamethylenebenzoxazole-2,5-diyliminosebacoylimino)		366	Heating rate: 20 K/min	113
Poly(benzoxazole-5,2-diyl-1,3-phenylenebenzoxazole-2,5-diyliminosebacoylimino)		393	Heating rate: 20 K/min	113
Poly(*m*-phenylene),*o*,*m*-2-benzoxazole		494–523		1474
Poly(*m*-phenylene),*o*,*m*-5-methyl-2-benzoxazole		494–523		1474
4.11. POLY(CARBORANES)				
Poly($C_2B_5H_5$-carboranylenedi(dimethylsilyleneoxy) dimethylsilylene)		<188	Dynamic method	180
Poly($C_2B_5H_5$-carboranylenedimethylsilyleneoxy-dimethylsilylene)		277, 211	Conflicting data	178,179
Poly($C_2B_{10}H_{10}$-carboranylenedimethylsilyleneoxy-dimethylsilylene)		298	Mechanical method	181
Poly($C_2B_{10}H_{10}$-carboranylenedi(dimethylsilyleneoxy) dimethylsilylene)		239		180–182

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly($C_2B_{10}H_{10}$-carboranylenedi(dimethylsilyleneoxy)dimethylsilylene)		213	Mechanical method	180–182
4.12. POLY(DIBENZOFURANS)				
Poly(3,6-dibenzofurandiylsulfonyl)		633		184
Poly(3,6-dibenzofurandiylsulfonyl-1,4-phenyleneoxy-1,4-phenylenesulfonyl)		563		184
4.13. POLY(DIOXOISOINDOLINES)				
Poly(1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylene)		~638	Dynamic method	428,905,437
Poly(1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenedecafluoropentamethylene-1,3-phenylene)		533–543	Softening point; viscosity only 0.11 dl/g	148
Poly(1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenehexafluorotrimethylene-1,3-phenylene)		~393	Sample hygroscopic	149
Poly(1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		<469	Heating rate: 32 K/min	124,125,150
Poly(1,3-dioxoisoindoline-2,5-diylcarbonylimino-1,4-phenyleneiminocarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene)		641	Dynamic method	151
Poly(1,3-dioxoisoindoline-2,5-diyldodecafluorohexamethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		458	Heating rate: 32 K/min	153
Poly(1,3-dioxoisoindoline-2,5-diylhexafluorotrimethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenedecafluoropentamethylene-1,3-phenylene)		371	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diylhexafluorotrimethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenehexafluorotrimethylene-1,3-phenylene)		418		148
Poly(1,3-dioxoisoindoline-2,5-diylhexafluorotrimethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenemethylene-1,4-phenylene)		498	Heating rate: 32 K/min	152
Poly(1,3-dioxoisoindoline-2,5-diylhexafluorotrimethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenyleneoxy-1,3-phenylene)		451	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diylhexafluorotrimethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		483		148
Poly(1,3-dioxoisoindoline-2,5-diylhexadecafluorooctamethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		457	Heating rate: 32 K/min; highly crystalline	152
Poly(1,3-dioxoisoindoline-2,5-diylhexafluorotrimethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene)		533	Heating rate: 32 K/min	154
Poly(1,3-dioxoisoindoline-2,5-diyloctafluorotetramethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenedecafluoropentamethylene-1,3-phenylene)		417	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyloctafluorotetramethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenehexafluorotrimethylene-1,3-phenylene)		432	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyloctafluorotetramethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		485	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyltetradeca-fluoroheptamethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylene-decafluoropentamethylene-1,3-phenylene)		385	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyltetradeca-fluoroheptamethylene-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylene-hexafluorotrimethylene-1,3-phenylene)		406	Heating rate: 32 K/min	148

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(1,3-dioxoisoindoline-2,5-diyltetradecafluoroheptamethylene-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		460	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenedecafluoropentamethylene-1,3-phenylene)		393		148
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenylenehexafluorotrimethylene-1,3-phenylene)		457	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenyleneimino-4-dimethylamino-1,3,5-triazinediylimino-1,3-phenylene)		567	Heating rate: 2 K/min	142
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenyleneimino-4-diphenylamino-1,3,5-triazinediylimino-1,3-phenylene)		563	Heating rate: 2 K/min	142
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenyleneimino-4-phenyl-1,3,5-triazinediylimino-1,3-phenylene)		565	Heating rate: 2 K/min	142
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenyleneimino-1,3,5-triazinediylimino-1,3-phenylene)		563	Heating rate: 2 K/min	142
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,3-phenyleneoxy-1,3-phenylene)		480	Heating rate: 32 K/min	148
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		523	Heating rate: 2 K/min	129
Poly(1,3-dioxoisoindoline-2,5-diyloxy-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylene-4-phenyl-1,3,5-triazinediyl-1,4-phenylene)		628	Heating rate: 2 K/min	142
Poly(1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonylimino-4,4′-biphenylyleneiminocarbonyl)		643	Dynamic method	151
Poly(1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonylimino-1,3-phenyleneiminocarbonyl)		584	Dynamic method	151
Poly(1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)		597	Dynamic method	151
Poly(1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonylimino-1,4-phenyleneoxy-1,4-phenylene-iminocarbonyl)		583	Dynamic method	151
Poly(1,3-dioxoisoindoline-5,2-diyl-1,4-phenylenesulfonyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonylimino-1,4-phenylenesulfonyl-1,4-phenyleneiminocarbonyl)		580	Dynamic method	151
4.14. POLY(FLUORESCEINS)				
Poly(fluorescein-3′,6′-diyloxyisophthaloyloxy)		549		183
4.15. POLY(FURAN TETRACARBOXYLIC ACID DIIMIDES)				
Poly(4,5,6,8,9,10-hexahydro-1,3,6,8-tetraoxofuro[3,2-c:4,5-c′]dipyrrole-2,7[1H,3H]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diylcarbonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		528	Dynamic method	111
Poly(4,5,6,8,9,10-hexahydro-1,3,6,8-tetraoxofuro[3,2-c:4,5-c′]dipyrrole-2,7[1H,3H]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		583	Dynamic method	111
Poly(4,5,6,8,9,10-hexahydro-1,3,6,8-tetraoxofuro[3,2-c:4,5-c′]dipyrrole-2,7[1H,3H]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		503	Dynamic method	111
4.16. POLY(OXABICYCLONONANES)				
Poly[9-oxabicyclo(3,3,1)nonane-2,6-diyloxycarbonylimino-1,4-cyclohexylenemethylene-1,4-cyclohexyleneiminocarbonyloxy] 53% *trans, trans*		494	DTA heating rate	164
70% *trans, trans*		502		164

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly[9-oxabicyclo(3,3,1)nonane-2,6-diyloxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyloxy]		473		164
Poly[9-oxabicyclo(3,3,1)nonane-2,6-diyloxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylenecarbonyloxy]		467	DTA heating rate	164
4.17. POLY(OXADIAZOLES)				
Poly(arylene-1,3,4-oxadiazole)		535–551		1490
Poly(1,3,4-oxadiazolediyl-1,3-phenylene-1,3,4-oxadiazolediyl-1,4-phenylene)		551	DTA heating rate	114
Poly(1,3,4-oxadiazolediyl-1,4-phenyleneoxy-1,4-phenylene)		513	Mechanical method	115
Poly(1,3,4-oxadiazolediyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1,4-phenylene)		453	Mechanical method	116
Poly(1,3,4-oxadiazolediyl-1,4-phenylene-3,3-phthalidylidene-1,4-phenylene)		653	Mechanical method	115
Starburst oxadiazole		370–415		1371
4.18. POLY(OXINDOLES)				
Poly(5,7-dichloro-3,3-oxindolylidene-1,4-phenyleneoxyisophthaloyl-1,4-phenylene)		543		145
Poly(3,3-oxindolylidene-1,4-phenyleneoxyisophthaloyloxy-1,4-phenylene)		529		145
4.19. POLY(OXOISOINDOLINES)				
Poly(*N*-methyl-3,3-oxoisoindolylidene-1,4-phenyleneoxyisophthaloyloxy-1,4-phenylene)		~558	Transition indistinct	145
Poly(*N*-methyl-3,3-oxoisoindolylidene-1,4-phenyleneoxyterephthaloyloxy-1,4-phenylene)		~555	Transition indistinct	145
Poly(3,3-oxoisoindolylidene-1,4-phenyleneoxyisophthaloyloxy-1,4-phenylene)		598		145
Poly(3,3-oxoisoindolylidene-1,4-phenyleneoxyterephthaloyloxy-1,4-phenylene)		600		145
4.20. POLY(PHTHALAZINE)				
Poly(aryl ether phthalazine)		551–603		1460
Poly(aryl ether phthalazine), 2-napthalenyl		560–607		1460
Poly(aryl ether phthalazinium)		570–636		1479
4.21. POLY(PHTHALIDES)				
Poly(3,3-phthalidylidene-1,4-phenyleneoxy-5-*tert*-butylisophthaloyloxy-1,4-phenylene)		552		145
Poly(3,3-phthalidylidene-1,4-phenyleneoxycarbonyloxy-1,4-phenylene)		513, 538	Conflicting data	145,185
Poly(3,3-phthalidylidene-1,4-phenyleneoxy-5-chloroisophthaloyloxy-1,4-phenylene)		586		145
Poly(3,3-phthalidylidene-1,4-phenyleneoxyisophthaloyloxy-1,4-phenylene)		591		145
4.22. POLY(PIPERAZINES)				
Poly(2,5-dimethyl-1,4-piperazinediylcarbonyloxyneopentylenesulfonyl-neopentyleneoxycarbonyl)		358		160
Poly(2,5-dimethyl-1,4-piperazinediylcarbonyloxyneopentylene-thioneopentyleneoxycarbonyl)		313		160
Poly(1,4-piperazinediyladipoyl)		399	No experimental details	161,162
Poly(1,4-piperazinediylcarbonyl-2,2′-biphenylylenecarbonyl)		466	Mechanical method, heating rate: 1 K/min; low viscosity	78,161
Poly(1,4-piperazinediylcarbonyloxyethyleneoxycarbonyl)		333		163
Poly(1,4-piperazinediylcarbonyloxyneopentyleneoxycarbonyl)		343		160
Poly(1,4-piperazinediylcarbonyloxy-9-oxabicylco-[3,3,1]nonan-2,6-yleneoxycarbonyl)		386	DTA heating rate	164

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(1,4-piperazinediylcarbonyl-1,4-phenylene-2,2-butylidene-1,4-phenylenecarbonyl)		492–505		165
Poly(1,4-piperazinediylisophthaloyl)		465	Mechanical method, heating rate: 1 K/min	78,161
Poly(1,4-piperazinediyl-1-oxotrimethylenefluoren-9-ylidene-3-oxotrimethylene)		418	Mechanical method, heating rate: 1 K/min	78,161
Poly(1,4-piperazinediylsebacoyl)		~355	Rather ill-defined transition	161,166–168
4.23. POLY(PIPERIDINES)				
Poly(2,6-dioxopiperidine-1,4-diyltrimethylene)		363	Heating rate: 10 K/min	172
4.24. POLY(PYRAZINOQUINOXALINES)				
Poly[3,7-diphenylpyrazino(2,3-g)quinoxaline-2,8-diyl-1,3-phenylene]		638	Heating rate: 20 K/min	119
Poly[3,7-diphenylpyrazino(2,3-g)quinoxaline-2,8-diyl-1,4-phenylene]		668	Heating rate: 20 K/min	119
Poly[pyrazino(2,3-g)quinoxaline-2,8-diyl-1,4-phenylene]		665	Heating rate: 20 K/min	119
Poly[pyrazino(2,3-g)quinoxaline-2,8-diyl-1,4-phenyleneoxy-1,4-phenylene]		626	Heating rate: 20 K/min	119
4.25. POLY(PYRAZOLES)				
Poly(arylene ether pyrazole)		463–566		1390
Poly(1,3-pyrazolediyl-1,3-phenylene-3,1-pyrazolediylhexamethylene)		343	DTA heating rate; low viscosity	175
Poly(1,3-pyrazolediyl-1,4-phenylene-3,1-pyrazolediylhexamethylene)		353	DTA heating rate; high crystallinity	175
Poly(1,3-pyrazolediyl-1,3-phenylene-3,1-pyrazolediyl-1,4-phenylene)		353	DTA heating rate; high crystallinity	175
Poly(1,3-pyrazolediyl-1,4-phenylene-3,1-pyrazolediyl-1,4-phenylene)		373	DTA heating rate; high crystallinity	175
Poly(pyrrole),		438		1328
p-toluene sulfonated		428		1529
4.26. POLY(PYRIDAZINES)				
Poly(3,6-pyridazinediyloxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy)		453	Mechanical method	116
4.27. POLY(PYRIDINES)				
Poly(2,5-pyridinediylcarbonyliminohexamethyleneiminocarbonyl)		322		170
Poly(2,3,5-trifluoropyridinediyloxy-2,2,3,3,4,4-hexafluoropentamethyleneoxy)		260	Polymer structure may contain *o*-linkage	169
4.28. POLY(PYROMELLITIMIDES)				
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrole-2,6[1H,3H]-diyl-4,4-dimethylheptamethylene)		408	No experimental details	121
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrole-2,6[1H,3H]-diyl-2,7-fluorenylene)		~623	Heating rate: 3 K/min	120
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrole-2,6[1H,3H]diyl-3-methylheptamethylene)		408	No experimental details	121
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrole-2,6[1H,3H]-diylnonamethylene)		383	No experimental details	121
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrole-2,6[1H,3H]-diyl-1,4-phenyleneoxy-1,4-phenylene)		Probably ~773	Conflicting data, transitions from 523 K upwards reported as T_g	119,120,122–131
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrole-2,6-[1H,3H]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diylcarbonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		513	Dynamic method, heating rate 5 K/min	132
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]dipyrrol-2,6[1H,3H]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		547	Dynamic method, heating rate 5 K/min	132

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′] dipyrrole-2,6[1H,3]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		490	Dynamic method, heating rate 5 K/min	132
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′] dipyrrole-2,6[1H,3H]-diyl-1,4-phenylene-3-phenylquinoxaline-2,7-diylsulfonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		459	Dynamic method, heating rate 5 K/min	132
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′] dipyrrole-2,6[1H,3H]-diyl-1,4-phenylenethio-1,4-phenylene)		618	Dynamic method	125
Poly([N,N′(*p,p*′-oxydiphenylene)pyromellitimeide] see Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′] dipyrrole-2,6[1H,3H]-diyl-1,4-phenyleneoxy-1,4-phenylene)				
4.29. POLY(PYRROLIDINES)				
Poly(1-butyl-2,5-diazo-3,4-pyrrolidinediyl)		461	DSC, Mdpt, Xp zero HR	1196
Poly(1-decyl-2,5-diazo-3,4-pyrrolidinediyl)		368–370	DSC, Mdpt, Xp zero HR, dilatomer	1196
Poly(2,5-dioxo-1,3-pyrrolidinediylethylene)		408	Heating rate: 20 K/min	176,177
Poly(dodecyl-2,5-diazo-3,4-pyrrolidinediyl)		255	Dilatomer	1196
Poly(1-ethyl-2,5-diazo-3,4-pyrrolidinediyl)		523	DSC, Mdpt, Xp zero HR	1196
Poly(1-hexadecyl-2,5-diazo-3,4-pyrrolidinediyl)		348	Dilatomer	1196
Poly(1-hexyl-2,5-diazo-3,4-pyrrolidinediyl)		422	DSC, Mdpt, Xp zero HR	1196
Poly(1-octadecyl-2,5-diazo-3,4-pyrrolidinediyl)		348	Dilatomer	1196
Poly(1-octyl-2,5-diazo-3,4-pyrrolidinediyl)		393–395	DSC, Mdpt, Xp zero HR, dilatomer	1196
Poly(1-tetradecyl-2,5-diazo-3,4-pyrrolidinediyl)		351	Dilatomer	1196
4.30. POLY(QUINONES)				
Poly(2-acrylaminoanthraquinone)		401		1294
Poly(*t*-butylhydroquinone)		450		1312
Poly(methylhydroquinone)		426		1312
Poly(phenylhydroquinone)		430		1312
4.31. POLY(QUINOXALINES)				
Poly(3-phenylquinoxaline-2,6-diylcarbonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		583	Dynamic method	133
Poly(3-phenylquinoxaline-2,7-diylcarbonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		595	Values range from 531 to 651 K	119,134,135
Poly(3-phenylquinoxaline-2,7-diylcarbonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylene)		528	Dynamic method, heating rate: 5 K/min	111
Poly(3-phenylquinoxaline-2,7-diylcarbonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		516, 544	Conflicting data	119,134
Poly(3-phenylquinoxaline-2,6-diyloxy-3-phenylquinoxaline-6,2-diyl-4,4′-biphenylene)		683	Dynamic method	136
Poly(3-phenylquinoxaline-2,6-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		565	Dynamic method	133
Poly(3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		526, 543	Conflicting data possibly arising from different rate effects	119,134,137
Poly(3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		571	Dynamic method	119,134,137–139
Poly(3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylene)		527	Dynamic method	111
Poly(3-phenylquinoxaline-2,6-diyloxy-3-phenylquinoxaline-6,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		710	Dynamic method	136

TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(3-phenylquinoxaline-2,6-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		516	Dynamic method	133
Poly(3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		541		119,134,137
Poly(3-phenylquinoxaline-2,6-diyl-3-phenylquinoxaline-6,2-diyl-4,4′-biphenylylene)		677	Dynamic method	136
Poly(3-phenylquinoxaline-2,6-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		639–698	Dynamic method	133
Poly(3-phenylquinoxaline-2,7-diyl-3-phenylquinoxaline-7,2-diyl-1,3-phenylene)		593	Dynamic method	134,137
Poly(3-phenylquinoxaline-2,7-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		590–638	Conflicting data; dilatometric T_g 638 K	119,134,139
Poly(3-phenylquinoxaline-2,7-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisoindoline-5,2-diyl-1,4-phenylene)		533	Dynamic method, heating rate: 5 K/min	111
Poly(3-phenylquinoxaline-2,6-diyl-3-phenylquinoxaline-6,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		567	Values range from 558 to 693 K	119,134,136,140
Poly(3-phenylquinoxaline-2,6-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		558	Dynamic method	133
Poly(3-phenylquinoxaline-2,7-diyl-3-phenylquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		561, 533	Conflicting data	119,134
Poly(3-phenylquinoxaline-2,6-diylsulfonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		543	Dynamic method	133
Poly(3-phenylquinoxaline-2,7-diylsulfonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)		485–618	Conflicting data	119,134,135
Poly(3-phenylquinoxaline-2,7-diylsulfonyl-3-phenylquinoxaline-7,2-diyl-1,4-phenylene-1,3-dioxoisoindoline-2,5-diylcarbonyl-1,3-dioxoisiondoline-5,2-diyl-1,4-phenylene)		513	Dynamic method, heating rate: 5 K/min	111
Poly(3-phenylquinoxaline-2,7-diylsulfonyl-3-phenylquinoxaline-7,2-diyl-1,4-pheyleneoxy-1,4-phenylene)		468, 563	Conflicting data	119,134
Poly(quinoxaline-2,7-diylcarbonylquinoxaline-7,2-diyl-1,4-phenylene)		591	Heating rate: 20 K/min	119
Poly(quinoxaline-2,6-diyloxyquinoxaline-6,2-diyl-4,4′-biphenylene)		663	Dynamic method	136
Poly(quinoxaline-2,7-diyloxyquinoxaline-7,2-diyl-1,4-phenylene)		579	Heating rate: 20 K/min	119
Poly(quinoxaline-2,6-diyloxyquinoxaline-6,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		655	Dynamic method	136
Poly(quinoxaline-2,6-diyloxyquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		543		137
Poly(quinoxaline-2,6-diylquinoxaline-6,2-diyl--4-4′-biphenylylene)		659	Dynamic method	136,141
Poly[quinoxaline-2,6-diylquinoxaline-6,2-diyl-di(1,4-phenyleneoxy)-1,4-phenylene]		468	Dynamic method	141
Poly[quinoxaline-2,7-diylquinoxaline-7,2-diyl-di(1,4-phenyleneoxy)-1,4-phenylene]		508	Heating rate: 20 K/min	119
Poly(quinoxaline-2,6-diylquinoxaline-6,2-diyl-1,4-phenylene)		623	Dynamic method	141
Poly(quinoxaline-2,7-diylquinoxaline-7,2-diyl-1,4-phenylene)		649	Heating rate: 20 K/min	119
Poly(quinoxaline-2,6-diylquinoxaline-6,2-diyl-1,4-phenyleneoxy-4,4′-biphenylyleneoxy-1,4-phenylene)		486	Dynamic method	141
Poly(quinoxaline-2,6-diylquinoxaline-6,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		661, 553	Dynamic method, conflicting data	136,137,141
Poly(quinoxaline-2,7-diylquinoxaline-7,2-diyl-1,4-phenyleneoxy-1,4-phenylene)		580		119
Poly(quinoxaline-2,7-diylquinoxaline-7,2-diyl-*p*-terphenyl-4,4′-ylene)		578	Heating rate: 20 K/min	119
Poly[quinoxaline-2,6-diylquinoxaline-6,2-diyl-tri-(1,4-phenyleneoxy)-1,4-phenylene]		406	Dynamic method	141
Poly[quinoxaline-2,7-diylquinoxaline-7,2-diyl-tri-(1,4-phenyleneoxy)-1,4-phenylene]		489	Heating rate: 20 K/min	119
Poly(quinoxaline-2,7-diylsulfonylquinoxaline-7,2-diyl-1,4-phenylene)		615	Heating rate: 20 K/min	119

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TABLE 4. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
4.32. POLY(TRIAZINES)				
Poly(heptafluoropropyl-1,3,5-triazinediyltrimethylene)		253–255	No measurement details	155
Poly[(4-H-octafluorobutyl)-1,3,5-triazinediyltrimethylene]		253–255	No measurement details	155
Poly(pentafluoroethyl-1,3,5-triazinediyltrimethylene)		253–255	No measurement details	155
Poly[perfluoro(propyl-1,3,5-triazinediylhexamethylene)]		261	DTA heating rate	156
Poly(6-phenyl-1,3,5-triazinediylphenylimino-1,3,5-triazinediylphenylimino)		541–552	DTA heating rate	114
Poly(6-phenyl-1,2,4-triazine-5,3-diyl-2,6-pyridinediyl-6-phenyl-1,2,4-triazine-3,5-diyl-1,4-phenylene)		533	Dynamic method; different structural isomers may be present	157
Poly(6-phenyl-1,2,4-triazine-5,3-diyl-2,6-pyridinediyl-6-phenyl-1,2,4-triazine-3,5-diyl-1,4-phenylenemethylene-1,4-phenylene)		478	Dynamic method; different structural isomers may be present	157
Poly(6-phenyl-1,2,4-triazine-5,3-diyl-2,6-pyridinediyl-6-phenyl-1,2,4-triazine-3,5-diyl-1,4-phenyleneoxy-1,4-phenylene)		488	Dynamic method; different structural isomers may be present	157,158
Poly(2-H-tetrafluoroethyl-1,3,5-triazinediyltrimethylene)		253–255	No measurement details	155
Poly(1,2,4-triazine-5,3-diyl-2,6-pyridinediyl-1,2,4-triazine-3,6-diyl-1,4-phenyleneoxy-1,4-phenylene)		496	Heating rate: 20 K/min	159
4.33. POLY(TRIAZOLES)				
Poly(4-phenyl-1,2,4-triazolediyl-1,3-phenyleneimino-terephthaloylimino-1,3-phenylene)		623	DTA heating rate	173
Poly(4-phenyl-1,2,4-triazolediyl-1,3-phenylene-4-phenyl-1,2,4-triazolediyl-1,4-phenylene)		538		174

TABLE 5. COPOLYMERS

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Copolyester (*p*-hydroxybenzoic acid-isophthalic acid-hydroquinone) 40 : 30 : 30		398–414		1436
Copolyester, aromatic		403–433		1509
Copolyester, aromatic		377		1269
Poly(alkylene *p,p'*-bibenzoate-b-tetramethylene ether)		205		1485
Poly(aryl ether sulfone-*b*-aryl ether ketone)		>473		1425
Poly(*t*-butyl methacrylate-*co*-styrene-*co*-butadiene-*co*-styrene-*co*-*t*-butyl methacrylate)		423		1377
Poly(ε-caprolactone-b-1,5-dioxepen-2-one-β-ε-caprolactone)		235		1515
Poly(carbonate-*co*-butylene terephthalate) 0.5/0.5		363		1386
Poly(3-carboxyphenyl maleimide-*co*-styrene)		493		1273
Poly(4-carboxyphenyl maleimide-*co*-styrene)		493		1273
Poly(2-chloro-1,3-butadiene-*co*-ethyl methacrylate)		238		1360
Poly(2-chloro-1,3-butadiene-*co*-glycidyl methacrylate)		257		1360
Poly(chloroprene-*co*-ethyl methacrylate)		238		1543,1360
Poly(chloroprene-*co*-glycidyl methacrylate)		256		1543,1360
Poly(chloroprene-g-ethyl methacrylate)		230		1360
Poly(chloroprene-g-glycidyl methacrylate)		243		1360
Poly(*N*-cyclohexylmaleimide-*alt*-isobutene)		465		1465
Poly(ethylene oxide-b-dimethyl siloxane-b-ethylene oxide)		156		1500
Poly(ethylene oxide-*co*-epychloridrine)		233		1415
Poly(ethylene terephthalate-*co*-*p*-hydroxybenzoic acid)		333		1517
Poly(ethylene-*co*-methacrylate)	25103-74-6	237		1307
Poly(ethylene-*co*-methacrylic acid) ionomer	25053-53-6	330	DSC	1265
Poly(ethyl methacryate-*co*-methyl methacrylate, 40 : 60)		377		1552
Poly(ethyl methacrylate-*co*-methyl methacrylate, 30 : 70)		365		1552
Poly(furfuryl acrylate-*alt*-2-hydroxyethyl methacrylate) 50 : 50		326		1279
Poly(3-hydroxybutyrate-*co*-4-hydroxybutyrate)-18		269	NMR	1494
Poly(3-hydroxybutyrate-*co*-4-hydroxybutyrate)-69		237	NMR	1494
Poly(β-hydroxybutyrate-*co*-hydroxyvalerate)		257		1560

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TABLE 5. *cont'd*

Polymer	CAS No.	T_g (K)	Remarks	Refs.
Poly(*N*-(4-hydroxyphenyl)maleimide-*co*-allytrimethylsilane)		499		1289
Poly(1,4-isoprene-b-styrene)		286		1283
Poly(L-lactic acid-*co*-DL-maleic acid) 0–45 mol%		306–329		1412
Poly(maleimide-*alt*-*p*-trimethylsilyl-a-methylstyrene)		499		1324
Poly(maleimide-*alt*-*p*-trimethylsilylstyrene)		503		1324
Poly(methyl methacrylate-*co*-styrene)		375		1318
Poly(methyl methacrylate-*co*-styrene-*co*-butadiene-*co*-styrene-*co*-methyl methacrylate)		433		1377
Poly(norbornene-*co*-ethylene)		428		1403
Poly(styrene-b-isoprene)		378/213		1472
Poly(styrene-b-methylphenylsiloxane) 58% styrene		303		1282
Poly(styrene-*co*-acrylonotrile-*co*-chromium acrylate)		369		1537
Poly(styrene-*co*-maleic anhydride)		381		1348
Poly[styrene-b-(ethylene-*co*-butylene)-b-styrene]		233		1321
Poly(*N*-vinyl carbazole-*co*-pyrrole)		453–473		1328
Poly(vinyl chloride-*co*-vinyl acetate)	9003-22-9	342		1359
Resorcinol-Bisphenol A copolymer, *o*-adamantyl		373		1369

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Rates of Crystallization of Polymers

J. H. Magill
School of Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

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A. INTRODUCTION

1. Background

1.1. General Remarks This chapter is intended to serve as a useful compendium of crystallization data for many types of polymers and polymeric systems. Some information is also provided on the fundamentals of crystallization (nucleation and growth) of these materials, with appropriate references relating to the techniques that are usually employed to study phase transformation processes in polymers. Controversial issues on growth and morphology will be mentioned briefly so that the reader who is new to this field will gain some perspective on the theoretical and experimental developments that have evolved over many decades, although this has little bearing on the numerical data presented here. This presentation serves not only as a guide to the data, but as a timely attempt to alert the vigilant reader to some difficulties, and some intricacies and problems of polymer crystallization that may be encountered in the literature (1–5).

The third edition of this Handbook reported the rates of crystallization for homopolymers (1–5), polymer blends (6,7), and copolymers (8). This edition updates this information, adds polymeric mesophases, and factors other than temperature that effect crystallization behavior. Within the past decade, crystallization of polymer blends have become increasingly important industrially. Besides the property-synergism provided through blending, there is a further economical incentive to use available materials rather than attempt to develop new polymers. Solid-state multiphase systems provide challenging academic research problems because polymer compatibility, *per se,* dominates morphology, whatever the crystallinity content of the system. The phase transformation depends upon the polymer type, monomer size and placement of the monomer units comprising the macromolecules (10). Sequence length and blockiness often feature strongly in determining rates of crystallization and levels of crystallinity. Related monotonic changes sometimes occur in physical parameters such as melting points and glass temperatures, crystallinities, and heats of fusion (11). The usefulness of a material depends upon the magnitude of these parameter changes. Polymer blending can often provide dispersions with overall properties that are superior to those of the respective components in the system, whether they crystallize or not. Blended mixtures frequently phase separate, but others maintain their morphological and physical integrity in practical applications (12). Cocrystallization may occur sometimes if there is lattice matching of the crystallographic chain axis repeat dimension and direction, and packing in the lateral directions within the crystallites is not too disruptive. In these circumstances the property changes may be striking. A fundamental knowledge of the kinetics of crystallization helps one to modify and improve properties (15).

The crystallization and morphology of lyotropic and thermotropic phases have only been developed comparatively recently, though liquid crystal polymers were recognized experimentally (13) and theoretically (14) a long time ago. The guidelines established for small-molecule liquid crystals (15) have been helpful for macromolecules, but they too may be misleading at times, particularly for polydisperse high-molecular-weight polymeric mesophases (16) and where their structural features are submicroscopic. Kinetic information for liquid crystal polymer systems is growing but still sparse (17,18). Synchrotron radiation sources and rapid monitoring techniques (19,20) are now available nationally and internationally for measuring isothermal and nonisothermal changes (21) and these simplify the monitoring of *in situ* transformations. Spectroscopic procedures (22) are now more capable than ever for sensing and tracking rapid and specific motions that have escaped detection by conventional means until the present. In addition to high intensity X-ray and light (laser) sources (23), deuterium NMR methods (24) are being used and developed for studying molecular dynamics, structural, or orientational changes (25). These new classes of nondestructive experiments are essential for improving our understanding of polymer behavior in the condensed state.

1.2. Background Over the years, two parallel themes describing aspects of crystallization of synthetic polymers have been developed. The oldest of these (26,27,30) uses a thermodynamic approach and provides a statistical description of morphology related to polymer crystallization, morphology, and properties. The other approach (28–29) is about half a century old and prefers a kinetic description of the development of lamellar structures that are basic to nucleation, growth, and stability in this context. Each has its merits and shortcomings but neither model is a panacea. Now, there is a consensus over the molecular dimensions that characterize macromolecules in the condensed state (4), but controversy remains over the intricacies of crystallization and its role in determining structure–property relationships. However, with new techniques now available for surface investigations and data processing, the time may not be too far away for an atomic view of matter in real space. For information on this topic, the reader should consult the current literature (15,31).

Whenever a polymer melt (liquid) or solution is sufficiently cooled, it may spontaneously crystallize. For instance, a supersaturated dilute solution produces tiny single[1] crystals (32). Spherulites are formed from concentrated polymer solutions, and these most frequently grow from the supercooled molten state. These growth patterns only occur from "privileged" nuclei, i.e., those that are capable of growing with a decrease in free energy (i.e., enhanced stability) to form ordered structures. If the supercooled melt (liquid) does not undergo this discontinuous transformation, then it is destined to form a glass, a disordered condensed phase. The crystalline texture and

[1] More appropriately described here as solution-grown crystals.

morphology, as well as degree of crystallinity, depends to some degree upon experimental conditions (33,34). "Single" crystals are comprised of thin lamellae with diverse habits. These morphological forms are discussed later in this article. Lamellae are basic crystal structures, although their intricate morphology is still open to debate (15,16). The next steps in the hierarchical level of structure are many different kinds of spherulites that are polycrystalline. The exact morphology of these moieties is still unsettled though they were discovered about a century ago. Several factors may be involved, namely: (a) monomeric chemical repeat unit, (b) crystallization temperature, (c) molecular weight and molecular weight distribution, (d) degree of branching and crosslinking, (e) tacticity, (f) degree of supersaturation, and (g) environmental factors (stereochemical defects, stress, solvent, impurities, etc.) and so on. These items are not placed in order of importance. Morphology is often dictated by other circumstances. Merely by changing the concentration of polymer in solution or its solvent, it is often possible to cover the "morphological spectrum" of crystalline polymeric forms, ranging from the monocrystal (formed in very dilute solution) to spherulites (formed in relatively concentrated solutions or from the polymer melt) under quiescent conditions. Other external factors such as pressure or stress and orientation can also alter the morphology (5).

This article deals mainly with isothermal crystallization conditions, but kinetic results obtained under constrained conditions are also listed. These are in the minority but the literature is growing. Although nonisothermal transformations (35) dominate in industrial operations, the data are frequently proprietary and often peculiar to specific process conditions. For example, molding processes (36) and fiber extrusion (37) operations create complex crystallization patterns, but the literature and even patents are still sparse on kinetic details. Most manufacturing procedures actually originated in industry. Still, some aspects of the topic have been examined theoretically (38).

Again, the influences of nucleants or additives on crystallization behavior have made considerable inroads in the scientific and patent[2] literature (39), but the importance of shear rates (40,41) on crystallization kinetics is beginning to receive more attention in the literature (42). In the field of "single crystal" growth many new results have been added to older kinetic data (43,44) tabulated in previous editions of "Polymer Handbook". The most recent are concerned with the crystallization of oligomers of polyethylene, polyethylene oxide and so on. Many aspects of crystallization are reported in some recent reviews (45,45a,45b) and later in this article.

1.3. Morphological Outline/Growth Features Under quiescent conditions, most often in very dilute solutions, and in self-seeding procedures, crystalline lamellae or "single" crystals are formed. They are seldom more than 85% crystalline even for annealed samples. Within these crystals, the chain macromolecules are disposed with their chain axis (*c* axis) more or less perpendicular to the flat faces of the thin lamellar crystals. However, angles of inclination as large as 48° have been reported in polyamides (5). Lamellar thickness (45–48) is controlled by nucleation/growth conditions. Electron microscopy (48) and other studies (49) have shown that crystallization (growth) proceeds outward from a primary center (a nucleation site) until growth is arrested or slowed to an imperceptible level at very low supersaturations. Screw dislocations (50) that often grow perpendicular to the basal plane of the crystal have an unusually large Burger's vector (equivalent to the lamellar thickness). Growth rates perpendicular on the basal plane of the crystal have not been reported, but a knowledge of this process should provide a better understanding of morphology and mechanistic relationships in high polymers and copolymers as they interrelate to each other and determine properties.

Crystallization from more concentrated solution(s) or from the supercooled molten state produces spherulites that seem to have nucleated similarly, and the high supersaturations encountered lead to polycrystalline spherical arrays. These arrays are comprised of radiating platelets or lamellae (often splayed and branched) in which the polymer chains are also folded to varying degrees, dependent upon polymer molecular weight and experimental conditions. The chains are usually oriented tangentially to their growth direction. Because of this morphology, most spherulites show a negative birefringence since the polarizability along the molecular chain axis is much greater than it is transverse to it, except in polymers with highly polar side groups or in hydrogen bonded polyamides. A variety of textural/optical features are associated with changes in crystallite orientation. The literature (51,52,5a) is replete with details of spherulite morphology, but no unique growth mechanism has been reported. Indeed, one might question its uniqueness in materials science! It is appropriate to mention that many classes of other materials also form spherulites; see for example, sulfur (53) selenium (54), antimony (55), proteins and carbohydrates (56), graphite (57), silicates (58), and inorganic (59) and polar and nonpolar low-molecular-weight organic molecules (60), to cite some examples. Spherulites are almost ubiquitous given suitable growth conditions and their forms are diverse, but it is important to realize that other morphological forms exist.

Polygonized structures are produced when spherulites impinge upon each other, limiting further outward radial growth. Growth rate is extremely temperature-sensitive and it is nucleation-controlled but this has been questioned recently (61). Even so, it is generally agreed that polymer transformations from solutions and melts are nucleation controlled. There has been confusion sometimes over the terms used to describe (a) primary and (b) secondary processes. Nucleation is termed primary for the onset of crystallization; the propagation of lamellae/spherulites (*i.e.*, growth) is named secondary crystallization. Crystallization

[2] Patents are excluded from this article.

that occurs after the radial growth ceases, *i.e.*, "filling-in" or densification behavior in spherulites, is sometimes termed secondary crystallization. However, kineticists often restrict the term primary crystallization to the nucleation step (creation) of the phase transformation process, and secondary is given to that stage in the transformation where significant deviations from Avrami[3] kinetics may take place. Several *in situ* experiments have been made with synchrotron radiation to monitor intricacies of nucleation and growth with time using WAXS and SAXS modes (62). During the secondary stage, densification takes place (63) and improvements in crystallinity have been reported by dilatometry (64). Even so, it must be recognized that the density and perfection of a spherulite decreases as it grows outwards from its center. Changes in crystallite thickness that may occur with annealing are another matter that is still unsettled.

The temperature dependencies of spherulitic and crystal growth rate have been claimed to correspond closely (65) under comparable conditions of undercooling, but there are results to the contrary. In monodisperse poly(oxyethylene) (66) and poly(ethylene)s (67,68), the rate of growth of single crystals in the melt depends on the crystal thickness, determined primarily by the undercooling temperature. Chain ends have been reported to reside sometimes inside (67) but more often outside (68, 68a) the crystalline core of low-molecular-weight poly(ethylene)s below 400 CH_2's per molecule[4].

2. General Principles and Techniques Involved in Crystallization Rate Studies

2.1. Kinetics of Bulk Transformations Whenever a polymer crystallizes, the extent of the phase transformation depends upon the crystallizing species and the experimental conditions. High molecular weight polymers do not crystallize completely (9,69) because of topological constraints that lower crystallinity considerably. The classical isothermal transformation kinetics, initially formulated by Kolmogorov (70) and Göler et al. (71) were extended later by the Avrami theory that was initially formulated for metals and later modified, for example, by Evans (72) and others, for polymers. The Avrami (73) equation

$$\theta = \exp(-kt^n) \qquad \text{(A1)}$$

relates the fraction or amount of uncrystallized material that remains after time t, during an isothermal transformation to its growth rate parameter, k, and nucleation parameter, n. As formulated by Avrami, crystallization was presumed to take place under isovolume conditions.[5] Modifications have been made to equation (A1) to correct for incomplete crystallization (74). The mode of nucleation, n, is an integer that varies from 1 to 4, reflecting the geometry and dimensionality of the growth process, under ideal conditions. The different forms are summarized in the following table.

AVRAMI EXPONENT AND MORPHOLOGY

Exponent	Nucleation Type	Crystallite Shape	
1	Instantaneous	Rod	Constant
2	Instantaneous Homogeneous	Discoid/ Rod	Constant
3	Instantaneous Homogeneous	Sphere/ Discoid	Constant
4	Homogeneous	Sphere	Constant

There are also classical growth conditions where the diffusion limited rate proceeds as $t^{1/2}$ and n exhibits 1/2, $1\frac{1}{2}$ and $2\frac{1}{2}$ values. These examples have been addressed in detail in other texts (31). Still, it is worthwhile pointing out that other terminology has been used to describe the mode of nucleation. For example, $n = 3$ may be termed sporadic or predetermined in time where the form of growth is disklike (2D) or spherulitic, respectively. Anyhow, it happens that in polymer phase transformation the growth velocity proceeds linearly with time. Now that mesophase crystallization is receiving more attention (75), rod-like morphologies with $n = 1$ resemble those found in well-oriented fibrous homopolymer systems (76). Some non-integral values of n correspond to heterogeneous transformations for $n = 2$ and 3. Other values of n determined in kinetic experiments may arise from many factors connected with the morphological complexity of the polymeric system. Computer simulations (77–79) have been conducted to model the bulk phase transformation, but the analysis is seldom free of ambiguity for many reasons, except in the early stages of crystallization. Note that in a recent paper, Levine et al. (80) have pointed out that the Avrami–Kolmogorov isothermal growth equation should not be applied to nonisothermal transformations without proper concern for the microstructural features that are inherent in the sample itself. Again, they claim that measurements employing small samples are subject to error whenever anisotropicity features in this mean field theory. They obtained a modified equation from extensive computer simulations. Polymeric materials are likely to be subjected to these criticisms though they were mainly concerned with metallic and related systems. Polymers exhibit more serious side-effects[6] such as mixed types of nucleation (that causes more than one type of spherulite morphology), nucleation on impurities, severe volume shrinkage upon crystallization and variations in spherulite

[3] The basic concepts in this model are hardly commensurate with the known crystallization behavior of polymers; see for example, Ref. 5, p. 250.

[4] The most recent *in situ* synchrotron studies made with monodisperse *n*-alkanes ($C_{246}H_{494}$) have indicated that once folded chains have considerable ciliated disorder as formed at first, but they undergo a slower improvement in crystallinity as chains equilibrate (adjust) to twice folded lamellae of much higher crystallinity (68a).

[5] In polymer crystallization experiments this situation is never realized, but large single polymer crystals accompanied by small volume changes, have been produced in some solid state polymerizations. So far, kinetic measurements have not been made on these systems.

[6] These are intrinsic factors that are known to influence the Avrami exponent.

density (crystallinity) within and between the spherulite(s) all of which may contribute to nonintegral values of n. In view of these complexities, it is surprising that Avrami n values are taken seriously in practice, except for making comparative rate studies. It is even claimed (81) that the mechanical properties of spherulitic samples may be related to internal morphological defects, such as tie-molecules, and even voids created between confined spherulites during melt crystallization. Laser microbeam and X-ray microdiffraction has also been used to examine the internal morphology of spherulites (82,83). The kinetics of the embryonic nuclei and subsequent stages of spherulitic developments (84,85) from a sheaf-like morphology to a spherical entity (spherulite) have been studied using low-angle light scattering. Of course, electron microscopy (86,87) has recorded more detailed morphological changes at higher resolution, and atomic force microscopy (AFM) investigations have probed even further in this respect (88,89,89a).

In principle, any technique that can follow unambiguously the amorphous $\rightarrow$ crystalline transformation with time, under isothermal or non-isothermal conditions, can be employed as a bonafide method to detect and monitor the crystallization rate(s) that occur. Many experimental techniques exist, such as calorimetry (90), dilatometry (91), density balance (92) and density gradient (93), light depolarization (or transmission) technique (94,95) and/or small-angle light scattering (96) (for average spherulite growth rate measurements), infrared spectra (97), X-ray (98), nuclear magnetic resonance (99,102), electrical resistivity (100), and small-angle X-ray scattering (101), neutron scattering (103), atomic force microscopy (103a) and more. The Avrami θ may involve any property parameters, P_i's, that are relevant in the transformation time domain. In this respect, specific volume changes are related to θ by the equation

$$\theta = (v_\infty - v_t)/(v_\infty - v_a) \tag{A2}$$

Here v_a, v_t, and v_∞ correspond to the initial, intermediate, and final stages of the isothermal crystallization (71,104) and the other P_i's may be similarly incorporated. Wood and Bekkedahl (104) were the first to show that the overall isothermal transformation rate of rubber expressed as $(t_{1/2})^{-1}$ passes through a maximum as its crystallization temperature was lowered. It was later shown experimentally and theoretically that the spherulitic growth rate also proceeded similarly, as related by Eq. (A3). Simply expressed (105), k may be written as in Eq. (A1):

$$k = f(\dot{N}G^{\alpha}) \tag{A3}$$

where α is a geometric parameter that is three for spherulites, and it may take on other values for other geometrical shapes. Another formulation (106) obtained experimentally, at constant crystallization temperature, is

$$k = f[\dot{N}(MW,t)G^{\alpha}(MW,t)] \tag{A4}$$

since it was observed that nucleation rate, $\dot{N}$, and spherulitic growth rate, G, are each dependent on molecular weight, molecular weight distribution and time.[7]

The type of property, P, being monitored (107) depends upon the amorphous contribution, P_a, and crystalline portion, P_c, where each phase can be expressed as a weight fraction or a volume fraction in the simple two-phase model expressed as

$$P = xP_c + (1-x)P_a \tag{A5}$$

If P is specific volume then a weight fraction $x_c(w)$ is obtained, whereas a volume fraction $x_c(v)$ results whenever the sensing is made (for example) by X-ray or dilatometry. The relationship then becomes

$$\frac{1-x_c(w)}{x_c(w)} = \left(\frac{\rho_a}{\rho_c}\right)\frac{1-x_c(v)}{x_c(v)} \tag{A6}$$

where ρ_a and ρ_c represent the amorphous and crystalline densities, respectively. This model is an oversimplification (109) in that it does not allow for the increasing interdependence of the properties of each phase with changes in crystallinity. Other complications also arise because (i) crystallinity is molecular weight dependent (9,45,64) and (ii) for oriented systems, accurate determinations of crystallinity can be difficult (110,111). It strongly depends upon morphology.

Bulk crystallization rates are of some practical value in a relative sense (112) and depend markedly on the concentration of impurity nuclei (of adventitious origin or from additives or nucleants introduced deliberately for property or process control). No satisfactory way (other than counting primary nuclei, *i.e.*, spherulites) exists to quantify their concentration. Generally, spherulitic growth rate (after nucleation) is independent of how the spherulite originated (94,113) (*i.e.*, whether the nucleation is homogeneous, heterogeneous, or pseudo-homogeneous). On the other hand, it must also be recognized that bulk transformations can be greatly influenced by impurities.

Adequate fusion conditions and sample purification (94,114) must always be established for best results in a given system to suppress or eliminate adventitious heterogeneous nuclei in crystallization. Homogeneous nucleation is seldom encountered at small undercoolings (115); although it may be mimicked in the earlier stages of crystallization (116). Because of these complications, it is always advisable to combine complementary techniques; for example, optical microscope studies with dilatometric or other rate measurement. Reliable nucleation rates may only be deduced from independent measurements of

[7]On this account bulk rate measurements are intrinically controlled by two convoluted independent factors or parameters. Only a unique insight into interfacial growth mechanisms is obtained from spherulitic or lamellar ("single crystal-like") interfacial tranformations *per se* from the polymer melt or solution growth respectively, and not from a composite of G and N contained in (4) above.

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(i) spherulitic growth rate and (ii) nucleation counts made over relatively long transformation times.

Investigations of liquid→solid phase transformations with SAXS and WAXS techniques now employ rotating anode X-ray (117) or the more intense synchrotron radiation sources for real time kinetic measurements. Normally, good policy to check samples for radiation damage after each experiment. Even so, it has been reported that the development of two or more crystal modifications may be identified and monitored *in situ* by synchrotron WAXS and SAXS investigations (118,119). Dilatometry, and/or DSC measurements for example, may be usefully combined with SAXS investigations where the absolute integrated scattering intensity Q was expressed (21) as

$$Q = K\phi(1-\phi)(\rho_c - \rho_a)^2 \qquad \text{(A7)}$$

and later modified to read:

$$Q = Kv_s\phi(1-\phi)(\rho_c - \rho_a)^2 \qquad \text{(A8)}$$

In this equation K is an instrumental constant, ρ_c and ρ_a being the densities of the crystalline and amorphous regions, respectively, ϕ is the volume fraction crystallinity, and v_s is the spherulitic volume. Note that Q increases with crystallinity, reaching a maximum around $\phi = 0.5$ as Sheldon had shown earlier. Rate profiles for poly(tetramethyl-*p*-silphenylene siloxane) [poly(TMPS)] fractions (21) of high and low molecular weights differ in some respects from measurements made by other techniques. Strangely, changes in Q for relatively long isothermal transformation times show no signs of the secondary crystallization often encountered in isothermal dilatometry for the same high molecular weight samples. Long period thickening becomes invariant with the time of crystallization in some polymers, but not in poly(ethylene) (25,117,121). Interestingly, synchrotron SAXS work on poly(β-hydroxybutyrate) (20) has shown that the long period is unaltered with time during isothermal crystallization from the melt even though crystals of this polymer have been found in another study (122) to thicken isothermally upon annealing. Elsewhere (123) in oriented poly(ethylene) the long periods are found to change reversibly between 30°C (217 Å) and 100°C (252 Å). Upon cooling of poly(TMPS) fractions, following isothermal crystallization, under quiescent conditions and reheating crystallized sample(s), a reversal of the long period,that is dependent upon molecular weight is observed (21). Concomitantly, the crystallinity increases upon cooling specimens from the crystallization temperature to room temperature (125). More detailed measurements have been made recently (62) where it was demonstrated that the increase in the degree of crystallinity by WAXS and SAXS cannot be correlated with the long period. Clearly, more investigations of this kind are needed.

2.2. Thermodynamic Crystallization Models Thermodynamic and statistical theories of morphology (124,126) *do not provide rate data* but only important crystalline/amorphous information, *i.e.*, morphological features consistent with thermodynamic quantities predicated to change with crystallization temperature or undercooling. Kinetically, these models hardly merit a place in this article on rate measurements except that they do provide information on the "equilibrium" crystallite size l_c in relation to its melting temperature T_m of the finite crystal, from the general expression of the form

$$\left(\frac{1}{T_m} - \frac{1}{T_m^0}\right) = \frac{R}{\Delta H_u}\left[\frac{2\sigma_e}{l_e R T_m} - \frac{1}{l_e}\ln\left(\frac{x_c - l_e + 1}{x_c}\right)\right] \qquad \text{(A9)}$$

that may be simplified for very long chains when the last term vanishes. In Eq. (A9), x_c is the molecular chain length, R, the gas constant, and ΔH_u, the ideal enthalpy of fusion per mole of repeat units comprising the crystallites of end interfacial energy, σ_e. $T_m^0 = \Delta H^0/\Delta S^0$ is the thermodynamic temperature of the infinite crystal with enthalpy and entropy, ΔH^0 and ΔS^0, respectively. Theories of melting of polymers have been the subject of much discussion (127) over the years. For example, the reported thermodynamic melting temperatures of poly(ethylene) range from 414 to 419 K and from poly(oxyethylene) from 342 to 348 K are in dispute based upon theory and experiment. At best, T_m^0 is only reasonably well established for a few well-characterized polymers, yet so much morphological, growth kinetics and structural interpretations are based upon T_m^0. Only a fraction ($\leq 70\%$) of the chains are folded into the end surfaces of the crystallite (126) but the quality and even the extent of the re-entry adjacency is still disputed.

The crystal fold surface of poly(ethylene) crystals and interfaces have been studied more than any other polymer (126–130). This dispute is likely to continue until the "crystal" surface morphology in real space (88,89) can be resolved and the corresponding surface(s) chemically analyzed by the newer experimental techniques of the last decade or more (131,132,133). It should be realized that the thermodynamic model, unlike the kinetic one, does not require a chain-folded nucleus, nor does it provide kinetic information.

2.3. Growth Kinetics of Lamellar Structures: Crystals and Spherulites Growth rate depends primarily upon the degree of undercooling rather than on the crystallization temperature, but the influence of chemical and physical structure and molecular weight and molecular weight distribution are also important factors in linear chain polymers. Without impurities, growth occurs isothermally at a constant rate, and the temperature dependence of these rates are typical of a nucleation controlled process (134), whatever the model employed to describe it.

Theories for isothermal growth rate-temperature, $G(T)$, in polymeric and other less complex systems can be formulated simply by

$$G(T) = f(T)D(T) \qquad \text{(A10)}$$

which is often approximated by

$$G(T) = \frac{f(T)}{\eta(T)} \tag{A11}$$

It is frequently assumed that the temperature dependence of the diffusive term $D(T)$ is reciprocally related via the Stokes–Einstein relationship[8] to the zero shear viscosity $\eta(T)$ which is more readily available than $D(T)$. The $f(T)$ term in equations (A10) or (A11) differentiates between the growth geometries introduced in various growth rate models. Different formalisms (1(a),4,15,61,119-121,134-137) invoking chain folding and diverse nucleus/growth geometries have been used to simulate crystallization. One of the most elaborate and widely used kinetic descriptions[9] is the modified multiparameter model of the original Hoffman–Lauritzen theory (1). Another salient model is that to Point (137), who first predicted the correct crystal thickness temperature up to large undercooling, that is accordance with experimental evidence (138–140). Point and others (137), have disputed some of the basic ideas in Hoffman's model, that pertain to a stable nucleus and to surface energy and other related features connected with growth Regimes that are now postulated to describe interface roughness and interfacial energy assigned to three stages of undercooling (see below in text). Point's test of Regime theory (141) questions its validity, though there is much experimental evidence (142) *pro and con* for "transitional breaks" in growth rate with undercooling. The matter is still unsettled.

The Hoffman–Lauritzen spherulitic growth rate equation (A1) is similar in principle to the Becker–Döring model (except for the complexions that are invoked to incorporate chain folding). The basic equation can be represented formally by

$$G = G_0 \exp\left(-\frac{\Delta E^*}{RT}\right) \exp\left(-\frac{\Delta G^*}{RT}\right) \tag{A12}$$

In which G_0 is a constant for a given molecular weight, ΔE^* is the activation barrier to molecular chain transport, and ΔG^* is the free energy barrier to nucleation.[10] However, the L–H model differs in several important macromolecular details that distinguish it from small molecule morphology. Following the *ad hoc* assumption that the first exponential in the crystallization equation (A12) may be approximated by a Vogel or modified[11] Williams–Landel–Ferry (WLF) type of term,[12], Eq. (A12) becomes

$$G = G_0 \exp\left[-\frac{A}{R(T - T_0)}\right] \exp\left[-\frac{\Delta G^*}{RT}\right] \tag{A13}$$

Here T_0 lies at least 30° below the glass transition temperature T_g, at a temperature where growth enabling motions vanish. A is an activation energy for such segmental transport, usually $\sim$5 kcal/mol. The nucleation term is often expressed as

$$\exp\left[-\frac{BT_m^0}{T\Delta T}\right] \tag{A14}$$

Here the undercooling $\Delta T = (T_m^0 - T)$ and T_m^0 is the melting temperature of the perfect polymer crystal, most often obtained by extrapolation. The term ΔT^{-1} implies two-dimensional surface nucleation (growth) but it has been claimed (143) that a ΔT^{-2} dependence provides an equally valid fit to experimental growth rate data. The geometric parameter B may be expressed as

$$B = nb_0\sigma\sigma_e/f\Delta h_f k \tag{A15}$$

where b_0 is the inter planar distance in the growth direction, σ and σ_e are the lateral and end surface (interfacial) free energy of the growing crystal or lamella[13], k is Boltzmann's constant, and Δh_f is the heat of fusion of the crystal. The adjustable parameter $f(0 \leq f \leq 1)$ accounts for the temperature dependence of the heat of fusion away from the melting point. Another fitting parameter ψ, $(0 \leq \psi \leq 1)$ is an "apportionment factor" of the bulk free energy associated with nucleation and growth away from the melting point. This has been troublesome in the past, amounting to serious discrepancies between theoretical and experimental values of lamellar thickness, l, with undercooling and it was referred to (by Hoffman et al.) as the "δl catastrophe" (1). Now, in a recent paper by Snyder et al., (146), claim to have resolved this problem. This integer n, (is not to be confused with the Avrami, n, in equation (1)). The Hoffman parameter, n, is both morphology and growth rate related and is claimed to coincide with nucleation Regime changes at the growth front with undercooling in some polymers

[8] Only valid for spherical molecules, but it has been used indiscriminately.

[9] Questions have been posed (61) that challenge the mechanistic nature of the nucleation processes *per se*. Recent AFM work has shown (68a) that growing polymer lamellae at the melt-crystal interface exhibited sporadic behavior with time, suggesting that stress may be a significant influence. Interestingly, reports on asymmetric aromatic hydrocarbons (60) have cited and demonstrated stress related growth behavior at faceted spherulitic interfaces. In this paper it was stated that this could complicate growth rate measurements unless proper care was exercised. The implications of this commonality in the behavior of polymers and small molecules may lead to further interesting investigations into materials, generally.

[10] Recently it was reported (144a) that the β-relaxation process is responsible for nucleation from the quenched state but this seems to be irrevalent to isothermal crystalliztion that takes place directly from the supercooled molten state well above the glass transition temperature. Crystallization from the supercooled melt and from glassy polymers (see Ref.5, p.258 and elsewhere) and small molecules were investigated (60) in some detail a long time ago and explained along conventional lines by the writer.

[11] The writer (60,144) pointed out decades ago that it differed in magnitude, from the macroscopic viscosity (or fluidity) temperature dependence by fitting experimental data for asymmetric aromatic hydrocarbons.

[12] Just recently (145), further considerations of Eq. (A13) concludes that a better "fit" to transport data is obtained by compromising the C_1 and C_2 parameters in the classical WLF type formulation for transport in the melt.

[13] This geometry is consistent with many polymer morphological habits.

(1,147,148). It alters for a smooth interface ($n = 1$) to a rough one ($n = 3$); $n = 2$ corresponds to an intermediate morphology. Several "transitions" in growth rates (149–152) are claimed to be consistent with Hoffman's predictions. Before this theory, "breaks" in the growth rate with undercooling were assigned to morphological changes, but now it is accepted by many investigators though the entire issue is still under discussion.

The concept of reptation[14] (7,152(a)) is another process that has been claimed facilitate chain folding[15] of lamellae, and to circumvent chain entanglements at the melt-crystal interface during crystallization. Experimental evidence (see for example 30, 45,69,144,153–155) questions its validity in interfacial growth kinetics, *whenever spherulitic growth over a wide span of molecular weight fractions is investigated.* For example, the dependence of the interfacial surface energy of crystallites on molecular weight is contrary to expectations if reptation was indeed functional. Clearly, it does not override topological constraints and multiple nucleation events that suppress chain folding and seriously diminish sample crystallinity in poly(TMPS) and polyethylene - see for example (Ref. 155). It is well known that low molecular weight crystalline fractions are mostly chain folded and brittle because of the lack of tie-molecules. On the other hand high molecular weight fractions are tough due to the existence of disordered regions as well as the presence of tie molecules. Hikosaka (156) has proposed another kinetic model for crystallization that simultaneously deals with lateral lamellar growth (chain-folding) coupled with crystal thickening for extended chain growth. Hikosaka and co-workers (157) believe this theory accounts for pressure crystallized polymers (158) and chain extended polymeric mesophases (159). Now, an all-encompassing crystallization scenario involving both of these features is claimed to be relevant in all polymer transformation kinetics (157). Although interesting, this model is open to question because other investigations dealing with *in situ* real time monitoring of "solid" phase transformations (1162) points out that melting *per se* precedes chain extension.

Another model termed Molecular Nucleation has been emphasized by Cheng and Wunderlich (160a) as a significant factor in the crystallization of PEO fractions and mixtures but it is not readily amenable to experimental testing yet, although it has received favorable mention from Point (159a). *So far, all theories of polymer crystallization and morphological models formulated, do not have à priori predictive capability whether they invoke chain folding implicitly or not.* The formation of lamellar structures is amply backed by electron and X-ray diffraction evidence (4,47,160) but real surface details are still lacking. Studies of well-defined oligomers of poly (ethylene) (67,68) and poly(oxy-ethylene)'s (66) support chain folding in short-chain polymers crystallized from the melt, yet the latest WAXS and SAXS measurements indicate that there are conflicting details too (68a,160).At this stage, it appears that the evidence is insufficient to take a polarized stance on this problem bearing in mind the balance of existing evidence and not opinion.

[14] A recent review (45b) still insists on this process even though it is unable to facilitate chain folding in high molecular weight polymers, nor is it required to account for crystallization behavior below the entanglement molar mass, M_c.

[15] If folding is a consequence of kinetics, it is an inherent surface defect that compromises the attainment of high degrees of crystallinity even under the most favorable circumstances. Multiple nucleation and topological contraints worsens this flawed situation even more as physical measurements have shown (eg. see situation summary in Ref. 155). Another publication is in press.

3. Other Significant Aspects of Crystallization

In the preceding sections, some of the following items have been mentioned, but the writer believes that they deserve more attention as many of these areas have grown since the publication of the third edition of this Handbook. For example, there have been developments in:

(I) Non-isothermal crystallization
(II) Crystallization of blends
(III) Solvent and pressure induced crystallization
(IV) Mesophase crystallization
(V) Flow induced crystallization
(VI) Epitaxial crystallization
(VII) Orientational crystallization from the melts and solutions
(VIII) Crystallization of copolymers
(IX) Computer simulations

A brief foreword is given by way of introduction in these important areas. Rate measurements in all of these fields except for epitaxial crystallization appears in the tabulated data in this chapter. In some respect, the growth experienced on a given topic is connected with practical developments and manufacturing and that often provides the opportunities for further investigations.

3.1. Nonisothermal Crystallization This important aspect of polymer crystallization is responsible for the morphology and properties of processed polymers that are crystallizable (ie. polymers, blends, mesophases or any combination of these ingredients in a plastic product) to whatever extent. in the developments. There are many complex events responsible for polymer properties. Several approaches have been used to gain a better representation and understanding of non-isothermal crystallization processes, since the quality of manufactured plastics goods depends upon it. Processing induced structures are never homogeneous even when the materials are thin films or fibers. Because of their complexity, years ago fundamental knowledge was gained through experiments, but now computer modeling has increased in popularity. Several approaches to this problem exist. The techniques of Ozawa (162) Nakamura et al. (163) are still popular. In essence, they have been usually modeled as an extension of

Avrami theory

$$\theta(t) = \sum_{j=1}^{k} \theta_j(t) \qquad \text{(A16)}$$

where the phase change over the crystallization range is considered to be comprised of many incremental isothermal parts so that where $j = 1$ to k involves all the types of nuclei (i.e., homogeneous, heterogeneous, pseudo homogeneous, thermal, athermal and so on). The nucleation rates $\dot{N}(t)$ and growth rates $G(t)$ has been patterned as

$$\dot{N}(t) = \dot{N}[f(t)] \quad \text{and} \quad G(t) = G[f(t)] \qquad \text{(A17)}$$

Simplifying assumptions lead to a more general equation. After some manipulations, it becomes:

$$\log\{-\ln(1 - x(t)\} = \log k(T) - n \log \beta \qquad \text{(A18)}$$

where $x(t)$ is the fraction of material transformed at T and β is the cooling rate, $k(T)$ is the cooling rate function and n is the Avrami exponent. From plots of $\log\{-\ln[1 - x(t)]\}$ vs. $\log \beta$ a straight line is obtained if Osawa's method is valid. From this plot, $k(T)$ and n respectively can be obtained.

Harnisch and Muschik (164) derived the Avrami equation from non-isothermal crystallization thermograms where

$$x(t) = 1 - \exp(-k_n t^n) \qquad \text{(A19)}$$

A plot of $\log\{-ln[1 - x(t)]\}$ vs. $\log t$ for each cooling rate is linear, providing the adjustable parameter k_n and n that are needed. Two parameters are different from the isothermal values. Besides this, it is important to realize that the heat of fusion of the 100% crystalline polymer is needed for the data analysis.

Ziabicki (165) developed a procedure where he assumed that crystallization in polymers may be represented by first order kinetics, i.e.,

$$\frac{dx}{dt} = (1 - x)kT \qquad \text{(A20)}$$

wherein overlap of growing moieties is neglected and $k(T)$ is a temperature dependent rate constant. Plots of rate constant vs. T is Gaussian-like; so that the kinetic crystallizability C, may be expressed in terms of D, the width of the crystallization exotherm at half-height and k_{max} equals k at the top of the exotherm

$$C = \int_{T_g}^{T_m} k(T)dT = (\pi/\ln 2)^{1/2} k_{max} D/2 \qquad \text{(A21)}$$

Depending upon the polymer and its crystallizability (fast vs. slow kinetically), C varies more than three or more orders of magnitude (polymer to polymer) but kinetic parameters obtained from Ziabicki's method do not always compare well with other methods. Except for tests on blended systems in recent literature (164) others were reasonable. A generalized theory by Ziabicki (165), containing the thermodynamics and kinetics of phase transitions, while sound in concepts, appears complex and not readily amenable to testing.

Whenever polymer melts or solutions are sheared (166) the nucleation rate can often be drastically enhanced so that the overall transformation rate becomes accelerated, if the conditions are conducive to crystallization (167,168). If the external cooling is sufficiently rapid, the level of crystallinity may be compromised for instance in molded parts that may subsequently crystallize slowly (ie. age in storage) causing serious changes in dimensions that could cause distortion in the workpiece. Moisture conditioning of polyamides, for example, is a well practised industrial procedure that is used to stabilize fibers "on-line" and as processed molded parts. Network systems undergo non-isothermal crystallization or isothermal crystallization when they are oriented uniaxially (169) or biaxially (170). Some of them have been analyzed from the viewpoint of kinetics and/or thermodynamics as further alluded to in the next section. Non-isothermal crystallization at varying cooling rates is representative of actual polymer processing situations. Integral methods have been developed (171) for simulating the material fraction of transformed material under arbitrary cooling rates but the widespread use of Avrami theory has been criticized (see Computer Modeling section).

In industrial processes rapid sample cooling and monitoring has been a problem. Years ago, the writer introduced the light depolarization intensity method (LDI) to follow rapid changes taking place "on the spin line" and in laboratory tests (94). This procedure is now widely used and has just been further developed (95) to cope with average cooling rates as high as 5000°C/min. for the investigation of non isothermal crystallization generally (i.e., with constant and varying cooling rates) as Spruiell and coworkers have demonstrated for polyolefins. Over the years, Janeschitz-Kriegl and coworkers (see for example, (38)) have investigated the theoretical and experimental difficulties associated with transport and transformation processes encountered in polymer crystallization. In recent papers, they have detailed their findings.

3.2. Crystallization of Blends The first polymer blend was made from two polymeric rubbers in 1846, but polymer blend technology and a scientific understanding of the underlying principles controlling the compatibility (or lack of) in polymer mixtures (alloys as they have been named recently) has taken place only in the latter part of the current century. Many blends are non-crystalline but our interest in this document is focused on the kinetics of phase transformations of binary and ternary systems that receives more attention annually. Some of these systems can be very complicated, often comprised of multiple phases that may involve homopolymers, copolymers, mesophases and the like. Polymorphism and even isomorphism may occur

because of inherent chemical interactions, imposed temperature and pressure conditions and so on. Despite these complexities, blends comprise a significant part of industrial production where synergism among materials is often exploited through various processing techniques.

The lattice theory of Flory–Huggins captures the essential features of mixing and demixing and the magnitudes of their corresponding entropic and enthalpic changes have provided a basis of understanding for some fifty years ago (172). Since then, experimental practice and more subtle theoretical developments, including computer simulations, have advanced our understanding of homopolymer and copolymer blends (see for example, Binder (173)). With mesophases the situation becomes more complex but it is still beneficial in practical ways. On the technological side, Utracki (174,175) has provided informative overviews of the processing science and technology of blends or alloys in detailed accounts of processing-morphology-property relationships.

Crystallization always involves phase changes and often insufficient attention is given to transformation rates that may correlate strongly with structural and morphological details. For polymer mixtures/blends and copolymers with one or more random components, certain generalizations may be made when they are crystallizable. For instance in bulk crystallization, the Avrami or a related theory has often been employed to analyze bulk kinetics in blends to demonstrate the strong effect of molecular weight and composition on transformations rates. There is an analogy here with homopolymers in that crystallization rate is usually suppressed by the non-crystallizable component(s) in the system. Consequently transformation curves are moved to lower temperatures, although their transformation isothermals are seldom superposable (as they are in most homopolymer transformations). Spherulitic growth rates are usually attenuated too and shifted toward lower temperatures as the results compiled in this article show. The crystallization of blends has been modeled by thermodynamic or kinetic type equations employing computer simulations.

3.3. *Solvent and Pressure-Induced Crystallization* Diluent or solvent in a polymer system, alters its crystallizability and often its crystallinity is enhanced. Solvent-induced morphological changes (176) may occur and mechanical properties and deform ability including aging behavior (177) of systems can be affected so that the topic is of considerable importance technologically. Plasticizers (178), nucleants (179), and chain length (180) may attenuate or sometimes accelerate the phase transformation kinetics. Several types of investigations and analysis have been employed. Mandelkern and others have adopted a thermodynamic approach where the focus is on the overall Gibbs free energy for nucleus formation, while crystallization kinetics has been investigated by using the Avrami theory as a basis for detecting mechanistic changes with time, temperature, and diluent concentration. For spherulitic growth kinetics the effect of diluent on morphology and crystallization kinetics has been formulated (74) according to

$$G = G_0' \exp\left\{\frac{-A'}{R(T - T_0)}\right\} \exp\left(\frac{-\Delta G^* - \Delta G_s^*}{RT}\right) \quad \text{(A22)}$$

where ΔG_s^* is the free energy contribution from the solvent (diluent), the other terms having been defined before. Equation (A22) may be modified to take care of crystal geometry and polymer diluent interaction. These effects are very marked in many polymers, especially where plasticizers that modify physical behavior are involved, as for instance moisture in polyamides. In these circumstances the defining parameters A', G_0', T_0' are altered (usually decreased in magnitude compared with homopolymers). In non-compatible polymer blends (181) this is often a rare event, and changes in morphology and crystallization behavior have not always been documented even when rates have been measured. Copolymer systems are being studied more extensively (181), and spherulitic growth rates (181,182) are receiving some attention as later tabulated results illustrate.

Pressure induced crystallization has been documented for a few systems (183), poly(ethylenes) (31,46,184) in especially being the most extensively investigated materials from a morphological and properties viewpoint. Conformational constraints are responsible for gauche bond formation in polyethylene, for example, lead to the formation of the higher entropy hexagonal phase as a morphological high-pressure intermediary that is essential to the overall thermodynamic picture of its melting temperature-pressure phase diagram. Other kinetics data (185–190) are also listed in this article. Pressure is a significant processing parameter. In the past, experimentation was the "yard stick" rather than theory for optimization of polymer processing conditions. Crystallization kinetics made by dilatometry at small undercoolings (190a) has moved the focus to the process rather than on the product itself for nylon 66, polypropylene and poly(ethylene terephthalate). According to Zoller (190a), the Malkin modification of the Avrami equation best describes the kinetic data in this investigation. Other systems such as polypropylene behave likewise, and *PVT* modeling studies have been published (190b,190c).

3.4. *Crystallization of Mesophases* Although polymeric mesophases were discovered more than one century ago (191), their exploitation has only been developed within the recent decades. Synthesis, properties and applications have been the focus of most studies because of the technological potential of these systems. Now that it is known that mesophases form supermolecular structures through self-organization, this discovery has lead researchers to investigate the criteria underlying liquid crystalline formation. The morphology and structure of these polymers have been the subject of theories (14,192,193) and experiments (194). Molecular design *vis a vis* properties (somewhat analogous to activities in drug chemistry/

industry) has become an attractive research topic. The molecular requirements for liquid crystallinity have been featured in papers and reviews (195) that have also covered lyotropic and thermotropic phases. Structure in these types of phases have sometimes been tailored to ease processing and/or to facilitate or even to reduce rates of crystallization. Blending has been tackled through processing and modeling, including phase separation dynamics (196); yet crystallization kinetics, despite its importance, has had a low profile until comparatively recently, kinetic measurements on mesophases are still sparse. Most results known to the writer, are tabulated in this article. Rate data have been analyzed along the conventional lines normally used for homopolymers in Section B. Insufficient research has been devoted to the development of a new theory and to examine the influence of crystallization rate on morphology-processing-property relationships; viscosity and diffusion considerations notwithstanding.

Crystallization of some thermotropic copolymers cannot be explained on the Flory model (192) through homopolymer segregation. However, Windle and coworkers (197), by means of computer modeling have demonstrated that 3D ordered regions, described as non-periodic layers (NPL) are possible. Structurally, NPL crystallites agree with experimental X-ray observations even when random intramolecular statistical sequencing exists. This ongoing project is of interest as the NPL model may also be explained by a paracrystalline lattice (PCL) model, that does not require explicit sequence matching (198).

3.5. Flow-Induced Crystallization This topic covers polymer solutions and melts (199,200) generally and may be further categorized into

(a) flow induced Poiseuille flow (201),
(b) elongational flow (199),
(c) shear induced transformations (202,203),

and there are others.

Polymers, other than homopolymers (i.e., blends, copolymers, mesophases) have been listed according to processing characteristics. Rates of crystallization in these categories are sparse compared with synthesis, structure, morphology, properties, processing and even computer simulation (the latter being a rapidly growing field), with some information on the factors/forces that modify behavior. An exception is the work of McHugh and coworkers (204,205) who have reported the strain induced crystallization rates of swollen poly(ethylene) networks by using dynamometry coupled with *in situ* fiber video-imaging with birefringence measurements in order to obtain one dimensional heterogeneous growth rates. However, the deformation rates encountered in these experiments are much lower than the values encountered in commercial fiber melt spinning and molding processes.Still, modeling is now underway to link transient deformation histories with flow induced shear results (205). These authors have just developed a continuum model for flow induced crystallization that embodies strain induced crystallization by employing an irreversible thermodynamic formalism based upon principles set forth by Beris and Edwards (206) for describing non equilibrium irreversible thermodynamics of flowing systems.

The Hoffman has developed a kinetic model for fibrous crystal growth from solutions (207). It is patterned after the well established pioneering solution spinning "shish-kebab" textures, and properties by Pennings and coworkers (see for example 208,208a) and others (208b) especially for UHMWPE and their blends. In this model, "shish's" comprise a well-oriented central core fibrils ($\sim$15–50 nm) flanked by chain-folded "kebab" overgrowths off the core. The "shish" cores are interconnected by highly strained amorphous regions. They (core regions) contain many defects. Here again, the paucity of experimental rate data hampers testing of the theoretical model.

3.6. Epitaxial Crystallization This aspect of crystallization deserves to be mentioned. Polymer–polymer epitaxy (209–210) involving mutual interactions between different macromolecules where crystallinity, crystal structure, lattice matching, molecular conformation and chemistry have been considered. The kinetics of epitaxial processes have been largely ignored despite their plausible significance in surface bonding that has practical implications.

Recent experiments (211) have shown that the lamellar thickness of poly(ethylene), PE, on oriented isotactic poly(propylene), changes from 16 to 39 nm upon annealing. This thickening is attributed to dimensional matching and secondary nucleation with the requirement (212) that the PE crystal(s) are thinner than the ^{i}PP dimension along the chain-row matching direction. However, no detailed kinetic measurements were reported on the rate of epitaxial growth here, or elsewhere in the literature.

3.7. Orientational Crystallization Strain, shear, and elongational flow under isothermal or nonisothermal conditions promote crystallization. The problem is of long-standing commercial importance in fiber manufacturing, injection molding (213) and other important processes. On the academic side, the problem has been recognized for a long time, but it has been studied only sporadically until now (203). Although published data are still sparse, useful behavioral trends have been established.

Crystallization of *cis*-1,4-polybutadiene between rollers during shearing has been modeled (214) using a novel procedure in which the influences of shear flow on lateral heat conduction is approximately avoided. This technique permits the crystalline layer build-up to be determined as a function of time, temperature, and shear rates in on-line processing. The morphology created under these conditions was studied. This is not an easy "kinetic" problem to handle theoretically.

Crystallization in polymer networks has received some attention (169) since Flory proposed the basic principles many years ago (215). Gaylord (216) modified this theory

for finite chains while others studied and determined the interrelation between elongation, melting, and crystallinity. Calculated strain dependence of the melting temperatures (max), average crystallite sizes and crystallinity extension ratios, λ's, as high as four for crosslinked rubber networks have been correlated, but rates of crystallization were not included in this kind of work that is further addressed by Negahban in Section IX.

3.8. Crystallization of Copolymers In this category, the focus has been on morphology and properties though Flory (215) developed an equilibrium thermodynamic description of the semi crystalline state of these materials almost half a century ago. Fusion of copolymers is expected to occur over a wider range of temperature in contrast to homopolymers. Random and block copolymers have been studied and melting theories are widely used to describe them. Whenever one species of a copolymer is crystallizable and is dependent upon its sequence probability, p, and not on composition, its melting behavior has been described[16]. The technological importance of copolymers has developed over the years, but kinetic descriptions of the phase changes observed (often multiple) have been mostly patterned after models for blends that are analogously related to equation (A22) whenever crystallization proceeds according to a spherulitic morphology. The non-crystallizable component(s) affects crystallization parameters in accordance with their degree of compatibility and interfacial transport that often constrains and usually suppresses growth rate. Even so, the morphological features that determine the overall crystallization kinetics and properties do change with molecular weight and co-unit content and rates have been monitored and analyzed mostly according to procedures outlined in Section A. Morphology varies with molecular weight akin to the behavior encountered in homopolymers. Avrami type transformations and spherulitic growth rates tabulated in this article indicate that the time scale of the transformation is strongly influenced here (more so than it is in blends of the same composition) for species with similar compositions. Other copolymers behave similarly even though the range of molecular weights for these random copolymers of ethylene is not extensive (216,217). Other kinetic theories of copolymer crystallization have been formulated (218) and tested. Modeling of copolymers with short crystallizable sequences using a Monte Carlo approach (219) has been aimed to reveal the 3D morphology of A-B type crystallites such as ethylene-propylene with high propylene content and low crystallinity. This work shows promise. Goldbeck-Wood (220,221) has written an informative overview of computer simulations where the focus has been on molecular dynamics and Monte Carlo simulations pertaining to classical lamellar crystallization and 3D models. The reader should consult the original texts for details.

3.9. Computer Simulations On this topic, there have been a number of developments that have a kinetics basis, apparently connected with assumptions used in the Avrami theory that only provides analytic solutions. In simulations, the approach has been used to model bulk transformations for:

(a) volume shrinkage, non-random nucleation and crystallinity variability (222),
(b) spherulite impingement in two dimensions on SALS patterns (223),
(c) the morphology of spherulites (thermally and athermally nucleated) (224) and the implications of various nucleation modes, as well as density changes and size distribution effects,
(d) isothermal kinetics in thin films, including the influence of surface nucleation on morphology (225,226), and
(e) simulation of crystallization in polymeric composites in two dimensions with some representation of the three dimensional situation (227), and for several other criteria too.

Simulation of phase transformations in these examples have some predictive capability. For composite systems, the Avrami model as such, is claimed not to apply because nucleation is constrained by fiber loading and surface sites. For instance, factors such as fiber fraction and diameter, spherulitic growth (normal and transcrystalline) must all figure in the overall composite morphology.

Another different, but recent approach by Negahban and coworkers (228–230) to crystallization kinetics involves modeling:

(a) thermo-mechanical effects that occur during the phase transformation in "simple" homogeneous processes,
(b) simulation of the thermo-mechanical effects of crystallization in non-homogeneous processes and,
(c) developments of models for the prediction and verification of material responses.

There are other criticisms of the Avrami method here. Negahban points out that modeling of crystallization kinetics using Avrami-type equations "is incompatible with the entropy production inequality" (i.e., Clausius Duhem inequality) that is basic to the termination of crystallization in real situations. Much of his work has concentrated on the crystallization of rubber (literature results) with all its ancillary effects/property-wise material functions that are amenable to simulation. In the same manner, the kinetic theory of crystallization, based upon concepts of molecular chain-folding and it's related parameters,at the same time recognizing some of the shortcomings involved. An attempt has been made to keep

[16] Goldbeck-Wood [Polymer **33**, 778 (1992)] has developed a new melting point equation that is comparable with Eq. (A23) (see below) for copolymer melting point depression, but it predicts a much steeper dependence on composition than the Flory model which states

$$\frac{1}{T_m} - \frac{1}{T_m^0} = -\frac{R}{\Delta H_u} \ln p \qquad \text{(A23)}$$

where p is the sequence probalility [P. J. Flory, Trans. Farad Soc., **51**, 848 (1955)].

this section relevant to crystallization kinetics even though modeling/simulation procedures are becoming widely applied now, on account of growing availability of computers. In this regard one of the more recent practical computer simulations that has been developed for injection molding,embodies nonisothermal and stress–induced crystallization kinetics in poly(phenylenesulfide) during processing (232). The authors claim to be able to "predict" the thermomechanical history and crystallinity developments in PPS in reasonable agreement with experiment. Undoubtedly, there will be further developments in this field,because of its technological and economic relevance.

ADDENDUM

This chapter on "Rate of Crystallization of Polymers" is incomplete for several reasons. Sometimes original data were not available. Where the deconvolution of complex graphical kinetic scenarios was unnecessarily tedious and resulted in questionable accuracy, these data were omitted. However, results are listed for rate plots that could be deciphered and digitized satisfactorily. Original data provided directly by authors are included and gratefully acknowledged by the writer.

B. TABLE OF RATES OF CRYSTALLIZATION OF VARIOUS POLYMERS

1. Rates of Crystal Growth

TABLE 1. POLY(ALKENES), POLY(DIENES), POLY(VINYLS)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
1.1. HOMOPOLYMER MELTS					
Poly(ethylene) oligomers C246 (alkane)		118	680	Melt crystallization as thin film; phase contrast hot stage microscopy; $1/t_{0.1}$, transformation rates for C198 follow a similar pattern with T_c	233
		119	638		
		119.6	137		
		120	124		
		120.6	67		
		121.1	138		
		121.5	103		
		122	138		
		122.5	142		
		123.1	159		
		123.5	103		
		124.0	75		
		124.6	67		
		125.1	25		
Poly(ethylene) oligomers C294 (monodisperse)		118	1100	Optical and electron microscopy, melt crystallized banded and and lamellar spherulites	234
		119	840		
		120	960		
		121	530		
		122	260		
		123	170		
		123.5	120		
		124	20		
		124.5	2.1		
		125	2		
		126	4		
		127	4		
		128	2		
		129	2		
Poly(ethylene) oligomers C246		118	4310		234
		119	3000		
		120	2250		
		120.5	2430		
		121	910		
		121.8	30		
		122	60		
		122.5	100		
		123	150		
		124	220		
		125	230		
		126	200		
		127	130		
		128	70		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
C198		118	1330		234
		119	1440		
		120	1330		
		121.8	1140		
		122	1340		
		122.2	1180		
		122.5	970		
		123	1040		
		123.5	1020		
		124	980		
		125	590		
		125.5	500		
Poly(ethylene)		−45	3.2	Crystallization from quenched droplets	235
$M_n = 32000$		−30	13	upon heating; lamellar thickness over	
$M_w = 119000$		−15	20	the same range; $45 \leq l \leq 75$ nm cited;	
		0	800	crystallization measured upon heating	
		10	1000		
		24.5	20000		
		39.5	2000000		
Poly(isoprene) *cis*		−40.2	0.023	Electron microscopy; thin films	238
		−25.1	0.125		
		−18.2	0.138		
		−13.0	0.098		
		0.2	0.019		
		−38.4	0.011	Electron microscopy; thin films	238
		−32.8	0.020		
		−26.3	0.030		
		−15.7	0.024		
		4.2	0.006		
			0.001		
Poly (isoprene) *cis* with 2–2.5% *trans*		−39.2	0.027	Electron microscopy after staining;	186
(α) growth in Hevea		−25.3	0.118	for further details see text	
		−19.4	0.138		
$M_w/M_n = 4.81$		−11.3	0.110		
$M_w/M_n = 16.93$		−0.4	0.027		
		−39.3	0.007		
(α) growth in Natsyn		−34.3	0.014		186
$M_w/M_n = 4.12$		−29.5	0.025		
$M_w/M_n = 10.17$		−25.2	0.034		
		−19.3	0.024		
		−14.5	0.010		
		−9.6	0.014		
		−4.9	0.009		
		0.6	0.003		
(α) growth in Natsyn		−39.2	0.004		
		−34.3	0.007		
		−29.7	0.013		
		−25.3	0.019		
		−19.6	0.016		
		−14.4	0.012		
		−10.1	0.009		
		−5.1	0.005		
cis with 2–2.5% *trans*		−10	0.071	0.0 kbar	186
(α) growth in Hevea			0.206	0.5 kbar	
			0.370	0.7 kbar	
			0.432	1.0 kbar	
			0.233	1.5 kbar	
			0.069	1.7 kbar	
(α) growth in Natsyn		−10	0.017	0.0 kbar	186
			0.021	0.5 kbar	
			0.123	0.7 kbar	
			0.117	1.0 kbar	
			0.051	1.3 kbar	
			0.036	1.5 kbar	

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
(α) growth in Hevea		0	0.009	0.0 kbar	186
			0.028	0.5 kbar	
			0.156	1.0 kbar	
			0.698	1.5 kbar	
			0.731	1.7 kbar	
			0.124	2.0 kbar	
(α) growth in Natsyn		0	0.003	0.0 kbar	186
			0.006	0.5 kbar	
			0.011	1.0 kbar	
			0.186	1.5 kbar	
			0.141	2.0 kbar	
Poly(isoprene)*cis*		−42	0.021	Electron microscopy of thin films	239
M_w = 543000		−36.5	0.049	(~80.0 nm); growth (lamellar)	
		−31	0.068	arrested by OsO_4	
		−27.3	0.113		
		−20.8	0.093		
		−16.1	0.065		
		−10.6	0.036		
		−5.6	0.014		
		−2.5	0.013		
		−0.9	0.011		
		1.4	0.005[5]		
		3.1	0.005[1]		
Poly(isoprene)*cis* (from Hevea rubber)					
M_w = 313000		−41.2	0.040	Electron microscopy of thin film	239
		−36.5	0.061	(~80 nm) growth; stained with	
		−33.4	0.074	OsO_4; lamellar growth rates reported	
		−31.3	0.082		
		−27.1	0.145		
		−21.1	0.117		
		−16.4	0.096		
		−15.3	0.091		
		−13.2	0.085		
		−10.3	0.076		
		−8.3	0.070		
		−6.0	0.060		
		−4.1	0.029		
		−1.6	0.0098		
		−0.0	0.0046		
		1.1	0.0038		
		2.7	0.00335		
Poly(isoprene)*cis* GR-F α-lamellar		−36	0.080	Electron microscopy with OsO_4	240
		−27.5	0.104	staining; α and β spherulitic	
		−21.5	0.144	morphologies studied in quayle	
		−16.7	0.114	rubber extracts as (a) fresh	
		−11.8	0.093	extract GR-F and (b) aged	
		−5.0	0.069	specimen GR-AP	
GR-AP α-lamellar		−35.5	0.063		240
		−27.0	0.093		
		−22.0	0.111		
		−16.8	0.094		
		−11.7	0.067		
		−5.0	0.041		
GR-AP β-lamellar					
Poly(isoprene)*trans*-1,4		41.7	4.2	Optical hot stage microscopy	241
(low melting crystals) LMF		44.3	2.1	T_m (LMF) = 64°C	
		46.5	0.95	σ_e = 23 erg/cm^2	
		47.5	0.50	(negative spherulites)	
		49.0	0.23		
(high melting crystals) HMF		41.7	7.0	T_m(HMF) = 74°C	241
		44.3	4.7	σ_e = 35 erg/cm^2	
		46.5	2.35	(dendritic spherulites)	
		47.5	1.90		
		49.0	1.21		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(isoprene)*trans*-1,4 (high molecular weight fraction)		− 10.2	0.096	Electron microscopy with OsO_4 staining; thin film ~ 100 nm thick spherulitic growth pressure = 1 bar	187,242
		− 5.3	0.154		
		− 0.6	0.42		
		4.3	0.80		
		9.9	1.43		
		14.7	2.08		
		47.3	1.47		
		49.3	1.09		
		51.3	0.77		
		54	0.44		
		55.3	0.30		
		60	0.052		
		− 0.7	0.11	0.5 kbar	187,242
		4.8	0.22		
		9.4	0.44		
		14.7	0.82		
		19.3	1.38		
		55.6	1.25		
		58.6	0.77		
		60.5	0.55		
		62	0.37^4		
		64.3	0.14		
		68.0	0.079		
		4.5	0.102	0.7 kbar	187,242
		9.8	0.26		
		14.3	0.49		
		19.5	0.89		
		25.6	1.58		
		57.5	1.29		
		61.5	0.80		
		63.5	0.57		
		66.0	0.31		
		68.4	0.14		
		14.2	0.23	1.0 kbar	187,242
		19.3	0.44		
		24.4	0.79		
		68	0.64		
		68.3	0.46		
		71.6	0.23		
		76	0.11		
		29.3	0.104	2.0 kbar	187,242
		34.5	0.202		
		39.5	0.39		
		44.6	0.69		
		49.2	1.10		
		54	1.46		
		59.5	1.75		
		63.7	1.80		
		70	1.67		
		75	1.17		
		79.3	0.58		
		82	0.35		
		84.5	0.20^6		
		87	0.10^3		
		49.3	0.10^4	3.0 kbar	187,242
		59	0.44		
		64.5	0.66		
		74	1.06		
		79.3	1.11		
		84.7	1.01		
		89	0.63		
		92.5	0.50		
		94.6	0.27		
		100	0.15		
		102.7	0.085		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		59.5	0.124	3.5 kbar	187,242
		63.7	0.23		
		69.3	0.38		
		74	0.53		
		79.2	0.73		
		85	0.90		
		89.7	0.83		
		95	0.68[3]		
		100	0.45		
		103	0.25[4]		
		105	0.15		
		107.7	0.095		
Poly(isoprene)*trans*-1,4		−5.3	0.099	Pressure, 1 bar	187,242
(low molecular weight fraction)		−0.6	0.197		
		4.4	0.385		
		9.8	0.630		
		14.7	0.915		
		39.4	1.81		
		41.3	1.33		
		44.7	0.90		
		47.7	0.62		
		49.5	0.41		
		51.3	0.26		
		54.0	0.12		
		55.8	0.063		
		4.4	0.11	0.5 kbar	187,242
		9.5	0.19		
		14.5	0.32		
		19.5	0.59		
		25	0.98		
		50.5	0.96		
		55.3	0.51		
		57.6	0.33		
		59.5	0.20		
		62.3	0.07[3]		
		9.5	0.088	0.7 kbar	187,242
		14.8	0.22		
		20	0.40		
		25	0.63		
		51.5	1.08		
		56	0.78		
		57.6	0.57		
		60	0.42		
		61	0.24		
		64	0.082		
		14.4	0.089	1 kbar	187,242
		19.4	0.180		
		24	0.303		
		29.5	0.57		
		36.6	1.02		
		56	0.98		
		57.7	0.83		
		59.8	0.66		
		63.5	0.39		
		69	0.16		
		35	0.10[4]		
		39.5	0.15[4]		
		45	0.31		
		49.7	0.46		
		54.5	0.64		
		59.8	0.79		
		64	0.79[4]		
		70	0.72		
		75	0.46		
		84.7	0.072		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		34.5	0.096	2 kbar	187,242
		40	0.15		
		45	0.32		
		50	0.48		
		54.5	0.64		
		60	0.77		
		64	0.82		
		70	0.72		
		74.4	0.47		
		85	0.085		
		59	0.08	3 kbar	187,242
		64.5	0.19[5]		
		70	0.33		
		74.5	0.42		
		80	0.48		
		84.7	0.40		
		89.5	0.26		
		92.4	0.14		
		94.7	0.052		
		67	0.091	3.5 kbar	187,242
		70	0.15		
		74.7	0.18		
		79.5	0.29		
		84.5	0.35		
		89.5	0.36		
		94.5	0.29		
		98.2	0.19		
		99.5	0.14		
		102.7	0.06[2]		
Poly(isoprene)/epoxide *cis*					242
100/0, w/w		−30.2	8.5×10^{-3}		
		−20.8	30×10^{-3}		
		−20	10×10^{-3}		
		−10.6	6.3×10^{-3}		
		−5.7	4.5×10^{-3}		
95.8/4.2, w/w		−30.2			292
		−24.8	1.8×10^{-3}		
		−20.0	2.3×10^{-3}		
		−15			
		−5.7	4.5×10^{-3}		
90.3/9.7, w/w		−30.2	2.4×10^{-3}		292
		−24.8	5.5×10^{-3}		
		−20			
		−5.7	0.5×10^{-3}		
87.8/12.2, w/w		−30.2	0.75×10^{-3}		292
		−24.8	0.10×10^{-3}		
		−20	0.53×10^{-3}		
		−15			
		−5.7	0.12×10^{-3}		

1.2. SOLUTIONS

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(ethylene)		70.45	7.67	Electron microscopy; temperature	42
$M_w = 3.1 \times 10^3$		72.93	6.53	control ± 0.01°C; data for [1 1 0]	
$M_n = 2.9 \times 10^3$		76.10	4.41	faces; 0.05 wt.% in xylene;	
$T_s = 365.9$ K		77.00	4.40	crystallized from stock	
$T_d = 367.4$ K		74.05	5.27	solution prepared at 75°C	
		78.25	2.93	seeded growth used	
		81.00	1.25		
		83.00	0.72		
		84.00	0.62		
		85.00	0.36		
		86.25	0.18		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_w = 3.1 \times 10^3$		68.90	5.77	Temperature control ±0.01°C; data for [1 1 0] faces; 0.01 wt.% in xylene	42
$M_n = 2.9 \times 10^3$		70.45	5.11		
$T_s = 365.9$ K		72.10	4.83		
$T_d = 367.4$ K		74.05	3.98		
		77.00	2.03		
		79.80	0.88		
		81.00	0.71		
		84.00	0.35		
		85.00	0.25		
		86.25	0.13		
		87.70	0.06		
$M_w = 4.05 \times 10^3$		70.85	9.93	Data for [1 1 0] faces; 0.05 wt.% in xylene	42
$M_n = 3.90 \times 10^3$		74.85	5.41		
$T_s = 367.6$ K		77.00	3.21		
$T_d = 371.5$ K		77.50	2.91		
		78.05	2.18		
		80.00	1.88		
		82.00	1.22		
		83.00	0.72		
		84.10	0.52		
		85.00	0.30		
		86.10	0.24		
		88.00	0.07		
$M_w = 4.05 \times 10^3$		68.90	6.04	Data for [1 1 0] faces; 0.01 wt.% in xylene	42
$M_n = 3.90 \times 10^3$		69.90	5.80		
$T_s = 367.6$ K		70.85	4.62		
$T_d = 371.5$ K		72.10	4.80		
		74.00	3.01		
		77.00	1.42		
		78.05	0.97		
		80.00	0.79		
		81.60	0.63		
		82.40	0.59		
		85.00	0.26		
		87.70	0.05		
$M_w = 3.1 \times 10^3$		68.90	3.93	Temperature control ± 0.01°C; data for [1 1 0] faces 0.005 wt.% in xylene	42
$M_n = 2.9 \times 10^3$		69.90	3.57		
$T_s = 365.9$ K		71.20	2.88		
$T_d = 367.4$ K		74.05	1.68		
		74.95	1.27		
		76.10	1.20		
		77.00	1.11		
		78.40	0.96		
		80.30	0.54		
		83.20	0.34		
		84.00	0.21		
		86.25	0.10		
		87.70	0.03		
$M_w = 3.1 \times 10^3$		70.45	1.06	Temperature control ±0.01°C; data for [1 1 0] faces 0.001 wt.% in xylene	42
$M_n = 2.9 \times 10^3$		71.20	1.01		
$T_s = 365.9$ K		72.93	0.89		
$T_d = 367.4$ K		74.05	0.69		
		77.00	0.48		
		78.25	0.47		
		79.80	0.32		
		81.00	0.20		
		83.00	0.17		
		85.00	0.10		
		86.40	0.05		
$M_w = 4.05 \times 10^3$		68.90	4.43	Data for [1 1 0] faces; 0.005 wt.% in xylene	42
$M_w = 3.90 \times 10^3$		69.10	4.29		
$T_s = 367.6$ K		70.85	3.63		
$T_d = 371.5$ K		73.06	2.71		
		75.00	1.52		
		76.00	1.17		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		77.00	1.13		
		78.40	0.70		
		78.90	0.67		
		80.30	0.57		
		82.00	0.38		
		83.20	0.28		
		84.10	0.17		
		85.00	0.13		
		86.70	0.06		
		87.70	0.03		
$M_w = 4.05 \times 10^3$		69.10	1.21	Data for [1 1 0] faces; 0.001 wt.%	42
$M_w = 3.90 \times 10^3$		71.00	1.16	in xylene	
$T_s = 367.6$ K		73.40	0.82		
$T_d = 371.5$ K		75.00	0.58		
		77.00	0.30		
		77.60	0.30		
		78.90	0.22		
		80.00	0.21		
		82.00	0.13		
		82.95	0.12		
		85.00	0.05		
		86.70	0.03		
$M_w = 6.75 \times 10^3$		75.50	21.60	Data for [1 1 0] faces; 0.05 wt.%	42
$M_n = 6.10 \times 10^3$		77.80	13.10	in xylene	
$T_s = 367.8$ K		78.95	11.33		
$T_d = 368.4$ K		81.60	3.33		
		83.60	1.08		
		86.00	0.25		
		88.10	0.07		
		75.50	11.25	Data for [1 1 0] faces; 0.01 wt.%	42
		77.80	5.55	in xylene	
		81.60	1.09		
		83.60	0.36		
		86.00	0.13		
		88.10	0.04		
		75.50	3.40	Data for [1 1 0] faces; 0.001 wt.%	
		77.80	1.50	in xylene	
		78.95	0.96		
		81.60	0.35		
		83.60	0.13		
		86.00	0.05		
		88.10	0.02		
$M_w > 10^4$	67	133	232	$\theta = 9.6°$ Growth rates from dilute	236
solution conc. 2.7×10^{-4} wt.%	68		180	$\theta = 8.0°$ tetrachloroethylene;	
	69	75	163	$\theta = 6.9°$ single crystal and [1 1 0]	
	70		127	$\theta = 7.0°$ twins measured, $G \sim C^{1/3}$	
	71	41	125	$\theta = 4.8°$ without [1 0 0] sectors;	
	71	41	102	$\theta = 3.8°$ $G < G_t$, enhanced growth	
	71.8	29	113	rate where θ is the angle w.r.t. growth	
	72.6	21		direction in twinned crystal (see	
	73.3	16	78	text figures)	
	74.1	11			
	75.4	6	33		
	76.7	2.9			
	77.8	1.5	8.5		
	77.8	1.33			
	79.0	0.70			
	79.0	0.58			
2.5×10^{-5} wt.%	69.0	12.0	20	$\theta = 10°$	
4.5×10^{-5} wt.%		20.8	35	$\theta = 8.5°$	
8.0×10^{-5} wt.%		33.3	65	$\theta = 8.5°$	
1.5×10^{-4} wt.%		53.3	87	$\theta = 8.0°$	
2.7×10^{-4} wt.%		75	163	$\theta = 7.5°$	
5.0×10^{-4} wt.%		105	260	$\theta = 7.6°$	
9.0×10^{-4} wt.%		142	488	$\theta = 7.2°$	

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
2.5×10^{-5} wt.%	73.3	3.5	7.2		
8.0×10^{-5} wt.%		7.8			
2.7×10^{-4} wt.%		15.8	78.3		
9.0×10^{-4} wt.%		31.7	167		
4.5×10^{-3} wt.%		75			
8.0×10^{-5} wt.%	75.4				
2.7×10^{-4} wt.%		32	15.5		
9.0×10^{-4} wt.%		61	32.5		
4.5×10^{-3} wt.%		123	71.7		
		317			
		54.5	43	$\theta = 7.3°$; θ is oblique angle with $\theta = 5.9°$; with respect to [1 1 0] faces; $\theta = 4.8°$; see Fig. 3 of text	
		58.4	37		
		61.7	27		
7×10^{-6} wt.%		50.0	28		
1.3×10^{-5} wt.%			48		
2.5×10^{-5} wt.%			105		
		82	450	Growth rates G measured by Dynamic Light Scattering (DLS) from self-seeded crystals in *p*-xylene. $G \sim M_z^{\alpha}$ where $0.6 \leq \alpha \leq 0.8$ for the molecular weights studied; surface energies reported as $\sigma\sigma_e$ erg^2/cm^4	246
$M_w = 120000$		83	340		
$M_w/M_n = 1.19$		84	208		
		85	125		
		86	58		
		86.5	51		
		87.2	35		
		87.6	27		
		87.6	24		
		88	18		
		88.5	7.3		
		89	5.5		
		89.5	2.9		
$M_w = 32000$					
$M_w/M_n = 1.11$		85	530		
		85.9	463		
		86.1	403		
		86.8	260		
		85.5	530		
		85.9	463		
		86.1	403		
		86.8	260		
		86.9	250		
		87.0	214		
		87.4	178		
		88.2	109		
		88.7	76		
		89.2	58		
		89.6	37		
		90.2	28		
		90.6	20		
		91	13		
					246
$M_w = 13600$		86.8	2710		
$M_w/M_n = 1.19$		87.1	2130		
		87.8	1810		
		88.5	1016		
		89.0	734		
		89.5	570		
		90	420		
		90.3	335		
		91	213		
		91.3	178		
		91.7	110		
		92.1	80		
		92.4	68		
		92.8	40		
		93	33		
		88.3	1186		

TABLE 1. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(1-cyanoethylene); poly(acrylonitrile)		105	5.56×10^{-8}	Crystallized from propylene	237
M_w =668 × 10^3		115	7.18×10^{-8}	carbonate; 0.06 wt./vol%	
		130	9.84×10^{-8}	solution 0.25 wt./vol% solution	
		140	2.00×10^{-7}		
		155	3.20×10^{-7}		
		160	2.89×10^{-8}		

TABLE 2. POLY(OXIDES)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(oxyethylene)		13.5	18330	Growth rates made from self-seeded	243
$M_n = 5.6 \times 10^4$		14.0	14968	polymer crystal stocks; dynamic	
$M_w/M_n = 1.05$		14.4	11045	light scattering measurements;	
		14.9	8730	$T_m^0 = 69$°C; 25.4 erg/cm $\leq$	
		15.3	9344	$\sigma_e \leq 81$ erg/cm^2; T_s^0 solution	
		15.7	6022	temperatures reported for each	
		16.4	4920	fraction	
		16.6	2865		
		17.4	2680		
		17.7	2422		
		18.3	1915		
		18.6	1193		
		19.6	567		
		20.5	252		
		21.1	174		
		21.6	19.4		
		22.0	77.3		
		22.5	9.24		
		23.6	19.4		
$M_n = 1.05 \times 10^5$		16.3	19060		243
$M_w/M_n = 1.03$		17.1	12722		
		17.6	6692		
		18.2	5658		
		18.8	4782		
		19.1	4000		
		19.6	2980		
		20.2	2912		
		20.7	1625		
		21.2	1013		
		21.7	625		
		22.1	435		
		22.5	221		
		23.0	125		
		23.5	67.8		
		24.0	37.6		
		24.5	16.9		
		24.9	10.9		
$M_n = 1.60 \times 10^5$		14.7	42570		243
$M_w/M_n = 1.05$		15.1	34983		
		15.7	33865		
		16.8	19745		
		17.3	15070		
		17.8	13178		
		18.2	10060		
		18.8	6486		
		19.2	5480		
		19.7	4184		
		20.2	3089		
		20.7	1990		
		21.2	1327		
		22.7	321		

TABLE 2. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		23.0	194		
		23.5	117		
		24.0	53.1		
		24.5	48.4		
		25.0	23		
		25.5	14.3		
$M_n = 3.25 \times 10^5$		16.3	40156		243
$M_w/M_n = 1.06$		17.3	31750		
		17.6	24235		
		18.6	18520		
		19.2	13672		
		19.8	11173		
		20.2	10450		
		20.8	7715		
		21.0	6517		
		22.0	5514		
		22.6	2904		
		23.6	1207		
		24.2	860		
		24.6	752		
		25.2	468		
		25.6	215		
		26.0	159		
		26.6	34.7		
$M_n = 7.70 \times 10^5$		16.3	54469		243
$M_w/M_n = 1.12$		17.8	36396		
		19.3	20538		
		19.7	15674		
		20.2	14813		
		20.7	10463		
		21.2	8262		
		22.1	4500		
		23.2	3682		
		23.8	3220		
		24.1	2025		
		24.7	1639		
		25.2	1056		
		25.6	955		
		26.0	807		
		26.6	520		
		27.2	384		
		27.6	209		
		28.1	134		
		28.6	69.0		
		29.1	19.6		
Poly(oxyethylene)	69 (15 min)	35.0	58900	Interference optical	160(a)
$M_w = 3.5 \times 10^3$		39.3	48900	microscopy for linear	
$M_w/M_n < 1.2$		40.0	46800	growth measurements	
		40.4	43700		
		41.7	38000		
		42.0	36300		
		43.5	26300		
		44	23400		
		44.4	19900		
		45.3	19500		
		46.0	10700		
		46.4	8910		
		47.0	7590		
		48.0	4680		
		49.0	2400		
		50.0	1260		
		51.0	436		
		52.0	141		
		54.0	42.7		
		55.0	8.51		

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TABLE 2. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_w = 4.5 \times 10^3$ $M_w/M_n < 1.04$	69 (15 min)	35.0	53700		160(a)
		37.0	50100		
		39.0	47900		
		39.8	45700		
		40.4	42600		
		42.8	33100		
		42.7	28800		
		43.4	24800		
		43.8	23400		
		45.0	16600		
		45.8	12900		
		46.8	9550		
		47.8	5010		
		49.8	1120		
		50.8	575		
		51.8	275		
		52.8	107		
		53.8	14.8		
		54.8	4.89		
$M_w = 7.0 \times 10^3$ $M_w/M_n < 1.2$	69 (15 min)	35.0	70800		160(a)
		39.8	60200		
		40.0	55000		
		41.2	53700		
		43.4	43600		
		44.9	33100		
		45.0	34700		
		47.0	21900		
		49.0	13500		
		49.4	13800		
		50.0	9120		
		51.0	4890		
		52.0	2820		
		53.0	1580		
		54.0	871		
		55.0	389		
		56.0	145		
		57.0	45.7		
		58.0	12.6		
$M_w = 9.0 \times 10^3$ $M_w/M_n < 1.07$	69 (15 min)	40.1	38900		160(a)
		40.8	38900		
		42.8	32600		
		43.4	30200		
		45.8	20400		
		48.4	11200		
		48.8	10200		
		49.6	7940		
		49.6	7410		
		50.8	7410		
		51.8	1900		
		52.8	1200		
		53.8	589		
		55.8	214		
		56.8	91.2		
		57.8	38.0		
		58.8	13.8		
		59.8	49.0		
$M_w = 20.0 \times 10^3$ $M_w/M_n < 1.3$	69 (15 min)	40.0	22400		160(a)
		42.0	17400		
		44.4	14500		
		45.0	13800		
		46.0	11700		
		46.3	11000		
		47.0	9120		
		48.0	7760		
		48.4	6920		

TABLE 2. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		49.0	5250		
		50.0	4470		
		51.0	3240		
		51.7	2570		
		52.0	2290		
		53.0	1170		
		53.2	1150		
		54.0	631		
		55.0	219		
		56.0	97.7		
		57.0	32.4		
		58.0	92.1		
$M_w = 100.0 \times 10^3$	69 (15 min)	39.8	26300		160(a)
M_w/M_n is unknown		40.0	24000		
		42.0	19100		
		43.4	19100		
		44.0	19100		
		46.0	17000		
		47.3	15100		
		48.0	10700		
		49.4	7240		
		51.5	3470		
		52.0	2950		
		53.0	2340		
		53.9	1380		
		54.0	1380		
		56.0	724		
		57.0	389		
$M_w = 3.5 \times 10^3$		39.5	35600	Interference optical microscopy	160(a)
$M_w = 100 \times 10^3$		40.0	27700		
Blend with mole fraction of		45.6	17000		
$M_w = 100 \times 10^3$ at 0.279 mol		46.8	12400		
fraction		47.9	10300		
		48.9	6550		
		50.0	3730		
		51.3	2450		
		51.9	1010		
		54.4	221		
		55.2	80.5		
		45.6	14100		
		46.8	7210		
		47.9	4590		
		48.9	2310		
		50.0	3470(?)		
		51.3	384		
		51.9	113		
		54.4	424		
		55.2	125		
Poly(oxyethylene)		34	129628		245
		36	110640		
		38.5	65120		
		40.5	44545		
		42.7	22615		
		45	9183		
		46.7	2952		
		48	1052		
		49	625		
		50.5	189		
		51	83.2		
		51.5	18.8		
		52.5	17.3		
		53.5	17.3		
		54.0	16.0		
		56.0	8.8		
		56.6	6.0^3		

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TABLE 2. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		57.7	1.46		
Poly(oxymethyoxyethylene)		34	217920		245
$M_w = 3000$		36.3	200355		
		38.2	137060		
		40	93780		
		42.5	68980		
		45	19280		
		47	68975		
		48.6	2968		
		55.8	23.1		
		55.8	23.1		
		57.2	8.72		
		57.5	4.15		
		52.5	294		
		51.4	130		
		53.7	31.6		
		55.8	23.1		
		57.2	8.72		
		57.5	4.15		
Poly(oxy-1,4-phenoxyethylene)					
$M_w = 3000$		28	46989	*In situ* synchrotron rate studies; optical microscopy and DSC runs made	245
		30	40180		
		32	27472		
		34	25292		
		36	13842		
		38	7034		
		39.5	3857		
		40.3	1969		
		41.9	515		
		43	125		
		44	25.9		
		45	9.90		
		46	2.07		
		47	1.14		
Poly(oxy-2,2-bischloromethyl-trimethylene)	139	45	7.000	High resolution NMR; experiment in *m*-xylene 0.1–0.001 wt.%, nucleation densities listed initial concentration 2×10^{-4} g/cm^3	244
$M_n = 5.0–10.0 \times 10^3$		60	3.830		
		78	2.160		
		86	2.160		
		95	1.170		
		105	0.333		
		60	4.500	Initial concentration 5×10^{-4} g/cm^3	244
		78	3.500		
		86	2.000		
		95	1.500		
		105	0.330		
		86	3.670	Initial concentration 2×10^{-3} g/cm^3	244
		95	2.830		
		105	0.670		
		112	0.333		

2. Rates of Radial Spherulitic Growth

TABLE 3. POLY(DIENES), POLY(ALKENES), POLY(VINYLS)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
3.1. HOMOPOLYMER MELTS					
Poly(1-butene)	160 (10 min)	90.0	338.0	Supercooled liquid, form II	249
		96.0	168.0		
		100.0	60.4		
		105.0	19.6		

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TABLE 2. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		57.7	1.46		
Poly(oxymethyoxyethylene)		34	217920		245
$M_w = 3000$		36.3	200355		
		38.2	137060		
		40	93780		
		42.5	68980		
		45	19280		
		47	68975		
		48.6	2968		
		55.8	23.1		
		55.8	23.1		
		57.2	8.72		
		57.5	4.15		
		52.5	294		
		51.4	130		
		53.7	31.6		
		55.8	23.1		
		57.2	8.72		
		57.5	4.15		
Poly(oxy-1,4-phenoxyethylene)					
$M_w = 3000$		28	46989	*In situ* synchrotron rate studies; optical microscopy and DSC runs made	245
		30	40180		
		32	27472		
		34	25292		
		36	13842		
		38	7034		
		39.5	3857		
		40.3	1969		
		41.9	515		
		43	125		
		44	25.9		
		45	9.90		
		46	2.07		
		47	1.14		
Poly(oxy-2,2-bischloromethyl-trimethylene)	139	45	7.000	High resolution NMR; experiment in *m*-xylene 0.1–0.001 wt.%, nucleation densities listed initial concentration 2×10^{-4} g/cm^3	244
$M_n = 5.0–10.0 \times 10^3$		60	3.830		
		78	2.160		
		86	2.160		
		95	1.170		
		105	0.333		
		60	4.500	Initial concentration 5×10^{-4} g/cm^3	244
		78	3.500		
		86	2.000		
		95	1.500		
		105	0.330		
		86	3.670	Initial concentration 2×10^{-3} g/cm^3	244
		95	2.830		
		105	0.670		
		112	0.333		

2. Rates of Radial Spherulitic Growth

TABLE 3. POLY(DIENES), POLY(ALKENES), POLY(VINYLS)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
3.1. HOMOPOLYMER MELTS					
Poly(1-butene)	160 (10 min)	90.0	338.0	Supercooled liquid, form II	249
		96.0	168.0		
		100.0	60.4		
		105.0	19.6		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
	95	100	0	Parallel plate shearing device; shear rate (s^{-1})	200
		100	0.23		
		94	0.46		
		92	0.9		
	100	23	0		
		27	0.23		
		25	0.66		
		23	1.0		
	105	3.2	0		
		3.1	0.23		
		3.3	0.5		
		3.3	1.0		
		4.1	2.2		
94% Isotactic Shell Chem. Co.	180 (5 min)	65	1192	Hot stage optical microscopy; crystallinity values listed	251
		70	1082		
$M_n = 73 \times 10^3$		80	675		
$M_w = 750 \times 10^3$		85	449		
		90	244		
		95	111		
		100	32.6		
Poly(chlorotrifluoroethylene)	305	163	450.1	Hot stage microscopy	121,252
	277	169	440.1		
	305	169	430.1		
	277	172	360.1		
	277	180	195.0		
	267	185	110.0		
	267	191	40.0		
		195	7.25		
		197	2.50		
Kel-F NST 300	270 (10 min)	170	406.7		121,252
		175	310.0		
		180	216.7		
		185	124.2		
		190	36.3		
Poly(l-difluoroethylene)					
Kureha KF-1100		154.7	120	Hot stage microscopy	253
$M_w = 525 \times 10^3$; $M_v = 348 \times 10^3$		159.5	36.2		
(α)-spherulites		165.3	7.2		
		167.2	3.4		
		170.2	0.82		
		174.0	0.07		
mixed spherulites		157.5	13.5		253
(α and γ)		161.4	4.26		
		165.2	1.68		
		167.3	0.86		
		170.1	0.39		
		174.1	0.10		
Kynar 881		151.6	57.2		253
$M_w = 555 \times 10^3$; $M_n = 375 \times 10^3$		155.7	20.3		
(α)-spherulites		159.9	4.51		
		162.2	1.60		
		165.1	0.33		
		168.8	0.03		
mixed spherulites (α and γ)		153.3	6.13		253
		159.3	1.20		
		162.3	0.56		
		165.1	0.26		
		167.4	0.12		
		168.9	0.07		
Poly(ethylene)					
Sinclair 2907		123	300	Spherulitic growth rates by laser light scattering; at atmospheric pressure	254
		122	500		
		121	750		
		120	1100		
		119	1700		

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TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		118	2000		
		132	310		
		130.9	490	Pressure = 0.5 kbar	
		129.5	820		
		128.5	1170		
		127.7	1410		
		148.5	140		
		147.5	200	Pressure = 1.0 kbar	254
		146.5	370		
		145.5	590		
		144.5	820		
		157.5	300		
		156.5	520		
		155.5	810		
		153.5	1820		
		151.5	2420		
		169.6	150		
		168.6	310	Pressure = 2.0 kbar	254
		168.0	540		
		166.6	910		
		166.2	1220		
		165.5	1560		
$M_w = 3.60 \times 10^3$	155	118.3	2265.2	Hot stage microscopy; selected	255
$M_w/M_n = 1.13$		119.6	271.3	values only listed for axialites	
		120.8	24.2		
		122.0	1.44		
$M_w = 4.20 \times 10^3$		118.9	5350.6		255
$M_w/M_n = 1.26$		119.3	3389.2		
		121.4	70.8		
		123.7	0.35		
$M_w = 6.15 \times 10^3$		122.3	3043.7		
$M_w/M_n = 1.09$		123.6	68.9		
		124.2	7.03		
		124.9	0.47		
$M_w = 6.29 \times 10^3$		122.7	2146.8		255
$M_w/M_n = 1.17$		124.0	87.8		
		124.6	23.5		
		125.1	3.5		
$M_w = 8.56 \times 10^3$		123.5	11663		255
$M\sim/M\sim = 1.09$		124.8	575.6		
		125.4	114.8		
		126.1	7.03		
$M_w = 8.59 \times 10^3$		124.6	1641		255
$M_w/M_n = 1.11$		125.1	623.9		
		126.0	52.7		
		126.8	3.90		
$M_w = 17.0 \times 10^3$		125.1	4678		255
$M_w/M_n = 1.08$		125.7	1435		
		126.9	108.8		
		127.5	14.5		
$M_w = 266 \times 10^3$	155	122.7	80.7	Hot stage microscopy;	255
$M_w/M_n = 1.81$		123.8	29.0	irregular shaped spherulites	
		125.4	5.6		
		127.7	0.2		
$M_w = 210 \times 10^3$		122.5	124.3		255
$M_w/M_n = 1.43$		126.1	6.9		
		127.4	1.7		
		128.5	0.5		
		124.9	52.4		
$M_w = 500 \times 10^3$		126.2	18.1		255
$M_w/M_n = 1.60$		127.7	3.0		
		128.9	0.6		
$M_w = 807 \times 10^3$		123.1	233.0		255
$M_w/M_n = 2.9$		125.5	50.4		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
SRM 1475		127.5	8.1		
		129.3	0.7		
$M_w = 74.4 \times 10^3$	155	125.6	22.95	Hot stage microscopy; axialites	255
$M_w/M_n = 1.12$		126.3	13.8	above 129°C approx.	
		127.6	4.86		
		128.5	2.54		
		128.9	1.53		
		129.6	0.41		
		130.1	0.12		
		130.6	0.04		
$M_w = 18.1 \times 10^3$		123.2	542.1	Axialites above 125°C	255
$M_w/M_n = 1.39$		124.5	199.1	approx.	
		125.2	108.3		
		125.5	98.2		
		125.6	63.7		
		126.7	10.1		
		128.0	0.78		
		128.7	0.14		
$M_w = 30.6 \times 10^3$		124.7	242.33	Axialites above 127°C	255
$M_w/M_n = 1.19$		125.8	90.76	approx.	
		126.7	48.41		
		127.1	32.68		
		127.5	17.78		
		128.1	5.16		
		128.5	1.59		
		130.0	0.05		
$D = 0$ MR*	292	120.7	117	Hot stage optical microscopy	256
	192	122.9	103.4		
	193	125.1	18.2		
	196	127.0	1.08		
	168	122.4	88.4		
	153	122.5	100.4		
$D = 40$ MR*	195	118.9	41.68		256
	195	113.1	291.7		
	195	115.8	65.0		
	195	117.8	2.33		
$D = 100$ MR*	195	100.0	71.7		256
	195	100.0	61.68		
	195	101.8	31.67		
	195	104.0	7.84		
$M_w = 19 \times 10^3$	200 (20 min)	125.0	126.7		257
		126.0	36.67		
		127.0	16.67		
		128.0	3.33		
$M_w = 4.0 \times 10^3$		81.0	510.0	# $CH_3/100CH_2 = 5.3$	258
		83.0	256.7		
		85.0	143.4		
		88.0	63.4		
$M_w = 7.0 \times 10^3$		91.0	215.0	# $CH_3/100CH_2 = 5$	258
		93.0	86.7		
		95.2	35.0		
		97.0	14.0		
		98.0	7.84		
$M_w = 10.0 \times 10^3$		92.0	175.0	# $CH_3/100CH_2 = 4.7$	258
		93.0	101.2		
		95.0	40.01		
		97.0	20.01		
		98.0	11.50		
$M_w = 12.0 \times 10_3$		90.3	316.7	$CH_3/100CH_2 = 4.5$	258
		92.0	185.0		
		98.0	12.2		
		100.3	3.33		

* D: Radiation does; MR: megarad.

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(ethylene)					
$M_n = 5.14 \times 10^3$	160 (30 min)	121.39	422.1	Fractionated samples;	259
$M_w = 6.29 \times 10^3$		125.12	1.069	NBS material SRM 1475	
$M_z = 7.62 \times 10^3$					
$M_n = 10.51 \times 10^3$		125.32	93.39	Fractionated samples;	259
$M_w = 11.74 \times 10^3$		127.81	0.433	NBS material SRM 1475	
$M_z = 13.22 \times 10^3$					
$M_n = 56.35 \times 10^3$		234.46	25.10	Fractionated samples;	259
$M_w = 68.57 \times 10^3$		128.65	0.377	NBS material SRM 1475	
$M_z = 83.93 \times 10^3$					
$M_n = 76.76 \times 10^3$		123.07	117.3	Fractionated samples;	259
$M_w = 134.30 \times 10^3$		127.74	1.039	NBS material SRM 1475	
$M_z = 276.00 \times 10^3$					
$M_n = 195.00 \times 10^3$		120.25	196.3	Fractionated samples;	259
$M_w = 323.20 \times 10^3$		126.30	1.062	NBS material SRM 1475	
$M_z = 500.80 \times 10^3$					
Poly(isoprene), unfractionated		−10	210.8×10^{-3}	Optical microscopy	283
		0	27.8×10^{-3}	0.5 kbar	
		10	2.11×10^{-3}		
		−10	392.5×10^{-3}	1.0 kbar	283
		0	156.1×10^{-3}		
		8	11.9×10^{-3}		
		0	782.8×10^{-3}	1.5 kbar	283
		10	98.6×10^{-3}		
		21	4.44×10^{-3}		
		25	3.89×10^{-3}		
		0	124.2×10^{-3}	2.0 kbar	283
		10	554.2×10^{-3}		
		21	43.9×10^{-3}		
		25	$3 5 \times 10^{-3}$		
		0	19.72×10^{-3}	2.5 kbar	283
		10	392.5×10^{-3}		
		25	110.6×10^{-3}		
		25	554.2×10^{-3}	3.0 kbar	283
		29	175.3×10^{-3}		
		35	31.1×10^{-3}		
cis-Poly(isoprene)					
$M_v = 313 \times 10^3$		−40	39.7×10^{-3}	Optical microscopy; rates	239,240
		−26	146.1×10^{-3}	I to II at −8°C; lamellar	
		−15	92.5×10^{-3}	thickness and surface	
		−12	82.2×10^{-3}	energy data are listed	
		−5	55.6×10^{-3}		
		−1	9.17×10^{-3}		
		0.8	4.08×10^{-3}		
		1.8	3.64×10^{-3}		
		3.0	2.92×10^{-3}		
$M_v = 351 \times 10^3$		−40	33.3×10^{-3}	Optical microscopy; rates	239,240
		−32	66.7×10^{-3}	I to II at −8°C; lamellar	
		−26	138.9×10^{-3}	thickness and surface	
		−20	100×10^{-3}	energy data are listed	
		−12	72.5×10^{-3}		
		−7.3	47.5×10^{-3}		
		1.0	10.0×10^{-3}		
$M_v = 543 \times 10^3$		−40	20.83×10^{-3}	Optical microscopy; rates	239,240
		−35	50.83×10^{-3}	I to II at −8°C; lamellar	
		−30	69.4×10^{-3}	thickness and surface	
		−26	111.1×10^{-3}	energy data are listed	
		−20	97.2×10^{-3}		
		−15	64.4×10^{-3}		
		−10	34.7×10^{-3}		
		−5	12.8×10^{-3}		
		−2.2	13.6×10^{-3}		
		−0.6	10.6×10^{-3}		
		1.4	5.39×10^{-3}		
		2.2	5.0×10^{-3}		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_v = 897 \times 10^3$		−40	38.20×10^{-3}	Optical microscopy; rates I to II at −8°C; lamellar thickness and surface energy data are listed	239,240
		−35	51.7×10^{-3}		
		−26	104.2×10^{-3}		
		−20	83.3×10^{-3}		
		−8.0	48.4×10^{-3}		
$M_v = 1421 \times 10^3$		−40	11.1×10^{-3}	Optical microscopy; rates I to II at −8°C; lamellar thickness and surface energy data are listed	239,240
		−30	47.2×10^{-3}		
		−26	61.1×10^{-3}		
		−20	50.0×10^{-3}		
		−5.0	6.94×10^{-3}		
cis-Poly(isoprene)				Electron microscopy with OsO_4 staining	
		0.0	8.37×10^{-3}	0.0 kbar	272
		0.0	15.74×10^{-3}	0.3 kbar	
		0.0	28.02×10^{-3}	0.5 kbar	
		0.0	55.37×10^{-3}	0.8 kbar	
		0.0	179.3×10^{-3}	1.0 kbar	
		0.0	783×10^{-3}	1.5 kbar	
		0.0	118.3×10^{-3}	2.0 kbar	
		0.0	16.38×10^{-3}	2.5 kbar	
		0.0	13.60×10^{-3}	3.0 kbar	
trans-Poly(isoprene)					
$M_v = 7.0 \times 10^3$	100	33.6	72.18	Hot stage optical microscopy	286
		35.6	63.01		
		37.5	48.01		
		37.6	53.18		
		40.4	39.01		
		43.0	22.67		
$M_v = 12.0 \times 10^3$	100	37.6	44.01	Hot stage optical microscopy	286
		39.5	36.01		
		43.0	21.34		
		45.6	14.34		
$M_v = 45.0 \times 10^3$	100	34.0	24.67	Hot stage optical microscopy	286
		38.0	11.67		
		40.0	9.34		
		43.0	5.67		
		46.0	2.83		
$M_v = 91.0 \times 10^3$	100	34.0	16.50	Hot stage optical microscopy	286
		38.0	7.92		
		40.0	5.85		
		43.0	3.52		
		46.0	1.71		
$M_v = 165.0 \times 10^3$	100	38.0	5.83	Hot stage optical microscopy	286
		40.0	4.25		
		43.0	2.10		
		46.0	1.05		
$M_v = 400.0 \times 10^3$	100	34.0	14.00	Hot stage optical microscopy	286
		38.0	6.67		
		40.0	4.38		
		43.0	2.33		
		46.0	0.95		
$M_v = 12.0 \times 10^3$	100	25.8	173.37		287
		29.6	111.69		
		33.6	66.68		
		37.6	34.01		
		43.0	9.17		
$M_v = 45.0 \times 10^3$	100	26.0	51.01		287
		30.0	34.84		
		34.0	16.50		
		38.0	8.17		
		40.0	4.83		
		43.0	1.83		
$M_v = 91.0 \times 10$	100	26.0	36.01		287
		30.0	20.83		
		34.0	11.16		
		38.0	4.33		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		40.0	2.50		
		43.0	1.17		
$M_v = 30 \times 10^3$		−9.5	0.080	Electron microscopy with	187
High melting form		−4.6	0.125	OsO_4 staining; pressure @1 bar	
		0.4	0.401		
		5.3	0.811		
		9.5	1.390		
		14.6	2.067		
		47.1	1.470		
		49.4	1.123		
		51.3	0.775		
		53.4	0.481		
		55.4	0.330		
		59.3	0.134		
Low melting form		−5.1	0.071	Electron microscopy with	187
		0.0	0.196	OsO_4 staining; pressure @1 bar	
		5.5	0.383		
		9.9	0.650		
		14.3	0.900		
		38.3	1.791		
		42.0	1.337		
		45.0	0.909		
		47.5	0.624		
		49.4	0.446		
		51.7	0.294		
		54.2	0.169		
		55.7	0.107		
$M_n = 30 \times 10^3$					
High melting form		29.8	0.096	Electron microscopy and	187
		34.6	0.213	OsO_4 staining; pressure @ 2 kbar	
		39.9	0.426		
		45.0	0.714		
		49.6	1.086		
		55.1	1.470		
		59.7	1.740		
		64.1	1.800		
		69.3	1.651		
		74.6	1.179		
		79.4	0.589		
		80.8	0.366		
		84.0	0.209		
		86.3	0.114		
Low melting form		34.2	0.092	Electron microscopy and	187
		39.3	0.170	OsO_4 staining; pressure @ 2 kabr	
		44.7	0.323		
		49.4	0.490		
		54.6	0.653		
		59.4	0.785		
		63.8	0.802		
		69.5	0.714		
		73.2	0.465		
		78.7	0.305		
		84.0	0.075		
Poly(propylene)	191–195	125	87.52	Hot stage optical microscopy	260
		130	61.51		
		134	28.67		
		138	8.668		
		140	4.501		
	180 (15 min)	122.0	300.1	Hot stage optical microscopy	261
		125.0	200.1		
		130.0	71.68		
		135.0	26.67		
		140.0	9.835		
		145.0	4.501		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_v = 178.0 \times 10^3$		120	490.1	Hot stage optical microscopy	262
		125	216.7		
		131	64.68		
		135	27.17		
	220	120.5	480.1	Pro-fax 6513E	263
		129	120.0		
		145	4.501		
		121	408.4	Pro-fax 6501	263
		132	46.67		
		145	2.334		
Hostalen PPN 106OF	164.6	127.5	116.7	Hot stage microscopy;	264
(Hoechst AG) $T_m = 180$°C	164.8	130.0	71.7	rate constants also listed;	
	165.3	132.5	43.3	crystallinity also provided	
	165.8	135.0	26.7		
	166.8	138.0	143.3		
	167.5	140.0	98.3		
	170.1	145.0	45.0		
$T_m = 190$°C	164.8	130.0	65.0		264
	167.5	140.0	83.3		
$T_m = 200$°C	164.8	130.0	63.3		264
	167.5	140.0	78.3		264
$M_w = 289 \times 10^3$		93.2	1733	Optical microscopy; linear	265
$M_n = 51 \times 10^3$		98.6	3363	crystallization under unilateral	
(KS10 from Petrochemica Danubia)		104.0	8531	quench, modeled and	
		108.7	7505	measured; comparisons	
		113.2	1794	made with literature	
		122.9	470.9	spherulitic growth rates	
		131.8	69.9		
		136.1	23.1		
		145.4	3.7		
(heterotactic/isotactic/syndiotactic		97.4	122.0	Hot stage microscopy	149
= 0.145/0.211/0.644; from		101.4	123.7		
^{13}C NMR analysis)		104.4	82.0		
		105.4	71.3		
		109.4	70.3		
		113.4	30.5		
		117.4	26.9		
		121.4	15.6		
		125.4	7.4		
		129.4	4.4		
		133.4	1.7		
		137.3	0.3		
Poly(1-phenylethylene)					
$M_v = 60 \times 10^3$		140	0.333	Hot stage optical microscopy	262
		155	1.500		
		177	4.334		
		190	3.667		
		200	1.667		
		210	0.500		
$M_v = 190 \times 10^3$	270	140	0.83		268
		150	0.333		
		170	1.334		
		180	334		
		190	0.500		
$M_v = 330 \times 10^3$	250	120	0.040		269
$M_n = 185 \times 10^3$		130	0.162		
		140	0.600		
		150	1.43		
		160	2.50		
		170	3.42		
		180	3.42		
		190	2.50		
		200	1.43		
		210	0.45		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_v = 1250 \times 10^3$		155	2.167		270
		170	4.834		
		184	4.501		
		200	2.167		
		210	0.666		
$M_v = 1380 \times 10^3$	270	130	0.333		268
		150	1.834		
		170	4.501		
		180	7.502		
		190	3.167		
$M_v = 2200 \times 10^3$	260	112.01	0.00454		270
		119.62	0.02582		
		129.70	0.1518		
		150.26	1.526		
		159.22	2.532		
		172.15	3.844		
		179.70	3.980		
		195.06	2.529		
		200.52	1.832		
Isotactic	260	113.3	0.005	Hot stage microscopy; average	271
$M_v = 220 \times 10^3$		121.9	0.040	of many literature results	
		133.0	0.158		
		143.8	0.582		
		154.9	1.343		
		174.8	3.063		
		180.0	3.380		
		190.6	3.063		
		203.6	1.872		
		203.4	1.279		
		202.4	0.821		
		208.3	0.582		
		212.2	0.422		
		212.5	0.611		
$M_v = 2100 \times 10^3$	250 (30 min)	111.1	0.004	Electron microscopy; thin films	272
(Dow Chem.)		123.2	0.069	(80–100 nm) solution cast	
		144.7	0.498	and then melt crystallized	
		161.6	2.009		
		180.0	3.711		
		192.2	3.529		
		206.3	1.738		
		215.2	0.404		
		215.2	0.355		
		220.7	0.037		
Poly(methyl methacrylate) isotactic	180 (5 min)	90	0.072	Hot stage microscopy	273
$M = 213 \times 10^3$		100	0.018		
(heterotactic/isotactic/syndiotactic = 5/94/1)		110	0.444		
		120	0.606		
		13	4.80		
Poly(2-vinyl pyridine) isotactic	230 (1 min)	100	100	Hot stage microscopy	274
$M_v = 400 \times 10^3$		110	79		
		120	413		
		130	1524		
		140	4163		
		150	8574		
		160	13058		
		170	13565		
		180	7707		
3.2. BLENDS					
Poly(isoprene)					
Blend of *cis/trans*					
5% *trans*		40	0.4	Hot stage optical	Ref. 6, p. 49
20			1	microscopy; other results	
40			1.6	in this paper including	
60			2.1	crystallinities	

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
80			3.6		
100			7.7		
Poly(ethylene)/isotactic poly(propylene)		125.4	265.4	Hot stage optical microscopy	275
PE: $M_w = 16.6 \times 10^3$		129.3	114.9	growth rates of PP spherulites	
$M_n = 10.2 \times 10^3$		131.2	71.7	in blends of 0, 10, 20,	
i-PP: $M_w = 307 \times 10^3$		135.1	27.3	and 50 wt.%; DSC rates listed	
$M_n = 15.6 \times 10^3$					
		137.1	19.0		
		125.6	267.9	Hot stage microscopy	276
		127.5	175.4	*average values cited for	
		129.5	116.9	blends of i-PP/LDPE:	
		131.4	74.7	100/0	
		133.4	47.9	90/10	
		135.3	29.3	70/30	
		137.3	20.3	50/150	
Poly(propylene)/poly(isobutene)					
Med. Mw.					
100/0; PP/PIB		121.0	550.0	Hot stage microscopy	6,277
		123.0	366.7		
		125.0	250.0		
		127.0	166.7		
		131.0	83.3		
90/10		121.0	400.0	Hot stage microscopy	6,277
		123.0	300.0		
		125.0	216.7		
		127.0	150.0		
		131.0	66.7		
80/20		121.0	333.3	Hot stage microscopy	6,277
		123.0	266.7		
		125.0	166.7		
		127.0	116.7		
		131.0	33.3		
60/40		121.0	316.7	Hot stage microscopy	6,277
		123.0	200.0		
		125.0	150.0		
		127.0	83.3		
		131.0	50.0		
High Mw.					
100/0; PP/PiB:		121.0	550.0	Hot stage microscopy	278
		123.0	366.7		
		125.0	250.0		
		127.0	166.7		
		131.0	83.3		
90/10		121.0	250.0	Hot stage microscopy	278
		123.0	166.7		
		125.0	116.7		
		127.0	66.7		
		131.0	33.3		
80/20		121.0	300.0	Hot stage microscopy	278
		123.0	216.7		
		125.0	133.3		
		127.0	100.0		
		131.0	50.0		
60/40		121.0	316.7	Hot stage microscopy	278
		123.0	166.7		
		125.0	150.0		
		127.0	100.0		
		131.0	50.0		
Poly(1-phenylethylene)/poly(1-phenylethylene); isotactic/atactic polystyrene					
i-PS, $M_w = 550 \times 10^3$; a-PS, $M_w = (900-1800) \times 10^3$					
i-PS/a-PS; 100/0		140	1.56		279
		160	3.43		
		170	4.27		
		180	4.65		

TABLE 3. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		190	3.42		
		200	1.76		
80/20		140	1.14		279
		160	2.67		
		170	3.50		
		180	3.56		
		190	2.46		
		200	0.92		
60/40		140	0.56		
		160	1.77		279
		170	2.30		
		180	2.50		
		190	1.72		
Poly(1-phenylethylene)(polystyrene)/poly(vinyl methyl ether)					
$M_v = 134 \times 10^3$; $M_v = 971 \times 10^3$					
PS/PVMe; 100/0		150.0	0.8	Hot stage microscopy	277
		180.0	2.5		
90/110		150.0	1.3	Hot stage microscopy	277
		180.0	3.0		
80/20		150.0	1.5	Hot stage microscopy	277
		180.0	3.2		
Poly(propylene)/poly(propylene) isotactic/atactic		121.3	503	Interpolated *i*-PP	280
i-PP: $M_w = 3.07 \times 10^5$; $M_n = 1.56 \times 10^4$		123.4	337		
a-PP: $M_w = 2.4 \times 10^4$		125.4	235		
		127.4	175		
		129.1	113		
		131.4	83.3		
		121.3	433	*i*-PP/*a*-PP = 9 : 1	280
		123.4	308		
		125.4	218		
		127.4	132		
		129.1	97		
		131.4	67		
		121.4	392	*i*-PP/*a*-PP = 8 : 2.	280
		123.4	263		
		125.4	180		
		127.4	130		
		129.1	70		
		131.4	50		
		212.4	358	*i*-PP:*a*-PP = 7 : 3.	280
		123.4	247		281
		125.4	163		
		127.4	117		
		129.1	67		
		131.4	33		
Poly(propylene)/poly(ethylene); isotactic/linear low density poly(ethylene)					
100/0, w/w		126	240	Hot stage microscopy; $t_{0.5}$ values are also listed microscopy	282
90/10, w/w		126	243		
80/20, w/w		126	242		
50/50, w/w		126	248		
		180.0	2.5		
90/110, w/w		150.0	1.3	Hot stage microscopy; $t_{0.5}$ values are also listed microscopy	282
		180.0	3.0		
80/20, w/w		150.0	1.5	Hot stage microscopy; $t_{0.5}$ values are also listed microscopy	282
		180.0	3.2		

TABLE 4. POLY(OXIDES)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
4.1. HOMOPOLYMER MELTS					
Poly[oxy(1-oxo-2,2-dimethyltrimethylene)]		180	7.93×10^3	Spherulitic growth; hot	308
Poly(pivalolactone); PPVL		185	3.60×10^3	stage, photographic method;	
		190	1.37×10^3	regime growth; α phase	
		192.5	7.25×10^2		
		195	3.65×10^2		
		197.5	1.90×10^2		
		200.0	95.0		
		202.5	40.2		
		205.0	23.5		
		207.5	12.2		
		210.0	6.38		
		213.0	3.88		
		215.0	2.18		
		218.0	0.99		
Poly(oxy-2,2-bischloromethyltrimethylene)	210 (25 min)	75	208.4	Hot stage optical microscopy	289
		80	183.4		
		90	150.0		
		100	125.0		
		110	100.0		
		120	66.68		
		130	33.34		
		140	25.01		
Poly(oxy-2,2-dimethyltrimethylene)	80 (15 min)	25.2	2.11	Hot stage microscopy; average of	290
$M_w = (18.5 \times 10^3 - 130 \times 10^3)$		29.1	1.38	several molecular weights cited	
		33.2	0.73		
		36.8	0.35		
		40.5	0.14		
		42.2	0.08		
		44.0	0.05		
		44.3	0.04		
Poly(oxyethylene)		42.0	12769.4	Hot stage optical microscopy	291
$M_v = 5.47 \times 10^3$		44.2	4734.2		
		45.2	2217.1		
		47.2	395.1		
$M_v = 12.4 \times 10^3$		47.2	11752.3	Hot stage optical microscopy	291
		48.8	6034.5		
		51.2	1514.0		
		55.2	55.51		
$M_v = 33.1 \times 10^3$		47.6	1784.0	Hot stage optical microscopy	291
		48.2	1516.9		
		51.0	421.8		
		53.8	94.19		
		56.4	1.60		
$M_v = 45.0 \times 10^3$		156.0	346.7	Hot stage optical microscopy	292–294
		157.0	180.0		
		158.0	99.19		
		159.8	77.02		
		160.8	56.61		
		163.0	20.84		
		163.9	14.25		
		164.5	4.801		
		166.1	2.951		
		169.1	0.475		
Poly(oxyethylene); Polyox WRS-205, Union Carbide					
$M_v = 920 \times 10^3$	120 (45 min)	53.7	352.2	Hot stage microscopy	11
		54.7	194.3		
		55.7	111.4		
		56.6	54.0		
		57.5	25.5		
$M_n = 1.6 \times 10^3$	100 (min)	44.8	36.5×10^3	Hot stage optical microscopy; selected	295
$M_w/M_n = 1.6$		45.4	18.2×10^3	molecular weights only are listed	
$[\eta] = 0.062$		45.9	6.91×10^3		
		46.5	1.82×10^3		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_n = 4.3 \times 10^3$		48.0	30.33×10^3		
$M_w/M_n = 1.07$		50.0	19.33×10^3		
		51.0	6.06×10^3		
		52.0	4.33×10^3		
		53.0	1.53×10^3		
		54.0	0.55×10^3		
		55.0	0.078×10^3		
$M_n = 20 \times 10^3$		53.6	40.0×10^3	Hot stage optical microscopy; selected	295
$M_w/M_n = 1.2$		55.1	8.00×10^3	molecular weights	
$[\eta] = 0.374$		55.9	4.00×10^3	only are listed	
		56.8	1.67×10^3		
		57.8	0.433×10^3		
		58.7	0.145×10^3		
$M_n = 600 \times 10^3$		51.7	31.00×10^3	Hot stage optical microscopy; selected	295
$M_w/M_w = 1.2$		52.5	25.50×10^3	molecular weights only are listed	
$[\eta] = 3.65$		53.6	21.83×10^3		
		54.3	11.67×10^3		
		55.1	7.80×10^3		
		56.8	1.67×10^3		
		57.8	0.233×10^3		
		59.1	0.163×10^3		
Poly(oxymethylene)					
$M_n = 66 \times 10^3$		137.3	19.82×10^4	Optical hot stage microscopy;	
		142.1	63.83×10^3	Regime III crystallization	
		145.2	26.80×10^3		
		147.0	18.37×10^3		
		150.0	81.50×10^2		
		152.0	40.08×10^2		
		153.4	17.58×10^2		
		155.0	863.3		
		156.5	359.0		
Poly(oxymethylene)					
$M_w = 2 \times 10^3$		29.6	84275	Melt crystallized; data interpolated	296
		32.6	51892	from original plots	
		37.2	17195		
		40.1	3908		
		41.8	841		
		44.1	678		
		48.0	231		
		50.4	19		
		51.2	1		
$M_w = 3 \times 10^3$		32.9	86579	Melt crystallized; data interpolated	296
		36.8	50513	from original plots	
		40.4	21913		
		45.2	3324		
		47.8	319		
		48.5	100		
		49.7	17		
		51.8	16		
		54.5	6		
		55.5	1		
$M_w = 4 \times 10^3$		34.6	96427	Melt crystallized; data interpolated	296
		37.7	57796	from original plots	
		42.5	22511		
		45.7	6013		
		48.3	1072		
		50.6	121		
		52.2	52		
		53.3	16		
		54.0	4		
		54.4	2		
		56.9	1		
		36.4	73655	Melt crystallized; data interpolated	296
$M_w = 6 \times 10^3$		41.5	37558	from original plots	
		45.7	14240		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		49.0	3415		
		51.9	407		
		54.1	43		
		55.4	6		
		57.2	2		
$M_w = 10 \times 10^3$		39.3	57796	Melt crystallized; data interpolated from original plots	296
		43.8	29471		
		47.0	15438		
		50.2	5399		
		52.2	1227		
		55.4	109		
		56.9	15		
		58.3	4		
		59.6	1		
$M_w = 150 \times 10^3$		30.2	64372	Melt crystallized; data interpolated from original plots	296
		34.6	54765		
		39.1	355		
		43.6	21913		
		46.8	10877		
		49.8	4471		
		52.9	1404		
		55.2	465		
		57.6	74		
		59.8	7		
		61.1	1		
Poly(oxymethylene oxyethylene) $M_v = 9.4 \times 10^3$	80	− 18	1840	Hot stage microscopy; 2 crystal modifications; form I	297
		− 9.8	3980		
		3.0	4680		
		8.5	5650		
		14.0	5410		
		16.0	2450		
		17.0	2630		
		19.0	1730		
		22.0	385		
		25.0	255		
		28.0	94.5		
		31.0	29.1		
		34.0	21		
		22.0	370	Form II	297
		25.0	240		
		28.0	90		
		31.0	10		
		34.0	9		
Poly(oxypropylene)	120 (2–5 min)	42.3	325.8	Hot stage optical microscopy	299
		46.3	132.5		
		46.7	39.1		
		51.0	16.7		
		40.5	165.8		
		42.3	104.1		
		44.2	66.7		
		46.3	73.3		
		39.0	8.3		
		40.5	40		
		42.3	33.3		
		44.2	8.3		
	85	45	1.37	Mean isotactic sequence length = 122	300
		50	0.175		
		55	0.14		
		38	1.00	Mean isotactic sequence length = 14	
		43	0.42		
		48	0.15		
$M_n = 10.3 \times 10^3$	120 (5 min)	0	500.1	Optically active hot stage optical microscopy	301
		5	746.8		
		10	723.4		
		15	838.5		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		25	476.8		
		30	403.4		
		35	240.0		
		40	145.7		
		45	56.68		
		50	23.50		
		60	2.050		
$M_n = 135 \times 10^3$	120 (5 min)	25	255.2	Optically active hot stage optical microscopy	301
		30	157.5		
		35	103.3		
		40	41.7		
		45	23.6		
		50	6.01		
		55	2.02		
		60	0.467		
Poly(oxypropylene) isotactic $M_v = 86.0 \times 10^3$ (Dow Chem.)	120 (20 min)	45.3	162.9	Hot stage optical microscopy; nucleation rates listed in text	11
		47.7	109.2		
		50.2	63.2		
		52.6	38.3		
		55.0	20.0		
4.2. COMPLEXES					
Poly(oxyethylene)/resorcinol stoichiometry, 2:1 complex PEO; $M_w = 6000$		25	3030	Hot stage optical microscopy; unbanded spherulites	303
		30	4440		
		35	7110		
		40	10800		
		45	15550		
		50	21230		
		55	27500		
		60	33170		
		62	34240		
		65	32900		
		67	31100		
		69.5	22540		
		71	16060		
		72.3	11050		
		72.8	720		
		72.7	8047		
		25.1	1490	Banded spherulites	303
		27.3	1740		
		30.2	2430		
		32.5	2740		
		35	3320		
		37.5	4020		
		40	4950		
		42.4	6020		
		44.9	6530		
		47.5	7490		
		50	6950		
		52.5	6230		
		54.7	5200		
		57.5	3270		
PEO; $M_w = 35000$		26	15990	Unbanded spherulites	302
		30.3	27680		
		35	139700		
		42.5	391110		
		47.2	784000		
		52.	1459150		
		57.5	2711400		
		62.5	3478600		
		67.4	4145700		
		71.4	3961000		
		74.2	3269600		
		78	1928000		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		80	1141300	Unbanded spherulites	302
		82	481000		
		82.5	117200		
		84.0	43100		
		85	14650		
		25	2160	Unbanded spherulites	302
		28	2400		
		30	3000		
		32	3580		
		35.5	4270		
		37.7	4940		
		42.4	5670		
		45.7	6530		
		50	7240		
		54	8020		
		57.3	8580		
		60	8220		
		62.5	6310		
		64	4170		
		65	3460		
		66	2660		
		67	1460		
Poly(oxyethylene)/resorcinol stoichometry 2 : 1 complex		45	15.34×10^3	Optical hot stage microscopy; two spherulitic form of PEO: α and β; other growth features were established α-type	303
		47.5	17.96		
		50	20.10		
		52.5	24.0		
		55	27.1		
		57.5	30.7		
		60	32.8		
		62.5	34.2		
		65	35.5		
		45	4.35×10^3	β-type	303
		47.5	4.21		
		50	6.03		
		52.5	7.14		
		55	8.6		
		57.5	11.40		
		60	12.51		
		60	14.32		
4.3. BLENDS					
Poly(oxyethylene)/poly[1-(methoxycarbonyl)-1-methylethylene] $M_w = 20 \times 10^3$ PEO/PMMA					
100/0	80	49.0	3333	Hot stage microscopy	6
		50.0	1950		
		51.0	1183		
		52.0	600		
		53.0	333		
		54.0	167		
		55.0	33		
95/5	80	47.0	3300	Hot stage microscopy	6
		48.0	2300		
		49.0	1583		
		50.0	1067		
		51.0	683		
		52.0	433		
		53.0	250		
		54.0	150		
		55.0	33		
90/10	80	47.0	1883	Hot stage microscopy	6
		48.0	916		
		49.0	650		
		50.0	483		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		51.0	283		
		52.0	216		
		53.0	116		
		54.0	50		
		55.0	17		
80/20	80	47.0	800	Hot stage microscopy	6
		48.0	600		
		49.0	367		
		50.0	233		
		51.0	200		
		52.0	100		
		53.0	33		
		54.0	17		
70/30	80	49.0	167	Hot stage microscopy	6
$M_w = 116 \times 10^3$		50.0	177		
0/100		51.0	100		
		52.0	67		
		53.0	17		
Poly(oxyethylene)/Poly[1-(methoxycarbonyl)-1-methylene] PEO/PMMA					
100/0		47.6	10189	Hot stage microscopy; homopolymer and blends	278
$M_w = 2.0 \times 10^3$		49.0	6793		
		48.5	6203		
		49.4	5333		
		49.9	4771		
		51.4	2386		
		52.5	1094		
		53.3	477.2		
		54.2	252.6		
90/10		46.3	3200	Hot stage microscopy; homopolymer and blends	278
		47.3	2189		
		48.5	2049		
		49.3	1319		
		50.4	1263		
		51.4	701.8		
		52.4	421.1		
		53.4	252.6		
		54.3	140.4		
80/20		46.3	926.3	Hot stage microscopy; homopolymer and blends	278
		47.3	729.8		
		48.4	561.4		
		49.3	477.2		
		50.5	449.1		
		51.4	252.6		
		52.5	252.6		
		53.4	84.2		
		54.3	56.1		
70/30		46.3	364.9	Hot stage microscopy; homopolymer and blends	278
		47.3	280.7		
		48.2	280.7		
		49.3	168.4		
		50.3	140.4		
		51.4	0.0		
		53.4	0.0		
Poly(oxyethylene)/poly[1-methylcarbonyl)-1-methy(ethylene] $M_w = 10 \times 10^3$					
PEO/PMMA		48.7	2570	Hot stage microscopy; homopolymer and blends	278
100/0		49.7	1583		
		50.3	1106		
		53.2	153		
		55.5	0.		
90/10		47.2	689	Hot stage microscopy; homopolymer and blends	278
		47.8	536.2		
		48.8	374.5		
		50.0	255.3		
		50.8	187.2		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		51.8	76.6		
		53.0	42		
80/20		42.9	740.4	Hot stage microscopy;	278
		45.0	434.0	homopolymer and blends	
		45.9	331.9		
		46.8	280.8		
		47.8	221.3		
		48.8	119.1		
		50.4	59.6		
70/30		41.1	417.0	Hot stage microscopy;	278
		42.0	280.8	homopolymer and blends	
		43.0	246.8		
		44.1	195.7		
		45.0	153.2		
		45.8	136.2		
		46.8	110.6		
		47.7	68.1		
		48.9	51.1		
60/40		39.2	119.1	Hot stage microscopy;	278
		41.1	93.6	homopolymer and blends	
		42.9	76.6		
		44.0	68.1		
		45.0	42.6		
		45.8	25.5		
		46.7	17.0		
Poly(oxyethylene)/poly([1-(methoxycarbonyl)-1-methylethylene]		54		Hot stage microscopy;	278
M_w(PEO) = 100000; M_w(PMMA) = 110000		53	167	homopolymer and blends	
PEO/PMMA wt.% ratio: 100/0		52			
		51	483		
		50	1134		
		49	1600		
		48	2550		
		47			
90/10		53	67	Hot stage microscopy;	278
		52	117	homopolymer and blends	
		51	217		
		50	275		
		49	357		
		48	547		
		47	667		
		46			
80/20		50		Hot stage microscopy;	278
		49	133	homopolymer and blends	
		48	900		
		47	300		
		46	333		
		45	433		
		43	734		
		42			
70/30		49	63	Hot stage microscopy;	278
		48	102	homopolymer and blends	
		47	102		
		46	140		
		45	163		
		44	190		
		43	250		
		42	267		
		41	305		
		40			
		39			
		47	37		
60/40		46	43	Hot stage microscopy;	278
		45	57	homopolymer and blends	
		44	80		
		43	98		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		42			
		41	102		
		40			
		39	125		
		38			
Poly(oxyethylene)/poly[1-(methoxycarbonyl)-1-methylethylene]		54	257	DSC measurements; rate constants	
M_w(PEO)100000; M_w(PMMA)110000		53	1278	in text, Avrami exponents	305
PEO/PMMA		52	546	$2.3 \leq n \leq 3.2$ respectively	
100/0		51	348		
		50	186		
		49	108		
		48	120		
		47	48		
90/10		53	1998	DSC measurements; rate constants	305
		52	996	in text, Avrami exponents	
		51	744	$2.3 \leq n \leq 3.2$ respectively	
		50	324		
		49	258		
		48	186		
		47	120		
		46	84		
80/20		50	2356	DSC measurements; rate constants	305
		49	1986	in text, Avrami exponents	
		48	1752	$2.3 \leq n \leq 3.2$ respectively	
		47	1149		
		46	744		
		45	606		
		43	192		
		42	204		
70/30		49	4344	DSC measurements; rate constants	305
		48	2292	in text, Avrami exponents	
		47	1992	$2.3 \leq n \leq 3.2$ respectively	
		46	1470		
		45	1308		
		44	1008		
		43	1044		
		42	684		
		41	564		
		40	432		
		39	342		
60/40		47	4776	DSC measurements; rate constants	305
		46	3906	in text, Avrami exponents	
		45	3222	$2.3 \leq n \leq 3.2$ respectively	
		44	2562		
		43	2082		
		42	1932		
		41	1542		
		40	1368		
		39	1140		
		38	1020		
Poly(oxyethylene)/poly(1-acetoxyethylene)		48.6	6167		278
PEO; $M_w = 2.0 \times 10^3$		49.5	5325		
PEO/PVA		50.9	2690		
100/0		51.7	1976		
		52.7	1116		
		53.6	530		
		54.6	164		
		55.5	73		
90/10		46.0	4630		278
		46.9	3879		
		47.8	3550		
		48.6	2214		
		49.7	2086		
		50.6	1537		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		51.7	1262		
		52.7	549.0		
		53.5	347.7		
		54.5	91.5		
80/20		45.9	3824		278
		46.8	3001		
		48.6	1738		
		49.7	1281		
		50.6	878.4		
		51.5	622.2		
		52.5	237.9		
		53.6	183.0		
		54.6	0.0		
60/40		45.7	1756		278
		46.5	1354		
		47.6	969.9		
		48.5	768.6		
		49.5	512.4		
		50.5	274.5		
		51.5	201.3		
		52.6	73		
Poly(oxyethylene)/poly([1-(methoxycarbonyl)-1-methylethylene]					
PEO; $M_w = 990000$; PMMA, $M_w = 525000$					307
PEO/PMMA					
100/0		11	67.3		
		18	78		
		22.5	56.5		
		26	56.6		
		30.7	37		
		36	24		
		41.7	9		
		45	5.2		
		50	1.72		
		55	0.041		
		57	0.018		
92/8		15.5	450		307
		22.5	272		
		26	217		
		31	130		
		36	75		
		41	23		
		49	11		
		53	1.3		
		55	0.43		
		60	0.014		
85/15		50	22		307
		51	11.5		
		52.5	7.2		
		54	3.2		
		56	0.82		
		58	0.18		
		60	0.014		
70/30		35	550		307
		40	381		
		45	200		
		48	96		
		51	35		
		54	9.5		
		56	2.6		
		58	0.50		
PEO = 990000; PPMA = 125000		16	23		307
100/0		22	16.8		
		28	11.5		
		31	10		
		36	8.6		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		41	5.2		
		43.5	3.0		
		46.5	2.4		
		49.5	1.4		
		51.5	0.83		
		54.5	0.42		
		56.5	0.17		
		57.5	0.10		
		58.5	0.06		
92/8		23	108		307
		30	58		
		35	52		
		42	70		
		46	11		
		49	12		
		51	5.4		
		54	2.0		
		56	0.66		
		58	0.19		
		60	0.064		
85/15		48.5	7.7		307
		50	3.7		
		54	9.05		
		57.6	3.8		
		58.2	0.46		
		58.3	0.19		
		59.3	0.10		
		60	0.041		
70/30		35	611		307
		40	446		
		45	229		
		48	110		
		50	52		
		52	17		
		54	11		
		56	2.93		
		57.3	1.46		
		58	0.56		
		59.5	0.22		
Poly[oxy(1-oxo-2,2-dimethyltrimethylene)] poly(1,1-difluoroethylene); (poly(pivalolactone)/poly(vinylidene fluoride)					
PPVL/PVF$_2$; $M_v = 250 \times 10^3 / M_n = 45 \times 10^3$; $M_w = 140 \times 10^3$					
100/0, w/w	260 (3 min)	180	6.2×10^3	DSC isothermal rates, selected values; consult reference for more details on Regime growth	308
		184	3.17×10^3		
		186	2.40×10^3		
		189	1.22×10^3		
		192	0.60×10^3		
		197	0.157×10^3		
		200	0.066×10^3		
		205	2.0×10^3		
		207	1.35×10^3		
		210	7.45×10^3		
		215.5	2.2×10^3		
70/30, w/w		169	3.52×10^3	DSC isothermal rates, selected values; consult reference for more details on Regime growth	308
		174	2.08×10^3		
		177	1.49×10^3		
		183	6.86×10^2		
		190	2.65×10^2		
		195	8.90×10		
		200	3.00×10		
		205	8.5		
		210	3.25		
		215	1.55		
20/80, w/w	260 (3 min)	165	2.21×10^2	DSC isothermal rates, selected values; consult reference for more details on Regime growth	308
		170	1.47×10^2		
		174	1.24×10^2		

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		178	8.84 × 10		
		182	5.87 × 10		
		186	3.60 × 10		
		189	2.32 × 10		
		192	1.54 × 10		
		196	8.08 × 10		
		199	4.22		
		202	2.81		
		204	1.57		
10/90, w/w		160	9.4 × 10	DSC isothermal rates, selected	308
		166	7.01 × 10	values; consult reference for	
		170.1	5.99 × 10	more details on Regime growth	
		174	4.38 × 10		
		179	3.22 × 10		
		184	1.81 × 10		
		190	9.52		
		196	4.13		
		200	2.39		
		205	1.11		
		206	0.72		
50/50, w/w	260 (3 min)	170	1.53×10^3	DSC isothermal rates, selected	308
		174	1.11×10^3	values; consult reference for	
		178	6.35×10^2	more details on Regime growth	
		182	4.19×10^2		
		185	2.69×10^2		
		190	1.27×10^2		
		195	4.00 × 10		
		200	1.10 × 10		
		205	4.73		
		210	2.15		
		215	0.75		
30/70, w/w		164	6.99×10^2	DSC isothermal rates, selected	308
		168	5.21×10^2	values; consult reference for	
		172	3.93×10^2	more details on Regime growth	
		182	1.25×10^2		
		188	5.80 × 10		
		192	2.62 × 10		
		197	1.00 × 10		
		200	6.6		
		205	3.3		
		210	1.0		
Poly (1,1-difluoroethylene)/poly(butylene succinate)					
PVF_2, $M_w = 140 \times 10^3$; PBSU, $M_n = 54 \times 10^3$					413
wt.% :PVF_2 / PBSU	190 (5 min)			Hot-stage microscopy DSC,	
100/0		150	197	T_m and T_m^0 and enthalpy	
		155	61.1	values listed in Ref. 413.	
		160	10.8	Spherulitic morphology in	
80/20		145	185	all blends	
		150	116		
		155	36		
60/40		140	222		
		145	110		
		150	44.3		
		155	13.0		
40/60		140	133		
		145	65		
		150	17.4		
Poly(butylene succinate)/poly (1,1-difluoroethylene)					
PBSU, $M_w = 54 \times 10^3$; PVF_2, $M_w = 140 \times 10^3$					
wt.% PBSU / PVF_2	190 (5 min)			Hot-stage microscopy DSC,	413
100/0		80	1943	T_m and T_m^0 and enthalpy	
		85	980	values listed in Ref. 413.	
		90	456	Spherulitic morphology in	
		100	73.2	all blends	

TABLE 4. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
80/20		80	1842		
		85	969		
		90	434		
		95	169		
60/40		80	1470		
		85	710		
		90	248		
		95	130		
Poly(oxyethylene); PEO/poly(octafluoropentoxytrifluoroethoxyphosphazene); PPZ/poly[oxy(1-chloromethyl)ethylene]; PECH					
PEO, $M_w = 5 \times 10^6$		53.8	609	Hot stage microscopy; bulk crystallization and morphology also recorded	309
PPZ, -unlisted		55.1	400		
PECH, $M_w = 7 \times 10^6$		56	286		
PEO/PPZ: 100/0		57.1	215		
		58	166		
		58.8	142		
75/25		52.3	1100	Hot stage microscopy; bulk crystallization and morphology also recorded	309
		54	563		
		55.1	429		
		56	286		
		57	239		
		57.9	193		
50/50		49.3	1402	Hot stage microscopy; bulk crystallization and morphology also recorded	309
		50.6	1045		
		57.9	770		
		53.2	536		
		54.2	426		
		55.2	302		
PEO/PECH: 75/25		49.2	905	Hot stage microscopy; bulk crystallization and morphology also recorded	309
		50.5	693		
		51.5	526		
		52.5	435		
	53.5	321			
		54.3	271		
PEO/PPZ/PECH: 66/17/17		49.7	633	Hot stage microscopy; bulk crystallization and morphology also recorded	309
		50.7	528		
		51.7	405		
		52.7	336		
		53.6	279		
		54.5	242		
PEO/PPZ/PECH: 50/25/25		48.9	600	Hot stage microscopy; bulk crystallization and morphology also recorded	
		50	477		
		51	422		
		51.8	370		
		52.7	313		
		53.6	266		

TABLE 5. POLY(CARBONATES)

Polymer	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1-4-phenylene)	190	0.0833	Hot stage optical microscopy	310
	195	0.042		
Poly(oxycarbonyloxy-1,4-phenylenemethylene-1,4-phenylene)	175	16.67	Hot stage optical microscopy	310
	180	10.00		
	185	5.00		
	190	3.33		
Poly(oxycarbonyloxy-1,4-phenylenethio-1,4-phenylene)	145	20.0	Hot stage optical microscopy	310
	150	15.00		
	160	8.33		
	170	5.85		
	180	4.17		

TABLE 6. POLY(ESTERS)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
6.1. HOMOPOLYMER MELTS					
Poly(hydroxybutyrate)		23	21.2	Measurements by Atomic Force Microscopy in thin polymer films; lamellar growth noted from spherulitic-melt interfaces; polymer characterization given in Ref. 103(a)	103
		30	52.3		
		33	78.6		
		38	134		
		42	283		
		45.4	425		
		55	995		
		67.4	4117		
		80	3930		
		100	3239		
		107	1787		
		115	902		
		119.5	425		
		127	150		
		129.5	86		
Poly(oxydecamethyleneoxysebacoyl) $M_v = 10.3 \times 10^3$	100	67.1	87.35	Hot stage optical microscopy; nucleation densities given in text	105
		68.1	21.67		
		69.1	6.451		
		70.1	1.884		
		71.1	0.583		
		72.0	0.083		
Poly(oxyethyleneoxyadipoyl) $M_v = 10.3 \times 10^3$		20	66.346		311
		40	18.00		
		44	13.169		
		47	9.002		
Poly(oxyethyleneoxyterephthaloyl)		123	4.0	Hot stage optical microscopy; crystallization from the glassy state at T_g	185
		140	17.5		
		145	34.0		
		161	56.0		
		170	70.0		
		190	64.5		
		200	42.0		
		210	21.8		
		120	7	Linear growth rates by laser light scattering; nucleation densities are provided in the test	312
		130	18		
		140	37		
		150	61		
		160	105		
		170	140		
		180	151		
		190	100		
		200	140		
		210	151		
		220	6		
		140	13	0.5 kbar	312
		150	21		
		160	23		
		170	41		
		150	2.5	1.5 kbar	
		160	8		
		170	16		
		180	30		
		160	2	2 kbar	
		170	9.5		
		180	24		
		190	34		
Poly(oxyethyleneoxyterephthaloyl)		39.6	147.0	Hot stage optical microscopy	313
		40.9	140.0		
		42.3	158.5		
		50.3	166.0		

TABLE 6. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		53.4	150.2		
		57.0	153.4		
		57.6	120.0		
		58.7	116.0		
		61.4	76.81		
		67.6	74.18		
		72.0	51.34		
		75.2	26.17		
		81.8	5.801		
		58.0	3.001		
$M_n = 16.8 \times 10^3$	294	220	41.08		314
		240	3.100		
$M_n = 19.0 \times 10^3$		120	6.84	Hot stage optical microscopy	315
		130	15.0		
		140	47.4		
		150	75.2		
		160	93.2		
		170	112.2		
		180	112.8		
		190	117.4		
		200	85.0		
$M_n = 27.4 \times 10^3$		120	3.28	Hot stage optical microscopy	315
		130	8.50		
		140	19.9		
		150	36.8		
		160	56.2		
		180	72.1		
		190	63.6		
		200	43.9		
		210	20.2		
$M_n = 39.1 \times 10^3$		120	1.54	Hot stage optical microscopy	315
		130	4.40		
		140	8.26		
		150	14.2		
		160	18.0		
		170	27.8		
		180	26.6		
		190	19.1		
		200	13.4		
Poly(oxymethyleneoxysuccinyl)		16.4	12.00	Hot stage optical microscopy	316
$M_w = 5.98 \times 10^3$		23.0	31.17		
		26.3	62.34		
		28.5	44.18		
		35.6	91.35		
		36.3	91.83		
Poly(oxytetramethylene oxysuccinyl); PTMS $\bar{M}_w = 1.14 \times 10^5$ $\bar{M}_n/\bar{M}_n = 3.1$					
	200(10 min)	89	162.7	Rate of spherulite growth; hot stage microscopy; $T_m^0 = 132$°C; $T_g = -38$°C; DSC, [1]HNMR	405
		90	146.4		
		91	119.5		
		92	102.3		
		93	82.1		
		94	71.6		
Showa High Polymer Co., Japan		95	54.0	IR characterization of polymer; Density-Temp. results listed	
		97	35.7		
		100	19.2		
		102	7.7		
		105	3.85		
Poly(oxy-1-oxo-2-methylethylene)/poly(L-lactic acid)					
$M_v = 150 \times 10^3$		115.2	62.2	Hot stage microscopy; Regimes I and II crystallization ranges cited	316
		120.2	71.1		
		126.0	83.2		
		130.3	82.8		
		134.4	63.8		
		139.0	57.4		
		143.8	49.3		

TABLE 6. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_v = 260 \times 10^3$		119.5	49.9	Hot stage microscopy; Regimes I and II crystallization ranges cited	316
		128.9	61.8		
		134.7	55.2		
		138.3	48.3		
$M_v = 350 \times 10^3$		114.2	27.9	Hot stage microscopy; Regimes I and II crystallization ranges cited	316
		119.0	43.2		
		125.0	49.7		
		129.4	55.2		
		133.5	46.1		
		143.1	34.5		
		150.1	20.8		
$M_v = 690 \times 10^3$		113.5	11.9	Hot stage microscopy; Regimes I and II crystallization ranges cited	316
		119.0	27.7		
		128.4	41.4		
		134.4	38.8		
		138.1	30.9		
		143.1	19.0		
		147.7	15.6		
		149.9	15.1		
		154.9	6.1		
		156.8	4.8		
Poly(oxyterephthalaloyloxydecamethylene) $M_n = 10.0 \times 10^3$	160 (5 min)	120.0	5.534	Hot stage optical microscopy; nucleation densities listed	317
		121.0	3.451		
		123.0	1.592		
		125.0	0.6217		
		126.0	0.2550		
6.2. BLENDS					
Poly(oxy-1-oxohexamethylene)/poly(1-chloroethylene) PCL/PVC					
100/0	100 (5 min)	25	696.6	Hot stage optical microscopy	318
		30	533.3		
		35	381.7		
		20	50		
75/25		25	39.5	Hot stage optical microscopy	318
		30	29.2		
		35	19.5		
70/30		20	23.7	Hot stage optical microscopy	318
		25	21.6		
		30	13.2		
		35	8.5		
65/35		20	8.3		
		25	7.4		
		30	5.4		
		35	3.3		
60/40		20	2.75	Hot stage optical microscopy	318
		25	2.2		
		30	1.7		
		35	1.2		
50/50		20	0.22	Hot stage optical microscopy	318
		25	0.24		
		30	0.20		
		35	0.14		
Poly(β-hydroxybutyrate)					
isotactic/atactic		35	38.2	Optical hot stage microscopy; DSC melting characterization also made	319
isotactic: $M_w = 445000$		50	405		
$M_n = 137000$		60	907		
atactic: $M_w = 21000$		65	1103		
$M_w = 11000$		70	1958		
isotactic/actactic 100/0		76	2582		
		84	3162		
		87.5	3435		
		90	3533		
		95	3322		
		100	2980		

TABLE 6. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		110	1778		
		114	1348		
		120	763		
		124	454		
		130	199		
		134.5	86.9		
		140	18.9		
90/10		35	27.0	Optical hot stage microscopy; DSC melting characterization also made	319
		45	200		
		55	469		
		60	797		
		65	1096		
		70	1508		
		74	1814		
		77	2000		
		80	2196		
		83.5	2382		
		87	2480		
		90	2489		
		94	2425		
		97	2365		
		100	2155		
		108	1980		
		105.5	1747		
		107	1592		
		110	1371		
		112	1184		
		117	753		
		126	332		
		130	177		
		142	29		
75/25		34.4	16.4	Optical hot stage microscopy; DSC melting characterization also made	319
		48.3	154		
		52	295		
		58	468		
		70	936		
		74	1177		
		77.5	1526		
		84	1612		
		87.5	1699		
		90.5	1797		
		100	1595		
		105	1439		
		110	1206		
		115.5	875		
		120.5	521		
		130	155		
60/40		35.5	37.9	Optical hot stage microscopy; DSC melting characterization also made	319
		49.7	131.2		
		55	272		
		60	402		
		65	630		
		70	750		
		77	1044		
		80	1174		
		84	1250		
		90	1347		
		94.5	1410		
		97	1398		
		100	1276		
		104	1132		
		107	1032		
		110	910		
		115	644		
		120	642		

TABLE 6. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		130	143		
		137	309		
50/50		40.4	2.96	Optical hot stage microscopy; DSC melting characterization also made	
		50	12.00		
		61	291.6		
		65	433.0		
		70.4	617.6		
		75	769.4		
		80.5	921.3		
		84.5	985.7		
		90.0	1126		
		97	1126		
		100	1067		
		105.0	901.0		
		135	318.1		
6.3. COPOLYMERS					
Poly(oxyethyleneoxyterephthalate)/poly(1,4-cyclohexane dimethylene terephthalate) (random copolymers)					
100/0, mol%		160	50	Hot stage optical microscopy $T_m = 280°C$; $T_g = 76°C$	320
		165	54		
		170	76		
		180	85		
		185	79.9		
		190	79		
		195	78.1		
		200	63		
		205	57		
		210	40.7		
		215	35		
		220	22		
		225	14		
		230	10		
95/5, mol/mol		160	38	Hot stage optical microscopy; $T_m = 269°C$; $T_g = 75.5°C$	
		165	48		
		170	54.5		
		175	56.6		
		180	52		
		185	50		
		190	40.7		
		195	39		
		200	31.6		
		205	24.4		
		210	15.3		
		215	9.2		
		220	6		

TABLE 7. POLY(AMIDES)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(iminopentamethylene iminoadipoyl) Nylon 5,6					
	282 (30 min)	220.5	1742	Hot stage optical microscopy; morphology depends upon crystallization temperature and and is illustrated in text	321
		222	1385		
		224.5	1210		
		226	1090		
		230	476		
		235	161.7		
		236	160.0		
		239	121.7		
		240	96.7		
		242	55.0		

TABLE 7. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(iminomethyleneiminoadipoyl) Nylon 96					
positive spherulites	282 (30 min)	200	1684	Hot stage optical microscopy; spherulitic morphology depends upon crytallization temperature and is illustrated in text	321
		203	1334		
		205	1134		
		207.5	897		
		213	532		
		215	500		
		218	257		
		225	80.8		
		230	10.84		
		231	8.00		
		234	2.67		
Poly(iminohexamethylene) iminoadipoyl) Nylon 66					
positive spherulites	295 (30 min)	150	22000	Hot stage optical microscopy; spherulitic growth	322
$M_n = 12.7 \times 10^3$		175	18000		
		180	16500		
		190	13000		
		200	9500		
		210	6,000		
		220	3,200		
		230	1,500		
Poly(iminohexamethyleneiminoadipoyl) Nylon 66					
$M_n = 11.6 \times 10^3$	295	241	166.7	Hot stage optical microscopy; nucleation densities cited in text	323,325
	295	247	58.35		
	295	250	13.84		
	295	252	10.50		
	285	247	66.08		
	262 (10 min)	251	14.24	Negative spherulites	326,327
		256	83.35		
		257	13.34		
		259	9.168		
		261	6.668		
		263	4.167		
		265	2.500		
Poly(iminohexamethyleneiminoadipoyl) Nylon 66					
$M_n = 12.9 \times 10^3$	300 (30 min)	246	106.68		328
		248	56.34		
		253	10.84		
$M_n = 13.7 \times 10^3$	300 (30 s)	141	13503		329
		160	13669		
		180	12119		
		199	8901		
		215	5167		
		230	2117		
		234	1530		
		237	920		
		239	765		
		241	471		
		244	368		
$M_n = 14.6 \times 10^3$	280	241	283	Nucleation densities listed in text	330
		243	230		
		245	180		
		248	33		
		252			
Poly(iminohexamethyleneiminoadipoyl) Nylon 66					
	300	241.5	204		322
		243	175		
		245	128		
		248	58.34		
		252	5.50		
	315	241.5	280.0		322
		243	168.4		
		245	113.4		
		248	56.6		

TABLE 7. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		252	6.33		
		50	3650.7		
$M_w = 17.2 \times 10^3$		100	4706.6	Positive spherulites	331
		142	6751.3		
		160	6101.2		
		178	5201.0		
		198	3700.7		
		200	12900.6		
		228	466.7		
$M_n = 25.5 \times 10^3$	300 (30 s)	180.0	1435.6	Positive spherulites	329
		200.0	7951.5		
		211.0	5284.4		
		220.0	2733.8		
		230.0	1615.3		
		235.5	680.13		
		240	483.4		
Poly(iminohexamethyleneiminosebacoyl) Nylon 6,10					
$M_n = 11.6$ and 26.3×10^3		200.0	253.4	Hot stage optical microscopy	331
		205.0	120.0		
		212.0	36.67		
		217.0	13.34		
		205.0	186	Negative spherulites	
		212.0	130		
		217.0	7		
Poly(imino(1-oxohexamethylene)) Nylon 6					
$M_n = 27.4 \times 10^3$	300 (30 s)	102.3	900	Positive spherulites	329
		112.5	1478		
		122.0	2033		
		130.0	2767		
		140.5	3133		
		150.5	2933		
		159.0	2450		
		170.0	1431		
		180.0	710		
		182.0	610		
$M_v = 24.7 \times 10^3$		90	375	Positive spherulites	322
		95	610		
		101	640		
		107	1108		
		117	1571		
		124.5	1933		
		135	2438		
		141	2438		
		148	2105		
		157	1790		
		172	983		
		184	305		
$M_w = 49 \times 10^3$		40	80	Hot stage optical microscopy; positive spherulites	312
		41	60		
		42	50		
		43	38		
		44	27		
		45	20		
		46	15		
		47	10		
		48	5.8		
		49	4.2		
		50	2.8		
		51	1.8		
$M_w = 15 \times 10^3$		39	162	Hot stage optical microscopy; positive spherulites	312
		40	138		
		41	102		
		42	100		
		43	81		

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TABLE 7. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		44	62		
		45	35		
		46	27		
		47	21		
		48	15		
		49	8		
		50	6		
		51	1.7		
$M_w = 7 \times 10^3$		40	197	Hot stage optical microscopy; positive spherulites	312
		41	15		
		42	100		
		43	75		
		44	58		
		45	42		
		46	28		
		47	18		
		48	13		
		49	6.7		
		50	4.2		

TABLE 8. POLY(SILOXANES)

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
8.1. HOMOPOLYMER MELTS					
Poly(oxydimethylsilylene-1,4-phenylenedimethylsilylene)					
TMPS	200 (5 min)	23	316	Hot stage optical microscopy; selected molecular weights; see text	333
$M_v = 8.7 \times 10^3$		30	530		
		40	900		
		50	1450		
		60	1640		
		70	1740		
		80	1460		
		90	959		
		100	417		
		110	161		
		120	14.5		
		130	0.593		
$M_v = 372 \times 10^3$	200 (5 min)	24	80.0	Hot stage optical microscopy; selected molecular weights; see text	333
		30	113.0		
		40	166		
		60	328		
		70	342.0		
		80	246		
		90	146		
		100	65.0		
		110	20.0		
		130	0.124		
		134	0.0365		
$M_v = 1400 \times 10^3$	200 (5 min)	24	41.5	Hot stage optical microscopy; selected molecular weights; see text	333,388
		40	165		
		51	280		
		60	328		
		70	302		
		80	240		
		90	146		
		100	70.6		
		110	23.4		
8.2. COPOLYMERS					
Poly(oxydimethylsilylene-1,4-phenylenedimethylsilylene-block-poly(oxydimethylsilylene)					
TMPS/DMS		21.5	5.25	Hot stage optical microscopy; crystallinites and densities	182
100/0	200 (5 min)	22.5	5.92		

TABLE 8. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
$M_w = 141 \times 10^3$		23.0	7.87	also listed	
		24.0	7.63		
		40.0	24.75		
		60.0	41.00		
		70.0	40.00		
		79.0	30.28		
		82.0	30.33		
		90.0	21.53		
		105.0	6.03		
		110.0	3.17		
		116.0	14.17		
		119.0	5.75		
		120.0	5.28		
		121.0	4.30		
		125.0	0.21		
		130.0	0.44		
90/10		−20.0	2.58	Hot stage optical microscopy; crystallinites and densities also listed	182
		−10.0	17.67		
		0.0	75.33		
		10.0	240.00		
		20.0	531.6		
		30.0	851.6		
		40.0	1420.0		
		45.0	1645.0		
		50.0	1850.0		
		55.0	1883.4		
		60.0	1700.0		
		70.0	1515.0		
		80.0	970.0		
		90.0	418.3		
		100.0	120.2		
		110.0	13.52		
		115.0	2.70		
80/20		−20.0	33.5	Hot stage optical microscopy; crystallinites and densities also listed	182
		−10.0	142.2		
		0.0	360.0		
		10.0	643.3		
		20.0	1041.7		
		30.0	1346.7		
		35.0	1498.4		
		40.0	1613.4		
		42.0	1630.0		
		45.0	1636.7		
		50.0	1625.0		
		55.0	1541.7		
		60.0	1396.7		
		65.0	1225.0		
		70.0	1018.4		
		75.0	798.3		
		80.0	585.0		
		90.0	241.7		
		95.0	129.7		
		100.0	58.8		
		105.0	21.3		
		110.0	5.62		
		115.0	0.925		
		120.0	0.177		
50/50		−20.0	501.6	Hot stage optical microscopy; crystallinites and densities also listed	182
		−10.0	558.3		
		0.0	550.0		
		10.0	351.6		
		20.0	260.0		
		25.0	215.0		
		30.0	173.3		
		38.0	111.6		

TABLE 8. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		42.0	86.8		
		45.0	69.3		
		50.0	45.2		
		55.0	26.8		
		62.5	9.58		
		70.0	2.18		
40/60		−20.0	278.3	Hot stage optical microscopy; crystallinites and desnsities also listed	182
		−15.0	283.3		
		10.0	280.0		
		0.0	235.0		
		10.0	165.0		
		20.0	109.83		
		23.5	94.83		
		30.0	75.00		
		35.0	51.33		
		40.0	35.33		
		45.0	22.83		
		50.0	12.17		
		55.0	8.17		
		58.5	3.25		
		67.5	0.32		
30/70		−20.0	261.7	Hot stage optical microcopy; crystallinites and densities also listed	182
		−10.0	188.3		
		0.0	119.84		
		10.0	66.50		
		20.0	35.67		
		25.0	24.00		
		30.0	15.83		
		35.0	9.250		
		40.0	5.133		
		45.0	3.067		
		50.0	0.558		

TABLE 9. OTHERS

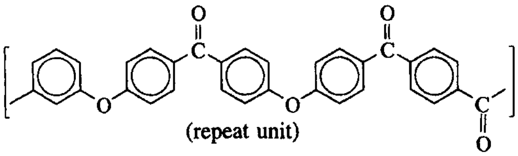
Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
9.1. HOMOPOLYMER MELTS					
Poly(aryl ether ketone ether ketone ketone) PEKEKK; 100/0, w/w		176	1350	Stage I spherulite growth conventional microbeam SALS; synchrotron time resolved SAXS	335
		179	1627		
		193	1840		
 (repeat unit)		210	1900		
		228	1850		
		247	1693		
		263	1540		
		285	1607		
		296	1515		
		313	1055		
		327	773		
		338	718		
		335	189		
		183	1862	Stage II spherulite aggregates (higher rate)	
		188	2042		
		204	2217		
		224	2050		
		242	2017		
		272.5	1833		
Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) PEEK					
$T_m = 340°C$		240	980	Hot stage microscopy; crystallinity, lamellar dimensions, $t_{1/2}$ values also given in text	402
$T_g = 144°C$		260	540		
		277	264		
		287	161		

TABLE 9. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) PEEK ICI grade 150P					
	400 (15 min)	270	14.60×10^2	Hot stage microscopy with video accessories; $T_m^0 \sim 395$°C	267
		275	12.88×10^2		
		280	9.91×10^2		
		285	6.95×10^2		
		290	5.26×10^2		
		295	3.60×10^2		
		298	2.90×10^2		
		300	2.42×10^2		
		305	1.91×10^2		
		310	1.05×10^2		
		315	0.627×10^2		
		320	0.364×10^2		
		325	0.171×10^2		
	415 (15 min)	270	12.0×10^2	Note decrease for higher fusion condition	267
		275	10.4×10^2		
		280	7.94×10^2		
		285	5.37×10^2		
		290	3.97×10^2		
		295	2.97×10^2		
		298	2.50×10^2		
		300	1.97×10^2		
		305	1.54×10^2		
		310	0.845×10^2		
		315	0.384×10^2		
		320	0.275×10^2		
		325	0.119×10^2		
Poly(thio-1,4-phenylene) Ryton	330 (2 min)	220	74.5	Hot stage and video micrometer assembly with optical microscope; DSC measurements; computer modeling	227
		225	54.4		
		230	37.6		
		235	23.2		
		240	13.59		
Poly(thio-1,4-phenylene) Fortron	345 (2 min)	250	7.81	Bulk nucleation density; density measured Avrami exponent ~ 3	227
		255	4.92		
		260	2.48		
		265	0.95		
Poly(thio-1,4-phenylene) $M_w = 24000$ $M_w/M_n = 1.4$		84	1387	Hot stage microscopy; DSC rates listed in text Avrami $2 < n < 3$ values	227
		79	1243		
		74	995		
		69	783		
		64	557		
		59	429		
		54	276		
		48.7	148		
$M_w = 49000$		88	490		227
		83	410		
		78	300		
		73	232		
		68	244		
		63	100		
		58	67		
		52.5	20.5		
$M_w = 63000$ $M_w/M_n = 1.5$		92	414		227
		87	356		
		81.8	244		
		76.7	159		
		71.8	130		
		67	79		
		62	41		
		56.6	20		
		255.3			
Poly(thio-1,4-phenylene) $M_w = 56000$		225		Growth rates measured as function of polymer end group	337
		230			
		235			

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TABLE 9. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		240			
		245			
		250			
Na$^+$ washed		255			337
		225			
		235			
		240			
		245			
		250			
Mn^{2+} washed		225			
		230			
		235			
		245			
		250			
		255			
		260			
Acid washed		225			
		230			
		240			
		250			
		255			
		260			
Poly(thio-1,4-phenylene) Phillips Pet.		100	0.87	Hot stage microscopy; Regimes I and	152
$M_w = 15 \times 10^3$		110	10.0	II crystallization noted	
		120	91.0		
		140	680.0		
		150	1200.0		
		160	1200.0		
		170	2300.0		
		180	2300.0		
		190	2200.0		
		200	1700.0		
		210	1200.0		
		220	710.0		
		230	390.0		
		240	160.0		
		250	53.0		
		260	12.0		
		270	1.30		
		280	0.094		
$M_w = 51 \times 10^3$		115	1.40	Hot stage microscopy; Regimes I and	152
Phillips Pet. Co.		120	5.2	II crystallization noted	
		125	10.0		
		130	25.0		
		140	73.0		
		150	160.0		
		160	250.0		
		170	300.0		
		180	280.0		
		190	260.0		
		200	240.0		
		210	180.0		
		220	98.0		
		230	48.0		
		240	21.00		
		250	7.90		
		260	1.80		
		270	0.13		
Poly(thio-1,4-phenylene)		102	8.5	Crystallization rates from DSC peak	338
		106	3.0	time (mins); measurements below	
		110	1.5	T_{max} were made by upquenching	
		114	0.9	from the amorphous state; $T_m^0 \sim 330$°C	
		118	0.71	using Hoffman–Weeks plot	
		120	0.54		
		235	0.36		

TABLE 9. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		240	0.53		
		245	0.82		
		250	1.30		
		255	2.40		
		260	5.20		
		265	8.00		
		270	17.5		
Random copolymer with 5% metamethylene linkages		110	6.71	$T_m^0 \sim 290°C$	338
		115	3.16		
		120	1.90		
		125	1.23		
		130	0.88		
		135	0.70		
		140	0.53		
		145	0.46		
		200	0.39		
		210	0.59		
		220	1.2		
		230	2.30		
		235	2.81		
		240	5.01		
		245	9.47		
Random copolymer with 8% metamethylene linkages		105	14.93	$T_m^0 \sim 283°C$	338
		110	5.80		
		120	1.97		
		130	1.09		
		140	0.67		
		150	0.47		
		190	1.75		
		200	2.52		
		205	4.19		
		210	5.26		
		215	7.40		
		220	9.62		
		225	23.02		
Random copolymer with 10% metamethylene linkages		105	13.4	$T_m^0 \sim 273°C$	338
		110	7.10		
		120	2.65		
		130	1.34		
		140	0.845		
		150	0.620		
		160	0.520		
		170	0.490		
		180	0.760		
		190	1.11		
		200	1.80		
		205	2.54		
		210	3.81		
		215	6.21		
		220	10.2		
Poly(thio-1,4-phenylene)		219.7	120	Optical hot stage microscopy	338
$M_w = 63000$		225	102		
TCB, 0 mol%		230	75		
		235	50		
		240	33		
		245	22		
		250	14		
$M_w = 75000$		220	104	Optical hot stage microscopy	338
TCB, 0.13 mol%		225	76		
		230	54		
		235	38		
		245	16		
		250	11.4		
		255	5.7		
$M_w = 65000$		220	89	Optical hot stage microscopy	338

TABLE 9. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
TCB, 0.2 mol%		225	64		
		230	44		
		235	30		
		240	22		
		245	20		
		250	8.8		
		255	4.3		
catena-Poly(selenium)					
Selenium (Gallard Schlesinger Chemical Manufacturing Co.)	600 (2 h) and ice water quenched	80	0.171	Hot stage optical microscopy; purity = 99.9999%	54
		90	0.808		
		100	1.535		
		110	2.383		
		120	3.083		
		130	5.834		
		140	4.884		
		150	2.85		
Selenium (Yokozawa Co.) 99.999%	230 (1 hr) and quenched	80.0	0.27	Spherulitic structures; growth rates of chlorinated polymer listed in text	414
		87	0.50		
		90	0.65		
		100	1.70		
		105	2.72		
		110	4.10		
		120	7.68		
9.2. IONOMERS					
Poly(thio-1,4-phenylene) ionomers					
PPS/Na^+		225	175	PPS with end-group counterions; growth rates in order PPSCa^{2+}>PPSH^+> PPSZn^{2+}> PPSNa^+; Growth rates obtained by hot stage optical microscopy; rate constants documented	338
		230	129		
		235	92		
		240	62		
		245	43		
		250	52		
		255	14		
PPS/Ca^{2+}		225	142		338
		230	106		
		235	71		
		240	49		
		245	81		
		250	16		
		255	28		
PPS/Zn^{2+}		225	123		338
		230	93		
		235	63		
		240	42		
		245	28		
PPS/Zn^{2+}		250	15.6		338
		255	9.0		
PPS/H^+		225	107		338
		230	79		
		235	53		
		240	36		
		245	22		
		250	10		
		245	43		
		158.3	113.0	Regime II crystallization; Transition II to III at 160°C approx.	340
		159.0	72.95		
		161.3	32.13		
		165.2	15.70		
		166.2	3.22		
		170.0	0.74		
		175.0	0.07		
		175.1	0.14^4		
Poly(oxyethylene) complex with *p*-nitrophenol (M_w = 6000)		28	6660	Hot stage optical microscopy	303
		30.5	8470		
		34	11310		

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TABLE 9. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		36.8	11860		
		41	12760		
		45	10820		
		49	7940		
		53	3870		
		60	1174		
		63	237		
		65	76.6		
		67.2	65.0		
		69.2	30.4		
Poly(oxyethylene)/poly(oxypropylene) Blend composition					341
$M_w = 5 \times 10^6 / 1.5 \times 10^6$	353 (10 min)			Rates measured on hot-stage microscope; blends were prepared by solution casting from acetonitrile; two crystallization regimes II and III were reported along with interfaced energy values	
100/0		53	450		
		54	217		
		55	122		
		56	52		
		57	23		
		58	12		
		59	4.5		
30/20		52	833		341
		53	500		
		54	300		
		55	120		
		56	55		
		57	25		
		58	8.5		
60/40		51	1417		341
		52	850		
		53	517		
		54	250		
		55	117		
		56	80		
		57	33		
40/60		50	1967		341
		51	1317		
		52	967		
		53	517		
		54	300		
		55	115		
20/80		52	617		341
		53	383		
		54	300		
		56	57		
		57	17		
		58	12		

3. Rates of Bulk Crystallization (Avrami Constants)

TABLE 10. POLY(DIENES), POLY(ALKANES), POLY(VINYLS)

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
10.1. MELTS AND SOLUTIONS							
C198 alkane		72.6	18			Half-time, listed as $t_{0.1}$, *i.e*, 10% transformation *not* 50% as cited here in column	233
		73	25				
		74.2	62				
		74.7	101				
		75	112				
		75.2	123				
		76.2	410				
		76.5	516				

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TABLE 9. *cont'd*

Polymer	T_f (°C)	T_c (°C)	G (nm/s)	Remarks	Refs.
		36.8	11860		
		41	12760		
		45	10820		
		49	7940		
		53	3870		
		60	1174		
		63	237		
		65	76.6		
		67.2	65.0		
		69.2	30.4		
Poly(oxyethylene)/poly(oxypropylene) Blend composition					341
$M_w = 5 \times 10^6/1.5 \times 10^6$	353 (10 min)			Rates measured on hot-stage microscope; blends were prepared by solution casting from acetonitrile; two crystallization regimes II and III were reported along with interfaced energy values	
100/0		53	450		
		54	217		
		55	122		
		56	52		
		57	23		
		58	12		
		59	4.5		
30/20		52	833		341
		53	500		
		54	300		
		55	120		
		56	55		
		57	25		
		58	8.5		
60/40		51	1417		341
		52	850		
		53	517		
		54	250		
		55	117		
		56	80		
		57	33		
40/60		50	1967		341
		51	1317		
		52	967		
		53	517		
		54	300		
		55	115		
20/80		52	617		341
		53	383		
		54	300		
		56	57		
		57	17		
		58	12		

3. Rates of Bulk Crystallization (Avrami Constants)

TABLE 10. POLY(DIENES), POLY(ALKANES), POLY(VINYLS)

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
10.1. MELTS AND SOLUTIONS							
C198 alkane		72.6	18			Half-time, listed as $t_{0.1}$, *i.e*, 10% transformation *not* 50% as cited here in column	233
		73	25				
		74.2	62				
		74.7	101				
		75	112				
		75.2	123				
		76.2	410				
		76.5	516				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		76.7	605				
		78.3	973			Molecular chain extension starts here	
		79.2	2063				
		80.3	571				
		81.4	1538				
		82.3	539				
		83.4	3893				
Poly(1-butenylene)	0 (30 min)	−80		$2.8 \leq n \leq 5.4$	4.8×10^{-16}	Measured by [1]HFT-NMR;	342
cis-1,4-Poly(butadiene)		−70			3.4×10^{-14}	$t_{0.5}$ values not listed	
$M_w = 3.15 \times 10^5$		−60			2.2×10^{-12}		
$M_w/M_n = 3 \pm 0.4$		−50			3.25×10^{-9}		
cis content – 96.5%		−40			7.45×10^{-9}		
		−30			3.97×10^{-8}		
		−25			3.74×10^{-9}		
		−20			4.5×10^{-11}		
		−15			6.1×10^{-13}		
Poly(1-butene)		65	57.6				
$M_n = 73 \times 10^3$		70	60			Nucleation densities cited in text	251
$M_w = 750 \times 10^3$		80	96				
		85	222				
		90	456				
		92	708				
		95	1572				
		100					
Poly(1-butene); unfractionated		95	7500	3.05	1.59×10^{-6}	Dilatometry	251
		98	15000	3.10	2.98×10^{-7}		
		102	60000	3.43	2.51×10^{-9}		
		105	189600	3.80	2.00×10^{-13}		
$M_v = 409 \times 10^3$		80	43	1.9	5.10×10^{-4}	Calorimetry; DSC	121
		78	32	2.0	6.89×10^{-4}		
		74	25	1.9	16.3×10^{-4}		
		72	22	2.0	14.0×10^{-4}		
Poly(1-butene)	170 (30 min)	95	750	3.05		Dilatometric rate constants	306
isotactic; unfractionated		98	15000	3.10		expressed in text in min^{-n}	
		102	60000	3.43			
		105	189600	3.80			
Solution concn.							
0.5 g/dl		58	27000	~2.4		Crystallized from amyl acetate	
1.0 g/dl		58	12600	~2.4		solution; k values listed in min^{-n}	
2.0 g/dl		58	9600	~2.4			
Poly(1-butene)		90	55	1.9	3.20×10^{-4}		121
$M_v = 964 \times 10^3$		88	37	2.0	5.64×10^{-4}		
		80	15	2.0	18.0×10^{-4}		
		78	12	1.9	50.2×10^{-4}		
$M_v = 679 \times 10^3$		86	80	1.9	1.55×10^{-4}		121
		84	65	2.0	1.98×10^{-4}		
		82	44	1.9	4.37×10^{-4}		
		78	29	2.2	4.48×10^{-4}		
		76	22	2.1	9.84×10^{-4}		
		72	18	2.2	11.3×10^{-4}		
		70	14	2.0	33.3×10^{-4}		
$M_v = 349 \times 10^3$		84	99	2.0	0.708×10^{-4}		121
		82	73	2.0	1.62×10^{-4}		
		80	58	2.1	1.08×10^{-4}		
		78	45	2.1	2.04×10^{-4}		
		76	38	2.3	1.80×10^{-4}		
		70	24	2.1	9.15×10^{-4}		
		66	17	2.1	20.8×10^{-4}		
$M_v = 289 \times 10^3$		80	101	1.9	1.03×10^{-4}		121
		78	86	1.9	1.28×10^{-4}		
		76	62	1.9	2.19×10^{-4}		
		70	43	2.0	3.12×10^{-4}		
		68	38	2.0	4.17×10^{-4}		
		66	33	2.2	3.64×10^{-4}		
		62	26	2.0	11.1×10^{-4}		

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_v = 96 \times 10^3$		68	136	1.9	0.54×10^{-4}		
		66	101	2.0	0.86×10^{-4}		
		62	52	2.0	2.43×10^{-4}		
		60	33	2.0	6.85×10^{-4}		
		58	25	1.8	19.4×10^{-4}		
Poly(1-butenylene); hydrogenaed		97.0	40			DSC; for sample details consult	344
Phillips Pet Co.		99.0	44			text; crystallinity, T_m listed	
$M_w = 5.10 \times 10^3$		100.0	66			in tables	
		101.0	78				
		102.0	98				
		103.0	126				
		104.0	186				
$M_w = 13.3 \times 10^3$		95.0	34			DSC; for sample details consult	344
		97.0	40			text; crystallinity, T_m listed	
		99.0	64			in tables	
		100.0	73				
		101.0	89				
		102.0	135				
$M_w = 60.7 \times 10^3$		89.0	59			DSC; for sample details consult	344
		91.0	92			text; crystallinity, T_m listed	
		92.0	125			in tables	
		93.0	173				
		94.0	262				
		95.0	427				
		96.0	876				
$M_w = 340.0 \times 10^3$		89.5	68			DSC; for sample details consult	344
		91.5	135			text; crystallinity, T_m listed	
		92.5	180			in tables	
		93.5	282				
		94.5	498				
		95.5	1056				
		96.5	2334				
Poly(1-butenylene) *trans*	157	120		1.26	0.064	DSC; melt to condis crystal;	18
		119		1.13	0.77	transformation I: two "Avrami"	
		117		0.62	27.4	regions exist; nucleation time	
		115		0.47	119	and crystallinities are listed	
		113		0.41	3010		
		108		0.35	8050		
		120		0.32	28.7	Transformation region II	
		119		0.22	96.6		
		117		0.19	310		
		115		0.21	543		
		113		0.19	1090		
		108		0.14	1340		
		105		0.08			
		55		1.74	0.052	DSC, condis to rigid crystal	
		54		1.41	0.922	transformation; region II	
		53		1.10	10.2		
		52		0.74	273		
		49		0.28	1490		
		45		0.15	930		
		55		0.12	68.4		
		54		0.08	360		
$M_n = 49 \times 10^3$	100 (15 min)	30.0	420	2.6		Dilatometry; values of k in	185
(GPC)		35.0	1200	2.6		original text	
		40.0	3300	2.6			
		45.0	1200	2.6			
$M_n = 59 \times 10^3$		30.0	180	4.4		Dilatometry; values of k in	185
		35.0	450	4.5		original text	
		40.0	3360	3.2			
		45.0	16800	2.6			
$M_n = 70 \times 10^3$		30.0	174	5.0		Dilatometry; values of k in	185
		35.0	456	4.0		oritinal text	
		40.0	3300	2.9			
		45.0	14400	2.8			

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_n = 77 \times 10^3$		30.0	210	3.6		Dilatometry; values of k in original text	185
		35.0	246	3.1			
		40.0	3300	3.1			
		45.0	9600	2.0			
$M_n = 94 \times 10^3$		30.0	216			Dilatometry; values of k in original text	185
		35.0	660	3.2			
		40.0	3900	2.2			
		45.0	14400	2.1			
$M_n = 106 \times 10^3$		30.0	420	3.1		Dilatometry; values of k in original text	185
		35.0	1560	2.6			
		40.0	5160	2.4			
Poly(1-butenylene) *trans*		45.0	19200	2.6			
	100 (15 min)	45.0	12840	2.8		k_n values listed in text	343
		42.0	5100	2.7			
$M_v = 30 \times 10^3$		40.0	2280	2.8			
		37.5	1050	2.8			
		35.0	600	2.2			
		32.5	360	2.2			
		27.5	192				
Poly(1-butenylene) *cis* 1,4		213.0	13×10^2			[1]HFT-NMR measurements from toluene solution @ $0.32 \leq v_2 \leq 1.0$ volume fractions; $t_{0.5}$ (s) is replaced by $t_{0.1}$ (s) in column 4	345
$M_n = 740000$		214.3	18×10^2				
$M_w/M_n = 1.25$;		214.8	22×10^2				
$v_2 = 1.0$							
$v_2 = 0.79$		204.7	5.5×10^2				
		205.7	9.9×10^2				
		207.3	14×10^2				
$v_2 = 0.59$		199.2	5.0×10^2				345
		201.7	14×10^2				
		203.0	23×10^2				
$v_2 = 0.42$		198.3	11×10^2				345
		200.5	30×10^2				
		201.7	44×10^2				
$v_2 = 0.32$		197.8	18×10^2				345
		198.5	22×10^2				
		200.0	49×10^2				
Poly(chlorotrifluoroethylene)		180	180			Dilatometry	346
		186	480	3			
		191	1500	3			
		94	2820	3			
		195	4200	3			
		196	5220	3			
		197	8580	3			
		197	11160	3			
Poly(ethylene) fraction		105.75	2.4	4		Crystallization measurements carried out in solution by dilatometry rate data from transformation plots; v_2 = polymer volume, fraction used in solution	167
n-Hexadecane		107.5	5.4				
$M_n = 3 \times 10^5$		108.5	19.2				
$v_2 = 0.540$		110.5	102.0				
Polyethylene fractions							
α-Chloronaphthalene		120	0.13	4			324
$M_n = 4000$		121	0.17				
$v_2 = 1$		122	0.21				
		123	0.52				
		124	1.56				
		125	9.60				
$v_2 = 0.70$		109	0.14				324
		110	0.16				
		111	0.18				
		112	0.25				
		113	0.72				
		114	2.22				
$v_2 = 0.46$		101	0.14				324
		102	0.17				
		103	0.24				
		104	0.30				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		105	0.54				
$v_2 = 0.30$		98	0.20	4			324
		100	0.36				
		101	0.5				
		102	0.81				
		103	1.82				
$M_n = 10000$		124	0.13	3			324
$v_2 = 1$		125	0.16				
		126	0.34				
		127	0.72				
		128	3.30				
$M_n = 10000$		109	0.78	3			324
$v_2 = 0.70$		110	0.10^{8}				
		111	0.15				
		113	0.30				
		116	0.81				
$M_n = 10000$		106	0.20	3			324
$v_2 = 0.46$		108	0.36				
		109	0.54				
		111	1.80				
$M_n = 10000$		102	0.35	3			324
$v_2 = 0.30$		103	0.47				
		104	0.84				
		105	1.14				
$M_n = 100000$		122	0.09	3			324
$v_2 = 1$		123	0.10^{4}				
		124	0.13^{8}				
		125	0.16				
		126	0.27				
		127	0.54				
		128	1.62				
$M_n = 100000$		113	0.08^{4}	3			324
$v_2 = 0.70$		115	0.22				
		116	0 27				324
		117	0.36				
		118	0.72				
$M_n = 100000$		105	0.26	3			324
$v_2 = 0.46$		107	0.54				
		108	0.84				
		110	1.80				
$M_n = 100000$		102	0.33				324
$v_2 = 0.30$		103	0.42				
		104	0.57				
		105	0.72				
		106	2.16				
$M_n = 250000$		124	0.19^{2}	3			324
$v_2 = 1$		125	0.39				
		126	0.66				
		127	1.33				
		128	4.19				
$M_n = 250000$		113	0.16	3			324
$v_2 = 0.70$		114	0.25				
		115	0.36				
		116	0.57				
$M_n = 250000$		105	0.30	3			324
$v_2 = 0.46$		107	0.66				
		108	0.90				
		110	3.12				
$M_n = 250000$		102	0.18	3			324
$v_2 = 0.30$		103	0.21				
		104	0.27				
		105	0.38^{4}				
		106	0.54				
Poly(ethylene) fractions							
α-Chloronaphthalene		98.0	0.26	4		Dilatometry:	336

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_n = 14000$		98.9	5.40	4		crystallinity = 85%	
$v_2 = 0.003$		100.1	14.70	4			
		100.9	48.60	4			
		101.9	156.00	4			
$M_n = 20000$		98.0	2.40	4		Crystallinity = 90%	336
$v_2 = 0.003$		99.0	6.48	4			
		99.9	16.20	4			
		100.9	42.00	4			
$M_n = 47000$		98.25	492	3			336
$v_2 = 0.003$		99.2	9.60	3			
		100.1	27.60	3			
		100.9	69.00	3			
		101.8	186.00	3			
$M_n = 190000$		98.1	9.60	3		Crystallinity = 95%	336
$v_2 = 0.003$		98.9	28.20	3			
		100.0	36.00	3			
		100.9	84.00	3			
		102.0	420.00	3			
$M_2 = 1200000$		96.4	2.55	3		Crystallinity = 75%	336
$v_2 = 0.003$		98.4	9.60	3			
		99.4	25.50	3			
		100.4	66.00	3			
Poly(ethylene) fractions							
Decalin		81.8	2.40	4		Dilatometry;	334
$M_n = 100000$		82.8	3.90	4		crystallinity = 95%	
$v_2 = 0.003$		83.7	6.30	4			
		85.2	19.80	4			
		86.4	60.30	4			
		87.2	126.00	4			
Xylene		87.2	3.00	4		Crystallinity = 90%	334
$M_n = 100000$		88.1	5.10	4			
$v_2 = 0.003$		89.0	12.00	4			
		90.0	24.00	4			
Tetralin		87.9	2.16	3		Crystallinity = 90%	334
$M_n = 100000$		89.4	3.72	3			
$v_2 = 0.003$		90.5	10.20	3			
		91.5	21.00	3			
		92.4	45.00	3			
		93.7	156.00	3			
α-Chloronaphthalene		98.9	90.00	3			334
$M_n = 100000$		100.0	270.00	3			
$v_2 = 0.003$		100.9	780.00				
		102.0	3720.0				
Poly(ethylene) Marlex 50		122	528			Dilatometry	347
		123	750				
		124	1080				
		125	1560				
		126	3420				
		127	11400				
		128	34800				
		129	198000				
		130	1140000				
Poly(ethylenes)							
$M_n = 1.69 \times 10^3$		151.7	328	1.3		Pulsed NMR;	348
$M_w = 120 \times 10^3$		151.0	364	1.3		pressure = 1 kbar	
$M_v = 90.5 \times 10^3$		153.0	571	1.5			
$M_z = 599 \times 10^3$		154.3	969	1.6			
		154.3	930	1.6			
		155.0	1380	1.6			
		155.3	1610	1.6			
		157.0	7210	1.7			
		173.0	295	1.2		2 kbar	348
		173.8	322	1.3			
		175.0	485	1.5			
		177.0	895	1.5			

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		177.3	989	1.5			
		179.0	3580	1.7			
		195.0	384	1.3		3 kbar	348
		197.0	521	1.4			
		197.3	594	1.4			
		199.0	785	1.5			
		199.3	950	1.6			
		201.0	1800	1.7		4 kbar	348
		217.0	260	1.6			
		219.0	367	1.7			
		221.0	670	1.7			
		221.3	806	1.7			
		223.0	2880	1.7			
		227	350	1.5		5 kbar	348
Poly(ethylene) HDPE	200 (2 min)	124	165	2.32		Bulk rates by DSC; crystallinity	349
		124	165	2.35		melting points and density	
		125	338	2.29		data are given inthe original	
Dow 08064N		126	750	2.05		references; t_i is proportional	
		127	1920	2.24		to t_{y2} (see original text)	
Dow 10062N		120	51	2.53			349
		121	81	2.44			
		122	162	2.60			
Phillips Marlex EHM 6006		120	42				349
		121	46				
		122	60				
		123	136	2.46			
		124					
		125	351	2.20			
Phillps Marlex EHM 6030		120	36	2.25			349
		121	56	2.72			
		122	108	2.76			
		123	222	2.56			
		124	308	2.48			
Phillips Marlex TR-855		122	66	3.18			349
		123	78	2.46			
		124	156	2.58			
DuPont Alathon 7480		122	165	1.89			349
		123	263	1.93			
		124	510	1.96			
		125	998	1.85			
Soltex T60-1000		120	54	2.36			349
		121	100	2.61			
		122	222	2.63			
		123	496	2.18			
		105		2.26			
Soltex T60-2000		123	240	2.32			349
		124	480	2.50			
		125	518	2.25			
		126	1500	2.47			
ARCO Super Dylan 5503A		120	45	1.96			349
		121	96	2.28			
		121.5	150	2.23			
		122	261	2.60			
ARCO Super Dylan 5503B		120	48	2.07			349
		121	81	1.98			
		122	252	2.62			
		125	714				
		123	370				
		120	250				
Sinclair 2907		117	62.5			Transmitted light intensity;	256
		115	31.3			(a) atmospheric pressure	
		113	19.2				
		112	7.14				
		143	1429			(b) 0.5 kbar	256
		141	476				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		138	189				
		137	137				
		135	62.6				
		133	28.8				
		157	154			(c) 1 kbar	256
		156	769				
		153	250				
		151	115				
		149	75				
		147	42.9				
		145	19.2				
		167	2000			(d) 1.5 kbar	256
		165	769				
		163	303				
		161	149				
		159	107				
		157	57.8				
		156	44.1				
		155	33.3				
		177	1250			(e) 2.0 kbar	256
		176	769				
		174	500				
		172.5	189				
		170	88.5				
		168	50.0				
		167	34.1				
		166	25.6				
$M_v = 166 \times 10^3$	160 (15 min)	127.6	6780	1.6		DSC; rates are also given in	
		126.6	3000	1.6		text after quenching; some	343
		126.1	2190	1.6		dilatometry results also available;	
		125.6	1500	1.4		k_n values are also cited	
		125.1	1080	1.2			
		124.1	420				
	170 (30 min)	95	7500	3.05		Dilatometry from amyl acetate	306
		98	15000	3.10		solution; k_n values listed	
		102	60000	3.43		in text	
		105	189600	3.80			
Poly(ethylene)							
I: $M_n = 52 \times 10^{-3}$		10(II)	12000	Varies		Dilatometry; pressure	188
$M_w/M_n = 2.7$		12(II)	3600	between		1000 kg/cm^2; ΔT_c (°C) is	
II: $M_n = 54 \times 10^{-3}$		17(II)	90	1 and 3339		cited; not t_c; see text	
$M_w/M_n = 3.0$		6(II)	24000	with pressure		2000 kg/cm^2; pressures up	
						to 5000 kg/cm^2 reported	
Poly(ethylene), unfractionated		150.6	357.0	1.9			
$M_w = 64000$		152.1	1200.0	0.9		Pressure = 840 kg/cm^2	339
$M_n = 14000$		153.6	10242.0	20.0			
		171.6	76.3	1.7		1950 kg/cm^2	339
		175.6	586.0	2.1			
		177.5	2100.0	2.1			
		193.4	46.3	1.3		3400 kg/cm^2	339
		195.8	55.2	1.3			
		197.3	99.0	1.6			
		199.2	100.0	1.7			
	220.3	18.7		1.0		5100 kg/cm^2	339
	222.7	19.4		1.0			
	225.2	22.3		1.1			
	227.6	47.2		1.2			
	229.1	52.4		1.2			
	226.6	21.6		1.2		5300 kg/cm^2	
	228.6	25.4		1.2			
	230.5	47.5		1.3			
	232.4	67.8		1.3			
	196.6			2.8			
Poly(ethylene) fractions	198.8			2.7	2.8	Avrami exponent of extended	263
$M_w = 15500$	186.6			2.9		chain crystallization in	

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_w/M_n = 1.2–1.3$	187.5			2.9		parentheses; calorimetry	
$M_w = 150000$	188.5			3.2		(DTA) @ 2.44 kg/cm^2	
$M_w/M_n = 1.2–1.3$	183.6			3.3			
	185.3			3.0			
	186.3			3.2			
	187.3			3.3			
					6000		
					1080		
					114		
					60		
Poly(ethylene), fractionated	125.4		906	3.1	1.45×10^{-4}	Dilatometry; col. #5 lists primary	304
$M_v = 18.5 \times 10^3$	125.8		1212	3.1	5.51×10^{-5}	process; 4 lists time (min^{-n})	304
	126.9		3216	3.1	3.27×10^{-6}		
	127.6		5826	3.0	8.68×10^{-7}		
	127.8		8220	3.0	3.30×10^{-7}		
	128.5		18180	2.8	1.04×10^{-7}		
	128.6		21300	2.7	9.01×10^{-8}		
	126.6			3.5	4.69×10^{-6}		
$M_v = 7.3 \times 10^3$	127.5			3.5	5.62×10^{-7}		304
	128.5			3.5	3.66×10^{-8}		
	129.5			3.5	1.18×10^{-9}		
	130.5			3.5	3.42×10^{-12}		
	131.0			3.5	5.62×10^{-14}		
$M_v = 1.8 \times 10^3$	128.6			3.5	7.48×10^{-6}		304
	128.7			3.5	1.86×10^{-6}		
	129.5			3.5	8.30×10^{-8}		
	130.0			3.9	5.65×10^{-10}		
	130.3			3.8	9.52×10^{-11}		
Poly(ethylene) fractions	124.5	96		2.6	2.40×10^{-11}	Calorimetry; fractions from	284
$M_n = 25.0$	125.5	174		2.3	6.00×10^{-2}	Marlex 60; column 5 listed	
$M_n = 41.0$	126.5	282		2.2	2.3×10^{-2}	as time (min^{-n})	
$M_w/M_n = 1.6$	127.5	636		2.6	1.5×10^{-3}		
		128.0	810	2.9	3.6×10^{-4}		
		129.0	2100	2.4	1.4×10^{-4}		
		130.5	4200	3	2.0×10^{-6}		
Poly(ethylene), fractions							
$M_n = 5.9 \times 10^3$		125.1	53	4		Dilatometry; column 4 gives	344
		126.1	280			values of $t_{0.1}$(min); note: n is	
		127.1	1500			independent of T_c for each	
		128.1	5000			fraction	
$M_n = 14 \times 10^3$		126.1	4.2	3			344
		127.1	20				
		128.1	130				
		129.1	1050				
		130.1	5600				
$M_n = 20 \times 10^3$		125	2.3	3			344
		126	4				
		127	6.8				
		128	18				
		129	76				
		130	220				
$M_n = 47 \times 10^3$		125	2.5	3			344
		126	4				
		127	6.5				
		128	12				
		129	35				
		130	190				
$M_n = 122 \times 10^3$		125	4.7	3			344
		127	9.5				
		128	17				
		129	36				
		130	130				
		131	670				
		132	10700				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_n = 200 \times 10^3$		125	3.4	3			344
		126	4.8				
		127	7.5				
		128	15				
		129	35				
		130	75				
$M_n = 284 \times 10^3$		125.1	6.5	3			344
		126.1	13				
		127.1	23				
		128.1	45				
		129.1	100				
		130.1	320				
		131.1	1600				
		132.1	17000				
$M_n = 600 \times 10^3$		125.1	9	3			344
		126.1	16				
		127.1	32				
		128.1	65				
		129.1	180				
		130.1	460				
		131.1	2000				
		132.1	21000				
$M_n = 1.2 \times 10^6$		125.1	17	3			344
		126.1	37				
		127.1	120				
		128.1	390				
		129.1	1400				
		130.1	7500				
$M_n = 8.0 \times 10^6$		125.1	20	3			344
		126.1	62				
		127.1	260				
		128.1	1020				
		129.1	4600				
		130.1	36000				
		116	0.053	2		Calorimetry (DSC); column 4 gives $t_{0.25}$ (min), not the half-time listed in column 4	332
		117	0.080				
		118	0.14				
		118	0.14				
		119	0.21				
		120	0.51				
		121	0.91				
		122	2.00				
		123	4.35				
		124	10.5				
		125	31.3				
		125.5					
		126	83.3				
$M_n = 5.0 \times 10^6$		116	0.048	2			
		117	0.091				332
		118	0.13				
		119	0.26				
		120	0.43				
		121	1.02				
		122	2.17				
		123	4.17				
		124	10.9				
		125	27.8				
		126	90.9				
$M_n = 3.0 \times 10^6$		116	0.05	2			332
		117	0.077				
		118	0.12				
		119	0.25				
		120	0.42				
		121	0.87				
		122	2.38				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		123	4.76				
		124	10.0				
		125	29.4				
		126	76.9				
$M_n = 8.0 \times 10^5$		116	0.041	3			332
		117	0.08				
		118	0.14				
		119	0.26				
		120	0.49				
		121	0.99				
		122	1.85				
		123	4.0				
		124	8.3				
		125	21.7				
		126	55.5				
		127	133.3				
		127.5	227.3				
$M_n = 4.25 \times 10^5$		116	0.047	3			332
		117	0.07				
		118	0.13				
		119	0.26				
		120	0.40				
		121	0.63				
		122	1.49				
		123	2.38				
		124	5.0				
		125	10.3				
		126	29.3				
		126.5	38.5				
		127	66.7				
		127.5	102.0				
$M_n = 1.07 \times 10^5$		116	0.055	3			332
		117	0.083				
		118	0.16				
		119	0.28				
		120	0.44				
		121	0.76				
		122	1.28				
		123	2.50				
		124	4.2				
		125	8.3				
		126	18.2				
		127	33.3				
		127.5	66.7				
		128	156.3				
$M_n = 1.95 \times 10^4$		116	0.043	3			332
		117	0.063				
		118	0.13				
		119	0.19				
		120	0.30				
		121	0.47				
		122	0.71				
		123	1.20				
		124	1.92				
		125	3.3				
		125.5	5.9				
		126	15.6				
		127	71.4				
$M_n = 11.4 \times 10^3$		117	0.045	3			332
		118	0.067				
		119	0.11				
		120	0.20				
		121	0.33				
		121.5					
		122	0.53				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		122.5					
		123	0.71				
		123.5					
		124	1.54				
		124.5					
		125	4.0				
		125.5	5.9				
		126	11.5				
		126.5	25.0				
		127	66.7				
$M_n = 8.0 \times 10^3$		118	0.043	4			332
		119	0.077				
		120	0.13				
		121	0.24				
		122	0.40				
		123	0.77				
		124	2.4				
		124.5	4.8				
		125	10.9				
		125.5	28.6				
		126	83.3				
$M_n = 5600$		113	0.063	4			332
		114	0.093				
		115	0.13				
		116	0.16				
		117	0.22				
		118	0.26				
		119	0.38				
		120	0.67				
		121	1.4				
		121.5	2.2				
		122	4.8				
		122.5	13.5				
		123	27.0				
		123.5	55.6				
		124	196.0				
$M_n = 3.9 \times 10^3$		111	0.034				332
		112	0.076				
		113	0.10				
		114	0.14				
		115	0.19				
		116	0.24				332
		117	0.38				
		118	0.71				
		119	1.79				
		120	6.67				
		121	52.6				
		122	357				
		123	2000				
$M_n = 2.9 \times 10^3$		111	0.054				332
		112	0.085				
		113	0.12				
		114	0.16				
		115	0.21				
		116	0.30				
		117	0.50				
		118	1.16				
		119	4.35				
		120	25.0				
Poly(ethylenes)							
$M_w = 51.5 \times 10^3$	155 (15 min)	123.4	28.5	Not listed	Expressed as	LDI techniques see Ref. 94; SAXS	350
$M_w/M_n = 1.5$		124.5	45.0		$t_{0.5}$ only	dimensions and σ_e values	
0 branches/1000 CH_2's		125.5	96.5			tabulated and regimes cited	
		126.5	188				
		127.5	323				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		127.8	439				
		129.0	993				
		130.0	8130				
		131.2	4330				
$M_w = 89.9 \times 10^3$	155 (15 min)	119.6	76.5	Not listed	Expressed as	LDI techniques see Ref. 94; SAXS	350
$M_w/M_n = 1.53$		120.5	133		$t_{0.5}$ only	dimensions and σ_e values	
6.67 branches/1000 CH_2's		121.5	188			tabulated and regimes cited	
		122.7	358				
		123.8	636				
		125.0	1453				
$M_w = 41.8 \times 10^3$	155 (15 min)	116.5	60	Not listed	Expressed as	LDI techniques see Ref. 94; SAXS	350
$M_w/M_n = 1.17$		117.5	137		$t_{0.5}$ only	dimensions and σ_e values	
15.5 branches/1000 CH_2's		118.5	243			tabulated and regimes cited	
		120.0	389				
		120.8	680				
		121.8	1239				
		122.6	2778				
		123.7	3985				
		127.7	4167				
$M_w = 54.7 \times 10^3$	155 (15 min)	111.5	76.5	Not listed	Expressed as	LDI techniques see Ref. 94; SAXS	350
$M_w/M_n = 1.69$		112.5	98.0		$t_{0.5}$ only	dimensions and σ_e values	
13.64 branches/1000 CH_2's		113.5	133			tabulated and regimes cited	
		144.5	173				
		115.5	263				
		116.7	330				
		118.5	873				
		119.7	1686				
		121.0	6710				
$M_w = 65.5 \times 10^3$	115 (15 min)	97.5	58				350
$M_w/M_n = 2.1$		98.3	98				
32 branches/1000 CH_2's		99.3	182				
		100.3	304				
		101.2	573				
		102.5	840				
		103.3	1570				
		104.4	1908				
		105.3	3310				
		106.3	3345				
		107.3	3378				
10.2. BLENDS AND COPOLYMERS							
Poly(ethylene)/poly(1-phenylethylene)							
PE/PS	175	122	126	1.57		Listed in text; DSC, mech.	351
		123	144	1.86		properties text crystallinity	
		124	264	2.29		and morphology	
		125	540	2.44			
		126	1140	2.26			
Rigidex 50/Carinex SR61		122	96	1.88			351
50/50, w/w		123	125	1.94			
		124	228	2.32			
		125	444	2.59			
		126	9000	2.36			
Poly(ethylene-*co*-1-acetoxyethylene) Hostalen, GC 6400							
0 wt.% VA		126.9	1071			Calorimetry: data interpolated	356
MI = 4.5 g/10 min		125.9	704			from original plots	
		125.1	367				
		124.1	138				
		123.2	90.5				
5.5 wt.% VA		102.2	1628				356
MI = 1.6 g/10 min		101.2	878				
		100.4	589.5				
		99.4	318				
		98.4	158				
		97.5	92				
		96.5	60				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
14.0 wt.% VA		87.6	1334				356
MI = 6.5 g/10 min		86.6	770				
		85.7	553.0				
		84.8	353				
		83.9	241				
17 wt.% VA		80.1	2444				356
MI = 108 g/10 min		89.1	1735				356
		78.3	1098				
		77.4	731				
		76.4	467.5				
		75.6	297				
		74.6	183				
		73.7	120				
		72.6	83.5				
		71.7	55.5				
		70.7	35.6				
19 wt.% VA		81.0	2200				356
MI = 98 g/10 min		80.2	1560				
		79.3	900				
		78.3	605				
		77.3	389.4				
		76.5	246.6				
		75.5	155				
		74.5	97.2				
		73.5	62.4				
19 wt.% VA		81.1	904				356
MI = 2.7 g/10 min		80.3	689				
		79.3	508				
		78.4	302				
		77.4	169.2				
24 wt.% VA		68.6	716				356
MI = 19 g/10 min		67.8	639				
		66.8	438.6				
		65.9	343.2				
Polypropylene/ethylene–propylene rubber							
	230 (2 min)	126	188	2.45	3.58×10^{-6}	Rates by DSC; spherulite	403
		128	268	2.55		growth rates also reported	
		130	455	2.72	8.80×10^{-8}	(see Section 2)	
		132	774	2.78	7.60×10^{-9}		
PP/EPR		134	1169	2.51			
100/0, w/w		136	1892	2.58	4.20×10^{-9}		
Melt flow index = 15; Montell Polyolefins G. Natta Res. Centre, Ferrara, Italy							
PP/EPR	230 (2 min)	120	188	2.48	1.95×10^{-6}		
		122	288	2.36			
		124	431	2.24	8.38×10^{-7}		
		126	678	2.30			
		128	1068	2.34	6.57×10^{-8}		
		130	1693	2.40			
		132	2700	2.38	5.83×10^{-9}		
PP/EPR	230 (2 min)	120	123	2.68	1.77×10^{-6}		
40/60, w/w		122	244	2.79			
		124	376	2.59	2.15×10^{-7}		
		126	596	2.52	1.04×10^{-7}		
		128	1045	2.57			
		130	1780	2.56	5.37×10^{-9}		
Poly(1-hexadecene), PHD isotactic		36		4.3	7.30×10^{-4}	Measurements by DSC;	352
M_v = 7800		38			2.45×10^{-3}	SAXS data included; units	
isotacticity = 43%		40			5.70×10^{-3}	of k are (min^{-n}) *not* (s^{-n})	
		41			1.32×10^{-2}	and independent of T_c	
		42			7.64×10^{-2}	for these comb-like	
		43			4.10×10^{-1}	polymers; T_m = 58°C	
M_v = 2800		36		3.7 ± 0.6	8.05×10^{0}		352
isotacticity = 62%		38			9.60×10^{-1}		
		40			1.49×10^{-1}		
		41			6.49×10^{-2}		
		42			2.65×10^{-2}		

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		43			9.95×10^{-3}		
		44			3.45×10^{-3}		
		45			8.86×10^{-4}		
$M_v = 1800$		36		3.3 ± 0.4	2.51×10^{1}		352
isotacticity = 91%		38			2.89×10^{0}		
		40			3.57×10^{1}		
		41			1.36×10^{-1}		
		42			5.46×10^{-2}		
		43			1.22×10^{-2}		
		44			2.96×10^{-3}		
		45			2.46×10^{-4}		
Poly(isoprene) *cis*		0	188160	3.6		Dynamometer for $t_{0.1}$(s);	166,353
room temperature; crosslinked		−10	30480	3.6		10% transformation	
at 0.5 MR; 20% gel		−15	14820	3.5		elongation ratio;	
		−20	10560	3.5		α = 1	
		0		2.45		α = 2	
		−10		2.90			
		−15		2.95			
		−20		2.85			
		0		2.10		α = 3	
		−10		2.15			
		−15		2.15			
		−20		2.10			
		0		1.65		α = 4	
		−10	9060	1.60			
		−15		1.57			
		−20	4668	1.55			
		0	21240	1.40		α = 5	
		−10	4896	1.55			
		−15	3186	1.37			
		−20	1896	1.40			
		0		1.35		α = 6	
		−10	2107	1.30			
		−15		1.35			
		−20	654	1.13			
Poly(isoprene) *cis*							
Natural Rubber		−5	55200				104,354,355
		−11	19800				
		−16	12000				
		−17	10200				
		−22	9000				
		−27	9000				
		−33	14400				
trans Gutta Percha		−38	23400				109,359,355
		35	768				
		40	1260				
		45	6780				
		47	11700				
		49	19800				
		51	31800				
		53	64500				
		55	129000				
		57	291000				
		59	720000				
$[\eta] = 2.8$ in toluene at 30°	100 (30 min)	20.5	475		6.25×10^{-9}	Dilatometry; other grades	109,359,355
		26.5	641		3.20×10^{-9}	of polymer are presented	
		30.5	919		9.44×10^{-11}		
		36.5	2160		7.50×10^{-11}		
		40.5	3995		1.22×10^{-11}		
		45.0	11417				
Poly(isoprene) *trans*-1,4	100 (30 min)	20.5			9.30×10^{-3}	Rate results from dilatometry	242
LMF Spalding Co. R-308		26.5			3.6×10^{-8}	measurements	
		30.5			1.84×10^{-8}		
		36.5			3.12×10^{-9}		
		40.5			6.40×10^{-11}		

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		45.0			2.21×10^{-11}		
HMF Spalding Co.		20.5			6.25×10^{-8}		242
		26.5			3.20×10^{-8}		
		30.5			9.44×10^{-10}		
		36.5			7.50×10^{-10}		
		40.5			1.22×10^{-10}		
		45.0			5.56×10^{-12}		
Balta		20.5			9.26×10^{-8}		242
		26.5			3.60×10^{-8}		
		30.5			1.84×10^{-8}		
		36.5			1.89×10^{-9}		
		40.5			2.12×10^{-10}		
		45.0			2.73×10^{-12}		
Poly(isoprene) *trans*-1,4 $M_n = 49 \times 10^3$	100 (5 min)	30.0			240×10^{-3}	Transformation rates by DSC; heat of fusion and melting points also provided	357
		32.5			108×10^{-3}		
		35.0			462×10^{-3}		
		37.5			570×10^{-4}		
		40.0			102×10^{-5}		
		42.5			216×10^{-6}		
		45.0			474×10^{-7}		
$M_n = 59 \times 10^3$		30.0			360×10^{-3}		357
		32.5			78×10^{-3}		
		35.0			156×10^{-5}		
		37.5			60×10^{-5}		
		40.0			96×10^{-6}		
		42.5			498×10^{-7}		
		45.0			168×10^{-7}		
$M_n = 70 \times 10^3$		30.0			74.3×10^{-3}		357
		32.5			169×10^{-3}		
		35.0			210×10^{-4}		
		37.5			84×10^{-4}		
		40.0			330×10^{-6}		
		42.5			252×10^{-7}		
		45.0			126×10^{-7}		
$M_n = 77 \times 10^3$	100 (5 min)	30.0			198×10^{-2}		
		35.0			102×10^{-3}		
		37.5			360×10^{-5}		
		40.0			384×10^{-6}		
		42.5			474×10^{-7}		
		45.0			60×10^{-7}		
$M_n = 94 \times 10^3$	100 (5 min)	32.5			120×10^{-3}		357
		35.0			174×10^{-4}		
		37.5			558×10^{-5}		
		40.0			420×10^{-5}		
		42.5			114×10^{-5}		
		45.0			450×10^{-6}		
$M_n = 106 \times 10^3$	100 (5 min)	30.0			150×10^{-3}		357
		32.5			276×10^{-4}		
		35.0			120×10^{-5}		
		37.5			414×10^{-5}		
		40.0			78×10^{-5}		
		42.5			234×10^{-6}		
		45.0			144×10^{-7}		
		45.0	11417		5.56×10^{13}		
Vulcanized rubber							
Extension ratios: 1 × 1		−27		3.0	10^{-9}	Biaxial crystallization X-ray kinetics; Avrami analysis	358
1.5 × 1.5				2.4			
2 × 2				1.7			
2.5 × 2.5				1.1	2.7×10^{-5}		
3 × 3				0.7	2.6×10^{-3}		
Poly (1-phenylethylene) isotactic (90%) $M_w = 4 \times 10^5$		50			3.97×10^{-5}	Solvent, dimethyl phthalate, (DMP); DMSO &TP solvents; $T_{max} = \sim 70$°C in DMP; polymer–solvent interaction is DMP > DMSO > TP	400
		55			3.63×10^{-5}		
		60			5.75×10^{-5}		
		65			5.74×10^{-5}		
		70			6.67×10^{-5}		

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		75			5.72×10^{-5}		
		80			4.67×10^{-5}		
		90			1.46×10^{-5}		
Poly(1-phenylethylene) isotactic	228.0 (1 min)	180	168.0			DSC measurements; see text	359
$M_n = 850 \times 10^3$	230.0 (1 min)		198.0				
	234.0 (1 min)		222.0				
	237.0 (1 min)		282.0				
	227.5 (1 min)		372				
	240.0 (1 min)		414				
	243.0 (1 min)		594				
	229.5 (1 min)		780				
$M_w = 850 \times 10^3$	233.0 (1 min)	170.0	210			DSC	359
		180.0	210				
		160.0	288				
		150.0	330				
		190.0	4200				
Poly(1-phenylethylene); syndiotactic							
$M_w = 803000$	300 (1 min)	110	15343	3.00		Rate values listed in text in s^{-1} vs. T_c; rate is MW dependent; $T_m \sim 543K$; $T_g \sim 373\,K$	398
		115	4783				
		120	1972				
		125	988				
		135	326				
		145	144				
		155	78				
		170	43				
		180	32				
		190	25				
		207	22				
		220	23				
		225	25				
		230	29				
		235	37				
		240	49				
		246	79				
		250	164				
$M_w = 562000$	300 (1 min)	110	2440	2.88			398
		115	1005				
		120.5	504				
		130	187				
		150	56				
		160	36				
		175	26				
		188	21.3				
		202	21				
		215	24.5				
		220	27.5				
		230	40				
		235	56				
		240	87.8				
		250	485				
$M_w = 348000$	300 (1 min)	110	920				398
		115	436				
		120	237				
		125	144.5				
		134.5	70.7				
		146	42.0				
		156	29.6				
		166	22				
		175	18.8				
		182.5	17.9				
		190	16.6				
		200	18.2				
		212	19.5				
		230	35.7				
		235	54.5				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		239	87.8				
		245.5	167.6				
		250	472				
Poly(1-phenylethylene), PS (syndiotactic)							
$M_w = 609000$; 1.5 mol%	330 (3 min)	149	19			DSC measurements for $t_{0.5}$	360
neutralized with various		155	11			values; T_g identical for all	
counterions cations Na^+ ions		160	6.8			materials; the counterion	360
		165	5.1			affects rate as $Na^+ < K^+$	
		170	4.1			$< Rb^+ < Cs^+$ for isothermal	
		175	4.0			changes	
		181	3.97				
		189	6.1				
		200	13.4				
		204	21.3				
		210	30.3				
K^+ ions		154.5	10.4				
		160	6.5				
		165	4.8				
		170	3.9				
		175	3.6				
		181	3.6				
		190	5.0				
		200	8.1				
		205	11.8				
		209.5	16.8				
		215	244.4				
		219.5	35.7				
Rb^+ ions		154.5	9.7				
		160	5.9				
		165	4.1				
		170	3.3				
		175	2.9				
		182	3.0^5				360
		190	3.9				
		200	6.0				
		204	8.5				
		210	10.6				
		215	15.1				
		220	20.1				
		225	30.2				
Cs^+ ions		150	6.0				360
		165	4.5				
		170	3.6				
		175	3.1				
		182	2.9				
		185	2.9				
		200	3.3				
		209.5	5.6				
		214.5	7.0				
Cs^+ ions		220	9.9				360
		225	14.0				
		232	27.7				
H^+ ions		210	1.4				360
		214	1.8				360
		220	2.8				
		225	4.5				
		231.5	11.9				
Poly(1-phenylethylene)/poly[oxy(2,6-dimethyl-1,4-phenylene)]							
syndiotactic		245	1360			DSC measurements; hot stage	361
$M_w = 129000$		244	1210			microscopy spherulitic growth	
SPS/PPO; 100/0, w/w		243	925			rates listed	
		242	676				
		241	571				
		240	489				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		239	437				
		237	257				
		236	219				
		235	137				
$M_n = 32000$		240	1289				361
$M_w = 244000$		239	1154				
SPS/PPO; 90/10		238	905				
		236	695				
		235	560				
		234	462				
SPS/PPO; 80/20		240	1923				361
		239	1450				
		238	1294				
		236	1042				
		235	824				
Poly(1-phenylethylene)/poly(1-methoxyethylene) PVME							
SPS/PVME; 90/10		237	1502				361
		236	1450				
		235	1065				
		233	719				
		232	645				
		231	486				
SPS/PVME; 80/20		237	2060				361
		236	1850				
		235	1602				
		234	1444				
		232	1165				
		231	1113				
Poly(1-phenylethylene)(S)/poly(*trans*-1-butylene)(B)/poly(imino-1-oxohexamethylene)(C)-*co*-poly(ε-caprolactam)							
Poly(ε-caprolactam) (100%)	250 (3 min)	37	64	2.63 ± 0.10		DSC measurement under nitrogen; rate constants given in min^{-n}; also spherulitic growth rates listed; nucleation dependent upon block size and type	362
		39	125				
		40	177				
		41	223				
		43	518				
		45	923				
		47	2374				
Wt.% composition ratios:		39	170	2.31 ± 0.11			362
35S/15B/50C		40	359				
		43	719				
		45	1564				
27S/15B/58C		37	86	2.54 ± 0.08			362
		38	115				
		39	151				
		40	200				
		41	269				
		43	549				
33S/06B/61C		37	76	2.34 ± 0.15			362
		39	151				
		40	169				
		41	213				
		43	420				
		45	858				
205/15B/65C		38	96	2.03 ± 0.03			362
		39	132				
		40	175				
		43	572				
		44	691				
9S/14B/77C		36	76	1.92 ± 0.06			362
		37	94				
		38	113				
		39	165				
		41	317				
		42	398				
		43	581				
Poly(propylene)							

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_v = 50.5 \times 10^3$		135	474			Dilatometry	363
		140	1524				
		145	6870				
		150	26400				
		155	117000				
$M_v = 96.8 \times 10^3$		133	636				363
		134	894				
		135	1356				
		136	2124				
		137	3564				
		138	5256				
		139	8094				
		140	11154				
		141	16320				
$M_v = 307 \times 10^3$		135	642				363
		140	2280				
		145	11400				
		150	32400				
		155	152400				
$M_v = 447 \times 10^3$	190 (10 min)	137.1	6600	2.9		Hot stage optical microscopy	343
		134.1	2820	2.9			
		133.0	2220	2.9			
		130.2	780	3.1			
$M_v = 447 \times 10^3$	190 (10 min)	140.0	8280	2		DSC; rates are also given in	343
		137.5	5340	2		test after quenching; results	
		135.0	2400	2		also available; k_n values	
		132.5	1344	2		are also cited	
		130.0	756	2			
		127.5	486	2			
		125.0	378	2			
		122.5	288	2			
		120.0	222	-			
		117.0	168	-			
$M_v = 447 \times 10^3$	190 (10 min)	145.0	990	2		DSC; Rates are also given in	343
(nucleated with 1 wt.%		143.5	720	2		text after quenching, some	
indigo)		142.5	612	2		dilatometry results also available;	
		141.5	498	2		k_n, n values are also cited	
		140.5	438	2			
Poly(propylene) Shell Carlona White							
$M_n = 196 \times 10^3$	270 (30 min)	75	3.0	4		DLI (depolarized light intensity)	94(b)
		100	6.7	4		rate measurements	
		110	11.1	4			
		125	100.0	3			
Poly(propylene)							
$M_w = 300 \times 10^3$		47	2045			0.3 g/100 ml decalin	364
		50	3296	4			
		51	3952	4			
		52	4528	4			
		53	5494	4			
		54	6740	4			
		65	2068	4		0.3 g/100 ml tetralin	
		67	2892	4			
		69	3863	4			
		70	4685	4			
		71	5717	4			
		72	7339	4			
Poly(propylene) isotactic	200 (5 min)	120	91			DSC measurements to give	365
$M_w = 947000$; $M_w/M_n = 8.7$		123	161			rate data; interfacial energy	
Tacticity = 96.5%; $[\eta] = 3.48$ dl/g		125	267			$\sigma_e = 92\,erg/cm^2$; average rate	
		128	427			constant listed; $T_m^0 = 184.3°C$;	
		130	825			$\sigma_e = 77\,erg/cm^2$; average rate	
		132	1508			constant listed; $T_m = 178.7°C$	
$M_w = 129000$; $M_w/M_n = 11$		120	56				

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
Tacticity =97%; $[\eta]=0.66$ dl/g		123	100				
		125	165				
		128	256				
		130	599				
		132	1271				
		135	1789				
Poly(propylene) isotactic	200 (5 min)	124	24			Hot stage microscopy;	365
Tacticity[m] = 99.8;		125	30			$T_m^0 = 186.4$°C;	
[mm] = 99.7; [mmm] = 99.4		126	52			$\sigma_e = 125$ erg/cm^2	
$M_v = 44350$; $[\eta] = 53$ dl/g		127	64				
		128	99				
		129	137				
		130	192				
		132	512				
		134	749				
		135	1621				
		136	2041				
Tacticity[m] = 99.77;		125	29			$T_m^0 = 177.0$°C;	365
[mm] = 99.7; [mmm] = 99.4		126	42			$\sigma_e = 69$ erg/cm^2	
$M_v = 16940$; $[\eta] = 26$ dl/g		127	50				
		128	67				365
		130	154				
		132	276				
		133	610				
		135	638				
		138	1729				
Poly(propylene), unfractionated		140	8280	2	3.50×10^{-5}	Calorimetry (DSC): values in	179
$M_v = 4.47 \times 10^5$		137.5	5340		9.52×10^{-5}	column 5 in min^{-n}	
		135.0	2400	2	4.02×10^{-4}		
		132.5	1344	2	1.35×10^{-3}		
		130.0	756	2	5.39×10^{-3}		
		127.5	486	2	1.05×10^{-2}		
		125	378	2	1.80×10^{-2}		
		122.5	288	2	3.16×10^{-2}		
		120	222				
		117	168				
Poly(propylene), unfractionated		95	38	2.96		Values for log k are reported;	200
		100	48	3.05		isotactic index 95–97%;	
		105	66	3.05		$[\eta] = 1.64$ in decalin at 135°C	
		110	78	3.05			
		115	115	3.03			
		117	130	2.96			
		120	181	3.08			
		122	242	3.12			
		125	407	3.03			
		127	561	2.97			
		130	917	3.05			
		132	1529	3.03			
		135	2073	2.98			
Poly(propylene), unfractionated		133	636	5.82×10^{-4}		Dilatometry: k for $n = 3$ (min)	
Profax, $P = 2300$		134	894	2.10×10^{-4}		in column 6	364
		135	1356	6.01×10^{-5}			
		136	2,124	1.56×10^{-5}			
		137	3564	3.31×10^{-6}			
		138	5256	1.03×10^{-6}			
		139	8094	2.82×10^{-7}			
		140	11148	1.08×10^{-7}			
		141	16320	3.45×10^{-8}			
$P = 1200$		135	474	1.43×10^{-3}			394
		140	1524	4.23×10^{-5}			
		145	6870	4.62×10^{-7}			
		150	26400	8.14×10^{-9}			
		155	117000	9.35×10^{-11}			
$P = 7300$		135	642	5.66×10^{-4}			394
		140	2280	1.26×10^{-5}			

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		145	11400		1.01×10^{-7}		
		150	32400		4.40×10^{-9}		
		155	152400		4.23×10^{-11}		
Poly(propylenes) isotactic metallocene type $M_w = 678–288$ K		114	670			Isothermal crystallizations measured by DSC; times @ 20% not 50% conversion are listed; average curve, digitized values	366
		116.5	870				
		118	1090				
		120.5	1500				
		123	2445				
		126	4315				
		128.8	8430				
		130.7	14520				
		132.5	27130				
Poly(propylene)/poly(ethylene) PE: $M_w = 307 \times 10^{-3}$; $M_n = 10.2 \times 10^3$; $M_w = 307 \times 10^3$; $M_n = 15.6 \times 10^3$							
i-PP/HDPE: 100/0		122	152	3		DSC	6
		123	187	3			
		124	237	3			
		125	305	3			
		127	456	3			
		130	981	3			
		131	1320	3			
		132	1763	3			
90/10		123	138	5		DSC	6
		124	210	4			
		125	309	4			
		126	354	3			
		127	675	3			
		128	668	3			
		130	1140	3			
		132	1863	3			
70/30		123	124	4		DSC	6
		124	215	5			
		125	355	3			
		126	450	3			
		127	675	3			
		128	850	3			
		130	1210	3			
		131	2040	3			
60/40		125	420	3		DSC	6
		126	566	3			
		126	647	3			
		127	763	3			
50/50		122	119	3		DSC	6
		123	163	3			
		124	242	3			
		125	330	3			
40/60		125	558	3		DSC	6
		125.5	847	3			
		126	1285	3			
30/70		122	91	3		DSC	6
		123	110	3			
		124	230	3			
		125	523	3			
		125	614	3			
		126	940	3			
		126	1777	3			
10/90		122	110	3		DSC	6
		123	190	3			
		124	441	3			
		124.5	730	3			
		125	1260	3			
		125.5	1650	3			
		126	2880	3			

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
0/100		122	91	2		DSC	6
		123	120	2			
		124	223	2			
		125	354	2			
		122.5	548	2			
		126	900	2			
		126.5	1415	2			
		127	3750	2			
PP/LDPE: 100/0		127.8	573.1			DSC measurements	277
		125.8	349.0				
		122.8	189.6				
90/10		127.8	704.8			DSC measurements	277
		125.8	401.6				
		122.8	207				
80/20		127.8	848.2			DSC measurements	277
		125.8	439				
		122.8	231.6				
60/40		125.8	788.1			DSC measurements	277
		122.8	219.8				
		127.8	1130.0				
		122.8	355.1				
40/60		127.8	1440.6			DSC measurements	277
		125.8	805.6				
		122.8	340.2				
Poly(propylene)/poly(ethylene) low density; melt flow indices 2.9/6.7 g/min wt.% *i*-PP/LDPE							
100/0	200 (10 min)	125	137			Two roll mill-blended; DSC measurements radial spherulitic growth rates also measured; Avrami exponent $1.09 \leq n \leq 3.86$; log k_n tabulated for various n's	367
		130	479				
		132	856				
		135	2001				
95/5		125	133				367
		130	415				
		132	594				
		135	1441				
90/10		125	217				367
		130	709				
		132	1123				
		135	2257				
85/15		125	193				367
		130	559				
		132	1254				
		135	1849				
80/20		125	241				367
		130	747				
		138	1212				
		135	2684				
Poly(propylene-*co*-ethylethylene) isotactic; 0 wt.% 1-butene		120	130	3.4	2.16	Calorimetry; values in column 6 tabulated here as − 1/3 log k	298
		121	175	3.5	2.29		
		122	230	3.3	2.41		
		123	295	3.0	2.52		
		124	380	2.9	2.63		
		125	460	3.0	2.72		
		126	550	3.0	2.79		
		127	750	2.9	2.93		
		128	1010	2.7	3.06		
		129	1300	2.7	3.17		
13.5 wt.% 1-butene		113	175	2.6	1.93		298
		114	190	2.4	1.95		
		115	250	2.4	2.05		
		116	295	2.5	2.11		
		117	430	2.4	2.25		
		118	503	2.3	2.30		
		119	642	2.4	2.39		
		120	750	2.4	2.45		
		121	1070	2.4	2.58		

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		122	1190	2.6	2.62		
29.8 wt.% 1-butene		100	355	2.2	2.02		298
		101	535	2.3	2.05		
		102	640	2.2	2.11		
		103	720	2.3	2.15		
		104	960	2.4	2.24		
		105	1050	2.3	2.27		
34.5 wt.% 1-butene		103	270	2.7	2.24		298
		104	330	2.7	2.32		
		105	360	2.7	2.35		
		106	420	2.7	2.41		
		107	500	2.7	2.48		
		108	660	2.7	2.59		
53.3 wt.% 1-butene		76	390	2.3	2.04		298
		77	420	2.3	2.06		
		78	560	2.3	2.16		
		79	670	2.3	2.22		
		80	810	2.3	2.28		
		81	1100	2.4	2.49		
Poly(propylene-*stat*-ethylene)							
ethylene content; 2.7 mol%		100	78			Crystallization rates measured by DSC; linear growth rate measurements also listed	368
		105	252				
		110	654				
		115	2460				
		125	7865				
5.7 mol%		100	64				368
		105	133				
		110	369				
		115	1203				
		120	2453				
6.9 mol%		100	49				368
		105	87				
		110	245				
		115	816				
		120	2453				
8.7 mol%		100	44				368
		105	72				
		110	153				
		120	958				
11.0 mol%		100	23				368
		105	35				
		110	69				
		115	216				
		120	750				
Poly(propylene)		120	161	3		Poly(propylene) crystallinity 61%; this polymer is basic to the blend study immediately below it	368
		121	199	3			
		122	242	3			
		123	299	3			
		124	366	3			
		125	443	3			
		126	554	3			
		127	688	3			
		128	845	3			
		129	992	3			
Poly(propylene) in poly(propylene) poly[imino(1-oxohexamethylene)] Nylon 6							
		124	60	3		Poly(propylene) crystallinity 72.6%, polyamide 6, 23.1%	368
		125	72	3			
		126	92	3			
		127	117	3			
		128	156	3			
		129	182	3			
Poly(propylene) in poly(propylene)/poly(imino(1-oxohexamethylene)]/nylon 6 poly(propylene) modified with 10% maleic acid							
		122	100	4		Poly(propylene) crystallinity 82.2%	368
		123	125	4			
		124	155	4			

TABLE 10. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		125	196	4		DSC studies	
		126	245	4			
		127	304	4			
		128	357	4			
		129	466	4			
		190	0.016				
Poly (propylene)/poly[imino(1-oxo-hexamethylene)]; PP in PP/PA							
70/30 wt.%; 0% anhydride		124	60	3		Compatabilizing agent: maleic anhydride used at 1–10 wt.% levels. Only DSC rates listed; PP, 0%, used as reference	250
		125	72	3			
		126	92	3			
		127	117	3			
		128	156	3			
		129	182	3			
70/30 wt.%; 10% PP modified with anhydride		122	100	4			250
		123	125	4			
		124	155	4			
		125	196	4			
		126	245	4			
		127	304	4			
		128	357	4			
		129	446	4			
Poly [imino (1-oxo-hexamethylene)]/poly (propylene) PA in PP/PA wt.%: 0% compatabilizer							
		203	170	3		Maleic acid compatabilizer in PP: 0–10 wt.%; reference PA rates in text DSC rate studies, thermal and mechanical properties in text	250
		204	203	3			
		205	276	3			
		206	329	3			
		207	419	3			
		208	636	3			
10% compatabilizer		203	213	3			250
		204	252	3			
		205	324	3			
		206	499	3			

TABLE 11. POLYOXIDES

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
11.1. HOMOPOLYMER MELTS							
Poly(oxyethylene)	100 (10 min)	54.7	432			Dilatometry/crystallinity values cited for $t_{0.1}$ transformation	369
$M_v = 23 \times 10^3$		55.6	780				
$M_w/M_n = 1.2$ (GPC)		57.0	2640				
		58.1	7200				
		59.4					
$M_v = 42 \times 10^3$	100 (10 min)	54.7					369
$M_w/M_n = 1.3$		55.6					
		57.0	960				
		58.1	2940				
		59.4	16200				
$M_v = 84 \times 10^3$							
$M_w/M_n = 1.21$	100 (10 min)	54.7	960				369
		55.6	1440				
		57.0	3600				
		58.1					
		59.4					
$M_v = 130 \times 10^3$	100 (10 min)	54.7					369
$M_w/M_n = 1.35$		55.6					
		57.0	462				
		58.1	1200			Dilatometry/crystallinity values cited for $t_{0.1}$ transformation	369
		59.4	4620				
$M_v = 240 \times 10^3$		54.7					369
$M_w/M_n = 1.22$		55.6					369

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		57.0	780				
		58.1	1380				
		59.4					
$M_v = 540 \times 10^3$	100 (10 min)	54.7					
$M_w/M_n = 1.53$		55.6					
		57.0	522			Dilatometry/crystallinity	369
		58.1	660				
		59.4					
$M_v = 1.570 \times 10^3$	100 (10 min)	54.7					369
$M_w/M_n = 1.85$		55.6				Dilatometry/crystallinity values	369
		57.0	558			cited for $t_{0.1}$ transformation	
		58.1	960				
		59.4	558				
$M_w = 0.3 \times 10^3$	88 (15 min)	−13.0	1146	2.3	See text	DSC and dilatometry; polymer	370
		−14.0	888	2.5		sources listed in text	
		−15.0	600	1.7			
		−20.0	354				
$M_w = 0.4 \times 10^3$		+0.3	360	2.3			370
		−1.0	270	2.2			
		−1.9	1140	2.2			
		−3.9	720	2.2			
		−5.4	660	2.3			
		−6.4	600				
		−7.1	240				
$M_w = 0.6 \times 10^3$		16.9	3870	2.1			370
		14.9	600	1.2			
		14.1	564	1.2			
		12.9	378				
$M_w = 1.0 \times 10^3$		30.4	2460	1.9			370
		30.1	1170	1.7			
		26.8	600	1.8			
		25.0	444				
$M_w = 1.5 \times 10^3$		45.1	14400	2.1			370
		44.5	7380	2.1			
		43.5	3210	2.2			
		42.4	2280	2.0			
		39.8	1020	1.7			
		30.4	240				
$M_w = 2.0 \times 10^3$		49.3	12120	2.0			370
		48.2	6000	1.8			
		48.0	3540	2.3			
		46.5	2340	2.3			
		45.5	1506	1.7			
		43.1	1380	2.7			
$M_w = 3.0 \times 10^3$		49.4	12540	1.9			370
		48.5	3360	1.7			
		46.9	1560	1.7			
		45.5	990	1.7			
		44.5	660	1.5			
$M_w = 4.0 \times 10^3$		51.0	24480	1.8			370
		49.9	3060	1.7			
		48.5	1440	1.5			
		46.9	1044	1.4			
		44.5	456				
$M_w = 6.0 \times 10^3$		55.7	19860	1.8			370
		52.2	1344	1.7			
		49.9	642	1.5			
		48.5	480	1.4			
		46.9	426	-			
$M_w = 15 \times 10^3$		58.1	15120	2.1			370
		57.4	6720	2.2			
		55.7	2520	1.9			
		53.2	900	1.4			
		52.2	672	1.4			
$M_w = 20 \times 10^3$		59.3	13140	2.2			370

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		59.0	6900	2.5			
		58.1	4884	2.1			
		57.1	1476	2.0			
		56.0	1200	1.9			
		55.0	612	1.8			
$M_w = 12.6 \times 10^3$ Carbowax 6000	$T_m + 25$ (60 min)					Shear dilatometer; couette, geometry; shear rate (s^{-1})	167
		55.6		2.9	10^{-6}	0	
		56.7		3.2	10^{-6}	0	
		56.7		3.7	10^{-9}	1.4	
		56.7		5.0	10^{-10}	5.4	
		56.8		5.1	10^{-10}	10.9	
		56.5		4.8	10^{-7}	28.0	
		56.3		6.1	10^{-8}	45.7	
		56.9		6.2	10^{-9}	56.1	
		56.6		6.4	10^{-9}	93.4	
		58.1		2.6	10^{-8}	0	
		58.0		3.7	10^{-9}	1.3	
		58.1		4.0	10^{-9}	5.3	
		58.1		5.0	10^{-10}	10.8	
		58.2		4.7	10^{-10}	11.0	
		58.2		5.0	10^{-8}	19.4	
		58.1		6.7	10^{-10}	32.5	
		58.1		6.6	10^{-10}	54.8	
		58.5		6.2	10^{-10}	84.1	
		59.0		2.2	10^{-7}	0	
		59.8		2.9	10^{-10}	0	
		59.5		4.4	10^{-13}	3.0	
		59.4		4.3	10^{-12}	5.3	
		59.0		5.2	10^{-11}	8.6	
		59.0		5.2	10^{-11}	9.3	
		59.4		5.6	10^{-14}	10.8	
		59.6		5.8	10^{-14}	11.0	
		59.0		6.0	10^{-12}	20.2	
		50.0		6.3	10^{-12}	35.7	
		59.1		6.1	10^{-12}	40.0	
		59.6		6.7	10^{-14}	44.6	
		60.0		6.6	10^{-14}	68.9	
$M_w = 72.2 \times 10^3$ WSR-N10 Union Carbide	$T_m + 25$ (60 min)					Shear rate (s^{-1})	167
		58.5		3.2	10^{-6}	0	
		58.0		3.0	10^{-5}	0	
		57.8		3.3	10^{-5}	0	
		58.6		3.9	10^{-8}	5.4	
		58.8		5.2	10^{-9}	7.6	
		59.1		5.3	10^{-8}	17.0	
		59.2		6.7	10^{-10}	25.2	
		57.8		5.5	10^{-7}	37.6	
		59.2		5.8	10^{-10}	36.5	
		59.6		3.2	10^{-7}	0	
		59.8		2.9	10^{-6}	0	
		59.5		3.0	10^{-7}	0	
		59.6		3.9	10^{-8}	1.4	
		59.6		3.3	10^{-7}	3.0	
		59.5		3.5	10^{-8}	5.4	
		59.2		4.5	10^{-9}	8.4	
		59.6		4.4	10^{-8}	9.6	
		59.6		3.5	10^{-8}	10.8	
		59.6		5.9	10^{-12}	17.1	
		59.9		5.0	10^{-8}	19.8	
		59.6		4.1	10^{-8}	27.1	
		59.8		3.9	10^{-7}	38.9	
		61.1		2.9	10^{-8}	0	
		61.0		3.1	10^{-8}	0	
		61.0		4.1	10^{-9}	1.4	
		60.9		4.8	10^{-10}	3.1	

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		61.0		4.9	10^{-11}	5.4	
		61.0		5.0	10^{-10}	9.1	
		61.8		5.1	10^{-11}	9.2	
		61.3		5.1	10^{-9}	28.5	
$M_w = 3.5 \times 10^3$	69 (15 min)		39.3	2.7	0.11	Slightly degraded after the	60(a)
$M_w/M_n < 1.2$			40.4	2.9	4.5×10^{-1}	determinations; DSC	
			41.7	2.6	1.6×10^{-2}	measurements	
			43.5	2.5	3.3×10^{-3}		
			44.4	2.6	3.0×10^{-4}		
			45.3	2.6	8.0×10^{-5}		
			46.4	2.9	2.3×10^{-6}		
$M_w = 4.5 \times 10^{-3}$			35.0	3.0	1.99		60(a)
$M_w/M_n < 1.04$			37.0	3.1	0.93		
			39.0	3.1	0.34		
			40.4	3.1	0.19		
			42.7	3.0	2.6×10^2		
			43.4	2.8	4.2×10^3		
			45.0	2.9	2.5×10^4		
$M_w = 7.0 \times 10^3$			39.8	2.4	2.1		60(a)
$M_w/M_n < 1.2$			41.2	2.4	1.2		
			43.4	2.1	0.23		
			44.9	2.1	7.7×10^{-2}		
			47.0	2.4	8.2×10^{-3}		
			49.4	2.4	3.8×10^{-4}		
$M_w = 9.0 \times 10^3$			40.1	1.9	1.85	DSC	60(a)
$M_w/M_n = 1.07$			43.4	2.0	0.68		
			48.4	2.3	2.6×10^{-2}		
			49.6	2.1	8.3×10^{-4}		
$M_w = 20.0 \times 10^3$			44.4	2.5	0.49		60(a)
$M_w/M_n = 1.3$			46.3	2.7	0.13		
			48.4	2.4	2.2×10^{-2}		
			51.7	2.4	7.4×10^{-4}		
			53.2	2.1	3.1×10^{-6}		
$M_w = 100.0 \times 10^3$			39.8	2.2	6.7		60(a)
M_w/M_n is unknown			43.4	2.2	2.7		
			47.3	2.3	0.58		
			49.4	2.3	0.15		
			51.5	2.1	1.6×10^{-2}		
			53.9	2.1	1.0×10^3		
			39.5	2.47	8.23	DSC used for bulk rate constants;	
			40.0	2.50	2.96	two stage Avrami rates cited;	
			45.6	3.00	0.90	Stage I	
			46.8	2.68	0.50		
			47.9	2.87	0.20		
			48.9	3.08	3.65×10^{-2}		
			50.0	3.04	3.71×10^{-3}		
			51.3	2.85	1.95×10^{-4}		
			51.9	3.46	1.14×10^{-6}		
			54.4	3.33	4.38×10^{-9}		
			55.2	3.22	2.40×10^{-11}		
			45.6	0.95	1.16	Stage II	
			46.8	1.12	0.82		
			47.9	1.06	0.56		
			48.9	1.02	0.30		
			50.0	0.95	0.14		
			51.3	0.98	4.21×10^{-2}		
			51.9	1.02	1.04×10^{-2}		
			54.4	0.86	3.88×10^{-3}		
			55.2	0.79	1.06×10^{-3}		
$M_v = 23 \times 10^3$	100 (10 min)	54.7	432			Dilatometry; crystallinity values	60(a)
$M_w/M_n = 1.2$ (GPC)		5.6	780			cited as $t_{0.1}$(s), not $t_{0.5}$	
		57.0	2640				
		58.1	7200				
		59.4					
$M_v = 42 \times 10^3$	100 (10 min)	54.7				Dilatometry; crystallinity values	60(a)
$M_w/M_n = 1.3$		55.6				cited as $t_{0.1}$(s), not $t_{0.5}$	

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		57.0	960				
		58.1	2940				
		59.4	16200				
$M_v = 84 \times 10^3$	100 (10 min)	54.7	960			Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
$M_w/M_n = 1.21$		55.6	1440			Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
		57.0	3600				
		58.1					
		59.4					
$M_v = 130 \times 10^3$	100 (10 min)	54.7				Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
$M_w/M_n = 1.35$		55.6					
		57.0	462				
		58.1	1200				
		59.4	4620				
$M_v = 240 \times 10^3$		54.7				Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
$M_w/M_n = 1.22$		55.6				Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
		57.0	780				
		58.1	1380				
		59.4					
$M_v = 540 \times 10^3$	100 (10 min)	54.7				Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
$M_w/M_n = 1.53$		55.6					
		57.0	522				
		58.1	660				
		59.4					
$M_v = 1570 \times 10^3$	100 (10 min)	54.7					
$M_w/M_n = 1.85$		55.6				Dilatometry; crystallinity values cited as $t_{0.1}$(s), not $t_{0.5}$	160(a)
		57.0	558				
		58.1	960				
		59.4	558				
$M_v = 20 \times 10^3$	88 (15 min)	59.3	12960	2.21		DSC; rates are also given in text after quenching; some dilatometry results also available; k_n values are also cited	343
		59.0	6900	2.5			
		58.1	4884	2.1			
		57.1	1476	2.0			
		56.0	1206	1.			
		55.0	612	1.8			
		54.0	540				
		52.0	492				
		48.2	300				
$M_n = 1.6 \times 10^3$	100 (15 min)	43.3	600			Dilatometry; selected values only listed	295
$M_w/M_n = 1.05$		44.8	3120				
		45.9	73200				
$M_n = 4.1 \times 10^3$		49.2	2760				295
$M_w/M_n = 1.05$		50.9	9600				
		53.4	277200				
$M_n = 20 \times 10^3$		54.8	1140				295
$M_w/M_n = 1.2$		56.3	2640				
$[\eta] = 0.374$		57.0	8100				
		57.5	17940				
		58.2	33360				
$M_n = 200 \times 10^3$		55.9	840				295
$M_w/M_n = 1.2$		57.8	3360				
$[\eta] = 1.92$		58.2	3492				
		58.9	12180				
		59.7	27840				
$M_n = 600 \times 10^3$		55.0	1140				295
$M_w/M_n = 1.2$		57.2	5760				
$[\eta] = 3.65$		58.2	6540				
		58.9	18900				
		59.4	25680				
		60.2	91200				
Poly(oxyethylene)							
0% silica	120 (45 min)	53.7	2334			Dilatometry; Me_3SiCl-treated silica	11
		54.7	3873				
		55.8	7381				

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		56.8	15071				
		57.8	32221				
2% silica		53.7	1941				11
		54.7	3533				
		55.8	6888				
		56.8	14065				
		57.8	31488				
5% silica		53.7	1770				11
		54.7	3297				
		55.8	6578				
		56.8	13432				
10% silica		53.6	1282				11
		54.7	2128				
		55.7	3873				
		56.8	8093				
		57.8	17707				
Poly(oxymethylene)							
$M_w = 66 \times 10^3$		140.0	36			DSC measurements of rate, average $t_{0.5}$ values interpolated from mean line of data of 3 samples; lamellar thickness and spherulitic growth rates listed in text	340
$M_w = 41 \times 10^3$		142.5	48				
$M_w = 35 \times 10^3$		145.0	72				
		147.5	90				
		150.0	185				
		152.5	420				
		155.0	1800				
		157.5	6000				
		160.0	24900				
Poly(oxymethylene–oxyethylene)							
$M_v = 9.4 \times 10^3$	80 (4 h)	19.5	4.0	2.8		Rate constants also listed in text	297
		22	5.7	2.8			
		25	10.5	4.1			
		28	22	4.1			
Unfractioned		35	1400	3.0			
$M_v = 6.7 \times 10^3$		19.5	240	2.8		Dilatometry; two crystal modifications	372
		22	342	2.8			
		25	630	4.1			
		28	13200	4.1			
		35	84000	3.0			
$M_v = 10 \times 10^3$		0	26	2.07	10	DSC	372
		2	28	2.93	8.8		
		4	25	2.19	11		
		6	28	2.65	8.8		
		8	26	2.34	10		
		10	34	2.40	6.0		
		12	75	2.00	1.2		
		14	126	2.00	0.43		
		15	135	1.90	0.38		
$M_v = 30 \times 10^3$		0	16	2.03	27	DSC	372
		2	16	2.05	27		
		4	14	1.90	35		
		8	31	2.26	7.2		
		10	25	1.90	11		
		14	39	1.90	4.5		
		16	34	2.12	6.0		
		19	101	1.95	0.67		
		21	290	2.00	0.085		
Poly(oxypropylene)	125 (10 min)	49.7	12600	3.1		Hot stage optical microscopy	343
$M_v = 300 \times 10^3$		48.5	10680	3.0			
		47.5	8580	3.0			
		46.7	6600	3.6			
		45.5	3540	3.3			
		42.8	2520	3.1			
		40.3	1650	3.0			
		38.7	1200	2.7			
$M_v = 300 \times 10^3$	125 (10 min)	50.0	15660	2.1		DSC; rates are also given in text after quenching; some diletometry results also available	343
		47.5	8640	2.1			
		45.0	4500	2.2			

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		42.5	2580	2.0			
		40.0	1620	2.0			
		38.5	1200	2.1			
		35.0	2.0				
After quenching		−53.5	1920	2.2			
		−52.0	990	2.3			
		−50.0	480	2.1			
Poly(oxytetramethylene)							
$M_n = 13.4 \times 10^3$	260	208.8		2.6	8.8×10^{-8}	DSC; polymerization method;	373
		209.8			2.8×10^{-8}	catalyst and T_m(optical)	
		211.1			7.4×10^{-9}	given in text	
		212.0			3.1×10^{-9}		
		212.7			1.5×10^{-9}		
		212.9			9.2×10^{-10}		
		213.5			5.6×10^{-10}		
Poly(oxytrimethylene)							
$M_n = 79 \times 10^3$	80 (15 min)	−50.2	579.7			DSC	290
		−44.4	333.5				
		−39.3	242.4				
		−36.7	224.6				
		−33.8	200.6				
		−28.7	189.4				
		−26.5	201.8				
		−23.6	208.0				
		−18.9	276.1				
		−14.5	369.9				
		−10.2	658.6				
		−6.9	1195.2				
		−4.0	2371.5				
		−0.4	8000.0				

11.2. BLENDS

Poly(oxyethylene)/Poly([1-(methoxycarbonyl)-1-methylethylene] PEO10/PMMA (isotactic)							
100/0		46.6	49.1				219
		49.3	114.1				
		50.1	213.7				
		51.0	417.8				
		52.0	766.3				
		53.0	2631				
		53.9	3076				
90/10		46.4	85.9				219
		47.3	125.9				
		48.1	206.5				
		49.2	317.0				
		50.1	382.9				
		51.0	1671				
		52.0	3681				
		53.0	4615				
80/20		43.2	202.0				219
		44.2	251.8				
		45.2	798.9				
		46.2	967.7				
		47.1	2047				
		48.1	3681				
		49.1	4615				
		50.1	6185				
60/40		39.2	346.8				219
		40.1	417.8				
		41.1	540.5				
		42.1	656.5				
		43.1	1312				
		44.2	1312				
		45.2	2298				
		46.1	3076				
		47.2	9230				

TABLE 11. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		48.1	3681				
		49.0	6185				
Poly(oxyethylene)/poly(octafluoropentoxytrifluoroethoxyphosphazene)/poly[oxy(1-(chloromethyl)ethylene]							
PEO, $M_w = 5 \times 10^6$; PPZ, Unlisted M_w; PECH, $M_w = 7 \times 10^5$							
PEO/PPZ: 100/0	100 (5 min)	52		2.1	2.51×10^{-2}	Measurements made by DSC and optical hot stage microscopy; T_m values and morphology documented units of k are unspecified in text-assumed to be in seconds	309
		53		2.0	5.25×10^{-2}		
		54		2.1	2.34×10^{-2}		
PEO/PPZ: 75/25		52		1.6	2.09×10^{-2}		
		53		1.7	0.93×10^{-2}		
		54		1.7	0.30×10^{-2}		
PEO/PPZ: 50/50		52		1.5	1.07×10^{-2}		309
		53		1.6	0.58×10^{-2}		
		54		1.7	0.27×10^{-2}		
PEO/PECH: 75/25		52		2.0	0.30×10^{-3}		309
		53		2.3	0.15×10^{-3}		
		54		2.1	0.85×10^{-3}		
PEO/PECH: 50/50		50		1.8	0.15×10^{-3}		309
		51		1.9	0.85×10^{-3}		
		52		2.1	0.43×10^{-3}		
PEO/PPZ/PECH: 66/17/17		52		2.0	1.66×10^{-2}		309
		53		2.1	0.50×10^{-2}		
		54		1.9	0.28×10^{-2}		
PEO/PPZ/PECH: 50/25/25		50		1.9	2.29×10^{-2}		309
		51		2.0	0.72×10^{-2}		
		52		2.1	0.17×10^{-2}		

TABLE 12. POLY(CARBONATES)

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)							
Bistan AF		35	598.5	3		DSC; solvent induced crystallization in CCl_4 and acetone; crystallinity cited; film thickness; 20000 *& 10000 nm*	374
$M_v = 62.5 \times 10^3$		40	268.9	3			
		25	2308.5	3			
		40	2964.1	3			
Poly(oxydecamethyleneoxysebacoyl)	135 (15 min)	73.7	35400	2.7		k_n values listed in text	343
$M_n = 14.4 \times 10^3$		73.2	16560	2.6			
$M_v = 28.6 \times 10^3$		72.8	13140	2.6			
		72.0	6780	2.6			
		71.8	6120	2.9			
		70.8	2100	2.2			
		69.2	900	1.6			
		68.2	678	1.6			
		67.2	444	1.5			
		66.6	396				
		65.8	324				
Poly(oxyethyleneoxyadipoyl)	125 (15 min)	39.0	28800	2.4		k_n values listed in text DSC; rates are also given in text after quenching some dilatometry; results also available	343
$M_w = 20 \times 10^3$		37.5	10800	2.5			
		36.8	8580	2.4			
		36.1	7800	2.4			
		35.6	6000	2.4			
		34.2	2880	2.7			
		33.2	1020	2.4			
		32.1	2052	2.7			
		29.9	1090	2.4			
		27.8	756	2.4			
		25.7	438	1.9			
		23.5	336				
		21.6	252				
		18.5	120				

Table 12. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
Poly(oxyethyleneoxysebacoyl)	135 (15 min)	71.4	10440	2.8		DSC rates are also given in text after quenching; some dilatometry resultsavailable; k_n values are also cited	343
$M_n = 14.4 \times 10^3$		70.9	7020	2.5			
		70.1	3960	2.6			
		69.6	3540	2.6			
0.5% soln. in tricresol		68.6	2220	2.5			
of 0.74 dl/g		67.6	1440	2.5			
		65.7	648	2.2			
		64.7	510	2.0			
		63.5	408	2.0			
		62.5	294	1.9			

TABLE 13. POLY(ESTERS)

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
13.1. HOMOPOLYMER MELTS							
Poly (ethylene-2,6-naphthalate)	280 (10 min)	230	110			DSC measurements. Column 4 contains T_m (time to attain max.heat flow and crystallinity, X_C); proportional to $t_{0.5}$	412
PEN (5); intrinsic viscosity		235	170				
~0.6 dl/g		240	358				
		250	1104				
	320	230	107			Range of crystalline order $0.4 < X_C < 0.45$. Non-isothermal data are listed in text ; spherulitic morphology is discussed	
		235	254				
		240	395				
		250	1042				
PEN (6); intrinsic viscosity	280	230	147				
~0.7 dl/g		235	223				
		240	374				
		250	799				
	320	230	165				
		235	338				
		240	527				
		250	1232				
Poly(oxyethyleneoxyterephthaloyl)							
$M = 6.65 \times 10^3$		227	72	2.6		DSC; k (min^{-n}) listed in text; crystallinities also cited	375
		230	111.6	3.1			
		235	349.2	3.4			
$M = 11.75 \times 10^3$		227	73.2	2.6			375
		230	133.2	3.4			
		232	177.0	3.4			
		235	297.0	3.9			
$M = 8.10 \times 10^3$		227	46.2	2.4			375
		230	88.2	3.4			
		232	126.0	3.9			
		235	244.8	4.0			
$M = 7.10 \times 10^3$		227	58.2	2.6			
		230	112.2	3.1			
		232	163.8	3.8			
		235	328.2	4.0			
$M = 5.35 \times 10^3$		225	81.0	2.0			375
		227	138.6	3.3			
		232	441.0	3.5			
		235					
$M_w = 81.7 \times 10^3$	270 (30 min)	225	906			0.0288 mol% Sb_2O_3	376
		230	1812				
		235	4536				
		240	9816				
$M_w = 69.7 \times 10^3$	270 (30 min)	225	486			0.0288 mol% Sb_2O_3	376
		230	1392				
		235	3348				
		240	8418				

TABLE 13. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
$M_w = 49.0 \times 10^3$	270 (30 min)	235	1398			0.0288 mol% $Ca(OOCCH_3)_2$	376
		240	3498				
		242	4158				
$M_w = 30.6 \times 10^3$	270 (30 min)	235	978				376
		240	2340				
		242	3408				
oriented fibers	RT quench	95	17190			Fibers, $f_a = 0.032$[a]; crystallinity and density listed	377
		100	7020				
		105	4800				
		110	900				
		115	600				
		95	14400			$f_a = 0.044$; crystallinity and density listed	
		100	3540				
		105	840				
		110	660				
		115	300				
		95	1920			$f_a = 0.123$; crystallinity and density listed	
		100	480				
		105	360				
		110	180				
DuPont, Type A Mylar $M_w = 35.5 \times 10^3$ $[\eta] = 0.580$	277	95	1380			DSC; crosslinked with 1 mrad γ-radiation	378
		100	720				
		105	240				
		110	150				
		230	360				
		235	780				
		240	210				
		95	2400			2 mrad γ-radiation	
		100	1200				
		105	480				
		110	240				
		230	600				
		235	1260				
		240	5400				
Intrinsic viscosity $[\eta] = 0.573$		95	1080			3 mrad γ-radiation	
		100	450				
		105	234				
		110	132				
		230	240				
		235	600				
		240	1620				
$M_n = 12.2 \times 10^3$	295.0	228.3		2.0	3.3×10^{-6}	DSC; polymerization method, catalyst and T_m (optical) given in text	373
		230.2			1.6×10^{-6}		
		232.6			5.1×10^{-7}		
		233.7			5.4×10^{-7}		
		234.6			3.3×10^{-7}		
		236.8			1.2×10^{-7}		
		237.2			1.5×10^{-7}		
		239.8			4.8×10^{-8}		
Poly(oxyethylene oxyterephthaloyl) (Various data compiled by author)		107	120			Crystallized from glassy state; average $t_{0.5}$ values, interpolated	379
		108	100				
		110	80				
		112	564				
		116	371				
		125	139				
		205	59				
		216	173			Nucleated with low mol. wt. poly(propylene)	
		227	393				
		232	549				
		236	734				
		237	937				
		113	1110			Nonnucleated polymer	
		114	862				
		117	655				
		124	342				

TABLE 13. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		133	175				
		202	72			Nucleated with poly(propylene)	
		215	213				
		226	444				
		231	607				
		233	810				
		235	1044				
		172	77			Nucleated with LLDPE	
		188	83				
		203	144				
		215	258				
		220	390				
		224	566				
		227	706				
		229	868				
		231	994				
		232	1134				
		215	362			Nonnucleated polymer; these constitute $t_{0.5}$(s) averages compiled from the literature	
		219	538				
		223	700				
		224	809				
		226	953				
		227	1080				
		228	1259				
Poly(oxyhexamethylene-terephthaloyl) PET	285	26.6	222		10	Avrami equation does not fit data; Malkin equation was used (see Ref.); crystallization temp. expressed as $T_m - T_c$ (°C); Pressure MPa; $T_m = 264.2 - 0.5058P$; $dT_m/dP = 0.506$/MPa; $T_c = 234.6 - 0.5330P$; @10MPa; $dT/dt = 2.5$	
		26.9	243		50		
		27.6	439		100		
		25.5	444		125		
		25.1	720		150		
Poly(oxyhexamethyleneoxyterephthaloyl)							
$M_n = 11.8 \times 10^3$	186	131.5		2.9	1.2×10^{-8}		373
		132.7			6.1×10^{-9}		
		134.0			1.4×10^{-9}		
		135.2			5.3×10^{-10}		
		136.6			1.6×10^{-10}		
		138.0			3.1×10^{-11}		
Poly(oxy-1-oxo-2,2-dimethylethylene)							
$M_n = 71 \times 10^3$	250 (5 min)	186.0	84	2.7		Dilatometry, DSC thermograms and $t_{0.1}$ values also given; higher fractions up to $M_n = 241 \times 10^3$ are measured	380
$M_w = 163 \times 10^3$		188.5	162	2.5			
		191.0	192	2.4			
		194.0	492	2.3			
		197.0	582	2.3			
Poly(oxy-1-oxyethylene)							
$M_w = 20–145 \times 10^3$		201	27.8		4 (approx.)	DSC	371
		203	38.4				
		205	52.2				
		207	66.2				
Poly(oxy-1-oxohexamethylene)						Shear dilatometer, shear rate(s^{-1})	
$M_w = 9.4 \times 10^3$	T_m + 24 (60 min)	48.1		3.0	10^{-10}	0	167
		48.0		3.7	10^{-10}	1.4	
		48.0		3.9	10^{-9}	2.9	
		48.3		3.7	10^{-9}	5.2	
		48.1		3.7	10^{-7}	10.9	
		48.1		4.0	10^{-8}	14.6	
		48.6		5.0	10^{-10}	16.0	
		48.4		5.5	10^{-11}	26.9	
		49.8		2.9	10^{-9}	0	
		49.8		2.9	10^{-8}	1.3	
		49.8		3.1	10^{-8}	2.8	
		49.8		4.5	10^{-11}	5.1	
		49.8		4.2	10^{-10}	8.9	
		49.8		4.3	10^{-9}	10.8	

TABLE 13. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		49.5		4.7	10^{-11}	11.2	
		49.8		4.9	10^{-11}	14.9	
		49.8		5.1	10^{-11}	26.6	
		49.9		5.0	10^{-11}	48.0	
		50.9		2.9	10^{-8}	3.0	
		50.9		3.2	10^{-9}	5.5	
		50.9		4.0	10^{-10}	11.0	
		50.8		4.1	10^{10}	14.3	
		50.8		4.8	10^{-12}	16.0	
		50.8		4.8	10^{-11}	24.9	
		50.9		5.0	10^{-11}	47.2	
		50.9		4.1	10^{-10}	15.3	
						Crystallinity with time of transformation cited	
Poly(oxypentamethyleneoxyterephthaloyl)							
$M_n = 13.4 \times 10^3$	260*	210.1		2.8	7.1×10^{-9}	Dilatometry	343
		211.7			2.1×10^{-9}		
		212.1			1.5×10^{-9}		
		213.6			3.7×10^{-10}		
		214.3			2.6×10^{-10}		
		214.7			1.5×10^{-10}		
		214.9			8.9×10^{-11}		
Poly(decamethylene-4,4′-diphenoxyterephthaloyl) PDDPT							
	265*	234	30	3		DSC studies; transformation after conditioning @265°C from the nematic state	247
		235	48	3			
		236	60	3			
		238	108	3			
		239	144	3			
	240	246	2				
		241	324	2			
	280*	237	72	3		Transformation from the nematic state after conditioning @280°C	
		238	90	3			
		239	156	3			
		240	264	2			
		241	486	2			
	300*	237	84	3		Transformation from the isotropic state after conditioning @300°C	
		238	132	2			
		239	258	2			
		240	522	2			
Poly(hexamethylene-4,4′-diphenoxyterephthaloyl) PHDPT							
	190*	171.5	57	3		DSC rate; transformation from nematic state after conditioning @190°C	248
		172	78	3			
		172.5	102	3			
		173	144	3			
	173.5						
	200*	171	54	3		Transformation from nematic state after conditioning @200°C	
		171.5	54	3			
		172.5	78	3			
		173	102	3			
		173.5	144	3			
		174	192	3			
		174.5	264	3			
	240*	170	42	2		Transformation from the isotopic state after conditioning @240°C	
		171	42	2			
		171.5	48	2			
		173	78	2			
		173.5	90	2			
		174	114	2			
		174.5	174	2			
		175	288	2			

* Denotes mesophase conditioning temperature; not T_f.

TABLE 13. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
Poly(hexamethylene-4,4′-diphenoxyterephthaloyl PHXDPT							
	280*	262	60	2		DSC studies transformation from the nematic state after conditioning @280°C	248
		262.5	60	2			
		263	78	2			
		263.5	90	2			
		264	102	2			
		264.5	120	2			
	285*	262	30	2		Transformation from nematic state after conditioning @285°C	
		262.5	36	2			
		263	48	2			
		263.5	66	2			
		264.5	90	2			
		265	96	2			
		265.5	138	2			
13.2. BLENDS AND COPOLYMERS							
Poly(oxy-1-oxohexamethylene)/poly(1-chloroethylene)							
PCL/PVC: 70/30	100 (5 min)	5	216	3	4.36×10^{-2}		318
		15	372		1.41×10^{-2}		
		25	1200		1.95×10^{-3}		
65/35		5	600	3	1.99×10^{-3}		
		15	900		7.60×10^{-4}		
		25	2220		7.57×10^{-5}		
60/40		5	2760	3	4.57×10^{-6}		
		15	2100		8.50×10^{-6}		
		25	3480		2.62×10^{-6}		
50/50		5	37800	3	2.45×10^{-9}		
		15	28800		3.98×10^{-3}		
		25	35700		3.16×10^{-9}		
Poly(oxyethyleneoxyterephthaloyl)/poly(ethylene-1,2-diphenoxyethane-1,2-dicarboxylate)							
PET/PC: 0/100, w/w		80	0.164			DSC used; rates expressed in s^{-1}; $T_m = 288°C$; $T_g = 72°C$	
		90	0.159				
		100	0.154				
		120	0.123				
		130	0.109				
		140	0.089				
		150	0.078				
		170	0.064				
33/67, w/w		80	0.105			$T_m = 284°C$; $T_g = 71°C$	
		90	0.109				
		100	0.108				
		110	0.095				
		120	0.083				
		130	0.064				
		150	0.045				
		170	0.004				
50/50, w/w		80	0.078			$T_m = 274°C$; $T_g = 71°C$	
		90	0.081				
		95	0.083				
		100	0.083				
		110	0.077				
		120	0.074				
		130	0.062				
		140	0.06				
		150	0.055				
		170	0.051				
67/33, w/w		80	0.07			$T_m = 276°C$; $T_g = 70°C$	
		90	0.072				
		100	0.077				
		105	0.076				
		110	0.072				
		120	0.061				

* Denotes mesophase conditioning temperature, not T_f.

TABLE 13. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
		130	0.049				
		140	0.045				
		150	0.04				
0/100, w/w		100	0.018			$T_m = 280$°C	
		110	0.02				
		120	0.027				
		130	0.031				
		140	0.03				
		160	0.02				
		170	0.018				
Poly(oxyethyleneoxyterephthaloyl)/poly(oxybutyleneoxyterephthaloyl)							
PET/PBT: 100/0, w/w	280 (5 min)		119	2920		DSC measurement; t_c values are listed in text; relation to k (s^{-n}) is not specified	382
		129	940				
		139	423				
		150	234				
		159	183				
		169	169				
		195	247				
		205	334				
		216	693				
		224	1256				
		229	2098				
90/10, w/w		100	2017				382
		105	615				
		110	500				
		195	133				
		221	115				
		120	157				
		125	131				
		130	107				
		135	83				
		210	282				
		216	369				
		223	1016				
		225	1290				
		230	3105				
75/25, w/w		75	2000				382
		80	494				
		85	485				
		90	327				
		94	176				
		100	161				
		105	110				
		110	107				
		115	88				
		120	54				
		125	51				
		185	119				
		206	232				
		210	337				
		215	515				
		217	587				
		218	602				
		222	805				
		227	1888				
Poly(oxyethyleneoxyterephthaloyl)/Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene)							
PET/PC	285 (5 min)	210			13.10×10^3	DSC measurements; Avrami n variable; optical micrographs included on text	395
$M_n = 16000$		215			9.76×10^3		
$M_w = 57000$		220			5.74×10^3		
$M_n = 24000$		225			3.42×10^3		
100/0, w/w		230			2.14×10^3		
Additive modified		220			22.26×10^3	With antioxidant Itganox, 2 ppm	
		225			11.82×10^3		
		230			6.68×10^3		
		235			3.42×10^3		

TABLE 13. *cont'd*

Polymer	T_f (°C)	T_c (°C)	$t_{0.5}$ (s)	n	k (s^{-n})	Remarks	Refs.
80/20, w/w		220			20.62×10^3		395
		225			10.92×10^3		
		230			6.25×10^3		
		235			2.90×10^3		
60/40, w/w		220			24.46×10^3		395
		225			13.77×10^3		
		230			8.13×10^3		
		235			3.50×10^3		
40/60, w/w		215			23.96×10^3		395
		220			14.90×10^3		
		225			8.83×10^3		
		230			4.88×10^3		
60/40, w/w	280 (1 min)	230			18.90×10^3	Effect of fusion on rate	395
	(5 min)				17.05×10^3		
	(10 min)				13.94×10^3		
	(15 min)				12.22×10^3		
	(20 min)				8.77×10^3		
	(30 min)				6.65×10^3		
	300 (1 min)	230			7.26×10^3	Effect of fusion on rate	395
	(5 min)				5.50×10^3		
	(10 min)				2.46×10^3		
	(20 min)				1.23×10^3		
	(30 min)				0.08×10^3		
Poly(butylene naphthalate terephthalate)-*co*-poly(hydroxybutylnaphthalate)							
BHBT/PHBN: 100/0, w/w	T_m + 40 (6 min)	161	65	2.5	2.91×10^{-5}	DSC measurements	
62.9/37.1, w/w		164	91	2.7	7.52×10^{-6}	DSC measurements	
		167	133	2.9	1.49×10^{-6}		
		170	204	3.0	3.12×10^{-8}		
100/0, w/w		161	85	2.5	9.30×10^{-4}	DSC measurements	
55.5/44.5, w/w		164	27	2.8	1.41×10^{-4}	DSC measurements	
		167	201	2.8	6.23×10^{-7}		
		170	336	2.9	1.08×10^{-7}		
100/0, w/w		161	97	2.7	6.19×10^{-6}	DSC measurements	
45.6/54.5, w/w		164	151	2.9	9.61×10^{-7}	DSC measurements	
		167	250	2.9	2.33×10^{-7}		
		170	471	3.0	2.10×10^{-8}		
Poly(butylene naphthalate terephthalate)-*co*-poly(hydroxybutylnaphthalate)							
BHBT/PHBN: 100/0, w/w	T_m + 40 (6 min)	161	65	2.5	2.91×10^{-5}	DSC measurements	404
62.9/37.1, w/w		164	91	2.7	7.52×10^{-6}	DSC measurements	404
		167	133	2.9	1.49×10^{-6}		
		170	204	3.0	3.12×10^{-8}		
100/0, w/w		161	85	2.5	9.30×10^{-4}	DSC measurements	404
55.5/44.5, w/w		164	27	2.8	1.41×10^{-4}	DSC measurements	404
		167	201	2.8	6.23×10^{-7}		
		170	336	2.9	1.08×10^{-7}		
100/0, w/w		161	97	2.7	6.19×10^{-6}	DSC measurements	404
45.6/54.5, w/w		164	151	2.9	9.61×10^{-7}	DSC measurements	404
		167	250	2.9	2.33×10^{-7}		
		170	471	3.0	2.10×10^{-8}		

TABLE 14. POLY(AMIDES)

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(imino(1-oxo-hexamethylene)) Nylon 6		205	1080			Dilatometry	289
$M_n = 14.6 \times 10^3$		207	2040				
		209	3600				
		210	4980				
		212	6000				
		215	12600				
Poly[imino(1-oxohexamethylene)] Nylon 6		48	1848	~2		DSC rate measurements from the glassy state; rate constants listed for non-integer n values	401
		49	1608				
		49.5	1230				

TABLE 14. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
		51.5	750				
		52.5	493				
		57.6	93				
		60.2	45				
		62.9	21.6				
Poly[imino(1-oxohexamethylene)]		241		3	1.48×10^{-9}	Rate constants in (min^{-n})	323
$M_n = 11.6 \times 10^3$		247		3	1.71×10^{-10}		
		250		3	1.39×10^{-11}		
		252		4	6.71×10^{-16}		
		243		3	3.06×10^{-9}		
		247		3	7.40×10^{-10}		
		250		3	7.40×10^{-11}		
		252		3	3.52×10^{-11}		
		253		4	5.71×10^{-16}		
		247		3	1.53×10^{-9}		
		250		3	6.50×10^{-10}		
		252		3	6.00×10^{-11}		
		253		3			
		254		4	5.48×10^{-16}		
		247		3	1.90×10^{-9}		
		250		3	5.10×10^{-10}		
		252		3	3.75×10^{-10}		
		255		3			
		257		4	2.70×10^{-14}		
$M_n = 17 \times 10^3$		178.0	98	2.3	Values cited in text in (min^{-n})	DSC; induction times cited in text	383
		182.1	122	2.1			
		186.1	160	2.0			
		189.2	262	2.0			
		193.2	400	19			
		195.3	560	1.8			
		199.3	960	2.05			
		203.3	3000	1.9			
		210.4	13100	2.35			
		176.0	24	4.5		With 0.1% kaolin	
		178.0	30	4.7			
		182.1	42	4.7			
		184.1	53	4.6			
		186.1	60	4.8			
		189.2	120	4.4			
		191.2	186	3.6			
		193.2	304	3.3			
		195.3	325	3.4			
		197.3	600	3.0			
		199.3	920	3.1			
		203.3	2100	2.7			
		184.1	32	3.2		With 0.01–0.5% talc	
		186.1	36	3.25			
		191.2	76	4.15			
		195.3	120	4.4			
		199.3	192	4.6			
		201.3	340	5.4			
		203.3	475	5.4			
		205.3	760	5.6			
		207.3	1230	6.1			
Poly[imino(1-oxohexamethylene)] Nylon 6		204	107	3		This polyamide is used in the blend below; see text	250
		205	166	3			
		207	255	3			
		208	271	3			
		209	398	3			
Poly[imino(1-oxohexamethylene)] Nylon 6		203	170	3			250
		204	203	3			
		205	276	3			
		206	329	3			
		207	419	3			
		208	636	3			

TABLE 14. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly[imino(1-oxohexamethylene)] Nylon 6		29.5	77.2			DSC measurements of $t_{0.5}$ and k; morphological study reported	384
linear	240 (10 min)	33.4	665				
$M_n = 16000$		35.6	560				
$M_w = 29000$		38.5	432				
DP = 270		41.2	605				
		45.0	280				
3-arm branched "dendrimers"	240 (10 min)	26.5	384				
		30.6	605				
$M_n = 19000$		32.3	493				384
$M_w = 36000$		35	385				
DP = 300		41	278				
6-arm branched "dendrimers"		23	868				
		28.3	646				
$M_n = 21000$		30.8	510				384
$M_w = 42000$		33.1	416				
		37	309				
Poly[imino(1-oxo-dodecamethylene)] Nylon 10							
$M_v = 15.7 \times 10^3$	220 (15 min)	163	168	4.3		DSC; k values listed in text	385
$[\eta] = 1.34$ dl/g		164	240	4.9			
(*m*-cresol at 20°C)		165	330	4.9			
		166	498	5.2			
		167	600	5.3			
		168	996	4.9			
		169	1200	4.7			
$M_v = 29.6 \times 10^3$		164	192	5.2			385
		165	240	5.3			
		166	348	5.0			
		167	546	5.3			
		168	750	5.5			
		169	996	5.6			
$M_v = 41.2 \times 10^3$		161	348	4.9			385
$[\eta] = 1.70$ dl/g		162	426	4.9			
		163	666	5.6			
		164	858	5.9			
		165	996	5.0			
$M_v = 9.5 \times 10^3$	220 (2 h)	162	360	4.4		Dilatometry; k values also cited in (min^{-n})	385
$[\eta] = 0.92$ dl/g		165	696	4.9			
(*m*-cresol at 20°C)		167	1128	4.2			
		169	3000	5.7			
$M_v = 23.9 \times 10^3$		162	522	5.0			385
$[\eta] = 1.80$ dl/g		165	1110	5.6			
		167	2070	4.7			
		169	3750	4.5			
$M_v = 23.9 \times 10^3$		162	396	4.7		Contains 0.1% kaolin	385
$[\eta] = 1.80$ dl/g		165	720	4.4			
		167	1332	4.7			
		169	2400	4.6			
Poly(iminoadipoyl iminohexamethylene) Nylon 66							
$M_n = 12.7 \times 10^3$		162	1.4			Light depolarization technique; spherulite growth from the melt	94
		175	1.85				
		187	3.03				
		200	4.0				
		212	9.1				
		224	16.7				
		238	40.0				
		20	10000			Growth from glassy state; spin line quenched and subsequently crystallized; fiber birefringence development using LDT on hot stage assembly between crossedpolars.Amorphous condition verified X-ray diffraction	94
		29	6600				
		34	1000				
		40	500				
		44	380				
		60	33				
		70	6.3				
		80	4.3				

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TABLE 14. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
14.1. BLENDS OF POLY(AMIDES)							
Poly(iminohexamethyleneaminoadipoyl)/poly[2-2'-bis(3,4-dicarboxy-phenoxy)phenylpropane-2-phenylene bisimide]							
	300 (5min)	237	29	$2.4 \leq n \leq 3.0$	k values listed in text as min^{-n}	DSC studies under nitrogen; textures are spherulitic $T_m^0 = 295$ C	410
(Nylon 66/PEI)							
wt%							
100/0		238.5	34				
		240	44				
		242	79				
		244	105				
95/5		237	38			T_m^0 unlisted	
		238.5	50				
		240	55				
		242	94				
		244	158				
90/10		237	39			$T_m^0 = 287$ C	
		238.5	58				
		240	69				
		242	100				
		244	165				
		246	300				
85/15		236	32			T_m^0 unlisted	
		237	40				
		238.5	40				
		240	71				
		242	111				
		244	198				
		246	294				
75/25		237	29			$T_m^0 = 281$ C	
		238.5	40				
		240	52				
		242	69				
		244	100				
50/50		237	34			$T_m^0 = 273$ C	
		238.5	42				
		240	65				
		242	94				
		244	120				
Poly[imino(1-oxo-hexamethylene)]/poly(iminohexamethyleneimioadipoyl)/[imino(1-oxohexamethylene)]							
Nylon 6/Nylon 66/caprolactam (mol/mol/mol)							
6/6.6/4.4	$T_m^0 + 30$(10–20 min)	207	12.3			DSC rate measurements; Polymers characterized by pyrolysis, NMR; T_m^0 using Flory copolymer theory (see Ref. 215)	386
		209	22.7				
		210.5	42.1				
		212	76.3				
6/6.6/8.2	$T_m^0 + 30$ (10–20 min)	205	14.8				386
		206.5	26.4				
		208	52.7				
		210	84.7				
6/6.6/17.5	$T_m^0 + 30$ (10–20 min)	205	19.6				386
		206.5	34.6				
		208	52.3				
		194	93.4				
6/66-4,4	$T_m^0 + 30$ (10–20 min)	195	12.3				386
		198	22.7				
		201	40.8				
		204	74.4				
6/PXD.6-4.1	$T_m^0 + 30$ (10–20 min)	182	12.4				386
		186	23.9				
		189	46.5				
		192	71.0				
6/MXD.6-3.4	$T_m^0 + 30$ (10–20 min)	189.5	13.2				386
		193	27.0				
		199	53.8				
		202.5	128				

TABLE 14. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
6/I-3.8	T_m^0 + 30 (10–20 min)	182	27.0				386
		185	53.8				
		188	75.9				
		191	194				
		194	190.4				
6/MXD.I-3.9	T_m^0 + 30 (10–20 min)	175	30.8				386
		187	110.6				
6/6.T-4.5	T_m^0 + 30 (10–20 min)	168	53.5				386
		171	69.5				
		174	96.0				
		177	142.6				
		180	198.2				

TABLE 15. POLY(URETHANES)

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(oxycarbonyliminotetramethylene iminocarbonyl oxyhexamethylene)							
$M_w = 10 \times 10^3$	195 (10 min)	169	3540	2.1		k_n values listed in text	343
		167	1650	2.1			
		165	1110	2.0			
		163	630	1.9			
		162	360	2.0			
Poly(oxycarbonyliminohexamethylene iminocarbonyl-bis(oxyethylene)							
	150 (10 min)	109	17280	3		k_n values listed in text	343
		107	8880	3			
[η] = 0.81 in		105	4860	3			
0.5% *m*-cresol		103.5	3060	3			
		100	960	3			
		95	630	3			
After quenching		14.2	5580				
		16.2	3960				
		17.8	3000				
		20.3	1950				
		22.3	1320				
		25.6	600				
		27.2	432				
		28.2	330				
Poly(oxycarbonyliminohexamethylene iminocarbonyl-tris(oxyethylene))							
	140 (10 min)	85	4260	2		k_n values listed in text	343
		81	2160	2			
		78	1350	2			
		75	930	2			
		72	630	2			
		69	420	2			
After quenching		14.7	3960				
		16.1	2940				
		19.0	1320				
		22.0	960				
		24.5	630				
		26.0	390				

15.1. BLENDS OF POLY(URETHANES)

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly[imino(1-oxohexamethylene)] Nylon 6; 70/30 blend with 10% polypropylene with maleic anhydride							
		203	213	3			
		204	252	3			
	205	324	3				
		206	497	3			
		28.0	300				

TABLE 16. POLY(SILOXANES)

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(oxydimethylsilylene) DMS	20	−55.6	900	2.2			343
		−6.7	660	2.1			
$M_v = 400 \times 10^3$		−58.0	480	2.0			
		−59.6	420	2.1			
		−60.5	318	2.1			
		−63.0	228	2.0			
		−65.0	174	2.0			
		−67.0	138				
		−115	1080	2.0			
After quenching		−109	108				
Poly(oxydimethylsilylene-1,4-phenylenedimethylsilylene) TMPS							
$M_w = 15.8 \times 10^3$	200 (5 min)	100	82			Other bulk transformation methods DSC and SAXS have been used on these same fractions	387,388
		110	2553				
		115	6383				
		120	24000				
		126.5	111540				
$M_w = 37.5 \times 10^3$		100	54				387,388
		110	1580				
		115	4110				
		120	10000				
		126.5	55050				
$M_w = 109 \times 10^3$		100	105				387,388
		110	2857				
		115	5405				
		120	15000				
		126.5	56075				
$M_w = 245 \times 10^3$		100	316				387,388
		110	8571				
		115	13636				
		120	30000				
		126.5	120000				
$M_w = 380 \times 10^3$		100	3191				387,388
		110	20000				
		115	35294				
		120	99174				
		126.5	272727				
Poly(oxydimethylsilylene)	20	−55.6	900	2.2			343
		−56.7	660	2.1			
$M_v = 400 \times 10^3$		−58.0	480	2.0			
		−59.6	420	2.1			
		−60.5	318	2.1			
		−63.0	228	2.0			
		−65.0	174	2.0			
		−67.0	138				
		−115	1080	2.0			
After quenching		−109	108				

TABLE 17. POLY(PHOSPHAZENES)

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly[bis(4-fluorophenoxy) phenylphosphazene]							
$M_n = 0.16 \times 10^6$	215 (5 min)	120	4	~2.0		DLI technique cross-polars with Chino controller and accessories; textures recorded	389
$M_w = 1.18 \times 10^6$		122.5	6.5				
		125	15				
		127.5	63				
		129.5	2200				
Poly[bis(trifluoroethoxy) phosphazene)]							
		229.8		~2.0 ± 0.1	1810	DSC isotropic thermotropic (2D) transformation rates: 10^7 ks^{-2}	406
		230.2			913		
		230.5			644		

TABLE 17. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
		231.0			477		
		231.5			186		
		228.6		~2.0 ± 0.1	8760	DLI isotropic → 2D transformation rates: 10^7 ks^{-2}	
		229.6			3410		
		230.6			1030		
		231.1			707		
		231.6			289		
		232.6			60.8		
		233.6			17.0		
		234.6			2.97		
		73.0		~2.0 ± 0.1	40600	DSC thermotropic (2D) → 3D crystalline transformation rates: 10^7 ks^{-2}	
		73.3			18000		
		73.6			6270		
		73.9			2210	Small birefringence changes negated the DLI measurement	
		74.2			927		
Poly[bis(phenylphenoxy) phosphazene]							
	290 (10 min)	237.5		~2.0 ± 0.1	49300	DLI method for isotropic → 2D thermotropic transition rate: 10^7 ks^{-2}	407
		237.9			16600		
		238.3			4080		
		238.7			1630		
		239.1		~2.0 ± 0.1	776		
		239.5			199		
		239.9			53.0		
		240.3			27.6		
		240.7			10.7		
		198.5		~2.0 ± 0.1	48000	DLI method for 2D thermotropic → 3D crystalline transformation rate: 10^7 ks^{-2}	
		198.9			29200		
		199.6			10700		
		200.0			5210		
		200.4			1750		
		200.9			450		
		201.4			71.1		
Poly[di(*p*-methylphenoxy) phosphazene]							
		101	7.2			*in situ* SAXS synchrotron radiation rate measurements; induction times by WAXS and SAXS are listed in text	17
		107	54				
		112	89				
		112.5	104				
		117.5	150				
		118.5	154				
		129	263				
		132.5	984				

TABLE 18. OTHERS

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)							
PEEK Poly(etheretherketone)		188.8[a]	5.1	1.8×10^{-7}	50[b]	DSC; Nonisothermal rates from glassy state; crystallinity, density listed	380
		182.3	5.7	4.7×10^{-10}	20		
		175.2	4.7	1.6×10^{-8}	10		
		171.3	6.9	6.6×10^{-16}	5		
		167.1	7.5	7.7×10^{-19}	2		
		164.4	7.8	2.9×10^{-4}	1		
Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)							
PEEK Poly(etheretherketone)		160	126	2.5–2.6		DSC; k values in text in min^{-n}	408
original polymer		164	54				
$M_n = 14000$		168	24				
		172	18				
Melt crystallized		290	21.6	2.3–2.4			408
		300	40.2				
		310	136.2				

TABLE 18. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Solvent treated and desorbed		168	570	1.1–1.2			408
		172	522				
		176	450				
		180	330				
		184	276				
		190	222				
		194	180				
Poly[oxy-1-methyl-2-oxyethylene]; poly(L-lactic acid)							
	200 (20 min)	80		2.62	1.25×10^{-3}	DSC measurements; various analysis of kinetic data are presented	145
		90		2.73	1.19×10^{-3}		
		100		2.82	2.97×10^{-3}		
		110		2.66	2.81×10^{-3}		
		120		3.24	1.88×10^{-3}		
Poly[oxy-1-methyl-2-oxyethylene]; poly(L-lactic acid)							
$M_v = 700000$	220 (10 min)	70			5.79×10^{-6}	Light depolarization technique; morphology and X-ray diffraction reported; k expressed t^{-1}s by the authors; values are not listed	390
		75			3.96×10^{-5}		
		80			1.33×10^{-4}		
		85			4.44×10^{-4}		
		90			1.49×10^{-3}		
		95			3.35×10^{-3}		
		100			6.79×10^{-3}		
		109.5			4.48×10^{-3}		
		115			4.10×10^{-3}		
		120			2.81×10^{-3}		
		125			1.73×10^{-3}		
		130			6.61×10^{-4}		
		134.5			4.29×10^{-4}		
		140			2.37×10^{-4}		
		145			1.01×10^{-4}		
		149.5			5.30×10^{-5}		
		155			2.14×10^{-5}		
		159			1.85×10^{-5}		
		165			1.41×10^{-5}		
Poly(L-lactide-*co*-meso-lactide)		85	88	2.5		Kinetics made using DSC	391
$M_n = 10.1 \times 10^3$; wt. (0% meso)		90	420	2.5			
		95	270	2.7			
		100	228	2.4			
		105	174				
		110	114				
		115	210	2.7			
		120	240				
		125	306	3.4			
		130	522	3.2			
		135	374	2.4			
$M_n = 15.7 \times 10^3$; wt. (0% meso)		90	684				391
		100	288				
		110	240				
		120	342				
		130	804				
$M_n = 8.8 \times 10^3$; wt. (3% meso)		85	1434				391
		90	660				
		95	486				
		100	564				
		105	516				
		110	360				
		115	414				
		120	492				
		25	690				
Poly(L-lactide)							391
$M_n = 11.4 \times 10^3$; wt. (3% meso)		100	1668				
		105	1176				
		110	1182				
		115	1332				
$M_n = 5.8 \times 10^3$; wt. (6% meso)		100	684				391
		110	648				

TABLE 18. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
		120	696				
$M_n = 11.4 \times 10^3$; wt. (6% meso)		110	2640				391
Poly(L-lactide-*co*-meso-lactide)							
$M_n = 12.3 \times 10^3$;		90	<60			Kinetics measured by DSC	391
(wt. 0% meso);		100	<60				
wt. 6% talc additive		110	<60				
		120	<60				
$M_n = 10.5 \times 10^3$;							
(wt. 3% meso);		90	120				391
wt. 6% talc additive		100	84				
		110	<60				
		120	126				
$M_n = 12.2 \times 10^3$;		90	342				391
(wt. 6% meso);		100	180				
wt. 6% talc additive		110	234				
		120	882				
$M_w = 8.1 \times 10^3$		90	528	2.3			391
(wt. 9% meso)		100	360				
wt. 6% talc additive		110	600				
		120	≥900				
Poly(L-lactide-*co*-meso-lactide)							
(wt. 9% meso)						Kinetics measured by DSC	391
$M_n = 3.9 \times 10^3$;							
wt. 2% talc additive		90°C	1134	2.7			391
$M_n = 4.6 \times 10^3$;							
wt. 6% talc additive			762	2.3			391
$M_n = 5.5 \times 10^3$;							
wt. 11% talc additive			600	2.3			391
$M_n = 5.3 \times 19^3$;							
wt. 2% talc additive			444	2.2			391
wt. 2% talc additive			1176				391
wt. 6% talc			876				391
wt. 11% talc			732				391
wt. 21% talc			732				391
Poly(thio-1,4-phenylene)		208.8	215.5				
		218.3	163.6				
		217.3	144.8				
		227	92.9				
		235.8	43.4				
		245.1	19.5				
		254.1	7.41				
		263.3	1.68				
		272.7	0.125				
Poly(thio-1,4-phenylene)		250	170	2.6		DSC	392
Phillips Pet. Co. research grade R-4		245	100	2.9			
$M_w = 51 \times 10^3$		240	48	2.3			
		235	34	2.3			
		230	26	2.6			
		220	17	2.5			
		215	14	2.6			
Phillips Pet. Co. Resin grade V-1		250	240	2.0			392
$M_w = 15 \times 10^3$		245	140	2.4			
		240	60	2.2			
		235	40	2.1			
$M_w = 15 \times 10^3$		220	22	2.5			392
		215	17	2.2			
Poly(thio-1,4-phenylene) Ryton V-I (Phillips Pet. Co.)							
	320	240	97.3		64.8×10^{-6}	DSC measurement	392
		243	101		59.1×10^{-6}		
		245	142		29.8×10^{-6}		
		249	207		12.6×10^{-6}		
		255	601		1.1×10^{-6}		
δ-irradiated polymer	320	240	76.6		170×10^{-6}	DSC measurement	392
		243	120		98×10^{-6}		
		245	137		70×10^{-6}		

TABLE 18. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
		251	329		5.7×10^{-6}		
		255	507		1.7×10^{-6}		
Poly (thio-1,4-phenylene) (PPS homopolymer) 0% metamethylene linkages		102	8.5			Crystallization rates listed as DSC peak times (mins); measurements below	411
		106	3.0				
		110	1.5				
		114	0.9				
		118	0.71			T_{max} were made by upquenching from the amorphous state ($T_m^0 \sim 330$°C using Hoffman-Weeks plot)	
		120	0.55				
		235	0.36				
		240	0.53				
		250	1.30				
		245	0.82				
		255	2.40				
		260	5.20				
		265	8.00				
		270	17.5				
Random copolymer with 5% metamethylene linkages		110	6.71			$T_m^0 \sim 290$° C	
		115	3.16				
		120	1.90				
		125	1.23				
		130	0.88				
		135	0.77				
		140	0.53				
		145	0.46				
		200	0.39				
		210	0.59				
		220	1.20				
		230	2.30				
		235	2.81				
		240	5.01				
		245	9.47				
		250	23.5				
Random copolymer with 8% metamethylene linkages		105	14.93			$T_m^0 \sim 283$° C	
		110	5.80				
		120	1.97				
		130	1.09				
		140	0.670				
		150	0.470				
		190	1.75				
		200	2.52				
		205	4.19				
		210	5.26				
		215	7.40				
		220	9.62				
		225	23.02				
Random copolymer with 10% metamethylene linkages		105	13.4			$T_m^0 \sim 273$° C	
		110	7.10				
		120	2.65				
		130	1.34				
		140	0.845				
		150	0.620				
		160	0.520				
		170	0.490				
		180	0.760				
		190	1.11				
		200	1.80				
		205	2.54				
		210	3.81				
		215	6.21				
		220	10.20				

TABLE 19. COMPOSITES

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(thio-1,4-phenylene) unreinforced		220	6.89×10^7	$2.2 \leq n \leq 2.7$		Modeled from rate data; $t_{1/2}$ values are graphical; Avrami n variable	393
		225	4.19				
		230	4.11				
		235	1.35				
		240	1.10				
With commercial glass (70% wt.)		220	11.23×10^7	$2.1 \leq n \leq 2.5$			393
		225	7.24				
		230	5.78				
		235	5.72				
		240	3.14				
Unsized glass (35% wt.)		220	163×10^7	$2.3 \leq n \leq 2.5$			393
		225	7.14				
		230	5.46				
		235	3.17				
		240	0.81				
Sized glass		220	17.0×10^7	$2.2 \leq n \leq 2.5$			393
		225	12.1				
		230	9.11				
		235	4.9				
		240	1.84				
Commercial carbon (66% wt.)		220	38.4×10^7	$2.3 \leq n \leq 2.5$			393
		225	14.1				
		230	7.83				
		235	5.61				
		240	6.87				
Unsized AS4 (36% wt.)		220	2.54×10^7	$2.1 \leq n \leq 2.4$			393
		225	1.55				
		230	6.67				
		235	0.93				
		240	0.37				
Sized AS4 (39% wt.)		220	204.8×10^7	$2.0 \leq n \leq 2.4$			393
		225	165.3				
		230	75.3				
		235	28.3				
		240	15.8				
Graphitized Thornel (35% wt.)		220	158.3×10^5	$1.6 \leq n \leq 1.7$			393
		225	79.3				
		230	28.90				
		235	13.95				
		240	6.08				
Poly(thio-1,4-phenylene) Unreinforced		220	176				394
		225	258				
		230	438				
		235	800				
		240	1409				
Unsized AS4, 54 wt.%		220	209				394
		225	317				
		230	395				
		235	516				
		240	718				
Sized AS4, 64%		220	294				394
		225	311				
		230	540				
		235	457				
		240	700				
Graphitized Thornel, 65%		220	232				394
		225	195				
		230	183				
		235	198				
		240	222				
Phillips prepreg 66 wt.%		220	294				394
		225	413				
		230	540				
		235	457				
		240	700				

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TABLE 19. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(oxyethyleneoxyterephthaloyl) modified		220			22.0×10^3	DSC measurements; fibers enhanced rate of crystallization	395
		225			12.0×10^3		
		230			6.5×10^3		
		235			3.37×10^3		
Modified/unsized Kevlar		225			17.60×10^3		395
		230			9.14×10^3		
		235			4.23×10^3		
Modified/unsized glass		220			17.25×10^2		395
		225			10.45×10^2		
		230			5.53×10^2		
		235			2.34×10^2		

19.1. COMPOSITES OF BLENDS

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(oxyethyleneoxyterephthoyl)/Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene) PET/PC							
Poly(carbonate) 80/20, w/w		220			20.4×10^3	DSC measurements	396
Unreinforced		220			20.4×10^3		
36% wt. Kevlar		220			13.1×10^3		
49% wt. Kevlar		220			11.4×10^3		
68% wt. Kevlar		220			5.96×10^3		
Unreinforced		230			6.09×10^3		
36% wt. Kevlar		230			3.82×10^3		
68% wt. Kevlar		230			0.77		
Poly(oxyethyleneoxyterephtholy)/Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene) PET/PC							
		220			24.4×10^3		397
		225			13.9×10^3		
60/40, w/w		230			8.3×10^3		
		235			3.4×10^3		
Unsized Kevlar		215			11.4×10^3		397
		220			6.8×10^3		
		225			4.5×10^3		
		230			2.3×10^3		
Unsized glass		215			10.9×10^3		397
		220			6.35×10^3		
		225			3.9×10^3		
		230			2.02×10^3		
Poly(oxyethyleneoxyterephthoyl)/Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene) terephthalate)							
		220			20.7×10^3		396
Poly(carbonate) 80/20, w/w		225			11.3×10^3		
		230			6.03		
		235			3.1		
80/20 unsized Kevlar		215			17.7×10^3		396
		220			11.5×10^3		
		225			6.8×10^3		
		230			4.0×10^3		
80/20 unsized glass		215			15.6×10^3		396
		220			9.5×10^3		
		225			5.5×10^3		
		230			3.12×10^3		
Poly(thio-1,4-phenylene) unreinforced		205			124	DSC measurements; optical microscopy of composites	394
		210			215		
		215			356		
		220			513		
		225			914		
		230			1022		
		235			2350		
		240			2760		
Unsized AS4 36 and 38 wt.%		220			171		394
		225			246		
		230			435		
		235			788		
		240			1400		
Sized AS4 39 wt.%		220			122		394
		225			197		
		230			289		
		235			511		

TABLE 19. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(thio-1,4-phenylene) unreinforced		220			176	DSC measurements Avrami variable; optical microscopy of composites	394
		225			258		
		230			438		
		235			799		
		240			1409		
Unsized Kevlar 58 wt.%		220			116		394
		225			172		
		230			232		
		235			335		
		240			570		
Phillips prepreg 55 wt.%		220			43		394
		225			60		
		230			86		
		235			163		
		240			327		
Sized Kevlar 53% wt.%		220			26		394
		225			52		
		230			69		
		235			126		
		240			253		
Poly(thio-1,4-phenylene) poly(phenylene sulfide) (PPS)							
100/0, w/w		250	58.6			DSC measurements	227
		257	106.3				
		263	215.3				
		268	497.1				
		269	558.4				
PPS/Fortron glass		251	58.5				227
		257	110.7				
		263	242.0				
		268	558.4				
Poly(thio-1,4-phenylene) (unreinforced) 100/0, w/w		220	167				397
		225	261				
		230	440				
		235	796				
		240	1391				
With sized glass 35/65, w/w		220	167				397
		230	440				
		240	988				

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TABLE 19. *cont'd*

Polymer	T_f (°C)	T_c(°C)	$t_{0.5}$ (s)	n	k (s^n)	Remarks	Refs.
Poly(thio-1,4-phenylene) unreinforced		220			176	DSC measurements Avrami variable; optical microscopy of composites	394
		225			258		
		230			438		
		235			799		
		240			1409		
Unsized Kevlar 58 wt.%		220			116		394
		225			172		
		230			232		
		235			335		
		240			570		
Phillips prepreg 55 wt.%		220			43		394
		225			60		
		230			86		
		235			163		
		240			327		
Sized Kevlar 53% wt.%		220			26		394
		225			52		
		230			69		
		235			126		
		240			253		
Poly(thio-1,4-phenylene) poly(phenylene sulfide) (PPS)							
100/0, w/w		250	58.6			DSC measurements	227
		257	106.3				
		263	215.3				
		268	497.1				
		269	558.4				
PPS/Fortron glass		251	58.5				227
		257	110.7				
		263	242.0				
		268	558.4				
Poly(thio-1,4-phenylene) (unreinforced) 100/0, w/w		220	167				397
		225	261				
		230	440				
		235	796				
		240	1391				
With sized glass 35/65, w/w		220	167				397
		230	440				
		240	988				

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Isomorphous Polymer Pairs

G. Allegra, S. V. Meille
Dipartimento di Chimica del Politecnico, Milano, Italy

W. Porzio
Istituto di Chimica delle Macromolecole del C.N.R., Milano, Italy

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A. INTRODUCTION

This chapter is intended to provide a list of known pairs of isomorphous monomeric units in synthetic crystalline polymer systems; we shall regard as "isomorphism" the statistical copresence of different units within the crystallites. Additional information will be also given, namely:

(a) the approximate range of relative concentrations where isomorphism is observed;
(b) the chain conformation in the crystalline state, the type of isomorphism (see below);
(c) the physicochemical techniques used in the investigation (see Section B); and
(d) the references to the scientific contributions wherein the isomorphism is demonstrated, implied, or claimed.

Systems in which the molar fraction of either type of monomeric units does not exceed about 5% have been disregarded. Cocrystallization of hydrogenated and deuterated units has not been considered as relevant in this context either.

Although we are aware of the growing expansion and importance of copolymer systems producing mesophases (92), we have chosen to limit our list to isomorphism in the classical crystallographic sense. In particular, polymer systems were regarded as crystalline either (i) when off-meridional X-ray reflections appear on the nonequatorial layers, or (ii) if the sample is shown to undergo a transition to a mesophase system before melting, as may be revealed by DSC methods. Sometimes distinctions between real crystalline systems and mesophases may be difficult, such as in the case of several polyesters. In all instances in which some degree of uncertainty is implied, an asterisk has been inserted.

The isomorphous polymer pairs are subdivided according to the scheme already proposed in a review article on the subject (2). Two basic classes of macromolecular isomorphism were distinguished, namely isomorphism of whole homopolymer chains (Class 1) and isomorphism of monomeric units within copolymer chains (Class 2) (2,62,63). Class 1 may be further subdivided into three different subclasses: subclass 1.1, where the monomeric units differ in chemical constitution (copolymers in the usual sense) (Table 1.1); subclass 1.2, where the monomeric units have randomly opposite, nonsuperimposable configurations (Table 1.2); and subclass 1.3, where the monomeric units, although stereochemically identical, assume different conformations at random. In spite of the scientific relevance of the last subclass in the context of polymer structure, we have preferred to omit the corresponding table, in view of both, the relatively low relevance of the issue for many people interested in polymer isomorphism, and of the wide ensemble of polymers that are presumably affected by this crystallographic disorder under appropriate circumstances. Also, for the sake of greater generality, we have included in subclass 1.2 (Table 1.2) all the cases where the isomorphous units are related either by geometrical stereoisomerism or by random head-to-head, head-to-tail enchainment. Concerning Class 2, the subclass consisting of stereochemically identical chains with randomly opposite orientations of their axes within the crystal is not

reported for the same reasons given above for subclass 1.3. Consequently, only isomorphous systems consisting of stereochemically different homopolymer chains are reported. In each case, the two units of the isomorphous pair are separated by a slash.

From a crystallographic viewpoint the following two types of polymer isomorphism may be distinguished (the different monomeric units will be designated as A and B).

Type 1: Homopolymers A_N and B_M have a similar crystal structure, with sufficiently small differences in unit cell dimensions. Binary systems, whether copolymers or homopolymer mixtures, display the same structure at any intermediate composition, except for a continuous change in cell dimensions (isomorphism in a true sense). The homopolymer chains may possess helical conformations with slightly different ratios of monomeric units per helix pitch, in which case intermediate helix conformations should appear at intermediate compositions.

Type 2: The two homopolymers have different crystal structures and in each of them some amount of monomeric units of the other may be accommodated. Accordingly, the structure of the homopolymer corresponding to the monomeric units with prevailing amount is observed, and an abrupt change in the structure of the second homopolymer may take place at a suitable composition. The simultaneous presence of both structures may also be observed within some intermediate composition range, in analogy with low-molecular weight systems (isodimorphism).

These types correspond to the first two types of polymer isomorphism suggested by Natta (62,63), who also proposed a third type whenever one of the two homopolymers is unable to crystallize by itself. We have thought it expedient to include these caseswithin Type 2, particularly in view of the difficulty in ascertaining the complete inability of either homopolymer to crystallize. It should be added in this context that no assumption concerning thermodynamic stability of the following isomorphous systems is implicit here; on the other hand, the crystal packing and friction forces may well be strong enough in most cases as to prevent any appreciable solid–solid transformation.

Concerning the partition of the data within each separate heading (1.1, 1.2, etc.), we tried to conform to the standard criteria adopted in this book. Each monomeric unit is assigned to the class corresponding to the higher ranking monomer.

Whenever a crystallizable copolymer is constituted by a regularly repeating sequence of monomeric units, isomorphism is usually ruled out in view of the very presence of constitutionally repeating units, i.e., of an effective homopolymer.

Several vinyl copolymers show macromolecular isomorphism when the side groups are sterically ordered. If, as it always happens in the examples known hitherto, the order is of the isotactic type, we have called them "isotactic" (copolymers).

Several cases are known of polymers having long, regular side groups (comb-like copolymers or the like) that may promote crystallization in spite of lack of configurational order in the main chain. These systems are not considered as belonging to the present list if crystallization is basically due to regular packing of the side chains only.

Whenever the conformation of the chain skeleton may be described as a regular helix, we have used the symbolism recommended by the document "Terminology Relating to Crystalline Polymers" of IUPAC (1984) and adopted, e.g., by R. L. Miller in the chapter "Crystallographic Data for Various Polymers" of this book. As an example, the helical conformation of the crystalline isotactic copolymers of 3-methyl-1-butene and 4-methyl-1-pentene (see Ref. 14), corresponding to four monomeric units in one turn, each unit having two skeletal atoms, is designated as $2*4/1$. However, referring to the general notation p/q, we have not considered as helical those conformations where both p and q are equal to unity (i.e., one repetitive unit in one turn). In these instances, qualifications such as "extended", "planar zig-zag", etc. are used to characterize the conformation. Also, whenever the helix structure is not explicitly reported by the author, the general term "helical" is adopted.

It may happen that, for a given concentration of the two monomeric units, more than one crystalline phase is observed. Under these circumstances, the corresponding chain conformations are reported.

For a discussion of macromolecular isomorphism, see Refs. 2,90,91, and some of the papers quoted therein.

B. TECHNIQUES

XR	Qualitative evaluation of crystallinity by diffraction methods
XR1	Structural analysis by diffraction methods (including observation of continuous changes of lattice spacings)
MP	Optically determined melting point
TA	Thermal analysis (DSC, DTA, etc.)
DM	Dynamical–mechanical measurements (e.g., mechanical and dielectric relaxation experiments)
MA	Morphological analysis (electron microscopy, SAXS etc.)
D	Density determination by flotation techniques
IR	Infrared spectroscopy
ED	Electron diffraction
CA	Conformational analysis

C. TABLES OF ISOMORPHOUS PAIRS OF MONOMER UNITS

TABLE 1. ISOMORPHOUS UNITS WITHIN THE SAME MACROMOLECULES (COPOLYMERS)

Monomer giving isomorphous copolymers	Mol% of first component	Type of isomorphism	Chain conformation	Techniques	Refs.
1.1. ISOMORPHOUS UNITS WITH DIFFERENT CHEMICAL CONSTITUTION					
1.1.1. MAIN-CHAIN CARBON COPOLYMERS					
Copoly(alkenamers)					
trans-1-Pentenamer/*trans*-1-octenamer	100–0	1	Extended, planar zig-zag	XR1	20,57,60
trans-1-Pentenamer/*trans*-1-heptenamer	100–0	1	Extended, planar zig-zag	XR1	20,57,60
trans-1-Octenamer/*trans*-1-dodecenamer	100–0	1	Extended, planar zig-zag	XR1	20,57,60
Copoly(alkenes)					
Ethylene/propylene	100–70	2	Planar zig-zag	MP,	5,6,71,77,
				XR1,	8,93,
				XR, TA	77
Propylene/*n*-1-hexene	100–50	2	Isotactic (2*3/1)*	XR, TA, DM	67
Propylene/*n*-1-butene	89–3	2	Isotactic (2*3/1)	XR1, MP	84
	100–0	2	Isotactic (2*3/1)	XR1, MP, MA	41
n-1-Butene/3-methyl-1-butene	100–0	1	Isotactic (2*4/1) and (2*29/8)	XR1	83
n-1-Butene/*n*-1-pentene	94–16	1	Isotactic (2*3/1)	XR1, MP	84
n-1-Butene/*n*-1-hexene	100–30	2	Isotactic (2*3/1) and (2*29/8)	XR1, MP	84
n-1-Butene/4-methyl-1-pentene	100–75	2	Isotactic (2*3/1) and (2*29/8)	XR1, MP	84
	75–50	2	Isotactic (2*3/1) and (2*7/2)		
	50–0	2	Isotactic (2*7/2)		
n-1-Butene/*n*-1-octene	100–50	2	Isotactic	XR1, MP	84
n-1-Butene			(2*3/1) and (2*29/8)		
n-1-Butene/*n*-1-decene	100–90	2	Isotactic (2*3/1) and (2*29/8)	XR1, MP	84
n-1-Butene/*n*-1-dodecene	100–90	2	Isotactic (2*3/1) and (2*29/8)	XR1, MP	84
3-Methyl-1-butene/4-methyl-1-pentene	100–50	2	Isotactic (2*4/1)	XR1, MP	70
	50–0	2	Isotactic (2*4/1) and (2*7/2)		
4-Methyl-pentene/1-pentene	50–100	2	Isotactic (2*4/1)	XR1, MP,	85
			(2*4/1)	XR1	15
	0–50	2	Isotactic (2*7/2)	TA, DM	41
4-Methyl-1-pentene/*n*-1-hexene	100–20	2	Isotactic (2*7/2)	TA, DM	41
4-Methyl-1-pentene/4-methyl-1-hexene	100–0	1	Isotactic (2*7/2)	XR1, MP	3
4-Methyl-1-pentene/*n*-1-octene	100-70	2	Isotactic (2*7/2)	XR1, MP	85
4-Methyl-1-pentene/*n*-1-decene	100-85	2	Isotactic (2*7/2)	XR1, MP	85
Copoly(vinyls) (nonhalogenated)					
Ethylene/vinyl alcohol	100–0	2	Planar zig-zag	XR1	12
				XR1, DM	58
Ethylene/(ethylene + CO)	100–50	1	Planar zig-zag	XR1	11,17,18
Isopropyl vinyl ether/*sec*-butyl vinyl ether	100–0	1	Isotactic (2*17/5)	ED, MA	1
				XR, MP	3
Copoly(vinyls) (halogenated)					
Ethylene/tetrafluoroethylene	100–0	2	Planar zig-zag	XR1, TA, MA	34
				XR1	88,55
				CA	29
Vinyl fluoride/vinylidene fluoride	100–0	1	Planar zig-zag	XR1, MP	61
Vinyl fluoride/tetrafluoroethylene	100–20	2	Planar zig-zag	XR1, MP	61
Vinylidene fluoride/trifluoroethylene	100–90		Planar zig-zag	XR, TA, DM	94
	88–15	2	$(TGTG')_n$		
	15–0		Helical		
	52		Planar zig-zag, (2*3/1)	XR1	53
	55		Planar zig-zag, $(TGTG')_n$	XR1, IR	80
	100–0		Planar zig-zag, $(TGTG')_n$	XR1	52
Vinylidene fluoride/tetrafluoroethylene	100–0	2	Planar zig-zag	XR1, TA, MA	34
				XR1	55
Vinylidene fluoride/chlorotrifluoroethylene	100–0	2	Planar zig-zag, (2*17/1)	XR1	55
Vinylidene fluoride/bromotrifluoroethylene	100–10	2	Planar zig-zag	XR1	55
Trifluoroethylene/tetrafluoroethylene	100–0	2	Helical, planar zig-zag	XR1, TA, MA	34
Tetrafluoroethylene/chlorotrifluoroethylene	100–0	1	Helical	XR1, TA	56
Tetrafluoroethylene/bromotrifluoroethylene	100–55	2	Helical	XR1, TA	56
Tetrafluoroethylene/hexafluoropropylene	100–93	2	Helical	XR1, TA	87
Vinyl chloride/vinylidene chloride	100–85, 44–0	2	Planar zig-zag, $(TGTG')_n$	XR1, TA, MA	65

TABLE 1. *cont'd*

Monomer giving isomorphous copolymers	Mol% of first component	Type of isomorphism	Chain conformation	Techniques	Refs.
Copoly(styrenes)					
Styrene/*p*-methylstyrene	100–50	2	Isotactic (2*3/1)	XR1, MP	62,63
Styrene/*o*-methylstyrene	100–80	2	Isotactic (2*3/1)	XR1, MP	62,63
Styrene/*o*-fluorostyrene	100–0	1	Isotactic (2*3/1)	XR1, MP	62,63
Styrene/*p*-fluorostyrene	100–50 50–0	2	Isotactic (2*3/1) Isotactic (2*4/1)	XR1, MP	62,63
Styrene/*p*-ethylstyrene	100–85	2	Isotactic (2*3/1)	XR1, MP	62,63
Styrene/*p*-chlorostyrene	100–85	2	Isotactic (2*3/1)	XR1, MP	62,63
Styrene/*p*-bromostyrene	100–85	2	Isotactic	XR1, MP	62,63
1.1.2. MAIN-CHAIN HETEROATOM COPOLYMERS					
Copoly(ethers)					
Trioxane/1,3-dioxolane	100–84	2	(2*9/5)*	XR1, TA, D	21,22
Copoly(aldehydes)					
Acetaldehyde/propionaldehyde	100–0	1	Isotactic copolymer (2*4/1)	XR1	78
Acetaldehyde/*n*-butyraldehyde	100–0	1	Isotactic copolymer (2*4/1)	XR1	78
Acetaldehyde/isobutyraldehyde	100–0	1	Isotactic copolymer (2*4/1)	XR1	78
Propionaldehyde/*n*-butyraldehyde	100–0	1	Isotactic copolymer (2*4/1)	XR1	78
n-Butyraldehyde/isobutyraldehyde	100–0	1	Isotactic copolymer (2*4/1)	XR1	78
n-Butyraldehyde/*n*-heptanal	100–0	1	Isotactic copolymer (2*4/1)	XR1	78
Copoly(carbonates)					
Hydroquinone/chlorohydroquinone/$COCl_2$	100–0	1	Extended, planar zig-zag	XR, MP	73
Toluenehydroquinone/chlorohydroquinone/$COCl_2$	100–0	1	Extended, planar zig-zag	XR, MP	73
Copoly(esters)					
Ethylene glycol, sebacic acid/undecanedioic acid/dodecanedioic acid	Equimolar proportion of the three acids	2	Extended, planar zig-zag	XR	31
Ethylene glycol, terephthalic acid/*p*-hydroxy-benzoic acid	100–90, 40–0	2	Extended, distorted planar	XR, TA, D	50 48
Ethylene glycol, terephthalic acid/isophthalic acid	100–70, 30–0	2	Extended, distorted planar	XR, TA, ED, MA D	39 48
Ethylene glycol, terephthalic acid/*p*-hydroxyoxy-propoxybenzoic acid	100–0	2	Extended, distorted planar	XR XR, MP	43 44
Ethylene glycol, terephthalic acid/1,4-bis-(*p*-carboxyphenoxy)butane	only 50	2	Extended, distorted planar	XR	45
Ethylene glycol, 1,4-bis-(*p*-carboxyphenoxy) butane/*p*-γ-hydroxypropoxybenzoic acid	only 50	2	Extended, distorted planar	XR	46
Tetramethylene glycol/decamethylene glycol, adipic acid	30–0	2	Extended, planar zig-zag	MP	28
Pentamethylene glycol/decamethylene glycol, adipic acid	40–0	2	Extended, planar zig-zag	MP	28
Hexamethylene glycol, adipic acid/decamethyl-ene glycol, sebacic acid	100–0	2	Extended, planar zig-zag	XR1, TA	42
Hexamethylene glycol, sebacic acid/decamethyl-ene glycol, adipic acid	100–0	2	Extended, planar zig-zag	XR1, TA	42
Decamethylene glycol, adipic acid/sebacic acid	100–70	2	Extended, planar zig-zag	MP	28
Decamethylene glycol/hydroquinone, adipic acid	100–70	2	Extended, planar zig-zag	MP	28
Decamethylene glycol/diethylene glycol, adipic acid	100–70	2	Extended, planar zig-zag	MP	28
4,4′-Dihydroxybiphenyl, pimelic acid/azelaic acid	100–0	2	Extended, planar zig-zag	XR1, TA	86
4,4′-Dihydroxybiphenyl, azelaic acid/decanedioic acid	100–60, 25–0	2	Extended, planar zig-zag	XR1, TA	86
4,4′-Dihydroxybiphenyl, decanedioic acid/tetradecanedioic acid	100–0	2	Extended, planar zig-zag	XR1, TA	86
4,4′-Dihydroxybiphenyl, dodecanedioic acid/tetradecanedioic acid	100–0	2	Extended, planar zig-zag	XR1, TA	86
Lactic acid R/S	100–85	2*	Extended, planar zig-zag*	XR, MA, TA	30
Copoly(amides)					
Hexamethylenediamine, adipic acid/sebacic acid	100–60, 50–0	2*	Extended, planar zig-zag	XR	7
Hexamethylenediamine, adipic acid/cyclohexane-dicarboxylic acid	100–70	2	Extended, planar zig-zag	MP	72

TABLE 1. *cont'd*

Monomer giving isomorphous copolymers	Mol% of first component	Type of isomorphism	Chain conformation	Techniques	Refs.
Hexamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP XR TA	96,66,72 23 40
Hexamethylenediamine, adipic acid/ nonamethylene diamine, azelaic acid	100–60, 50–0	2	Extended, planar zig-zag	XR	7
Hexamethylenediamine/decamethylene-diamine, adipic acid	100–70, 60–0	2*	Extended, planar zig-zag	XR	7
Hexamethylenediamine, adipic acid/deca-methylene diamine, sebacic acid	100–65, 50–0	2*	Extended, planar zig-zag	XR	7
Hexamethylenediamine/*trans*-1,4-cyclohexanebis-methylamine, adipic acid	100–70*	2	Extended, planar zig-zag	MP	72
Hexamethylenediamine, suberic acid/4-benzene-diacetic acid	40–0*	2	Extended, planar zig-zag	MP	95
Hexamethylenediamine/decamethylene-diamine, adipic acid	100–0	2	Extended, planar zig-zag	XR	7
Hexamethylenediamine/decamethylenediamine, sebacic acid	100–0	2	Extended, planar zig-zag	XR MP	7 28
Hexamethylenediamine, sebacic acid/*p*-phenylene-dipropionic acid	100–0	2	Extended, planar zig-zag	XR, MP	81
Hexamethylenediamine, sebacic acid/ 3-(*p*-carboxy-methyleneoxy) phenylpropionic acid	100–0	2	Extended, planar zig-zag	XR, MP,	81
Hexamethylenediamine, sebacic acid/ 4-(*p*-carboxy-methylene)phenylbutyric acid	100–0	2	Extended, planar zig-zag	MP	81
Hexamethylenediamine/*N*,*N*′-diisobutyl-hexamethylene diamine, sebacic acid	100–0	2	Extended, planar zig-zag	XR, MP	89
Hexamethylenediamine, sebacic acid/1,4-(dicarboxy-methyleneoxy)phenylene	100–0	2	Extended, planar zig-zag	XR, MP	81
Hexamethylenediamine, undecanedioic acid/ 6-oxa-hendecanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
Hexamethylenediamine, undecanedioic acid/ 6-thio-hendecanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
Hexamethylenediamine/α,α′-*p*-xylenediamine, sebacic acid	50–0*	2	Extended, planar zig-zag	MP	95
Hexamethylenediamine, *p*-phenylenedipropionic acid/4-(*p*-carboxymethylene)phenylbutyric acid	100–0	2	Extended, planar zig-zag	XR, MP	81
Hexamethylenediamine, *p*-phenylene-dipropionic acid/3-(*p*-carboxymethyleneoxy)-phenylpropionic acid	100–0	2	Extended, planar zig-zag	XR, MP	81
Hexamethylenediamine, *p*-phenylene-dipropionic acid/*p*-bis-(carboxymethyleneoxy)-phenylene	100–0	2	Extended, planar zig-zag	XR, MP	81
Hexamethylenediamine, 3-(*p*-carboxymethyleneoxy) phenylpropionic acid/*p*-bis-(carboxymethyleneoxy) phenylene	100–0	2	Extended, planar zig-zag	MP	81
Heptamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP XR, MP, DM	96 19
Heptamethylenediamine/4-oxa-heptamethylene-diamine, adipic acid	75, 50, 25	1	Extended, planar zig-zag	XR, MP, DM	19
Heptamethylenediamine, adipic acid/4-oxa-hepta-methylenediamine, terephthalic acid	75, 50, 25	2	Extended, planar zig-zag	XR, MP, DM	19
Heptamethylenediamine, terephthalic acid/4-oxa-heptamethylenediamine, adipic acid	75, 50, 25	2	Extended, planar zig-zag	XR, MP, DM	19
Heptamethylenediamine/4-oxa-heptamethylene-diamine terephthalic acid	75, 50, 25	2	Extended, planar zig-zag	XR, MP, DM	19
Octamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP	96
Octamethylenediamine/2,2′-*p*-phenylene-bis-ethylamine, adipic acid	100–0*(100–60)	2	Extended, planar zig-zag	MP	95
Octamethylenediamine/2,2′-*p*-phenylene-bis-ethylamine, azelaic acid	100–0*(100–10)	2	Extended, planar zig-zag	MP	95
Octamethylenediamine, sebacic acid/ 4-benzenedipropionic acid	100–0	2	Extended, planar zig-zag	MP	95

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TABLE 1. *cont'd*

Monomer giving isomorphous copolymers	Mol% of first component	Type of isomorphism	Chain conformation	Techniques	Refs.
Octamethylenediamine/2,2′-*p*-phenylene-bis-ethylamine, sebacic acid	100–0*(100–10)	2	Extended, planar zig-zag	MP	95
Octamethylenediamine/2,2′-*p*-phenylene-bis-ethylamine, suberic acid	100–0*(100–30)	2	Extended, planar zig-zag	MP	95
Octamethylenediamine/bis(4-aminocyclohexyl) methane, dodecanedioic acid	100–0*(90, 50)	2	Extended, planar zig-zag	TA	16
Nonamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP	96
Nonamethylenediamine/bis(4-aminocyclohexyl) methane, octanedioic acid	100–0	2	Extended, planar zig-zag	TA	16
Nonamethylenediamine/bis(4-aminocyclohexyl) methane, dodecanedioic acid	100–0	2	Extended, planar zig-zag	XR, TA	16
5-Methyl-nonamethylenediamine/bis-(4-amino-cyclohexyl)methane, dodecanedioic acid	100–0*(90, 50)	2	Extended, planar zig-zag	XR, TA	16
Decamethylenediamine, adipic acid/sebacic acid	100–0	2	Extended, planar zig-zag	XR	7
Decamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP	96
Decamethylenediamine/bis(4-aminocyclohexyl) methane, dodecanedioic acid	100–0*(90, 50)	2	Extended, planar zig-zag	TA	16
Undecamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP	96
Dodecamethylenediamine, adipic acid/terephthalic acid	100–0	2	Extended, planar zig-zag	MP	96
Dodecamethylenediamine/bis(4-aminocyclohexyl) methane, dodecanedioic acid	100–0*(90, 50)	2	Extended, planar zig-zag	XR, TA	16
1,4-Bis(aminomethyl)cyclohexane (*cis*/*trans*), adipic acid	100–0	2	Twist boat, planar zig-zag	XR1	69
1,4-Bis(aminomethyl)cyclohexane (*cis*/*trans*), sebacic acid	100–0	2	Twist boat, planar zig-zag	XR1	69
1,4-Bis(aminomethyl)cyclohexane (*cis*/*trans*), dodecanedioic acid	100–0	2	Twist boat, planar zig-zag	XR1	69
α,α′-*p*-Xylenediamine, nonanedioic acid/5-oxa-nonanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
α,α′-*p*-Xylenediamine, nonanedioic acid/5-thio-nonanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
α,α′-*p*-Xylenediamine, undecanedioic acid/6-oxa-undecanedioic acid/6-thio-undecanedioic acid	All proportions of the three acids	1	Extended, planar zig-zag	XR, MP, D	74
α,α′-*p*-Xylenediamine, triadecanedioic acid/7-oxa-triadecanedioic acid/6-oxa-triadecanedioic acid	All proportions of the three acids	1	Extended, planar zig-zag	MP	74
α,α′-*p*-Xylenediamine, triadecanedioic acid/7-thio-triadecanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
α,α′-*p*-Xylenediamine, pentadecanedioic acid/6-oxa-pentadecanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
α,α′-*p*-Xylenediamine, pentadecanedioic acid/8-tia-pentadecanedioic acid	100–0	1	Extended, planar zig-zag	MP	74
α,α′-*p*-Xylenediamine, 7-oxa-triadecanedioic acid/7-thio-triadecanedioic	100–0	1	Extended, planar zig-zag	MP	74
4-Oxa-heptamethylenediamine, adipic acid/terephthalic acid	75, 580, 25	2	Extended, planar zig-zag	XR, MP, DM	19
Caprolactam/4(-aminomethylcyclohexyl) carboxylic acid	100–70, 50–0	2	Extended, planar zig-zag	MP XR, MP	51 68
Caprolactam/4(-aminomethyl)benzoic acid	100–70	2	Extended, planar zig-zag	MP	51
Caprolactam/γ-4(-aminomethyl)propionic acid	100–80, 15–0	2	Extended, planar zig-zag	XR, TA, IR	75
Caprolactam-ω-laurolactam	100–70, 30–0	2	Extended, planar zig-zag	XR1, TA, D, IR TA DM	74 36 38
Copoly(peptides)					
α-Methyl-*S*-glutamate/γ-benzyl-*S*-glutamate	100–0	2	α-helix, (3*18/5)	XR1	35,47
α-Methyl-*S*-glutamate/γ-methyl-*R*-glutamate	100–0	2	α-helix, (3*18/5)	XR1, IR	59
α-Benzyl-*S*-glutamate/*S*-phenylalanine	80	2*	α-helix, (3*18/5)	MA, ED	79
Butyl-*S*-aspartate/benzyl-*S*-aspartate	87–0	1	α-helix, (3*4/1)	XR1, TA, IR, DM	82

TABLE 1. *cont'd*

Monomer giving isomorphous copolymers	Mol% of first component	Type of isomorphism	Chain conformation	Techniques	Refs.
Copoly(diacetylenes)					
(General formula $[(=\underset{R}{\overset{R}{C}}-C=C-\underset{R}{C}=)_n\ (=\overset{R'}{C}-C=C-\underset{R'}{C}=)_{1-x})]_n$)					
R R′					
p-Tolylsulfonyloxymethyl/*p*-fluorosulfonyl-oxymethyl	100–0	1	*trans*-Planar	XR1	26
p-Tolylsulfonyloxymethyl/*p*-chlorosulfonyl-oxymethyl	100–80	1	*trans*-Planar	XR1	24,25
p-Tolylsulfonyloxymethyl/*p*-bromosulfonyl-oxymethyl	100–93	1	*trans*-Planar	XR1	25
p-Tolylsulfonyloxymethyl/*p*-naphthylsulfonyl-oxymethyl	100–90	1	*trans*-Planar	XR1	4
p-Tolylsulfonyloxymethyl/*p*-methoxysulfonyl-oxymethyl	100–90	1	*trans*-Planar	XR1	4
Methylcarbazolyl/methylcarbazolyl, methylanthryl	100–94	1	*trans*-Planar	XR1	27
Copoly(phosphazenes)					
(General formula $[(RO)_x(R'O)_{2-x}PN]_n$)					
R R′					
Phenyl/*p*-ethylphenylene	100–85/15–0	2	$(cis\text{–}trans)_2$	XR1, TA	33
4-Chlorophenylene/4-methylphenylene	50 only	1*	$(cis\text{–}trans)_2$	XR1, TA	9
4-Chlorophenylene/4-ethylphenylene	50 only	1*	$(cis\text{–}trans)_2$	TA	9
4-Chlorophenylene/phenyl	50 only	2	$(cis\text{–}trans)_2$	XR1, TA	9
4-Chlorophenylene/3-methylphenylene	50 only	2*	$(cis\text{–}trans)_2$	TA	9
4-Chlorophenylene/3-chlorophenylene	50 only	2	$(cis\text{–}trans)_2$	TA	9
4-Methylphenylene/3-methylphenylene	50 only	2	$(cis\text{–}trans)_2$	TA	9
3-Chlorophenylene/4-methylphenylene	50 only	2	$(cis\text{–}trans)_2$	TA	9
3-Chlorophenylene/3-methylphenylene	50 only	1*	$(cis\text{–}trans)_2$	TA	9
1.2. ISOMORPHOUS UNITS WITH DIFFERENT CONFIGURATIONS AND/OR WITH HEAD-TO-HEAD, OR HEAD-TO-TAIL CONSTITUTIONAL DISORDER					
Poly(vinyl alcohol)	Atactic polymer		Planar zig-zag	XR1	12,13,14
Poly(vinyl fluoride)	Atactic polymer with constitutional disorder		Planar zig-zag	XR1	64
Poly(vinylidene fluoride)	Constitutional disorder		Planar zig-zag	XR1, CA	29
Poly(chlorotrifluoroethylene)	Atactic polymer		(2*14/1)	XR1	13
			(2*16/1)	XR1	54
Poly(ethylene-*alt*-chlorotrifluoroethylene)	Atactic polymer with constitutional disorder		Extended, distorted planar	XR1	76
Poly(*p*-carboxyphenyl methacrylate)	Atactic polymer		Extended, distorted planar	XR1, ED, MA, TA	10
Poly(butadiene-*alt*-acrylonitrile)	Atactic polymer		Extended, distorted planar	XR, IR	32

TABLE 2. ISOMORPHISM OF MACROMOLECULES

Monomer giving isomorphous copolymers	Mol% of first component	Type of isomorphism	Chain conformation	Techniques	Refs.
Poly(propylene)/poly(1-butene)	100–80 and 20–0	2	Isotactic polymers (2*3/1)	DM, MA, TA, ED	37
Poly(4-methylpentene)/poly(4-methylhexene)	100–75 and 20–0	1	Isotactic polymers (2*7/2)	XR1, MP	3
Poly(1-propylvinyl ether)/poly(*sec*-butyl vinyl ether)	100–0	1	Isotactic polymers (2*17/5)	XR1, MP	3
Poly(styrene)/poly(styrene-*co-p*-methyl styrene) (70/30, mol/mol)	50	1	Isotactic polymers (2*3/1)	XR1, IR	63
Poly(oxy-4,4′-biphenylene oxy dodecanoyl)/poly(oxy-4,4′-biphenylene oxy-tetradecanedioyl)	100–0	2	Planar zig-zag	XR1, TA, MA	86

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Miscible Polymers

Sonja Krause
Department of Chemistry, Rensselaer Polytechnic Institute, Troy, New York, USA

S. H. Goh
Department of Chemistry, National University of Singapore 119260, Singapore

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A. DEFINITION OF MISCIBILITY

A rigorous definition of miscibility is used in the following tables. In order to be classified as miscible polymers, there must be some evidence in the literature that the polymers are miscible on a submolecular (segmental) scale. If the polymer mixture contains several phases, the polymers will be listed as miscible even if segmental miscibility data exists in only *one* of these phases, but this is noted under Comments in the Tables. Tables 1–7 list miscibility in the *amorphous* state. A polymer pair will be listed as miscible even if one or both of the polymers forms a single-component crystalline phase in the mixture; a note about the existence of crystallinity, however, is made under Comments. Evidence for miscibility of a polymer with only one microphase in a microphase separated block copolymer is also noted. In other cases, literature data indicated miscibility with a known block copolymer, but no data were shown which indicate whether the mixture still contained the second microphase. In those cases, no comments are made in these Tables, and readers will have to make judgements of their own. Since miscibility on a submolecular or segmental scale includes cocrystallization, some mixtures that have proven cocrystallization behavior are shown in Table 8.

There is some controversy in the literature about the dimensions of the submolecular scale of segment mixing that indicates true miscibility in the amorphous state of polymers. Followers of one school of thought feel that every segment of polymer A must be surrounded by the numbers of segments of polymers A and B whose fraction is governed by the volume fraction of the two polymers present in that phase. This is the random mixing assumption implicit in the Flory–Huggins theory of polymer solutions and mixtures. These ideas are much too rigorous for real solutions, even solutions of small molecules. It is well known that clustering occurs in real solutions, so that volume elements containing an unexpectedly large number of one of the solution components (in solutions of small molecules) or segments of one of the polymers (in polymer mixtures) can and do occur. Thus, data generated by some solid state NMR techniques and some fluorescence techniques that can show the proximity of two polymers over a distance of 1–2 nm have often been misinterpreted to show immiscibility in a miscible polymer system. In fact, data showing that a large proportion of the nearest neighbor segments of a particular polymer belong to the same polymer could simply indicate clustering in a homogeneous phase.

B. DATA COLLECTION

The following tables include information from the third edition of "Polymer Handbook", additional information from an incomplete polymer–polymer miscibility database compiled by one of us (SK), and the data from papers (but not patents) published in the English language and listed in "CA Selects–Polymer Blends" and Science Citation Index through December 1995 as compiled by one of us (SHG). Note that Table 8 contains less complete information for the earlier years than the other tables because most of the information in this table comes from the incomplete database. The inclusion of patents and papers in languages other than English by SHG would have necessitated a great deal more time and additional data compilers.

C. ARRANGEMENT OF THE TABLES

The following eight tables have essentially the same format as those compiled for the third edition of "Polymer Handbook". Each table contains a particular mixture only once. The column labeled "Polymer I of" is an alphabetical listing. The column labeled "Polymer II of" is an alphabetical listing of the polymers miscible with the appropriate polymer from the first column. The common names of polymers were used whenever possible; sometimes the Chemical Abstracts or IUPAC names of polymers also appear. Unfortunately, we could not cross-list the many possible names of the polymers. Thus, it may be necessary to look for a particular polymer under several names in these tables.

The column labeled Methods very briefly indicates the method(s) used by the experimenters to determine miscibility in amorphous phases. A large number of such methods exist, but two of these are most commonly used. One of these involves the determination of glass transition temperatures (T_g's) by methods such as DSC, DTA, dynamic mechanical measurements, dilatometry, or other methods. The observation of a single T_g for the amorphous portion of a polymer mixture, especially if it is intermediate between those of the constituent polymers and varies monotonically between these values as the mixture composition changes, has generally been considered a reliable indication of a miscible polymer pair. This method is difficult to use when the T_g's of the constituent polymers are close together, perhaps within 10°C of each other. Furthermore, the glass transition region of a miscible polymer pair is often broader than that of the unmixed polymers. Some experimenters have interpreted this as an indication of two overlapping glass transition regions, but we have taken the existence of such a broad glass transition region as an indication of miscibility. We feel that a broad glass transition region probably indicates the existence of composition fluctuations rather than two overlapping T_g's.

The criterion of sample clarity has often been used as an indication of miscibility. This criterion will not work if the constituent polymers have the same refractive index or if they are so immiscible that they form phases so large that they do not scatter light appreciably. Furthermore, semicrystalline mixtures are always turbid, even if their amorphous phases are completely miscible. In addition, on at least one occasion, a set of polymers was turbid at low temperatures, clear at intermediate temperatures, and turbid again at high temperatures only because their refractive indices became almost identical at the intermediate temperatures.

All single methods, not all of them described here, of determining polymer–polymer miscibility sometimes give ambiguous results. Unless many experimenters have used a variety of methods to determine miscibility, the inferences drawn from the data may be wrong. This is one of the reasons for listing the methods used and the references that describe the experiments, results, and interpretation. Some of the mixtures listed in these tables, especially when only a single mixture has been reported in a single reference, may turn out to be less miscible than stated. This is especially possible because some of the methods that were used in the original investigations do not necessarily probe miscibility as such. For example, a negative volume change on mixing, that is, a shrinkage on mixing, could possibly be observed if each of the coexisting phases contains both polymers, though in different proportions, and if each of the coexisting phases has a negative volume change on mixing. Also, FTR methods generally involve the observation of absorption band shifts due to hydrogen bonding between polymers; however, this hydrogen bonding could conceivably occur on phase boundaries or within coexisting phases each of which contains both polymers, but in different proportions.

The Comments column in the Tables indicates compositions of copolymers, whether the samples were semicrystalline, and other relevant data.

The eight tables are:

1. Chemically dissimilar polymer pairs miscible in the amorphous state at room temperature. Some of these polymers may be copolymers, but the polymer pairs may not have any monomer units in common. One or both of the polymers may be semicrystalline.
2. Polymer pairs containing one monomer in common (at least one of these must be a copolymer), miscible in the amorphous state at room temperature. One or both of the polymers may be semicrystalline.
3 Chemically, dissimilar polymer triads and tetrads miscible in the amorphous state at room temperature. It seemed reasonable to place mixtures of three or four polymers that were miscible in a separate table.
4. Polymer pairs miscible in the amorphous state at room temperature. Molecular weight dependence investigated. These are usually polymer pairs that are miscible when the molecular weights are low and immiscible as when the molecular weights are increased.
5. Polymer pairs that appear to have high temperature miscibility although immiscible at or below room temperature (Upper Critical Solution Temperature [UCST] behavior).

6. Polymer pairs miscible at room temperature that appear to have a lower critical solution temperature (LCST) above room temperature. These polymer pairs are also listed in one of the earlier tables, usually Table 1 or 2.
7. Polymer pairs that appear to have both lower and upper critical solution temperatures.
8. Polymer pairs that cocrystallize and form mixed crystals. These blends are generally composed of polymers with similar subunits that can substitute for each other in the same unit cells; this is generally called "isomorphous replacement". This Table is probably incomplete even though cocrystallization is expected to be rare.

Abbreviations

DSC	Differential scanning calorimetry
FTIR	Fourier-transform infrared spectroscopy
IGC	Inverse gas chromatography
LS	Light scattering
MW	Molecular weight (unspecified)
M_n	Number-average molecular weight
M_w	Weight-average molecular weight
NMR	Nuclear magnetic resonance spectroscopy
NRET	Nonradiative energy transfer fluoro-spectroscopy
PALS	Positron annihilation lifetime spectroscopy
SAXS	Small-angle X-ray scattering
SALS	Small-angle light scattering
SANS	Small-angle neutron scattering
SEM	Scanning electron microscopy
T_g	Glass transition temperature
T_m	Melting temperature
WAXD	Wide-angle X-ray diffraction

D. TABLES

TABLE 1. CHEMICALLY DISSIMILAR POLYMER PAIRS MISCIBLE IN THE AMORPHOUS STATE AT ROOM TEMPERATURE

Polymer I of	Polymer II of	Method	Comments	Refs.
2-Acrylamido-2-methyl-propanesulfonic acid	Vinylpyridine	Single T_g	II was 2- or 4-vinylpyridine (2 blend systems); formed complexes	354
Acrylic acid	Acrylamide	NMR	Formed complexes	1012
	Acrylamide-*co*-*N*,*N*-dimethyl-acrylamide	Fluorescence study	Formed complexes; II had 6.0–55 mol% acrylamide	859
	Caprolactam (nylon 6)	Single T_g; WAXD	Semicrystalline	1140
	N,*N*-dimethylacrylamide	Fluorescence study	Formed complexes	859
	Ethylene glycol	Single T_g; FTIR; NMR	Semicrystalline when >50% II	374,712,953, 1115,1128
	Vinyl alcohol	FTIR; T_m-depression; NMR	Semicrystalline	197,1211,1255,1256,1257
	Vinyl methyl ether	Single T_g	Formed 1:1 complexes	160
	N-vinylpyrrolidone	NMR	Formed complexes	1128
Acrylic acid-*co*-ethylene	Caprolactam (nylon 6)	Single T_g	I had 19 wt.% acrylic acid	564
Acrylic acid-*co*-styrene	Caprolactone	Single T_g	I had 11.4–20.8 wt.% acrylic acid	383
	Ester	Single T_g	I had 20% acrylic acid; II was nylon 6, nylon 11 or nylon 12 (3 miscible blend systems)	471,884
	Ethyl methacrylate	Single T_g; IGC	I had 2.65–20 wt.% acrylic acid	72,1001
	Ethyl methacrylate-*co*-4-vinylpyridine	Single T_g; IGC	I had 20 mol% acrylic acid	1001
	Ethylene glycol	Single T_g	I had 21 wt.% acrylic acid	384
	Isobutyl methacrylate-*co*-4-vinylpyridine	Single T_g; IGC	I had 20 mol% acrylic acid	1001
	Methyl methacrylate	Single T_g	I had 8–20 wt.% acrylic acid	72,382,384
	n-Propyl methacrylate	Single T_g	I had 2.65–8.84 wt.% acrylic acid	70
	Vinyl methyl ether	Single T_g	I had 8–20 wt.% acrylic acid	576
Acrylonitrile-*co*-butadiene	Cellulose acetate-butyrate	Some compositions appeared homogeneous	–	30,249,452,651
	Chloroprene	Single T_g when I had 18% acrylonitrile; sorption of solvent vapors	Two phases in electron micrograph when I had 18% acrylonitrile may indicate a crystalline phase; two torsional transitions when I had ≥ 28% acrylonitrile	93,797
	Epichlorohydrin	Single T_g	II had 26–54 wt.% acrylonitrile	966
	Nitrocellulose	Transparent films when I had 28.6–44.4% acrylonitrile	Immiscible when I had 18.4% acrylonitrile	93,296,398,399 452
	Vinyl acetate-*co*-vinyl chloride	Single loss peak when ≤40% vinyl acetate in II; clear films for some mixtures of commercial polymers	Two loss peaks when ≥50% vinyl acetate in II	296,452 539,651

6. Polymer pairs miscible at room temperature that appear to have a lower critical solution temperature (LCST) above room temperature. These polymer pairs are also listed in one of the earlier tables, usually Table 1 or 2.
7. Polymer pairs that appear to have both lower and upper critical solution temperatures.
8. Polymer pairs that cocrystallize and form mixed crystals. These blends are generally composed of polymers with similar subunits that can substitute for each other in the same unit cells; this is generally called "isomorphous replacement". This Table is probably incomplete even though cocrystallization is expected to be rare.

Abbreviations

DSC	Differential scanning calorimetry
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M_n	Number-average molecular weight
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SALS	Small-angle light scattering
SANS	Small-angle neutron scattering
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	N,*N*-dimethylacrylamide	Fluorescence study	Formed complexes	859
	Ethylene glycol	Single T_g; FTIR; NMR	Semicrystalline when > 50% II	374,712,953, 1115,1128
	Vinyl alcohol	FTIR; T_m-depression; NMR	Semicrystalline	197,1211,1255,1256,1257
	Vinyl methyl ether	Single T_g	Formed 1:1 complexes	160
	N-vinylpyrrolidone	NMR	Formed complexes	1128
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	Ethyl methacrylate	Single T_g; IGC	I had 2.65–20 wt.% acrylic acid	72,1001
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	Isobutyl methacrylate-*co*-4-vinylpyridine	Single T_g; IGC	I had 20 mol% acrylic acid	1001
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	n-Propyl methacrylate	Single T_g	I had 2.65–8.84 wt.% acrylic acid	70
	Vinyl methyl ether	Single T_g	I had 8–20 wt.% acrylic acid	576
Acrylonitrile-*co*-butadiene	Cellulose acetate-butyrate	Some compositions appeared homogeneous	–	30,249,452,651
	Chloroprene	Single T_g when I had 18% acrylonitrile; sorption of solvent vapors	Two phases in electron micrograph when I had 18% acrylonitrile may indicate a crystalline phase; two torsional transitions when I had ≥ 28% acrylonitrile	93,797
	Epichlorohydrin	Single T_g	II had 26–54 wt.% acrylonitrile	966
	Nitrocellulose	Transparent films when I had 28.6–44.4% acrylonitrile	Immiscible when I had 18.4% acrylonitrile	93,296,398,399 452
	Vinyl acetate-*co*-vinyl chloride	Single loss peak when ≤ 40% vinyl acetate in II; clear films for some mixtures of commercial polymers	Two loss peaks when ≥ 50% vinyl acetate in II	296,452 539,651

References page VI-461

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Vinyl chloride	Single T_g; IGC	I had 29–45 wt.% acrylonitrile	9,79,85,161,196, 452,484,520,561, 614,615,632,682,755 799,860,867,885,1186
	Vinyl chloride	Single T_g; microscopy	I was hydrogenated; I had 38 wt.% acrylonitrile	1191
	Vinyl chloride, head-to-head	Single T_g	I had 23.5–56.6 wt.% acrylonitrile	158
Acrylonitrile-*co*-butadiene-*co*-methyl acrylate	Ethylene-*alt*-maleic anhydride	Single T_g; microscopy	I was made from a copolymer of AN/MA (75/25) grafted onto BD/AN (70/30) copolymer	1156
Acrylonitrile-*co*-butadiene-*co*-styrene	Propylene-*co*-vinyl chloride	Single T_g	I was Blendex 701; II had 3.2 or 3.8% propylene; electron micrographs may indicate two phases	107
Acrylonitrile-*co*-methyl methacrylate	*N,N*-dimethylacrylamide	Single T_g; transparency	I had 70 wt.% acrylonitrile (AN)	648
	Maleic anhydride	Single T_g; transparency	I had 70 wt.% AN	648
	Vinyl chloride	Single T_g; transparency	II had 2–17 wt.% AN	1091
	N-vinylpyrrolidone	Single T_g; transparency	I had 70 wt.% AN	648
Acrylonitrile-*co*-methyl methacrylate-*co*-α-methylstyrene	Vinyl chloride	Single T_g	I had 8/58/34 or 32.3/8.1/59.6/ acrylonitrile/methyl methacrylate/ α-methylstyrene	93,1078
Acrylonitrile-*co*-α-methylstyrene	Alkyl methacrylate	Single T_g; transparency	I had 30 wt.% acrylonitrile (AN); II had an alkyl group of acetonyl, chloromethyl, 2-chloroethyl, 2-hydroxyethyl, 2-hydroxypropyl, methoxymethyl, methylthiomethyl or tetrahydrofurfuryl (8 miscible blend systems)	266,268,279
	n-Butyl methacrylate	Single T_g	I had 12 wt.% AN	152
	n-Butyl methacrylate-*co*-methyl methacrylate	Single T_g; transparency	I had 30 wt.% AN; II had 70 wt.% methyl methacrylate	289
	Ethyl methacrylate	Single T_g	I had 10–28 wt.% AN	152,277
	Ethyl methacrylate-*co*-methyl methacrylate	Single T_g; transparency	I had 30 wt.% AN; II had 30 or 60 wt.% methyl methacrylate	287
	Ethylene, chlorinated	Single T_g	Depended on AN and Cl contents	154
	Maleic anhydride-*co*-styrene	Single T_g	Region of miscibility was sensitive to MW	1011
	Methyl methacrylate	Single T_g	I had 10–37 wt.% AN; I had 30 wt.% AN and II was atactic or isotactic (Ref. 277); I had 6.5–30 wt.% AN (Ref. 1010)	152,277, 1010
	Methyl methacrylate-*co*-2,2,6,6-tetramethyl-piperidinyl methacrylate	Single T_g; transparency	I had 30 wt.% AN; II had ≥76.2 wt.% methyl methacrylate	272,274
	n-Propyl methacrylate	Single T_g	I had 17–20 wt.% AN	152
	Vinyl chloride	Single T_g	I had 30 wt.% AN; miscible when melt blended or cast from methyl ethyl ketone; immiscible when cast from tetrahydrofuran; I had 11.9–30 wt.% AN (Ref. 1010)	435,684, 1010
Acrylonitrile-*co*-*p*-methylstyrene	Acetonyl methacrylate	Single T_g; transparency	I had 43–61 wt.% AN	118
	2-Bromoethyl methacrylate	Single T_g; transparency	I had 14–61 wt.% AN	608
	n-Butyl methacrylate	Single T_g; transparency	I had 13.6 wt.% AN	285
	2-Chloroethyl methacrylate	Single T_g; transparency	I had 18.3–46 wt.% AN	613
	Chloromethyl methacrylate	Single T_g; transparency	I had 13–42 wt.% AN	263
	Cyclohexyl methacrylate	Single T_g; transparency	I had ≤22 wt.% AN	120
	2,6-Dimethyl-1,4-phenylene ether	Single T_g; transparency	I had ≤5.0 wt.% AN	275
	Ethyl methacrylate	Single T_g; transparency	I had 12–33 wt.% AN	285
	Methyl methacrylate	Single T_g; transparency	I had 12–34 wt.% AN	285
	Methylthiomethyl methacrylate	Single T_g; transparency	I had 19–34 wt.% AN	269
	n-Propyl methacrylate	Single T_g; transparency	I had 6–28 wt.% AN	285
	Tetrahydrofurfuryl methacrylate	Single T_g; transparency	I had 12–48 wt.% AN	286
	Tetrahydropyranyl-2-methyl methacrylate	Single T_g; transparency	I had 5–29 wt.% AN	119

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Acrylonitrile-*co*-styrene	Acetonyl methacrylate	Single T_g; transparency	I had 33–58 wt.% AN	121
	Arylate	Single T_g	Miscibility the greatest when AN = 25%	7
	Arylate of tetramethylbisphenol-A	Single T_g	I had 4–13 wt.% AN	1048
	Benzyl methacrylate	Single T_g	I had 7.8–24.3 wt.% AN	1180
	2-Bromoethyl methacrylate	Single T_g; transparency	I had 10–58 wt.% AN	608
	Butylene adipate	Single T_g	I had 13–32.3 wt.% AN	228
	Butylene sebacate	Single T_g	I had 13–20 wt.% AN	228
	n-Butyl methacrylate-*co*-methyl methacrylate	Single T_g; transparency	I had 22 wt.% AN; II had 70 wt.% methyl methacrylate	289,405
	tert-Butyl methacrylate-*co*-methyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	621
	Caprolactone	Single T_g; FTIR; microscopy; LS	I had 13–30 wt.% AN	228,295,458,565,729, 1021,1047,1097,1145,1185
	2-Chloroethyl methacrylate	Single T_g; transparency	I had 12.5–43 wt.% AN	613
	Chloromethyl methacrylate	Single T_g; transparency	I had 12–37 wt.% AN	262
	Copolyarylate of Tetramethylbis-phenol-A and tetrabromobis-phenol-A	Single T_g	Miscibility depended on compositions of I and II	
	Copolycarbonate of bisphenol-A and tetramethylbisphenol-A	Single T_g	I had ≤ 18 wt.% acrylonitrile; II had ≤ 22 wt.% bisphenol-A	431
	Cyclohexyl methacrylate	Single T_g; transparency	I had ≤ 20 wt.% AN	119
	Cyclohexyl methacrylate-*co*-methyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	621
	2,6-Dimethyl-1,4-phenylene ether	Single T_g	I had ≤ 10.5 wt.% AN	457,1022
	2,6-Dimethyl-1,4-phenylene ether, benzoylated	Single T_g	I had 18 mol% AN; II had 35 or 86% benzoylated units	776
	Ethylene adipate	Single T_g	I had 25–28 wt.% AN	228
	Ethyl methacrylate	Single T_g; transparency	I had 5.5–28.0 wt.% AN (Ref. 229); I had 9–34 wt.% AN (Ref. 112)	112,229,489
	Ethyl methacrylate-*co*-methyl methacrylate	Single T_g; transparency	I had 22 wt.% AN; II had 30 or 50 wt.% methyl methacrylate	288
	Ethyl methacrylate-*co*-2,2,6,6-tetramethyl-piperidinyl methacrylate	Single T_g; transparency	I had 30 wt.% AN; II had ≤ 13.3 wt.% 2,2,6,6-tetramethyl-piperidinyl methacrylate	274
	Ethyloxazoline	Single T_g; transparency	I had 25–40 wt.% AN; two T_g's when I had 8, 23.5 or 70% AN	426,652
	Hexamethylene sebacate	Single T_g	I had 16.2 wt.% AN	228
	2-Hydroxyethyl methacrylate	Transparency	I had 22 wt.% AN	277
	2-Hydroxypropyl methacrylate	Single T_g; transparency	I had 22 wt.% AN	279
	Itaconic anhydride-*co*-methyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	920
	Methoxymethyl methacrylate	Single T_g; transparency	I had 30 wt.% AN	269
	Methyl methacrylate	Transparency	I had 9.4–34.4 wt.% AN (Ref. 789); I had 9.5–28 wt.% AN (Ref. 229); I had 9–39 wt.% AN (Ref. 164)	56,164,229, 392,566, 598,651,670,741, 782,789
	Methyl methacrylate-*co*-*N*-phenylitaconimide	Single T_g	Miscibility depended on compositions of I and II	169
	Methyl methacrylate-*co*-phenyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	621
	Methyl methacrylate-*co*-2,2,6,6-tetramethyl-piperidinyl methacrylate	Single T_g; transparency	I had 22 or 30 wt.% AN; II had ≤ 31.4 wt.% 2,2,6,6-tetramethyl-piperidinyl methacrylate	272,274
	Methylthiomethyl methacrylate	Single T_g; transparency	I had 9–36 wt.% AN	267
	Novolac	Single T_g	I had 25 wt.% AN; II was formaldehyde + 13/17/70 mol% *p-tert*-butylphenol/*m*-cresol/*o*-cresol	221
	Oxy-1,4-phenylene-sulfonyl-1,4-phenylene oxy-2,6-diisopropyl-1,4-phenylene isopropylidene 3,5-diisopropyl-1,4-phenylene	Modulus-temperature	I had 13–16% AN	685
	Phenyl acrylate	Single T_g	I had 14.6–34.1 wt.% AN (Ref. 717) or 11.5–32 wt.% AN (Ref. 1171)	717,1171, 1180

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	n-Propyl methacrylate	Single T_g	I had 5.7–19.5 wt.% AN (Ref. 229) or 9–24 wt.% AN (Ref. 1090)	229, 1090
	Tetrahydrofurfuryl methacrylate	Single T_g; transparency	I had 9–48 wt.% AN	281,286
	Tetrahydropyranyl-2-methyl methacrylate	Single T_g; transparency	I had ≤31 wt.% AN	116
	Vinyl chloride	Single T_g	I had 11.5–26 wt.% AN	437
Acrylonitrile-*co*-vinylidene chloride	Caprolactone	Single T_g	I was usually Saran F (80% vinylidene chloride); semicrystalline when ≤70 wt.% I	31,825,887
	Hexamethylene terephthalate	Single T_g	Probably semicrystalline; I was Saran F(80% vinylidene chloride)	36
Allyl alcohol-*co*-styrene	Ester	Single T_g	I had M_W = 1.4–2.1 kg/mol and had 1.3–7.7 wt.% OH groups; II was butylene adipate, butylene sebacate, caprolactone, 1,4-cyclohexane dimethylene succinate, decamethylene sebacate, 2,2-dimethyl-1,3-propylene adipate or hexamethylene sebacate (7 blend systems); high OH content of I favored miscibility	46,869
Amic acid	3,3′-Diamino-4,4′-benzidine isophthalamide	Transparency; FTIR	I was PARC-TPI	1071
	Phenol–formaldehyde	Clear before and after curing	I was made from 4,4′-methylene-dianiline and pyromellitic dianhydride	1
	Imide	Single T_g	II was Polyimide P84; miscible over certain composition range	538
Amideimide	Novolac	Single T_g	I was made from rosin	466
	Resol	Single T_g	I was made from rosin maleic anhydride Diels–Alder adduct with 4,4′-diamino-diphenylmethane	468
	Shellac	Single T_g	I was made from rosin-imidoamino acid with 4,4′-diaminodiphenylmethane	469
n-Amyl methacrylate	Vinyl chloride	Single T_g; transparency	–	319,649,812,850
	Vinyl chloride, chlorinated	Single T_g; transparency	II had 65 or 68 wt.% Cl	319,810
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran, ≥ 80% vinylidene chloride	407,812
Aramide	Amide	Single T_g	I was made from 2,2,4-trimethyl-1,6-hexanediamine and terephthalic acid (Trigamid T); semicrystalline; II was nylon 6, nylon 6,6, nylon 6,12, nylon 6,9 or nylon 6,10 (5 miscible blend systems)	211,212, 595
	Butylene terephthalate	Single T_g	I was Trogamid T; semicrystalline	596
	Caprolactam-*co*-laurolactam	Single T_g	I was Trogamid T; II had 43.8–55.6 mol% caprolactam; semicrystalline	213,214
	Caprolactam-*co*-2-pyrrolidinone	Single T_g	I was Trogamid T; II had 93.5 mol% caprolactam; semicrystalline	213,214
	Copolyester	Single T_g	I was Trogamid T; II was made from 1,4-cyclohexanedimethanol/ethylene glycol/terephthalic acid (PETG 6763)	596
	Cycloaliphatic amide	Single T_g	I was Trogamid T; II was made from 1,4- and 1,3-benzenedicarboxylic acids and a mixture of 1,6-hexanediamine and bis(4-aminocyclohexyl)methane (Bexloy AP C-803)	212
	Ethylene terephthalate	Single T_g	I was Trogamid T; semicrystalline	596
Aramide	Amide	Single T_g	I was made from 1,6-hexanediamine and a mixture of isophthalic and terephthalic acids (Zytel 330); semicrystalline; II was nylon 6, nylon 6,6, nylon 6,9 or nylon 4,6 (4 miscible blend systems)	212,213
	Cycloaliphatic amide	Single T_g	I was Zytel 330; II was Bexloy AP C-803	212
Aramide	Amide	Single T_g; T_m-depression	I was poly[2,2′-bis(trifluoromethyl)-4,4′-biphenylene dicarboxamide]; II was nylon 6, nylon 4,6, nylon 6,6, nylon	1013

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			6,9, nylon 6,10 or nylon 11 (6 blend systems)	
Arylate	Aramide	Single T_g	I was made from bisphenol-A and a mixture of terephthalic acid/isophthalic acid/5-*tert*-butyl-isophthalic acid = 44/44/12 (Polyarylate C); II was Trogamid T	188
	Aramide-S	Single T_g	I was Polyarylate C; II was made from 5-*tert*-butylisophthalic acid/isophthalic acid 90/10 and 1,12-diaminododecane (Aramide-S)	189
	Aramide-M	Single T_g	I was made from bisphenol-A and a mixture of terephthalic acid/isophthalic acid/5-*tert*-butyl-isophthalic acid = 42.5/42.5/15 (Polyarylate D); II was made from adipic acid and *m*-xylene-diamine/hexamethylene diamine 80/20 (Aramide-M)	189
	Aramide	Single T_g	I was Polyarylate D; II was Trogamid T	189
	Aramide-S	Single T_g	I was Polyarylate D; II was Aramide-S	189
	Aramide-M	Single T_g	I was made from bisphenol-A and a mixture of terephthalic acid/isophthalic acid/5-*tert*-butyl-isophthalic acid = 37.5/37.5/25 (Polyarylate E); II was Aramide-M	189
	Aramide	Single T_g	I was Polyarylate E; II was Trogamid T	189
	Aramide-S	Single T_g	I was Polyarylate E; II was Aramide-S	189
	Aramide	Single T_g	I was made from bisphenol-A and a mixture of terephthalic acid/5-*tert*-butylisophthalic acid 50/50 (Polyarylate F); II was Trogamid T	189
	Aramide	Single T_g	I was Polyarylate F; II was Aramide-S	189
	Carbonate of bisphenol-A	Single T_g	I was made from bisphenol-A and a mixture of terephthalic acid/isophthalic acid 50/50 (Ardel D-100); miscibility arised from transesterification	687
	Copolyester	Single T_g	I was Ardel D-100; II was made from cyclohexane dimethanol and terephthalic acid/isophthalic acid (80–87% tere) (Kodar A-150) and another copolymer with tere/iso ratio of 70/30	687
	Copolyester	Single T_g	I was Ardel D-100; II was made from cyclohexane dimethanol, ethylene glycol and terephthalic acid (molar ratio 1:2:3, PETG-6763)	291,687
	Ethylene terephthalate	Single T_g	I was Ardel D-100; miscibility arised from transesterification	687
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g	I was Ardel D-100; miscibility arised from transesterification	687
Arylate of tetramethyl-bisphenol-A	Butylene sebacate	Single T_g	Semicrystalline	907
	Hexamethylene sebacate	Single T_g	Semicrystalline	906
Aryl ether ketone	Etherimide	Single T_g	I was made from 4,4′-difluoro-benzophenone and hydroquinone; II was Ultem 1000	334
	Etherimide	Single T_g	I was made from *p*-phenoxybenzoyl chloride; II was Ultem 1000	334
Aryl sulfone	Imide	Single T_g	I was Radel A; II was XU-218	375
γ-Benzyl glutamate	γ-Butyl glutamate	Dynamic mechanical methods; DSC	Miscible as random coils but not as α-helics	813
Bis(methyoxyethoxyethoxy) phosphazene	Acrylic acid-*co*-methyl methacrylate	Single T_g; transparency	II had 10, 20 or 30 mol% acrylic acid	1087
	Methacrylic acid-*co*-methyl methacrylate	Single T_g; transparency	II had 20 mol% methacrylic acid	1087
	Styrene-*co*-styrene-4-carboxylic acid	Single T_g; transparency	II had 75 mol% styrene	1087

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Styrene-*co*-*p*-vinylphenol	Single T_g; transparency	II had 78 mol% styrene	1087
	p-Vinylphenol	Single T_g; transparency	–	1087
Bis(methoxyethoxyethoxy-ethoxy)phosphazene	*p*-Vinylphenol	Single T_g; transparency	–	1087
3-Bromo-2,6-dimethyl-1,4-phenylene ether	*p*-Bromostyrene	Single T_g; microscopy	–	402
	p-Bromostyrene-*co*-styrene	Single T_g; microscopy	II had ≤ 85 mol% styrene	402
3-Bromo-2,6-dimethyl-1,4-phenylene oxide-*co*-2,6-dimethyl-1,4-phenylene ether	*p*-Bromostyrene	Single T_g; microscopy	I had ≤ 22 mol% 2,6-dimethyl-1,4-phenylene ether	402
	Styrene	Single T_g; microscopy	Miscible up to full bromination of I when I had MW ≤ 40 kg/mol and II had MW ≤ 30 kg/mol	402,530
2-Bromoethyl methacrylate	Ester	Single T_g	Semicrystalline; II was butylene adipate, caprolactone, 2,2-dimethyl-1,3-propylene adipate, 2,2-dimethyl-1,3-propylene succinate, ethylene adipate, or hexamethylene sebacate (6 miscible blend systems)	1137
	Tetrahydrofurfuryl methacrylate	Single T_g; transparency	–	606
p-Bromostyrene-*co*-styrene	2,6-Dimethyl-1,4-phenylene ether	Single T_g; microscopy	I had ≥ 53 mol% styrene	402
Butadiene	Butadiene	Single T_g	I was 1,4-polybutadiene; II had 63% 1,2-	701
	Diene-*co*-ethylene-*co*-propylene	Single T_g	Commercial samples; many mixtures had two T_g's	92,440,451
	Isoprene	Single T_g; microscopy; light scattering; NMR	Depended on microstructure; immiscible when I and II were both highly cis; I was deuterated (Ref. 335)	47,80,149,237,249, 335,520,542,548,549, 757,770,771,787,854, 901,1032,1063
Butadiene-*co*-styrene	*tert*-Butylstyrene	Single dynamic mechanical loss peak	I had 25% styrene; II had $M_w = 0.835$ kg/mol	138
	Glycerol ester of hydrogenated rosin	Single dynamic mechanical loss peak	I had 25% styrene; II had $M_w = 0.5$ kg/mol	139
1-Butene	1-Pentene	Single T_g	–	190
	Propylene	Single T_g	Semicrystalline	190,502,657
Butyl acrylate	Ethylene, chlorinated	Single T_g; transparency	II had 49.8 or 62.1% Cl; immiscible when II had 48.0% Cl	100
	4-Hydroxystyrene-*co*-styrene	Single T_g	I was *tert*-butyl; II had 28-66 mol% 4-hydroxystyrene	897
	Vinyl chloride	Single T_g; transparency	Some papers showed two T_g's (Refs. 812, 866) or phase separation in solution (Ref. 425)	425,655,812,845, 846,850,851 866
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran (≥ 80% vinylidene chloride)	812
Butyl acrylate-*co*-methyl methacrylate	Vinyl chloride	Single T_g; electron microscopy	I was Degalan V26(90% methyl methacrylate) (Ref. 886); I had 75% butyl acrylate) (Ref. 654)	654,886
Butyl methacrylate	*p*-(2-Hydroxy-hexafluoroisopropyl) styrene-*co*-styrene	Single T_g; transparency	II had 83.3–98.25 mol% styrene; immiscible when II had 99.0 mol% styrene	103,572,646, 807
	p-(2-Hydroxy-hexafluoroisopropyl)-α-methylstyrene-*co*-styrene	NMR	II had 1.5 mol% OH-containing monomer	89
	Vinyl chloride	Single T_g; transparency; miscible in solution	I was *n*-butyl, isobutyl or *sec*-butyl	319,425,649, 653,846,810,850
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran, ≥ 80% vinylidene; I was *n*-butyl, isobutyl or *sec*-butyl	409,812
n-Butyl methacrylate-*co*-methacrylic acid	Styrene-*co*-4-vinylpyridine	Single T_g; FTIR	I had 8 or 18 mol% methacrylic acid; II had 15, 22 or 28 mol% 4-vinylpyridine	985
n-Butyl methacrylate-*co*-4-vinylpyridine	Styrene-*co*-methacrylic acid	Single T_g; FTIR	I had 10.6, 18.9 or 26 mol% 4-vinylpyridine; II had 12, 24 or 29 mol% methacrylic acid	198,985
N-Butyl-3-hydroxymethyl carbazoyl methacrylate	ω-Hydroxybutyl-3,5-dinitrobenzoyl methacrylate	Single T_g	–	693
tert-Butylstyrene	Cyclohexyl acrylate	Single T_g; transparency	–	765
	Cyclohexyl methacrylate	Single T_g; transparency	–	765

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Isoprene	Single dynamic mechanical loss peak	I had $M_w = 0.835$ kJ/mol II was natural rubber	138
	3,3,5-Trimethyl-cyclohexyl methacrylate	Single T_g; transparency	–	765
Butylene adipate	Epichlorohydrin	Single T_g	Semicrystalline	223
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; melt transparent; IGC	Semicrystalline when ≤ 60 wt.% II	332,1205
	Vinyl acetate-*co*-vinylidene chloride	Single T_g	II was Saran C ($\geq 80\%$ vinylidene chloride); semicrystalline	31
	Vinyl bromide	Single T_g	–	150
	Vinyl chloride	Single T_g	Semicrystalline when ≤ 70 wt.% II	900
Butylene dodecamethylene dicarboxylate	Vinyl chloride	Single T_g	Semicrystalline	872
Butylene 2,6-naphthalene dicarboxylate	Ethylene 2,6-naphthalene dicarboxylate	Single T_g	Blend had ≥ 80 wt.% I	1238
Butylene sebacate	Epichlorohydrin	Single T_g	Semicrystalline	223
	Vinyl chloride	Single T_g	Semicrystalline	872
Butylene terephthalate	Arylate	Single T_g; X-ray scattering	Semicrystalline	1040
	Butylene oxide-γ-butylene terephthalate	Single T_g; dielectric loss measurements; microscopy	II had 84 wt.% butylene terephthalate	554,703
	Copolyester	Single T_g	Semicrystalline when ≥ 25 wt.% I; II was CP-350(bisphenol-A-neopentyl glycol terephthalate)	768
	Copolyester	Single T_g	Semicrystalline; II was made from bisphenol-A and 1/1 or 1/3 tereph-thaloyl chloride/isophthaloyl chloride	438,439
	Decamethylene-4,4′-terephthaloyl-dioxydibenzoate	Single T_g; microscopy; T_m-depression	0–50% II in blend	660,661,662
	Ethylene terephthalate	Single T_g	Semicrystalline	219,220,916
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; melt transparent	Semicrystalline	688,689,735
	Vinyl acetate-*co*-vinylidene chloride	Single T_g	II had $\geq 80\%$ vinylidene chloride	36
	Vinyl chloride	Single T_g	Semicrystalline	36,686
	Vinyl chloride, chlorinated	Single T_g	Semicrystalline	36
Caprolactam	Acrylic acid	Single T_g	Semicrystalline	378
	Hexamethylene adipamide	Single T_g; enthalpy recovery kinetics	Semicrystalline	215,830
	Methacrylic acid	SAXS	Semicrystalline	371
	Styrene, sulfonated and Li-neutralized	Single T_g	II had 9.8 mol% sulfonated groups; semicrystalline	583,584
	Styrene, sulfonated and Mn-neutralized	Single T_g; T_m-depression	II had 10.2 mol% sulfonated groups; Semicrystalline	523
	Styrene, sulfonated and Zn-neutralized	Single T_g; T_m-depression	II had 10.1 mol% sulfonated groups; semicrystalline	524
Caprolactone	Acrylonitrile-*co-tert*-butylstyrene	Single T_g; SALS; microscopy	II had 19.8–39.6 wt.% acrylonitrile	1175
	3,3-Bis(chloromethyl)oxetane	Single T_g	Semicrystalline; II was Penton	301,445
	Chlorostyrene	Single T_g	II was *o*-chlorostyrene or mixed *o*- and *p*-isomers; semicrystalline when $\geq 21\%$ I	18,32
	Epichlorohydrin	Single T_g	Semicrystalline	82,223
	Ester	DSC; SALS; X-ray diffraction; microscopy	II was made from terephthaloyl chloride and 4,4′-bis(6-hydroxy-hexyloxy) biphenyl	821
	Ethylene, chlorinated	Single T_g	Semicrystalline when $\leq 90\%$ II; II had $\geq 30\%$ Cl; two T_g's when II had 25% Cl	32,55,191 295
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; melt transparent; IGC	Semicrystalline when >50 wt.% I	82,193,332,982
	Nitrocellulose	Single T_g	$\geq 50\%$ I; semicrystalline when $\geq 50\%$ I	82,352,353
	Propylene, chlorinated	Single T_g	I had 66 wt.% Cl; semicrystalline when ≥ 50 wt.% I	18,32
	Vinyl acetate-*co*-vinylidene chloride	Single T_g	II was Saran C (≥ 80 mol% vinylidene chloride); semicrystalline	31,887
	Vinyl bromide	Single T_g	Semicrystalline when $>30\%$ I	147

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Vinyl chloride	Single T_g; NMR	Semicrystalline when ≥ 30% I	82,352,353,446 628,635,872,900, 1082
	Vinyl chloride, chlorinated	Single T_g	II had 67.2 wt.% Cl; semicrystalline when ≥ 50 wt.% I	54
	Vinyl chloride-*co*-vinylidene chloride	Single T_g	Semicrystalline; II had 79% or 88% vinylidene chloride; some samples of II were Saran B	31,825,868, 873,887
	Vinylidene fluoride	T_m-depression	Semicrystalline	386
	Vinyl methyl ether	Single T_g		1145
Caprolactone-*co*-ethylene terephthalate	Ethylene, chlorinated	Single T_g	I had 33–89 wt.% ethylene terephthalate; II had 67.2 wt.% Cl	525,892
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; FTIR	II had 48–82 wt.% ethylene terephthalate	1243
	Vinyl chloride	Single T_g	I had 33 or 44 wt.% ethylene terephthalate	525
	Vinyl chloride, chlorinated	Single T_g	I had 33 wt.% ethylene terephthalate	525
Carbon monoxide-*co*-ethyl acrylate-*co*-ethylene	Vinyl chloride	Single T_g	Semicrystalline when I had >60% ethylene; I had 4.0–19.6% carbon monoxide, 5.5–35.4% ethyl acrylate, and 34.2–79.6% ethylene	692
Carbon monoxide-*co*-2-ethylhexyl acrylate-*co*-ethylene	Vinyl chloride	Single T_g	I had 17.8/34.2/47.9 or 18.6/39.6/41.8 = carbon monoxide/2-ethylhexyl acrylate/ethylene	692
Carbon monoxide-*co*-ethylene-*co*-vinyl acetate	Chlorostyrene	Single T_g	I was Elvaloy 741; II was a mixture of *o*- and *p*- isomers	18
	Propylene, chlorinated	Single T_g	I was Elvaloy 741	18
	Vinyl chloride	Single T_g	Semicrystalline when I had >60% ethylene; I was Elvaloy 741 or 10.5/66.7/22.8 or 10.2/58.2/31.5 = carbon monoxide/ethylene/vinyl acetate	21,40,92
Carbonate of bisphenol-A	Alkylene terephthalate	Single T_g	II had an alkylene group of 2-ethyl-2-methylpropylene, 1,7-heptylene, 1,9-nonylene or 1,5-pentylene (4 blend systems); miscibility arised from *trans*-esterification	1074
	Biphenyl-4,4′ylene sebacate	Single T_g	Up to 40 wt.% II in blend	387
	Butylene adipate	Single T_g	Semicrystalline	174,176
	Butylene terephthalate	Single T_g; FTIR	–	1132
	p-tert-Butylphenol formaldehyde	Single T_g	–	1057
	Caprolactone	Single T_g; SANS; SAXS; FTIR; NMR	Semicrystalline, especially when ≥ 25 wt.% II	174,176,645 948,949,950
	Caprolactone-*co*-ethylene terephthalate	Single T_g; FTIR	II had 48 or 58 wt.% ethylene terephthalate	1120,1242
	Carbonate	Single T_g; transparency	II was carbonate of bisphenol-E, bisphenol-F, bisphenol-Z, bisphenol chloral, dimethylbisphenol-A, dimethylbisphenol-Z, norborane, or tetramethylbisphenol-F (8 miscible blend systems)	427
	Copolyester	Single T_g; melt transparent	Semicrystalline when cast from solvent up to 80 wt.% II; II was prepared from bisphenol-A and 1/1 = terephthalic/isophthalic acid	585
	Copolyester	Single T_g	II was made from terephthalic acid and 1,4-cyclohexane-dimethanol and up to 60 mol% ethylene glycol	23,1093
	Copolyester	Single T_g; melt transparent	Semicrystalline; II was KODAR A150, made from 1,4-cyclohexanedimethanol and 1/4 = isophthalic/terephthalic acid	174,556 581,1251
	Copolyester	Single T_g	II was Hytrel 5556, a multiblock copolymer with poly(tetramethylene ether)glycol terephthalate soft segment	248

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			and tetramethylene terephthalate hard segment	
	1,4-Cyclohexane-dimethylene succinate	Single T_g	Semicrystalline	174,175
	1,4-Cyclohexane-dimethylene terephthalate	Single T_g; melt transparent	Semicrystalline	174,486,581
	Cyclohexyl methacrylate-*co*-methyl methacrylate	Single T_g	II had 6.1–43.8 wt.% cyclohexyl methacrylate	574,622,1039
	Ethylene adipate	Single T_g	Semicrystalline	174,176
	Ethylene succinate	Single T_g	Semicrystalline	174,176
	Ethylene terephthalate	Single T_g	Semicrystalline; ≥50 or 75% II; two T_g's when ≤60% II	337,593 603,1151
	p-(2-Hydroxy-hexafluoroisopropyl) styrene-*co*-styrene	Single T_g; transparency	II had 29–78 mol% styrene; immiscible when II had 83 mol% styrene	571,646, 807
	Maleic anhydride-*co*-styrene	Light scattering	II had 8% maleic anhydride	712
	Methacrylic acid-*co*-styrene	Single T_g	II had 2–23 wt.% methacrylic acid	10,11
	Methyl methacrylate	Single T_g	Blends prepared by precipitation of THF solutions in *n*-heptane or cast from hot THF solutions	29,109, 481,486,715
	Methyl methacrylate-*co*-*p*-methylstyrene	Single T_g	II had ≥70 wt.% methyl methacrylate	357
	Methyl methacrylate-*co*-*N*-phenylmaleimide	Single T_g	II had ≥70 wt.% methyl methacrylate	357
	Methyl methacrylate-*co*-phenyl methacrylate	Single T_g	II had 16–63 wt.% phenyl methacrylate	622
	Methyl methacrylate-*co*-styrene	Single T_g	II had ≤14 wt.% styrene	577,930
	Novolac	Single T_g	II had MW = 1 kg/mol and was made from formaldehyde and 13/17/70 mol% = *p*-*tert*-butylphenyl/*m*-cresol/*o*-cresol	221
	Phenyl methacrylate	Single T_g	–	480,622
	Pyrrole	Single T_g	Blend had 7% II	856
	Vinylidene chloride-*co*-vinyl chloride	Single T_g	II had 13.5 wt.% vinyl chloride; semi-crystalline when ≤25 wt.% I	871
Carbonate of hexafluorobisphenol-A	Alkyl methacrylate	Single T_g; transparency	II had an alkyl group of methyl, ethyl or *n*-propyl (3 miscible blend systems)	225,430
	Isopropyl methacrylate	Single T_g; transparency	≤70 wt.% I in blend	430
	Methyl methacrylate-*co*-α-methylstyrene	Single T_g	II had 81 or 95 wt.% methyl methacrylate	930
Carbonate of tetramethyl-bisphenol-A	Acrylonitrile-*co*-α-methylstyrene	Single T_g	II had 4–16.5 wt.% acrylonitrile	1010
	Acrylonitrile-*co*-styrene	Single T_g; FTIR	II had < 13% acrylonitrile	8,225,1069
	Allyl alcohol-*co*-styrene	Single T_g	II had < 19.1 wt.% allyl alcohol	225
	Butylene sebacate	Single T_g	Semicrystalline	227
	Caprolactone	Single T_g	Semicrystalline	227
	Carbonate of bisphenol-A	Single T_g; transparency; dielectric spectroscopy	–	51,427,1124
	Carbonate	Single T_g; transparency	II was carbonate of bisphenol-AP, bisphenol-E, bisphenol-F, bisphenol-S, bisphenol-Z, bisphenol chloral, dimethylbisphenol-A, dimethylbisphenol-Z, norbonane, tetramethylbisphenol-F or tetramethylbisphenol-P (11 miscible blend systems)	427
	Ester	Single T_g	II was decamethylene decamethylene dicarboxylate, decamethylene sebacate, ethylene adipate, hexamethylene decamethylene dicarboxylate, or hexamethylene sebacate (5 miscible blend systems)	227
	Maleic anhydride-*co*-styrene	Single T_g	II had 8% maleic anhydride	225
	Methyl methacrylate-*co*-styrene	Single T_g	II had < 50 wt.% methyl methacrylate	575,884,1194
	α-Methylstyrene	Single T_g	–	227
	p-Methylstyrene-*co*-tetrahydro-furfuryl methacrylate	Single T_g	II had ≤50 mol% tetrahydrofurfuryl methacrylate	270

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Styrene-*co*-tetrahydrofurfuryl methacrylate	Single T_g	II had ≤53 mol% tetrahydrofurfuryl methacrylate	270
Cellulose	Acrylonitrile	NMR; single T_g; microscopy; WAXD	–	560,627,1208 556
	Caprolactone	NMR	–	625,1075
	Ethylene glycol	Single T_g; FTIR	–	
	Vinyl acetate	Single T_g	≥70% I in blend	626
	Vinyl alcohol	NMR; FTIR; T_m-depression	–	560,623,744,1075
	4-Vinylpyridine	Single T_g, NMR	–	559,1208
Cellulose acetate	2,6-Dimethyl-1,4-phenylene ether, phosphonate derivative	Single T_g	II had 9.5% P	87
	2,6-Dimethyl-3-bromo-1,4-phenylene ether, phosphonate derivative	Single T_g	II had 10.5% P	87
	Styrene, phosphonate derivative	Single T_g	II had 8.0% P	87
	Styrene, phosphorylated	Single T_g	II had more than 1 phosphoryl group per 4 styrene units	550
	Styrenephosphonate ester	Single T_g	Blend initially prepared was heterogeneous, became miscible when annealed above T_g	792
	styrene-*co*-vinylidene chloride phosphonylated, chloromethylated	Single T_g; electron microscopy	I was Eastman 394–45; II had 7% P, 14.5% Cl	88
	styrene-*co*-inylidene chloride phosphonylated	Single T_g	II had 8.6% P	87
	4-Vinylpyridine	Single T_g; cast films transparent	Semicrystalline; I had 39.4% acetyl content or had 10H/2 glucose	27,86
Cellulose acetate-butyrate	Ethylene-*co*-vinyl acetate	Single T_g; transparent films	I had 18.5/45 = acetic acid/butyric acid and II had 80% vinyl acetate; two T_g's when II had 70% vinyl acetate	93,452
	Hydroxybutyrate-*co*-valerate	Single T_g; WAXD; NMR	II had 10 mol% valerate; miscible when blend had 20–50% II, and partially miscible when blend had 60–80% II	84
Cellulose acetate propionate	Alkylene glutarate	Single T_g	The alkylene group was ethylene, diethylene, hexamethylene, pentamethylene, tetramethylene or trimethylene (6 miscible blend systems)	927
Cellulose triacetate	Highly subsitituted cyanoethyl cellulose	Single T_g; FTIR; microscopy	–	1026
Chitin	*N*-Vinylpyrrolidone	Single T_g; FTIR	–	1133
Chitin-*g*-2-methyl-2-oxazoline	Vinyl alcohol	Single T_g; FTIR	–	913
	Vinyl chloride	Sinlge T_g; FTIR	Blend had ≤10 wt.% II	914
Chitosan	Ethylene oxide	T_m depression	–	1245
Chitosan acetate	Ethylene oxide	FTIR; microscopy	–	1227
p-Chloro-(3-ethenoxypropyl) cinnamate	*p*-Methoxy-(6-ethenoxyhexyl) cinnamate	Single T_g	–	515
	p-Methoxy-(6-ethenoxypropyl) cinnamate	Single T_g	–	515
	p-Methyl-(3-ethenoxypropyl) cinnamate	Single T_g	–	515
1-Chloroethyl methacrylate	Alkyl methacrylate	Single T_g; transparency	The alkyl group of II was methyl, ethyl, *n*-propyl, isopropyl, *n*-butyl or tetrahydrofurfuryl (6 miscible blend systems)	1152
	Ester	Single T_g; transparent melt	II was butylene adipate, caprolactone, 2,2-dimethyl-1,3-propylene adipate, 2,2-dimethyl-1,3-propylene sebacate, 2,2-dimethyl-1,3-propylene succinate or hexamethylene sebacate (6 miscible blend systems)	1154
2-Chloroethyl methacrylate	Alkyl methacrylate	Single T_g; transparency	The alkyl group of II was methyl, ethyl or tetrahydrofurfuryl (3 miscible blend systems)	612
	Ester	Single T_g; transparent melt	II was butylene adipate, caprolactone, 2,2-dimethyl-1,3-propylene adipate, 2,2-dimethyl-1,3-propylene sebacate, ethylene adipate or hexamethylene sebacate (6 miscible blend systems)	609,611
	N-vinylpyrrolidone	Single T_g	–	607

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Chloromethyl methacrylate	Alkyl methacrylate	Single T_g	II had an alkyl group of methyl, ethyl, *n*-propyl, isopropyl, acetonyl or tetrahydrofurfuryl (6 miscible blend systems)	123,273
	Carbonate of bisphenol-A	Single T_g	Miscibility depended on method of preparation	271
	Ester	Single T_g; transparent melt	II was butylene adipate, caprolactone, 2,2-dimethyl-1,3-propylene adipate, 2,2-dimethyl-1,3-propylene sebacate, 2,2-dimethyl-1,3-propylene succinate, ethylene adipate, ethylene succinate or hexamethylene sebacate (8 miscible blend systems)	609,611
	N-vinylpyrrolidone	Single T_g	–	607
Chloroprene	Ethylene-*co*-methyl acrylate	Single T_g; phase contrast microscopy	Semicrystalline	396
	Isoprene, epoxidized	Single T_g; FTIR		597
3-Chloropropyl methacrylate	Acrylonitrile-*co*-*p*-methylstyrene	Single T_g	II had 15–33 wt.% AN	1105
	Acrylonitrile-*co*-styrene	Single T_g	II had 12–35 wt.% AN	1105
	Ester	Single T_g	II was butylene adipate, caprolactone, 2,2-dimethyl-1,3-propylene adipate or hexamethylene sebacate (4 miscible blend systems)	1111
	Tetrahydrofurfuryl methacrylate	Single T_g	–	1104
o-Chlorostyrene	Styrene	Single T_g	–	396
o-Chlorostyrene-*co*-*p*-chlorostyrene	2,6-Dimethyl-1,4-phenylene ether	Single T_g; transparency	I had 23-64% *p*-chlorostyrene	16
	Styrene	Single T_g	After quenching from 145°C; I had 71–92 mol% *o*-chlorostyrene; two T_g's when I had ≤ 62 mol% *o*-chlorostyrene	131,803
o-Chlorostyrene-*co*-*o*-fluorostyrene	2,6-Dimethyl-1,4-phenylene ether	Single T_g; transparency; NMR	I had 14–40 mol% *o*-chlorostyrene; two T_g's when I had >36 mol% *o*-chlorostyrene	22,840, 843
p-Chlorostyrene-*co*-*o*-fluorostyrene	2,6-Dimethyl-1,4-phenylene ether	Single T_g; transparency; NMR	I had 13–74 mol% *p*-chlorostyrene; two T_g's when I had >74 mol% *p*-chlorostyrene	22,840, 843
p-Chlorostyrene-*co*-styrene	2,6-Dimethyl-1,4-phenylene ether	Single T_g	I had ≥ 34.7 mol% styrene; two T_g's when I had <34.7 mol% styrene	243,413, 749
Collagen hydrolyzate	Ethyl acrylate	Single T_g	–	578
Copolyester	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g	I was cyclohexylene dimethylene tere/isophthalate	689
	p-(2-Hydroxy-hexafluoroisopropyl) styrene-*co*-styrene	Single T_g; clear films	I was KODAR PETG (made from terephthalic and isophthalic acid and ethylene glycol and 1,4-dihydroxymethyl cyclohexane; II had 60 mol% styrene; immiscible when II had ≥ 83 mol% styrene	571,646
		Single T_g; clear films	I was VITEL PE-307; II had 83–90.3 mol% styrene	646
		Single T_g	I was VITEL VPE-5545; II had 83 mol% styrene; immiscible when II had 90.3 mol% styrene	646
	Vinyl chloride	Single T_g for II with soft segments of I	I was Hytrel, a multiblock copolymer with poly(tetramethylene ether) glycol terephthalate soft segments and tetramethylene terephthalate hard segments; hard segments crystalline; two T_g's after 130°C annealing; Refs. 343, 344 showed single T_g to 50 or 60 wt.% I	343,344, 617
	Vinyl chloride	Single T_g	I was made from adipic acid, hexane-1,6-diol and neopentanediol and had $M_n = 2$ kg/mol	331
Copolyester-carbonate	Ethylene terephthalate	Single T_g	I was from $1/2 =$ terephthalate/ bisphenol-A with ester and carbonate linkages	3

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Vinyl chloride	Single T_g	I was made from adipic acid and hexane-1,6-diol and neopentane-diol and diphenyl carbonate	333
Copolyether-amide	*N*-vinylpyrrolidone	Single T_g; transparency	Studied up to 30% II; I was made from isophthaloyl chloride and *cis*-4,4′-diamino-dibenzo-18-crown-6	720
Copolymer of bromohydro-quinone and 4,4′-(decame-thylenedioxy) bibenzoic acid	Copolymer of *p*-hydroxybenzoic acid and 3-methyl-1,6-hexanediol-terephthalic acid	Single T_g; microscopy	Transition temperature from a mesophase to an isotopic phase changed continously and smoothly depending on the composition	380
	Copolymer of 4,4′-(decamethylene-dioxy)-bibenzoic acid and 4,4′-(ethylenedioxy)diphenol	Single T_g; microscopy	Transition temperature from a mesophase to an isotopic phase changed continously and smoothly depending on the composition	380
2-Cyanoethyl methacrylate	Alkyl methacrylate	Single T_g	II had an alkyl group of methyl, acetonyl or tetrahydrofurfuryl (3 miscible blend system)	1234
	2-Ethyl-2-oxazoline	Single T_g	Blend had ≥ 80 wt.% I	1236
	2-Hydroxyethyl methacrylate	Single T_g; FTIR	-	1235
	2-Hydroxypropyl methacrylate	Single T_g; FTIR	Blend had ≤ 50 wt.% I	1235
	Tertiary amide	Single T_g	II was *N,N*-dimethylacrylamide, *N*-methyl-*N*-vinylacetamide or *N*-vinyl-2-pyrrolidone (3 blend systems); formed complexes	1236
Cyanomethyl methacrylate	Alkyl methacrylate	Single T_g; FTIR	II had an alkyl group of acetonyl, 2-hydroxyethyl or 2-hydroxypropyl (3 miscible blend systems)	1233, 1235
	2-Ethyl-2-oxazoline	Single T_g	Blend had ≥ 60 wt.% I	1236
	Tertiary amide	Single T_g	Complexation formation; II was *N*-vinylpyrrolidone, *N,N*-dimethyl-acrylamide or *N*-methyl-*N*-vinylacet-amide (3 miscible blend system)	1236
1,4-Cyclohexanedimethylene succinate	Epichlorohydrin	Single T_g	Semicrystalline	223
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; transparent melt	Semicrystalline ≥ 50 wt.% I	332
	Vinyl chloride-*co*-vinylidene chloride	Transparent melt; large T_m-depression	II was Saran (86.5% vinylidene chloride)	868
	Vinyl chloride	Single T_g	Semicrystalline ≤ 30 wt.% II	898
1,4-Cyclohexanedimethylene 1,4-Cyclohexanedicarboxylate	Arylate	Single T_g; PALS	II was Ardel D100	1251
	Carbonate of bisphenol-A	Single T_g' PALS	II was Ardel D100	1251
Cyclohexyl methacrylate	Vinyl chloride	Single T_g; NMR	-	641
	Vinyl chloride-*co*-vinylidene chloride	Single T_g	Semicrystalline ≥ 75% II; II had 86.5 wt.% vinylidene chloride	409,870
	2-Vinylnaphthalene	Single T_g; excimer fluorescence	I had low MW; II had MW = 70 kg/mol	231
Decamethylene decamethylene dicarboxylate	Vinyl chloride	Single T_g	Semicrystalline	872
Decamethylene sebacate	Epichlorohydrin	Single T_g	Semicrystalline	223
Dianhydrosorbityl dicarboxylate	Dianhydrosorbityl dicarboxylate	Single T_g; microscopy	6 Miscible blend systems based on different polyesters; the dicarboxylate was adipate, oxalate, sebacate, suberate or succinate	925
2,3-Dichloro-1-propyl acrylate	Ethyl acrylate-*co*-glycidyl methacrylate	Single T_g	II had 65% ethyl acrylate	181
2,2-Dichloroethyl methacrylate	Alkyl methacrylate	Single T_g; transparency	The alkyl group of II was methyl, ethyl, *n*-propyl, isopropyl, *n*-butyl, isoamyl, cyclohexyl or tetrahydrofurfuryl (8 miscible blend systems)	1110
2,6-Diethyl-1,4-phenylene ether	Styrene	Single T_g	-	134
N,N-dimethylacrylamide	Allyl alcohol-*co*-styrene	Single T_g; FTIR	Formed complexes; II had 4.5 or 6.5 wt.% OH groups	974
	Alkyl methacrylate	Single T_g; FTIR	II had an alkyl of chloromethyl, 2-chloroethyl, 3-chloropropyl,	1108

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			2-bromoethyl or 2-iodoethyl (5 miscible blend systems)	
	Vinylidene fluoride	Single T_g	Semicrystalline $\geq$60 wt.% II	241
N,N-Dimethylacrylamide-*co*-ethylene	Vinyl chloride	Single T_g	I had 71.4 or 73.1 wt.% ethylene; two T_g's when I had $\geq$75.1 wt.% ethylene	563
2,6-Dimethyl-1,4-phenylene ether	Acrylic acid-*co*-styrene	Single T_g	II had 4.7–8.5 wt.% acrylic acid	921,1022
	p-Bromostyrene-*co*-fluorostyrene	Single T_g; FTIR	II had 11–73 mol% *p*-bromostyrene	547,834
	Cyclohexylmaleimide-*co*-styrene	Light scattering	I had 83 wt.% styrene	712
	o-Fluorostyrene-*co*-*p*-fluorostyrene	Single T_g; transparency	II had 10–38% *para* isomer; two T_g's when II had 5 or $\geq$43% *para* isomer	412,835
	o-Fluorostyrene-*co*-styrene	Single T_g; transparency	II had $\geq$9 mol% styrene	836,839,842
	p-Fluorostyrene-*co*-styrene	Single T_g; transparency	II had $\geq$44 mol% styrene	531,532,836,839,842
	p-(2-Hydroxy-hexafluoroisopropyl) styrene-*co*-styrene	Single T_g	II had 77.9–90.3 mol% styrene	571,572,646,807
	Luoloylmeleimide-*co*-styrene	Light scattering	II had 81 wt.% styrene	712
	Maleic anhydride-*co*-styrene	Single T_g; transparency; microscopy	II had 5.9–12.5 wt.% maleic anhydride	232,233, 1022,1026
	Methacrylic acid-*co*-styrene	Single T_g	II had 5.9 or 7.8 mol% methacrylic acid	917,921
	2-Methyl-6-benzyl-1,4-phenylene ether	Single T_g; transparency	–	751
	Methyl methacrylate-*co*-styrene	Single T_g	II had 2–20 wt.% methyl methacrylate	258,461,1022
	2-Methyl-6-phenyl-1,4-phenylene ether	Single T_g	–	752,753
	α-Methylstyrene	Single T_g	–	134,459,691
	α-Methylstyrene-*co*-styrene	Single T_g	All compositions of II	459,754
	o-Methylstyrene	NMR	NMR showed heterogeneity on a 3-nm scale	195
	p-Methylstyrene	Single T_g	–	195,235,788
	p-Nitrostyrene-*co*-styrene	Single T_g	II had <22 mol% nitrostyrene	155,158
	N-phenylmaleimide-*co*-styrene	Single T_g; light scattering	II had 84 or 90 wt.% styrene	712,1102
	Styrene	Single T_g; transparency; NMR	–	39,201,526,589,663, 750,753,784,1207
	Styrene, head-to-head	Single T_g	–	463
	Styrene, iodinated	Single T_g	II had $\leq$47% iodination	261
	Styrene, sulfonated and metal-neutralized	Single T_g	II had up to 7.8 mol% sulfonation (Ref. 677); II had 2.8 mol% sulfonation and was neutralized by Na, Zn, Ni or Mn, and miscible when blend had $\leq$40 wt.% I (Ref. 1200)	677, 1200
	Styrene, syndiotactic	Single T_g	–	954
	Styrene-*b*-isoprene-*b*-styrene	Single T_g for mixed with styrene blocks of II	II had block MW 15-51-17 and 78-52-80 kg/mol	568
	Styrene-*co*-2,2,6,6-tetramethyl-piperidinyl methacrylate	Single T_g	II had $\leq$24 wt.% 2,2,6,6-tetramethylpiperi-dinyl methacrylate	257
	Urethane acrylate	Single T_g; FTIR	I and II formed interpenetrating network	567
2,6-Dimethyl-1,4-phenylene ether, carboxylated	Styrene	Single T_g	11.8 mol% of repeat units in I carboxy-lated; two T_g's when 35.0 mol% repeat units in I carboxylated	874
2,6-Dimethyl-1,4-phenylene ether, brominated phosphonylated	Cellulose acetate	Single T_g; electron microscopy	II was Eastman 394–45	88
2,6-Dimethyl-1,4-phenylene ether, modified	Epichlorohydrin, modified	Single T_g	Both I and II had at least 25% carbazolyl or 3,5-dinitrobenzoyl groups	664
2,6-Dimethyl-1,4-phenylene ether, sulfonylated	Acrylonitrile-*co*-styrene	Single T_g	I had 20–26 wt.% sulfonylation	410
	p-Bromostyrene	Single T_g	I had >12 mol% sulfonylation	1216,1220
	o-Bromostyrene-*co*-*p*-bromostyrene	Single T_g	High *p*-bromostyrene content and high degree of sulfonylation favored miscibility	1216
	p-Chlorostyrene	Single T_g	II had >9 mol% sulfonylation	1217,1220
	o-Chlorostyrene-*co*-*p*-chlorostyrene	Single T_g	Miscibility depended on compositions of I and II	1217
	o-Chlorostyrene-*co*-*o*-fluorostyrene	Single T_g	Miscibility depended on compositions of I and II	1218

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	p-Chlorostyrene-*co*-*o*-fluorostyrene	Single T_g	Miscibility depended on compositions of I and II	1218
	o-Fluorostyrene	Single T_g	I had 4–17 mol% sulfonylation	1220
	p-Fluorostyrene	Single T_g	I had 17–66 mol% sulfonylation	1220
	o-Fluorostyrene-*co*-*p*-fluorostyrene	Single T_g	Miscibility depended on compositions of I and II	1215
	p-Fluorostyrene-*co*-styrene	Single T_g	I had 20–26 wt.% sulfonylation	410
	Phenylvinyl *sec*-butyl ether-*alt*-*N*-phenylmaleimide	Single T_g	I had 68–87 mol% sulfonylation	1219
	Phenylvinyl ethyl ether-*alt*-*N*-phenylmaleimide	Single T_g	I had 61–91 mol% sulfonylation	1219
	Styrene	Single T_g	I had <31 wt.% sulfonylation	410
α,α-Dimethyl-β-propiolactone (pivalolactone)	Vinyl chloride	T_m-depression	Semicrystalline	32,33
Dimethylsiloxane	Ethylene-*co*-methyl acrylate	Single T_g; FTIR	I had a small amount of vinyl groups; II had 21 wt.% methyl acrylate	1182
Dimethylsiloxane, modified	Butyl methacrylate	Single T_g; FTIR	One of the methyl groups in the repeating unit of I was changed to 4-hydroxy-4,4-bis (trifluoromethyl) butyl group	127
	Ethylene glycol	Single T_g; FTIR	One of the methyl groups in the repeating unit of I was changed to 4-hydroxy-4,4-bis(trifluoromethyl) butyl group	127
2,6-Dipropyl-1,4-phenylene ether	Styrene	Single T_g	–	134
Dodecamethylene adipamide, *N,N*-dimethyl substituted	*p*-(2-Hydroxy-hexafluoroisopropyl) styrene-*co*-styrene	Single T_g	Semicrystalline when $\leq 50\%$ substitution on I	454
Dodecamethylene adipate	Epichlorohydrin	Single T_g	Semicrystalline	223
	Vinyl chloride	Single T_g	Semicrystalline	872
Dodecamethylene decamethylene dicarboxylate	Vinyl chloride	Single T_g	Semicrystalline	872
Dodecamethylene dodeca-methylene dicarboxylate	Vinyl chloride	Single T_g	Semicrystalline	872
Enaminonitrile	Ethylene glycol	Single T_g	–	587
	Tertiary amide	Single T_g	II was *N,N*-dimethylacrylamide, 2-ethyl-2-oxazoline or *N*-vinyl-2-pyrrolidone (3 miscible blend systems)	587
	4-Vinylpyridine	Single T_g	–	587
Epichlorohydrin	Acrylonitrile-*co*-styrene	Single T_g	II had 18 or 25 wt.% acrylonitrile	305
	Alkyl acrylate	Single T_g	II had an alkyl group of ethyl or *n*-propyl (2 miscible blend systems)	224,226
	Alkyl methacrylate	Single T_g	II had an alkyl group of ethyl, *n*-propyl, *n*-butyl or cyclohexyl (4 miscible blend systems)	224
	Butyl acrylate rubber	Single T_g	II was Hycar 4043	226
	Ethyl acrylate rubber	Single T_g	II was Hycar 4051EP	226
	Ester	Single T_g	II was ethylene adipate, ethylene sebacate or 2,2-dimethyl-1,3-propylene adipate (3 miscible blend systems)	223,278
	Glycidyl methacrylate	Single T_g	–	864
	Glycidyl methacrylate-*co*-methyl methacrylate	Single T_g	II had 76% glycidyl methacrylate	864
	Hexamethylene sebacate	Single T_g	–	864
	Methacrylonitrile-*co*-methyl methacrylate	Single T_g	II had 30–40 mol% methacrylonitrile	864
	Methyl methacrylate	Single T_g	Broad T_g might due to separate phases with differing T_g's within the mixture	135,224
	Vinyl acetate	Single T_g	–	303
Epichlorohydrin-*co*-ethylene glycol	Neopentyl glycol adipate	Transparency	I was Hydrin 200; refractive indices not equal in the temperature range investigated	288
Ester	Ester	Single T_g; microscopy	13 Miscible blend systems based on different linear aliphatic polyesters	925
	Ester	Melting behavior	Both polymers I and II were liquid crystalline; II had one more ethylene unit in the main chain	979

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Ester, hyperbranched and 3,5-dihydroxyphenyl-terminated	Aramide	Single T_g	II was Trogamid T or MXD-6	1125
	Amide	Single T_g	II was nylon-6	1125
	Butylene adipate	Single T_g	–	1125
	Copolyester	Single T_g	II was made from terephthalic acid and a mixture of ethylene glycol and 1,4-cyclohexane dimethanol	965
Ester, hyperbranched and 3,5-diacetoxyphenyl-terminated	Butylene terephthalate	Single T_g	–	1125
	Copolyester	Single T_g	II was made from terephthalic acid and a mixture of ethylene glycol and 1,4-cyclohexane dimethanol	1125
Ether ether ketone	Arylketone	Single T_g	II had 25, 50 or 57% ketone content	333
	Etherketone	Single T_g	I was oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene; II was oxy-1,4-phenylenecarbonyl-1,4-phenylene; semicrystalline	739
	Etherimide	Single T_g; microscopy; WAXD; T_m-depression	I was Victrex 450G; II was Ultem 1000; semicrystalline	172,946,1037 1178
	Ether sulfone	Single T_g	–	883
Ether ether ketone, sulfamidated	Amideimide	Single T_g; FTIR	I had degree of sulfamidation of 1.33; II was Torlon 4000T	1061
Ether ether ketone, sulfonated	Amideimide	Single T_g; FTIR	I had degree of sulfonation of 0.42, 0.53 or 1.00; II was Torlon 4000T	414,1061
	Etherimide	Single T_g; FTIR	II was Ultem 1000	414,1061
Ether ether sulfone, phenolphthalein	Epoxy	Single T_g; microscopy	Miscible when II was cured by amine; immiscible when II was cured by anhydride	1023
Etherimide	Amideimide	Single T_g	I was Ultem 10000; II was Torlon 4203L	1147
	Ethylene terephthalate	Single T_g; microscopy; T_m-depression	I was Ultem 1000	942,1054,1127
	Imide	Single T_g	I was Ultem 1000; II was based on diphenylpyromellitic dianhydride (DPPMDA) (3 different imides)	240
Etherimide ether	Thioetherimide ether	NMR	I was made from 4,4′-oxydianiline (ODA) and 4,4′-(1,4-phenylene-dioxy)diphthalic acid; II was made from ODA and 4,4′-thio-diphthalic anhydride	1000
Ether ketone ketone	Etherimide	T_m-depression	II was Ultem 1000	946
Ether sulfone	Aramid	Single T_g	II was made from isophthaloyl chloride and bis(4-aminophenyl) ether	562,600
	Imide	Single T_g; NMR	II was Polyimide XU218	372
	Imide	Single T_g	II was Matrimide 5218	510,940
	N,N′-(oxydi-*p*-phenylene) isophthalamide	Single T_g	–	1031
	Phenylene ether ether ketone	Single T_g	–	1184
	Phenylene ether sulfone ketone	Single T_g	–	1184
	Phenylene sulfone ether sulfone ketone	Single T_g	–	1184
	Phenylene thioether ether ether ketone	Single T_g	–	1184
	m-Phenylene isophthalamide	Single T_g	Prepared by *in situ* blending	1030
Ether urethane	Vinyl chloride	Single T_g	20 or 40 wt.% II; I was Adiprene L-100 and 4,4′-methylene-bis-2-chloroaniline	344
3-Ethenoxypropyl cinnamate	*p*-Methyl-(3-ethenoxypropyl) cinnamate	Single T_g	–	515
Ethyl acrylate	Novolac	Single T_g	II had MW about 1 kg/mol; II was formaldehyde and 13/17/70 mol% = *p*-*tert*-butylphenol/*m*-cresol/*o*-cresol or formaldehyde and 15/17/68 mol% = 2-*tert*-butylphenol/*m*-cresol/*o*-cresol	221

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Hexafluoroacetone-*co*-vinylidene fluoride	Single T_g	II had 8 mol% vinylidene fluoride	411,1059
	Styrene, sulfonated	Single T_g; FTIR	II had 7.2 mol% sulfonated units	1198
	Styrene-*co*-*p*-vinylphenol	Single T_g; FTIR	II had >4.46 mol% vinylphenol	1198
	Vinyl chloride	Single T_g	*In situ* polymerized II; other mixtures formed two phases (Refs. 296, 426 for example)	846
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran ($\geq$80% vinylidene chloride); I had MW = 50 kg/mol; two T_g's when I had MW = 140 kg/mol and II was Saran (86.5 wt.% vinylidene chloride)	812,870
	Vinylidene fluoride	Single T_g; transparency	Semicrystalline $\geq$25 wt.% II	56,80,844
Ethyl acrylate-*co*-methacrylonitrile-*co*-α-methylstyrene	Vinyl chloride	Single T_g; transparency	I had 2/40/58 = ethyl acrylate/methacrylonitrile/α-methylstyrene or unknown composition	422,424
Ethyl acrylate-*co*-methyl methacrylate	Vinyl chloride	Single T_g; electron microscopy	I was Polaroid K120N (95% methyl methacrylate)	886
Ethyl acrylate-*co*-4-vinylpyridine	Styrene-*co*-styrene sulfonic acid	Single T_g; transparency	I and II both $\geq$5% of second monomer (data obtained $\leq$10% substitution)	210,773
	Vinyl chloride	Single T_g	I had 2–14 mol% 4-vinylpyridine	137
	Vinyl chloride, sulfonated	Single T_g	I had 6.2 mol% 4-vinylpyridine; II had 3.7 mol% sulfonic acid	137
(*N*-ethylcarbozol-3-yl)methyl acrylate	2-(3,5-Dinitrobenzoyl) oxyethyl methacrylate	Single T_g; NMR	–	760
(*N*-ethylcarbozol-3-yl)methyl methacrylate	2-(3,5-Dinitrobenzoyl) oxyethyl methacrylate	Single T_g; NMR	–	761
Ethyl methacrylate	Novolac	Single T_g; FTIR	II had MW about 1 kg/mol and was formaldehyde and 13/17/70 mol% = *p*-*tert*-butylphenol/*m*-cresol/*o*-cresol	221,434
	Ethyl acrylate	Single T_g	–	156
	p-(2-Hydroxy-hexafluoro-isopropyl)styrene-*co*-styrene	Single T_g; transparency	II had 90.3–98.9 mol% styrene	103,571,646
	Vinyl acetate	Transparency	Transparent film when I <25 wt.% or when content of I toward 100 wt.%	634
	Vinyl chloride	Single T_g; transparency	–	234,319,649, 812,846
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran ($\geq$80% vinylidene chloride) or 86.5 wt.% vinylidene chloride; semicrystalline $\leq$30% I	409,812, 870
	Vinylidene fluoride	Single T_g	Semicrystalline when $\geq$40% II; two T_g's when >60% II	244,361,476 630,695
Ethylene, chlorinated	Acrylonitrile-*co*-butadiene	Single T_g	Depended on Cl content and acrylonitrile content	96,161
	Hexamethylene terephthalate	Single T_g	I had 48% Cl; immiscible with I had 36% Cl	36
	Methyl methacrylate	Single T_g; transparency; electron microscopy	I had $\geq$50 wt.% Cl; II was atactic, isotactic or syndiotactic (Ref. 1204)	99,296,812 848,1204
	Neopentyl glycol adipate	Single T_g	I had 42 or 48 wt.% Cl; immiscible when I had $\leq$36 wt.% Cl	288
	Vinyl chloride, chlorinated	Single T_g	I and II with identical chlorine content were immiscible	818
Ethylene, chlorosulfonated	Vinyl chloride	Single T_g	I had 1% S as SO_2Cl and 42 wt.% Cl; stated immiscible when I had 30 wt.% Cl in Ref. 296	200
Ethylene adipate	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; transparent melt	Semicrystalline when $\geq$50 wt.% I	332
Ethylene-*co*-methacrylic acid	Ethylene glycol	FTIR	I had 55 wt.% methacrylic acid	287
	Ethylene glycol-*co*-propylene glycol	Single T_g; FTIR	I had 18, 32, 44 or 55 wt.% methacrylic acid; II had 70 wt.% ethylene oxide	494
	2-Ethyl-2-oxazoline	FTIR	I had 44 wt.% methacrylic acid	512
	Styrene-*co*-2-vinylpyridine	FTIR	I had 32 wt.% methacrylic acid; II had 70 wt.% 2-vinylpyridine	495

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Tetramethylene glycol	FTIR	I had 55 wt.% methacrylic acid	496
	Vinyl ethyl ether	FTIR	I had 55 wt.% methacrylic acid	496
	Vinyl methyl ether	Single T_g; FTIR	I had 18, 32, 44 or 55 wt.% methacrylic acid	494
	2-Vinylpyridine	FTIR	Miscible when I had 18 wt.% methacrylic acid and formed complexes when I had 44 or 55 wt.% methacrylic acid; formed complexes when I had 32 wt.% methacrylic acid and was $\leq 35\%$ I in blend	494
Ethylene-*co*-methacrylic acid, zinc neutralized	Vinyl methyl ether	FTIR	I had 44 wt.% methacrylic acid	732
	4-Vinylpyridine	NMR	I had 15 wt.% methacrylic acid and 60% zinc-neutralized	52
Ethylene-*co*-methyl acrylate *co*-unspecified acid	Vinyl chloride	Single T_g	I was Vamac N-123	395
Ethylene orthophthalate	Vinyl acetate	Single T_g	–	829
Ethylene glycol	Copolyester-polyurethane	Single T_g	–	363
	Epoxy resin	Single T_g	Miscible when II was uncured; immiscible when II was cured (Ref. 313)	313, 1118,1119
	Ethersulfone	Single T_g; light scattering	–	317,534,743
	Ethyl methacrylate	Single T_g	–	130
	Ethylene-*co*-vinyl acetate	Single T_g	II had 87.1 wt.% vinyl acetate (Ref. 132); II had 73.4 wt.% vinyl acetate, miscible with I of $M_w = 20$ and 100 kg/mol (Ref. 328)	132, 328
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; NMR	Semicrystalline when >40% I	363,364,690
	p-(2-Hydroxy-hexafluoroisopropyl) styrene-*co*-styrene	Single T_g	II had 77.9 mol% styrene and I/II was 1/8-1/2; semicrystalline and no amorphous phase	806
	Methacrylic acid	Single T_g; NMR	Formed complexes in water and dimethylsulfoxide	374,1128
	Methacrylic acid-*co*-styrene, Na-neutralized	FTIR	I had 5.6–17.9 mol% acid	1098
	Methyl methacrylate	Single T_g; FTIR; NMR	I was miscible with atactic or syndiotactic II and immiscible with isotatic II; semicrystalline when >20 wt.% I	124,389,511 552,759, 1192
	Resorcinol	NMR	–	51
	Styrene, sulfonated and Na-neutralized	Single T_g	II had 2.9–8.8 mol% sulfonation; miscible when blend had low I content	498
	Styrene-*co*-*p*-vinylphenol	Single T_g	II had 13.1 mol% styrene and I/II was 1/8–1/1; semicrystalline at higher I content and no amorphous phase miscibility	806
	Styrene-*co*-vinylphenol trifluoromethyl carbinol	Single T_g	II had 84.4 mol% styrene and I/II was 1/8–1/4 or II had 54.5 mol% styrene and I/II was 1/8–1/2; semicrystalline at higher I content and no amorphous phase miscibility	806
	Sulfone	Transparency; light scattering	I had $M_n = 3.5$– 4.0 kg/mol; immiscible when I had $M_n = 200$ kg/mol	796
	Vinyl acetate	Single T_g	Ref. 397 stated miscible when ≥ 40 wt.% II in blend; Ref. 311 stated completely miscible if I had $M_w = 20$ kg/mol, and miscible up to 50 wt.% II if I had $M_w = 100$ kg/mol	311,397, 553
	Vinyl chloride	Single T_g; T_m-depression; NMR; IGC	Semicrystalline	418,1126,994
	Vinylnapthalene	Single T_g	Semicrystalline when >50% I; two amorphous phases when 25–50% I	178,580,679
	p-Vinylphenol	FTIR; NMR; X-ray diffraction	Semicrystalline	668,888,1150, 1149
Ethylene-*co*-sulfur dioxide-*co*-vinyl acetate	Vinyl chloride	Single T_g; transparency	I had 72.7/8.8/18.5 = ethylene/sulfur dioxide/vinyl acetate; immiscible when	339

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			I had 89.0/3.2/7.8 = ethylene/sulfur dioxide/vinyl acetate	
Ethylene terephthalate	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g	T_g's of I and II were close; semi-crystalline	689
	Liquid crystalline copolyester	Single T_g	II was copolymer of ethylene terephthalate (40%) and hydroxybenzoic acid (60%) (Ref. 898) or a segmental block copolyester (Ref. 1099)	898, 1099
	Ethylene-2,6-naphthalene dicarboxylate	Single T_g	Miscibility arised from *trans*-esterification	912
Ethylene-*co*-vinyl acetate	Acrylic acid-*co*-alkyl acrylate	Single T_g	II had an alkyl group of *n*-butyl, ethyl, ethylhexyl or methyl (4 blend systems); miscibility depended on compositions of I and II	924
	3-Alkyl thiophene	Microscopy	I had 20 wt.% of vinyl acetate; II had an alkyl group of dodecyl or octyl; blend had < 30 wt.% II	1033,1095
	Aniline, *N*-octadecylated	Microscopy	I had 20 wt.% vinyl acetate; II was 60.2 mol% alkylated	1246
	Chloroprene	Single T_g; microscopy	I had 28 wt.% vinyl acetate	1081
	Hexafluoroacetone-*co*-vinylidene fluoride	Single T_g	I had ≥ 70% vinyl acetate; II had 8.9 mol% hexafluoroacetone	336
	Novolac	Single T_g; FTIR	I had 14–50 wt.% vinyl acetate	1130
	Propylene, chlorinated	Single T_g	I had 40, 44.3 or 45 wt.% vinyl acetate; II had 40 or 50 wt.% Cl	499,500
	Vinyl chloride	Single T_g	I had 65–75 wt.% vinyl acetate; two T_g's when I had 40–45 wt.% vinyl acetate; ambiguous when I had 45–65 wt.% vinyl acetate	216,222, 325,330, 452,541, 672,756
	Vinyl chloride, chlorinated	Single T_g	Stated that there was a miscible region when I had 0.4–0.75 mol% ethylene and II had 0.4–0.8 mol% vinyl chloride	747
Ethylene-*co*-vinyl acetate-*co*-unnamed monomer	Vinyl chloride	Single T_g	Semicrystalline; I was du Pont de Nemours PB3041 (> 60% ethylene)	41
Ethylene-*co*-vinyl alcohol	Alkyl methacrylate	Single T_g; FTIR	II had an alkyl group of methyl, *n*-octyl or *n*-decyl (3 miscible blend systems); I had 21 mol% vinyl alcohol	1054
	Amide	Single T_g	I had 33 mol% vinyl alcohol; II was nylon 12 or nylon 6,12 (2 miscible blend systems)	4
	Copolyamide	Single T_g	II had 60 mol% nylon 6 units and 40 mol% nylon 12 units; I had 59 mol% vinyl alcohol	909
	4-Vinylpyridine	Single T_g	I had 68 mol% vinyl alcohol	1045
2-Ethylhexyl methacrylate	Styrene-*co*-hexyl methacrylate	Single T_g	I had 3–5% acrylic acid; II had 30% styrene and 5–15% 3-(dimethyl-amino)-2,2-dimethylpropyl methacrylate	766
N-ethyl-3-hydroxymethyl-carbazoyl methacrylate	ω-Hydroxyalkyl-3,5-dinitrobenzoyl methacrylate	Single T_g	II had an alkyl group of butyl, hexyl, pentyl or propyl (4 blend systems)	694
2-Ethyl-2-oxazoline	Acrylic acid	Single T_g	Formed complexes in water, methanol or dioxane	517
	Acrylic acid-*co*-styrene	Single T_g	II had 74 mol% acrylic acid	517
	Allyl alcohol-*co*-styrene	Single T_g; FTIR	II had 4.5 or 6.5 wt.% of hydroxyl group	974
	Aramid	Optical microscopy; light scattering	–	533
	Ether sulfone	Light scattering, transparency	–	599
	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; transparency	–	426
	Maleimide-*co*-styrene	Single T_g	II had 9.5–48.2 mol% maleimide	188
	Novolac	Single T_g	Formed complexes in methanol or acetone	517
	Sulfone, carboxylated	Single T_g	II had ≥ 0.93 degree of carboxylation	254

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	p-Vinylphenol	Single T_g	Formed complexes in dioxane	517,857
	Vinylidene fluoride	Single T_g	>50 wt.% II	243
2-Ethyl-6-propyl-1,4-phenylene ether	Styrene	Single T_g	–	134
2-Fluoroethyl methacrylate	Alkyl methacrylate	Single T_g	II had an alkyl group of methyl or ethyl (2 miscible blend systems)	1153
3-Fluoropropyl methacrylate	Alkyl methacrylate	Single T_g	II had an alkyl group of methyl or tetrahydrofurfuryl (2 miscible blend systems)	1155
	Ester	Single T_g	II was butylene adipate or 2,2-dimethyl-1,3-propylene adipate (2 miscible blend systems)	1155
Glycidyl methacrylate	Acrylonitrile-*co*-styrene	Single T_g	II had 32.3–58.8 wt.% AN	1007
	Methyl methacrylate	Single T_g	II had $M_w \leq 4.25$ kg/mol	1007
	α-Methylstyrene	Single T_g	II had $M_w = 3.5$ kg/mol	1009
Glycidyl methacrylate-*co*-methyl methacrylate	Acrylonitrile-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	1007
Glycidyl methacrylate-*co*-styrene	Carbonate of tetramethylbisphenol-A	Single T_g	I had 1.6–37.1 wt.% GMA	1007
	2,6-Dimethyl-1,4-phenylene ether	Single T_g	I had 1.6–18.6 wt.% GMA	1007
	Vinylidene fluoride	Single T_g	I had $\leq$35.7 wt.% GMA	1009
Hexadecamethylene dodecamethylene dicarboxylate	Vinyl chloride	Single T_g	Semicrystalline	872
Hexafluoroisopropyl methacrylate	Alkyl methacrylate	Single T_g	II had an alkyl group of methyl or ethyl (2 miscible blend systems)	1153
Hexamethylene adipamide (nylon 6,6)	Ethylene terephthalate	FTIR; NMR	Blends prepared by coprecipitation; blends prepared by melt blending showed no sign of hydrogen-bonding	656
Hexamethylene adipate	Ester	Single T_g; microscopy	II was butylene sebacate or butylene succinate (2 miscible blend systems)	925
Hexamethylene isophthalate	Amide	Single T_g	Polymer II was nylon 6,5, nylon 6,7, nylon 6,8 or nylon 6,9 (4 miscible blend systems)	962
Hexamethylene sebacate	Vinyl acetate-*co*-vinylidene chloride	Single T_g	Semicrystalline; II was Saran C ($\geq$80% vinylidene chloride)	31
	Vinyl bromide	Single T_g	–	150
	Vinyl chloride	Single T_g	Semicrystalline when $\geq$50% I	872,900
Hexamethylene terephthalate	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g	Semicrystalline when $\geq$75% I	735
	Vinyl chloride	Single T_g	Semicrystalline; deposited from some solvents as two phases	36
1-Hexene	1-Pentene	Single T_g	–	190
Hexyl methacrylate	Vinyl chloride	Single T_g; transparency	Especially when II was polymerized *in situ* (Ref. 846); stated as immiscible in Ref. 812	812,846, 850
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran ($\geq$80% vinylidene chloride)	409,812
3-Hydroxybutyrate	Cellulose acetate-butyrate	Single T_g	Semicrystalline	719,933,1183
	Cellulose acetate-proprionate	Single T_g; microscopy	Semicrystalline	719,1183
	Cellulose tributyrate	Single T_g; microscopy	Semicrystalline	1183
	Epichlorohydrin	Single T_g; microscopy; T_m depression	Semicrystalline	987,1183,1201
	Ethylene glycol	Single T_g	Semicrystalline	37,464,1237
	Ethylene glycol-*co*-lactide	Single T_g	II had 15 wt.% ethylene glycol	1241
	Lactide	Single T_g; microscopy	–	923,1079
	Methyl methacrylate	Single T_g	Blend had $\leq$20 wt.% I	1103,1183,1189
	Vinyl acetate	Single T_g	Semicrystalline	292,465
	Vinyl alcohol	NMR	Blend had a large amount of I	1239
	p-Vinylphenol	Single T_g; FTIR	–	1043
	Vinylidene fluoride	Single T_g; T_m-depression	Semicrystalline	407,414
3-Hydroxybutyrate-*co*-3-hydroxyvalerate	Acrylonitrile-*co*-butadiene-*co*-styrene	Single T_g	I had 16% hydroxyvalerate	180
	Vinyl chloride	Single T_g	I had 16 or 18% hydroxyvalerate	180,952
Hydroxyether of bisphenol-A (Phenoxy)	2,2-Dichloroethyl methacrylate	Single T_g; FTIR	–	1017
	2,2-Dichloroethyl methacrylate-*co*-methyl methacrylate	Single T_g; FTIR	II had $\leq$62 wt.% methyl methacrylate	1017

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Ether sulfone	Light scattering	–	714
	Ethylene oxide-*co*-propylene oxide	Single T_g	II had ≥22 mol% ethylene oxide	1025
	Methyl methacrylate	Single T_g; NMR	II was atactic, isotactic or syndiotactic	112,218, 775,910
	Vinyl methyl ether	Single T_g; IGC	–	690,819,820,996
	Vinylpyridine	Single T_g; FTIR	II was 2- or 4-vinylpyridine (2 miscible blend systems)	981
	N-vinylpyrrolidone	Single T_g; transparency: FTIR	–	1253
	Urethane	Single T_g	II was made from 1/1/2 = polycaprolactone diol (M_n = 2.1 kg/mol)/ 1,4-butanediol/4,4′-diphenylmethane diisocyanate	730
Hydroxyether of bisphenol-A, benzoylated	*N*-vinylpyrrolidone	Single T_g; FTIR	–	1002
Hydroxyether of bisphenol-A, modified	2-Vinylpyridine	Single T_g; FTIR	OH groups in I was converted to benzoate, acetate or methoxy group	989
Hydroxyether of phenolphthalein	Butylene terephthalate	Single T_g	–	310
	Carbonate of bisphenol-A	Single T_g	–	310
	Ether sulfone	Single T_g; FTIR	–	306
	Ethylene glycol	Single T_g	–	309
β-Hydroxyethyl-3,5-dinitrobenzoyl methacrylate	*N*-alkyl-3-hydroxymethylcarbazoyl methacrylate	Single T_g	II had an alkyl group of butyl, decyl, dodecyl, ethyl, hexadecyl, hexyl, methyl, octyl or tetradecyl (9 miscible blend systems)	693
	N-(2-hydroxyethyl)carbazoyl methacrylate	Single T_g	–	693
2-Hydroxyethyl methacrylate	Acrylamide-*co*-styrene	Single T_g; NRET	II had 40, 47 or 52 mol% acrylamide	955,1248
p-(2-Hydroxy-hexafluoroisopropyl) -α-methylstyrene-*co*-styrene	Butyl acrylate	Single T_g	I had ≥1.2 mol% OH-containing monomer	90
	Butyl methacrylate	Single T_g	I had >2.8 mol% OH-containing monomer	1166
	Methyl methacrylate	Single T_g	I had ≥1.9 mol% OH-containing monomer	90
	Methyl methacrylate-*co*-2-vinylpyridine	Single T_g	I had ≥6 mol% OH-containing monomer	377
p-(2-Hydroxy-hexafluoro-isopropyl)styrene-*co*-styrene	Aramide	Single T_g; transparency	I had 60 mol% styrene; two T_g's when I had 83 mol% styrene; II was iminotrimethylhexamethylene-iminoterephthaloyl	571,646
	Butyl methacrylate	Single T_g; NRET	I had >1 mol% OH-containing monomer; formed complexes when I had 18 mol% OH	1166
	α,ω-Decanedicarboxylic-*co*-hexanediamine acid (nylon 6,12)	Single T_g	Semicrystalline	454
	Hydroxypropyl L-glutamate	Single T_g; light scattering; microscopy	Blend had <50 vol% II	971
	Methyl methacrylate	Single T_g; transparency; NMR; FTIR; WAXD; NRET	I had >8 mol% OH; formed complexes when I had 24 mol% OH; II was isotactic or syndiotactic (Ref. 1116,1117)	571,646, 1021,1116, 1117,1241
	Vinyl acetate	Single T_g; transparency	I had 90.3 mol% styrene	571,646
	Vinyl methyl ether	Single T_g; transparency	I had 83.3–99.9 mol% styrene	571,572,646
	Vinyl methyl ketone	Transparency	I had 90.3 mol% styrene	567
2-Hydroxypropyl methacrylate	Tertiary amide	Single T_g; FTIR	Formed complexes; II was dimethylacrylamide, *N*-methyl-*N*-vinylacetamide or ethyloxazoline (3 blend systems)	975
Imide	Ether ketone ketone	Single T_g	I was made from pyromellitic dianhydride (PMDA) and 4,4′-bis(3-aminophenoxy) biphenyl	1179
	Ether ketone	Single T_g	I was the same as the previous system; II was Victrex 220P; blend had ≤50 wt.% I	1179
	Imide	X-ray diffraction	I was made from PMDA and oxydianiline; II was made from	391

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			PMDA and *p*-phenylenediamine; <90% II in blend	
	Imide	Single T_g	I was made from 2,2′-bis(3,4′-dicarboxyphenyl)hexafluoro-propane dianhydride (6FDA) and 2,2′-bis(3-aminophenyl)-hexafluoropropane (3,3′-6F-diamine); II was made from 6FDA and 2,2′-bis (4-aminophenyl)hexafluoropropane (4,4′-6F-diamine)	130
	Imide	Single T_g	I was made from 4,4′-biphthalic anhydride (BPDA) and 3,3′-6F-diamine; II was made from BPDA and 4,4′-6F-diamine	130
	Imide	Single T_g	I was made from 3,3′4,4′-benzophenone-tetracarboxylic dianhydride (BTDA) and 3,3′-6F-diamine; II was made from BTDA and 4,4′-6F-diamine	130
	Imide	Single T_g	I was made from 3,3′,4,4′-diphenyl-ethercarboxylic dianhydride (OPDA) and 3,3′-6F-diamine; II was made from OPDA and 4,4′-6F-diamine	130
	Imide	Single T_g	I was made from PMDA/BPDA/3,3′-6F-diamine = 25/25/50; II was made from PMDA/BPDA/4,4′-6F-diamine = 25/25/50	130
	Imide	Single T_g	I was made from PMDA/BTDA/3,3′-6F-diamine = 25/25/50; II was made from PMDA/BTDA/4,4′-6F-diamine = 25/25/50	130
	Imide	Single T_g	I was made from PMDA/OPDA/3,3′-6F-diamine = 25/25/50; II was made from PMDA/BTDA/4,4′-6F-diamine = 25/25/50	130
	Imide	Single T_g; WADX; SAXS	I was made from 3,3′,4,4′-diphenyltetra-carboxylic dianhydride (DBTA) and oxydianiline (DOA); II was made from 4,4′-thiodiphthalic anhydride and ODA	1244
	Imide	Single T_g	I was made from DBTA and 3,3′-hexa-fluoroisopropylidene dianiline (3,3′-HIPD); II was made from DPTA and 4,4′-hexafluoroisopropylidene dianiline (4,4′-HIPD)	957
	Imide	Single T_g	I was made from 5,5′-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene] bis-1,3-isobenzofuranedione (A) and HIPD; II was made from A and 4,4-HIPD	957
	Imide	Single T_g	I was made from BTDA and 3,3′-HIPD; II was made from BTDA and 4,4′-HIPD	957
2-Iodoethyl methacrylate	Acrylonitrile-*co*-*p*-methylstyrene	Single T_g	II had 21–42 wt.% AN	1106
	Acrylonitrile-*co*-styrene	Single T_g	II had 13–51 wt.% AN	1106
	Ester	Single T_g	II was butylene adipate, caprolactone, 2,2-dimethyl-1,3-propylene adipate or hexamethylene sebacate (4 miscible blend systems)	1111
	Tetrahydrofurfuryl methacrylate	Single T_g	–	1107
cis-Isoprene	Butadiene-*co*-1,2-vinylbutadiene	Single T_g	II had ≥32.3% vinylbutadiene	420
	cis-Pentenamer	Single T_g	–	77
	Vinylethylene	Single T_g; NMR	II had 86% 1,2-butadiene	570,697,700,810,811
Isoprene, chlorinated	Ethylene-*co*-vinyl acetate	Single T_g; transparency	Semicrystalline; commercial samples	503,665
Isoprene, modified by hexafluoroisopropanol group	Alkyl methacrylate	Single T_g; FTIR	II had an alkyl group of methyl or *n*-butyl (2 miscible blend systems)	959
	Ethylene-*co*-methyl acrylate	Single T_g; FTIR	II had 40 or 75 wt.% methyl acrylate	959

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Ethylene-*co*-methyl methacrylate	Single T_g; FTIR	II had 50 wt.% methyl methacrylate	959
	Ethylene-*co*-vinyl acetate	Single T_g; FTIR	II had 35 or 70 wt.% vinyl acetate	959
	Methyl acrylate	Single T_g; FTIR	–	959
	Methyl acrylate-*co*-styrene	Single T_g; FTIR	II had 28 wt.% methylacrylate	959
Isoprene-*stat*-*N*-(2-hydroxyethyl) carbazole methacrylate	Styrene-*stat*-*N*-itaconimidyl-3,5-dinitrobenzoate	Single T_g	Polymer had at least 20 mol% of electron-donor or electron-acceptor group	963
Isoprene-*b*-methyl methacrylate	Acrylonitrile-*co*-styrene	Single T_g	II had 22 wt.% acrylonitrile	1049
	p-(2-Hydroxy-hexafluoroisopropyl)-α-methylstyrene-*co*-styrene	microscopy	II had ≥ 1.6 mol% OH groups	1254
Isopropenyl methyl ketone	*p*-Vinylphenol	Single T_g; NMR; FTIR	–	1035
Isopropyl acrylate	Isopropyl methacrylate	Single T_g; transparency	–	453
Maleic acid-*co*-styrene	Vinyl butyral	Transparency	I was Daidou Kogyo Styrite HS-2	452
Maleic anhydride-*alt*-α-methylstyrene	2,6-Dimethyl-1,4-phenylene ether, sulfonylated	Single T_g	II had <55 mol% sulfonylation	838
Maleic anhydride-*co*-styrene	Caprolactone	Single T_g	I had 14 or 25 wt.% maleic anhydride; semicrystalline	192
	Carbonate of tetramethylbisphenol-A	Single T_g	I had <12% maleic anhydride	1008
	2,6-Dimethyl-1,4-phenylene ether	Single T_g	I had <10% maleic anhydride	1008
	2,6-Dimethyl-1,4-phenylene ether, sulfonylated	Single T_g	I was alternating copolymer and had <55 mol% sulfonylation	838
	Ethyl methacrylate	Single T_g	I had 0–33 wt.% maleic anhydride	73
	Methyl methacrylate	Single T_g; NMR; FTIR	I had 8–33 wt.% maleic anhydride	73,999
	n-Propyl methacrylate	Single T_g	I had 0–18.1 wt.% maleic anhydride	73
	Vinyl methyl ether	Single T_g	I had 4.7 wt.% maleic anhydride	862
Maleimide-*alt*-α-methylstyrene	2,6-Dimethyl-1,4-phenylene ether, sulfonylated	Single T_g	Depended on degree of sulfonylation of II	837
Methacrylate, liquid crystalline	Methacrylate, liquid crystalline	Single T_g; microscopy	I had electron-donating (carbazolyl methylene)aniline groups; II had electron-accepting groups	1077
Methacrylic acid-*co*-α-methylstyrene	Butyl methacrylate-*co*-4-vinylpyridine	Single T_g; FTIR	I had 50.6 mol% methacrylic acid (MA); II had 18 or 26 mol% vinylpyridine (VP)	1131
	Ethyl methacrylate-*co*-4-vinylpyridine	Single T_g; FTIR	I had 50.6 mol% MA; II had 23 mol% VP	1131
	Methyl methacrylate-*co*-4-vinylpyridine	Single T_g; FTIR	I had 50.6 mol% MA; II had 8 mol% VP	1131
Methacrylic acid-*co*-styrene	Ethyl methacrylate	Single T_g; fluorescence study	Miscible when cast from toluene or dioxane; immiscible when cast from chloroform; I had 93.4–96.7 mol% styrene	103
Methacryloyl glycine-*co*-styrene	Ethyl methacrylate	Fluorescence study	Miscible when cast from toluene; immiscible when cast from chloroform; I had 93.8–97.2 mol% styrene	103
Methacrylonitrile-*co*-α-methylstyrene	Vinyl chloride	Single T_g	I was azeotropic	423
Methacrylonitrile-*co*-*p*-methylstyrene	*n*-Butyl methacrylate	Single T_g	II had 12–28 wt.% of methacrylonitrile (MAN)	944
	Ethyl methacrylate	Single T_g	II had 12–55 wt.% MAN	944
	Methyl methacrylate	Single T_g	II had 19–70 wt.% MAN	944
	Isopropyl methacrylate	Single T_g	I had 19–34 wt.% MAN when II had $M_n = 161$ kg/mol; I had 16–34 wt.% MAN when II had $M_n = 41.6$ kg/mol	944
	n-Propyl methacrylate	Single T_g	I had 12–43 wt.% MAN	944
Methacrylonitrile-*co*-styrene	*t*-Butyl methacrylate-*co*-methyl methacrylate	Single T_g	Miscibility depended on composition of I and II	1139
	Cyclohexyl methacrylate-*co*-methyl methacrylate	Single T_g	Miscibility depended on composition of I and II	1139
	Ethyl methacrylate	Single T_g	I had 4.5–44 wt.% methacrylonitrile (MAN)	943
	Methyl methacrylate	Single T_g; transparency;	Miscibility range varied in various fluorescence spectroscopy studies especially at the low MAN end	970,986, 1018, 1139

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Isopropyl methacrylate	Single T_g; transparency	I had 12–38 wt.% MAN when II had $M_n = 161$ kg/mol; I had 8–43 wt.% MAN when II had $M_n = 41.6$ kg/mol	943
	n-Propyl methacrylate	Single T_g; transparency	I had 2–32 wt.% MAN	943
4-[[6-(Methacryloyloxy)hexyl]-oxy]-*N*-[(9-methyl-2-carbazolyl) methylene]aniline	4-[[6-(Methacryloyloxy)hexyl] oxy]-*N*-(4′-nitrobenzylidene) aniline	Single T_g	Polymer I and polymer II were liquid crystalline	1076
4-[[1-[4(-Methoxyphenyl)azo] phenyl]-4-oxy]-3-propyl] oxy]styrene	4-[[1-[(4-cyanobiphenyl)-4′)oxy]-3-propyl]oxy]styrene	Single T_g	Blend showed liquid crystallinity	1042
p-Methoxystyrene-*co*-*p*-vinyl-phenol	Alkyl acrylate	Single T_g; FTIR	II had an alkyl group of methyl or ethyl (2 miscible blend systems); I had 33–63 mol% vinylphenol	1177
	Vinyl acetate	Single T_g; FTIR	I had 33–63 mol% vinylphenol	1177
Methyl acrylate	Epichlorohydrin	Single T_g	–	226
	Epichlorohydrin-*co*-ethylene glycol	Single T_g	I had 50 mol% epichlorohydrin (Hydrin 200)	226
	Ethylene glycol	Single T_g	–	226
	Nitrocellulose	Single T_g	–	416
	Vinyl acetate	Single T_g; transparency; NMR	Probably formed two phases when deposited from some solvents (Refs. 601)	453,601,615 1196
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran (≥ 80% vinylidene chloride); I had MW = 1.0 kg/mol; two T_g's when I had MW = 576 kg/mol in Ref. 870	812,870
	Vinylidene fluoride	Single T_g; transparent melt	Semicrystalline	844,1122
Methyl acrylate-*co*-vinylcarbazole	Methyl methacrylate-*co*-2(3,5-dinitrobenzoyl)oxyethyl methacrylate	Single T_g	Both I and II had >27 mol% monomer with interactive groups	705
	Styrene-*co*-2(3,5-dinitrobenzoyl) oxyethyl methacrylate	Single T_g	Both I and II had > 12 mol% monomer with interactive groups	173
Methyl 1-bicyclobutane-carboxylate	Acrylonitrile-*co*-styrene	Single T_g; transparency	II had 24–38 wt.% acrylonitrile	202
	Ethylene glycol	Single T_g; transparency	≤ 20 wt.% II	202
2-Methyl-6-ethyl-1,4-phenylene ether	Styrene	Single T_g	–	134
α-Methyl-α-ethyl-β-propiolactone	Vinyl chloride	Single T_g	Semicrystalline when blend had 75% I	33
Methyl methacrylate	Acrylonitrile-*co*-methyl methacrylate-*co*-styrene	Single T_g	II had 40/39.1/20.9 or 61.1/19.6/19.3 = styrene/methyl methacrylate/ acrylonitrile	620
	4′-[[2-(Acryloyloxy)ethyl]-ethylamino]-4-nitroazobenzene	Single T_g; NMR	–	1228
	4′-[[2-(Acryloyloxy)ethyl]-ethylamino]-4-chloro-4-nitro-azobenzene	Single T_g; NMR	–	1228
	p-*tert*-Butylphenol-*co*-formaldehyde	Single T_g; FTIR; WAXD	–	647,1056
	Carbon monoxide-*alt*-propylene	Single T_g; FTIR; NMR	–	1229
	Carbonate	Single T_g; transparency	II was carbonate of bisphenol-F or bisphenol-AF (2 miscible blend systems)	426
	Carbonate of bisphenol chloral	Single T_g; NMR	–	110.426,673,983
	Copolycarbonate of bisphenol-A and hexafluorobisphenol-A	Single T_g; transparency	II had 4.5–14.0 wt.% hexafluoro-bisphenol-A	430
	p-Chlorophenol-*co*-formaldehyde	Single T_g; FTIR	–	647
	Epichlorohydrin-*co*-ethylene glycol	Single T_g	–	224
	Ethyl acrylate	Single T_g	–	156
	Ethyl methacrylate	Single T_g	Made from slurries of polyethyl methacrylate and methyl methacrylate; inherently unstable, phase separation upon heating	763
	Formaldehyde-*co*-*p*-nitrophenol	Single T_g; FTIR	–	647
	Formaldehyde-*co*-phenol	Single T_g; FTIR	–	647
	Hexafluoroacetone-*co*-vinylidene fluoride	Single T_g	–	443

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	N-Maleimide-*co*-styrene	Single T_g; FTIR	II had 8, 14 or 21 wt.% *N*-maleimide	1213
	Methoxymethyl methacrylate	Single T_g	–	264
	Methyl acrylate	Single T_g	–	156
	α-Methylstyrene	Single T_g	–	167,765
	Nitrocellulose	No phase separation in solution or films	–	199,296,452,651
	Novolac	Single T_g; FTIR	II had MW about 1.0 kg/mol and was formaldehyde and 13/17/70 mol% = *p-tert*-butylphenol/*m*-cresol/*o*-cresol or formaldehyde and 15/17/68 mol% = 2-*t*-butylphenol/*m*-cresol/*o*-cresol; I was isotactic, atactic or syndiotactic	221,434,473
	Propylene glycol	Single T_g; SAXS	I had MW = 550 kg/mol; II had MW = 1.0–3.9 kg/mol	527
	Tetrafluoroethylene-*co*-vinylidene fluoride	Single T_g; T_m-depression	II had 80 mol% vinylidene fluoride	113,324
	Trifluoroethylene-*co*-vinylidene fluoride	Light scattering; FTIR; T_m-depression	II had 58 or 75 mol% vinylidene fluoride	713,1066
	Vinyl acetate	Single T_g; FTIR; LS; microscopy	Miscible when cast from chloroform or cyclohexanone; immiscible when cast from tetrahydrofuran or melt blended	302,602, 726,777, 778,928, 1092
	Vinyl acetate-*co*-vinyl chloride	Single T_g; transparency	II had 5.9–15.1 vol% vinyl acetate	236,296,452, 497,651
	Vinyl chloride	Single T_g; transparency	Especially when II was polymerized *in situ* (Ref. 846); I of all tacticities miscible with II (Ref. 338); increase in isotactic content and mol. wt. of I reduced miscibility with II (Ref. 893)	66,338,368, 641,642,653, 812,846,850, 892,893,895
	Vinyl chloride, chlorinated	Single T_g; FTIR	II had 63–68 wt.% Cl; I was atactic, isotactic of syndiotactic (1204)	506,833,1204
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	II was Saran (>80% vinylidene chloride) or 86.5 wt.% vinylidene chloride; semicrystalline when ≥20% II and I was isotactic, and when ≥75% II and I was atactic for the second II	409,506, 812,870
	Vinyl chloroacetate	Single T_g	–	179
	Vinylidene fluoride	Single T_g; NMR	Semicrystalline when >35–65% II; I was isotactic, atactic or syndiotactic	124,293, 320,342,361, 569,618,630, 643,644,696
Methyl methacrylate, imidized	Acrylonitrile-*co*-styrene	Single T_g	I had 53–91 wt.% imidized units; II had 5.7–33 wt.% acrylonitrile; miscibility depended on extent of imidization of I and acrylonitrile content of II	230,1123
	Vinyl chloride	Single T_g	I had 53–85 wt.% imidized units	230
Methyl methacrylate-*co*-styrene	Copolycarbonate of bisphenol-A and tetramethylbisphenol-A	Single T_g; transparency	I had ≤33 wt.% methyl methacrylate; II had ≤15 wt.% bisphenol-A	431
	Copolycarbonate of hexafluoro-bisphenol-A and tetramethyl-bisphenol-A	Single T_g	I had 9, 20 or 33 wt.% methyl methacrylate; II had 20 wt.% hexafluorobisphenol-A	1194
Methyl methacrylate-*co*-vinylpyridine	Acrylic acid-*co*-butyl acrylate	Single T_g; FTIR	I had 13–20 mol% vinylpyridine; II had 13–20 mol% acrylic acid	385
2-Methyl-2-oxazoline	Allyl alcohol-*co*-styrene	Single T_g; FTIR	II had 6.5 wt.% OH group	978
	Hydroxyether of bisphenol-A	Single T_g; FTIR	–	978
	2-Hydroxypropyl methacrylate	Single T_g; FTIR	–	978
	Vinyl alcohol	Single T_g; FTIR	–	913
	Vinyl chloride	Single T_g	I <50 wt.% in blend	442
	Vinyl fluoride	Single T_g	I <50 wt.% in blend	442
	p-Vinylphenol	Single T_g; FTIR	–	978
2-Methyl-1-pentene sulfone	Novolac	Single T_g	II had MW = 1.0 kg/mol and was formaldehyde and 13/17/70 mol% = *p-tert*-butylphenol/*m*-cresol/*o*-cresol or formaldehyde and 15/17/68 mol% = 2-*tert*-butylphenol/*m*-cresol/*o*-cresol	221

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
2-Methyl-6-propyl-1, 4-phenylene ether	Styrene	–	–	134
α-Methyl-α-*n*-propyl-β-propiolactone	Vinyl chloride	Single T_g	Semicrystalline when >50% I	32,33
α-Methylstyrene	Alkyl methacrylate	Single T_g; transparency	II had an alkyl group of cyclohexyl, ethyl or *n*-propyl (3 miscible blend systems)	116,765
	Cyclohexyl acrylate	Single T_g; transparency	–	765
p-Methylstyrene	Cyclohexyl acrylate	Single T_g; transparency	–	765
	Cyclohexyl methacrylate	Single T_g; transparency	–	116,765
	2,6-Dimethyl-1,4-phenylene ether, bromobenzylated	Single T_g; transparency	II had 9, 16 or 37% bromination	261
α-Methylstyrene-*co*-4-(2-hydroxyethyl)-α-methylstyrene	Alkyl acrylate	Single T_g	I had 6, 41, 72 or 89 mol% α-methylstyrene; II had an alkyl group of ethyl, *tert*-butyl or methyl (3 blend systems)	968
	Alkyl methacrylate	Single T_g	I had 6, 41, 72 or 89 mol% α- methylstyrene; II had an alkyl group of ethyl, *tert*-butyl or methyl (3 blend systems)	968
	Dialkyl itaconate	Single T_g	I had 6, 41, 72, or 89 mol% α-methylstyrene; II had a dialkyl group of dimethyl, diethyl, di-*tert*-butyl or di-*n*-propyl (4 blend systems)	968
	Vinyl acetate	Single T_g	I had 6, 41, 72 or 89 mol% α-methylstyrene	969
	4-Vinylpyridine	Single T_g	I had 6, 41, 72 or 89 mol% α-methylstyrene	969
	N-Vinyl pyrrolidone	Single T_g	I had 6, 41, 72 or 89 mol% α-methylstyrene	969
α-Methylstyrene-*co*-[4-(1,1,1-trifluoro-2-hydroxyethyl)-α-methylstyrene	Alkyl acrylate	Single T_g	I had 23, 47, 60, 84 or 93 mol% α-methylstyrene; II had an alkyl group of methyl, ethyl or *tert*-butyl (3 blend systems)	968
	Alkyl methacrylate	Single T_g	I had 23, 47, 60, 84 or 93 mol% α-methylstyrene; II had an alkyl group of methyl, ethyl or *tert*-butyl (3 blend systems)	968
	Dialkyl itaconate	Single T_g	I had 23, 47, 60, 84 or 93 mol% α-methylstyrene; II had a dialkyl group of dimethyl, diethyl, di-*n*-propyl or di-*tert*-butyl (4 blend systems)	968
	Vinyl acetate	Single T_g	I had 23, 47, 60, 84 or 93 mol% α-methylstyrene	969
	4-Vinylpyridine	Single T_g	I had 23, 47, 60, 84 or 93 mol% α-methylstyrene	969
	N-Vinyl pyrrolidone	Single T_g	I had 23, 47, 60, 84 or 93 mol% α-methylstyrene	969
N-Methyl-*N*-vinylacetamide	Allyl alcohol-*co*-styrene	Single T_g; FTIR	II had 4.5 or 6.5 wt.% OH group; formed complexes in 2-butanone	973
Monomethyl itaconate	Thiocarboate	Single T_g	II had methyl, ethyl or propyl side groups	669
Natural rubber, epoxidized	Acrylic acid-*co*-ethylene	Single T_g	I had 50 mol% epoxidation; II had 6 mol% acrylic acid; blend had >50 wt.% II	1134
	Alkyl acrylate-*co*-vinylidene chloride	Single T_g	I had 50 mol% epoxidation; II had 10% alkyl acrylate	400
	Chloroprene	Single T_g	I had 50 mol% epoxidation	1065
	Ethylene, chlorinated	Single T_g	I had 50 mol% epoxidation; II had 25 or 48% Cl	543
	Ethylene, chlorosulfonated	Single T_g	I had 25 mol% epoxidation; II was Hypalon 40	590
	Novolac	Single T_g	I had 50 mol% epoxidation	401
	Propylene, chlorinated	Single T_g	I had 50 mol% epoxidation	400
	Vinyl chloride	Single T_g	I had 50 mol% epoxidation	507,827,828
	Vinyl chloride, plasticized	Single T_g	I had 50 mol% epoxidation; II had 40 phr dioctyl phthalate	826

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TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Neopentyl glycol adipate (2,2-dimethyl-1,3-propylene adipate)	Hydroxyether of bisphenol-A (Phenoxy)	Single T_g; transparency	–	332
	Vinyl acetate-*co*-vinyl chloride	Single T_g; transparency	II had 2 or 17 wt.% vinyl acetate	276
	Vinyl chloride	Single T_g; transparency	–	277
	Vinyl chloride-*co*-vinylidene chloride	Single T_g	Semicrystalline; II was Saran (86.5 wt.% vinylidene chloride)	868
	Vinylidene fluoride	Clear melt although refractive indices very different; T_m-depression	Semicrystalline	287
Neopentyl glycol succinate (2,2-dimethyl-1,3-propylene succinate)	Epichlorohydrin	Single T_g; transparency	–	223
	Hydroxyether of bisphenol-A (phenoxy)	Single T_g; transparency	Semicrystalline ≤20 wt.% II	332
	Vinyl chloride	Single T_g; transparency	–	900
	Vinyl chloride-*co*-vinylidene chloride	Single T_g	≤60 wt.% I; possible second T_g when >60 wt.% I; semicrystalline	868
Nitrocellulose	Ester	Single T_g; FTIR	I had 12.62 or 13.42% N; II was butylene adipate, caprolactone, ethylene adipate or valerolactone (4 miscible blend systems)	393
	Vinyl acetate	Single T_g; clear films	–	236,421,452
Novolac	*n*-Butyl methacrylate	Single T_g; FTIR	–	434
	Vinyl acetate	Single T_g	I had MW about 1.0 kg/mol and was formaldehyde and 15/17/68 mol% = 2-*tert*-butylphenol/*m*-cresol/*o*-cresol	221
	Vinyl methyl ether	Single T_g	I had MW about 1.0 kg/mol and was formaldehyde and 13/17/70 mol% = *p*-*tert*-butylphenol/*m*-cresol/*o*-cresol	221
Phenolphthalein polyether ether ketone	Epoxy	Single T_g	–	312
	Hydroxyether of bisphenol-A (phenoxy)	Single T_g	–	308,312
	Sulfone	Single T_g	–	308,311
	N-Vinylpyrrolidone	Single T_g	–	307
Phenolphthalein polyether ether sulfone	*N*-Vinylpyrrolidone	Single T_g	–	307
Phenol–formaldehyde	*N,N*-Dimethylacrylamide	Single T_g	Formed complexes from acetone, dioxane and ethyl acetate	881
	Methyl methacrylate-*co*-styrene	Single T_g	II had >20 wt.% methyl methacrylate	433
Phenyl acrylate	Vinyl benzoate	Single T_g; transparency	–	535
Phenylene, sulfonated	Ethyl acrylate-*co*-4-vinylpyridine	Single T_g	–	592
p-Phenylene benzobisoxazole	Amide	Single T_g; dielectric measurements; WAXS; LS	II was Zytel 330 (Du Pont)	945
	Amide	Single T_g; microscopy; dielectric measurements	II was nylon-6,6; semicrystalline	1084
2,2-(*m*-Phenylene)-5,5′-bibenzimidazole	Arylate	Single T_g	–	125
	Carbonate of bisphenol-A	FTIR	–	594
	Imide	Single T_g; FTIR	II was made from 3,3′,4,4′-benzophenonetetracarboxylic dianhydride and 3,3′-diaminobenzophenone (LARC TPI)	299
	Imide	Single T_g; FTIR	II was 2,2′-bis(3,4-dicarboxyphenoxy)phenylpropane-2-phenylene bisimide(Ultem 1000)	507,509,748, 823
	Imide	Single T_g; FTIR	II was made from 3,3′,4,4′-benzophenone-tetracarboxylic dianhydride and 5,6-amino-1-(4′-aminophenyl)-1,3,3′-trimethylindam (XU 218)	115,507, 748
	Imide	Single T_g; FTIR	II was made from benzophenone-tetracarboxylic dianhydride and 4/1 mixture of 2,4-toluenediisocyanate	507,781

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			and 4,4′-diphenylmethanediisocyanate(PI 2080)	
	Imide sulfone	Single T_g; FTIR	II was made from 3,3′,4,4′-benzophenonetetracarboxylic dianhydride and 3,3′-diaminodiphenyl sulfone	105,369, 492
	Imide sulfone, fluorinated	Single T_g; FTIR	≥80% I	369
	Siloxaneimide, segmental copolymer	Single loss tangent peak	II was 3,3′,4,4′-benzophenone-tetracarboxylic dianhydride and 3,3′-diaminodiphenylsulfone based polyimide and dimethylsiloxane segmental copolymer	105
m-Phenylene isophthalamide	Aramide	Single T_g	II was a copolyamide of 1,6-hexanediamine, caprolactam and terephthalic acid (BASF Ultramid T) or Selar 3426 (Du Pont) (2 blend systems)	993
	Hexamethylene isophthalamide	Single T_g	Semicrystalline	81,993
	Heptamethylene isophthalamide	Single T_g	Semicrystalline	81
	m-Xylene adipamide	Single T_g	Semicrystalline	993
Phenylene sulfide	Phenylene sulfide ether	Single T_g	Semicrystalline	926
p-Phenylene terephthalamide	Amide	Single T_g; FTIR	Semicrystalline; II was nylon 6 or nylon 6,6 (2 miscible blend systems)	477
	p-Phenylene 1,3,4-oxadizole	Miscroscopy; FTIR	–	1080
n-Propyl acrylate	Vinyl chloride	Single T_g; transparency	–	850
n-Propyl methacrylate	Vinyl chloride	Single T_g; transparency	–	319,649,812,850
	Vinyl chloride-*co*-vinylidene chloride	Single T_g; transparency	Semicrystalline when ≥65% II; II was Saran (≥80% vinylidene chloride) or 86.6 wt.% vinylidene chloride	409,812, 870
Propyloxazoline	Styrene	Single T_g	<25 wt.% I in blend	442
Propylene	Hydrogenated oligocyclopentadiene	Melting point depression; WAXS; SANS	–	550
Propylene, chlorinated	2,2-Dimethyl-1,3-propylene adipate	Single T_g; transparency	I had 67 wt.% Cl	287
Rubber, chlorinated	Vinyl methyl ether	Phase diagram	–	250
Styrene	Carbonate of tetramethylbisphenol-A	Single T_g; light scattering; NMR; PALS	Semicrystalline after long annealing	316,359,428, 741,1100,1230,1231
	2-Chlorostyrene	Negative volume change of mixing	–	814
	Copolycarbonate of bisphenol-A and tetramethylbisphenol-A	Single T_g; transparency	II had ≥85 wt.% tetramethylbisphenol-A	431
	Cyclohexyl acrylate	Single T_g	–	765
	Cyclohexyl methacrylate	Single T_g; transparency	–	116,621,765
	Cyclohexyl methacrylate-*co*-methyl methacrylate	Single T_g	II had ≥21.6% cyclohexyl methacrylate	621
	2,6-Dimethyl-1,4-phenylene ether, bromobenzylated	Single T_g	II had ≤76% bromination	259
	2,6-Dimethyl-1,4-phenylene ether, sulfonated	Single T_g	II had <1.9% sulfonation	345
	2,6-Dimethyl-1,4-phenylene ether-*co*-2,3,6-trimethyl-1,4-phenylene oxide	Single T_g	I was atactic or isotactic; II had <20 mol% 2,3,6-trimethyl-1,4-phenylene oxide	638
	Ethyl methacrylate	Single T_g	Miscible when melt blended	72
	o-Fluorostyrene-*co*-*p*-fluorostyrene	Single T_g	II had 10 or 23 mol% *p*-fluorostyrene	1144
	α-Methylstyrene	Single T_g	–	710,722,822,865,875
	n-Propyl methacrylate	Single T_g	Miscible when melt blended	72
	Vinyl methyl ether	Single T_g; transparency; NMR; attenuated total reflectance IR	Two phases when deposited from some solvents	43,44,62,126,475, 565,616,964
	Vinyl methyl ether	Single T_g	I was syndiotactic; blend had <20 wt.% I	954
	Vinyl methyl ether	SANS; NMR	I was atactic or isotactic	915,918,1199
Styrene, sulfonated	Alkylene glycol amine-terminated	FTIR	I had 4.5 mol% sulfonation; II had $M_n = 0.9$ kg/mol (Jeffamine ED-900)	246
	N,*N*-Dimethylacrylamide	Transparency; NMR	I had 12 mol% sulfonation	487,1064
	2,6-Dimethyl-1,4-phenylene ether	Single T_g	I had <2.6% sulfonation	345
	10,12-Docosadiynylene diisonicotinate	Single T_g; FTIR	I had 9 mol% sulfonation	990,991
	Ethylene oxide	Single T_g	I had 1.35 or 4.51 mol% SO_3H; II end-capped with propylamine groups	861

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TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Bis[2-[2-(2-methoxyethoxy)ethoxy] ethyl itaconate	Single T_g; FTIR	I had 14 mol% sulfonation	1086
	Methyl methacrylate	Single T_g; transparency	I had 12 mol% sulfonation	487
	Methyl methacrylate-*co*-4-vinylpyridine	NMR	I had 9.9% sulfonation; II had 11.1% vinylpyridine	604
	Urethane	FTIR	I had 7.9 mol% sulfonation	801
Styrene, sulfonated and metal-neutralized	Amide	Single T_g; FTIR; SAXS	I was lightly sulfonated and Mg- or Mn-neutralized; II was nylon 6	1038
	Amide	Single T_g; FITR; SAXS	I had 9.7 mol% sulfonation and Li-neutralized; II was nylon 4	1138
	Amide	Single T_g	I had 9.8 mol% sulfonation and Li-neutralized; II was nylon 6,6 or nylon 6,10 (2 blend systems)	1135
	Amide	Single T_g; FTIR; SAXS	I had 5.4 or 9.8 mol% sulfonation and Li-neutralized; II was nylon 6	1168,1223
	Amide	Single T_g; NMR; FTIR; SAXS	I had 6.5–9.0 mol% sulfonation and Zn-neutralized; II was nylon 6	1083,1223
	Ethyl acrylate-*co*-4-vinylpyridine	FTIR	I had 2.1–7.3 mol% sulfonation and Zn-neutralized; II had 2.4–10.6 mol% vinylpyridine	1176
Styrene-*co*-styrene-4-carboxylic acid	*N*,*N*-Dimethylacrylamide	Single T_g; transparency	I had 25 or 54 mol% acid groups	487
	Methyl methacrylate	Single T_g; transparency	I had 25 mol% acid units	487
Styrene-*co*-4-vinylbenzene phosphonic acid	Styrene-*co*-4-vinylbenzene phosphonic acid diethyl ester	Single T_g	Both I and II had 7.5 or 13.3 mol% phosphorus moiety	1250
Styrene-*co*-4-vinylbenzoic acid, K-neutralized	5,7-Dodecadiyne-1,12-dicarboxylic acid, K-neutralized	Single T_g	I had 26 mol% acid group	990
Styrene-*co*-4-vinylbenzoic acid, triethylammonium ionomer	5,7-Dodecadiyne-1,12-dicarboxylic acid, triethylammonium ionomer	Single T_g; FTIR	I had 26 mol% acid group	990,991
Styrene-*co*-4-vinylphenyl-dimethylsilanol	*n*-Butyl methacrylate	Single T_g; FTIR	I had 9–34 mol% silanol group	1112,1114
	N-Vinyl-2-pyrrolidone	Single T_g; FTIR	I had ≥4 mol% silanol group; formed complex when II had ≥34 mol% silanol group	1113
Styrene-*co*-*p*-vinylphenol	Bis[2-[2-(2-methoxyethoxy) ethoxy]ethyl] itaconate	Single T_g; FTIR	II had 22 mol% vinylphenol	1086
	n-Butyl methacrylate	Transparency; FTIR; fluorescence study	I had 8, 25, 43 or 75 wt.% vinylphenol	103,876
	Caprolactone	Single T_g	I had 10–20.4 wt.% vinylphenol	905,1206
	N,*N*-Dimethylacrylamide	Transparency; FTIR; single T_g; NMR	I had 22, 42 or 82 mol% vinylphenol	487,1064
	Ethyl methacrylate	Transparency; fluorescence study	I had >0.93 mol% vinylphenol	103
	n-Hexyl methacrylate	FTIR; LS	I had 8, 25 or 43 wt.% vinylphenol	876,922
	Methyl methacrylate	Single T_g; transparency; fluorescence study; FTIR; NMR	I had >0.93 mol% vinylphenol; II was atactic, isotactic or syndiotactic	103,487,1055
	Vinyl butyl ether	FTIR	I had 48 wt.% vinylphenol	734
	4-Vinylpyridine	Single T_g	I had 50 mol% vinylphenol	832
Styrene-*co*-4-vinylpyridine	Isoprene, sulfonated	Single T_g; transparency	II had 5–10% substituted and partly cyclized; immiscible when II had 2% substituted	210,896
N,*N*′-Sulfo-*p*-phenylene terephthalamide	Vinyl alcohol	Single T_g	–	972
	4-Vinylpyridine	Single T_g	–	972
	N-Vinylpyrrolidone	NMR	–	972
Sulfone of hexafluorobisphenol-A	Methyl methacrylate	Single T_g	I had $M_w = 27$ kg/mol and II had $M_w = 1.21$ kg/mol; blends of polymers of higher MW showed LCST	931
Sulfone of tetramethylbisphenol-A	Acrylonitrile-*co*-α-methylstyrene	Single T_g	II had 9–19 wt.% AN when I had $M_w =$ 4.8 kg/mol; II had 16–19 wt.% AN when I had $M_w = 12.4$ kg/mol	908,931
	Acrylonitrile-*co*-styrene	Single T_g	II had 11–25 wt.% AN when I had $M_w = 4.8$ kg/mol; II had 13–20 wt.%	931

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			AN when I had $M_w = 12.4$ kg/mol	
	Maleic anhydride-*co*-styrene	Single T_g	II had 17 or 18 wt.% maleic anhydride when I had $M_w = 4.8$ kg/mol	931
Tetrafluoroethylene, sulfonated	Ethyl acrylate-*co*-4-vinylpyridine	Single T_g	I had equivalent weight of 1.155 kg/mol	591
Tetrafluoroethylene-*alt*-vinyl alcohol	Alkyl methacrylate	Single T_g; FTIR	II had an alkyl group of methyl or ethyl (2 miscible blend systems)	961
	Methyl acrylate	Single T_g; FTIR	–	961
	Vinyl acetate	Single T_g; FTIR	–	961
Tetrahydrofurfuryl methacrylate	Allyl alcohol-*co*-styrene	Transparency	II had 5.4–6.0% OH	253
	Epichlorohydrin	Single T_g; transparency	–	117
	Hydroxyether of bisphenol-A (phenoxy)	Single T_g; transparency	–	253
	Vinyl chloride	Single T_g; transparency	–	281
	Vinyl chloride-*co*-vinylidene chloride	Single T_g	II had 88% vinylidene chloride	117
Tetrahydropyranyl-2-methyl methacrylate	Allyl alcohol-*co*-styrene	Transparency	II had 5.4–6.0 wt.% OH	118
	Epichlorohydrin	Single T_g; transparency	–	117
	Hydroxyether of bisphenol-A (phenoxy)	Single T_g; transparency	–	118
	Vinyl chloride	Single T_g; transparency	–	117
	Vinyl chloride-*co*-vinylidene chloride	Single T_g	II had 88% vinylidene chloride	117
	p-Vinylphenol	Single T_g; transparency	–	118
2,2,2-Trichloroethyl methacrylate	Alkyl methacrylate	Single T_g; transparency	II had an alkyl group of methyl, ethyl, *n*-propyl, isopropyl, cyclohexyl or tetrahydrofurfuryl (6 miscible blend systems)	1110
3,3,5-Trimethyl cyclohexyl methacrylate	3,3,5-Trimethyl-cyclohexyl acrylate	Single T_g; transparency	–	765
Trifluoroethylene	Vinylidene fluoride	Single T_g	Semicrystalline	252
Trimethylene adipate	Vinyl chloride	Single T_g; transparency	When $\geq 75\%$ II	872
Urethane	Carbonate of bisphenol-A	Single T_g	I was based on polycarbonate diols and/or polypropylene glycol; miscible when blend had 10–20 wt.% I	997
	Ethylene glycol	FTIR	I was made from a mixture of 2,4- and 2,6-tolyldiisocyanate and 1,4-butanediol	141,347
	Ethylene-*co*-methyl acrylate	Single T_g; FTIR	I was Estane 58311; II had 21 wt.% methyl acrylate	1181
	Ethylene glycol-*co*-propylene glycol	Single T_g; FTIR	I was made from a mixture of 2,4- and 2,6-tolyldiisocyanate and 1,4-butanediol; II had 70 wt.% ethylene glycol	145
	Methacrylic acid-*co*-styrene	Single T_g	I had polyether segment with MW = 1.0 or 2.0 kg/mol; II had 10.5% methacrylic acid, Li-neutralized	707
	Urethane	Single T_g	I and II were separate polymers; I was 4,4′-diisocyanate diphenyl methane (MDI)/dipropylene glycol = 9/10 mol ratio; II was poly G55–56 polyoxyethylene-*co*-oxypropylene, 45% ethylene oxide, MW = 2.0 kg/mol/ MDI/1/1	521
	Vinyl chloride	Single T_g	Blend had ≤ 30 wt.% I	1029
	N-vinylpyrrolidone	Single T_g for II with hard segments of I; soft segment T_gs also observed; clear films	I was segmented, made from methylene bis(4-phenyl isocyanate) and poly-(ethylene glycol) and *cis*-2-butene-1,4-diol and butane-1,4-diol	206
Urethane, functionalized	Acrylic acid-*co*-styrene	Single loss peak; microscopy	I had tertiary amine group; II had 15 or 30 mol% acrylic acid; linear blend of I and II or interpenetrating polymer network of I and II	346
	2-Methyl-5-vinylpyridine-*co*-styrene	Single T_g	I carried pendant carboxylated groups neutralized by ammonium ion	706

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Valerolactone	Vinyl acetate-*co*-vinylidene chloride	Single T_g	Semicrystalline; II was Saran C ($\geq$ 80% vinylidene chloride)	31
	Vinyl bromide	Single T_g	–	150
	Vinyl chloride	Single T_g	Semicrystalline when $\geq 50\%$ I	32,34,35
Vinyl acetate	2-Bromoethyl methacrylate	Single T_g; transparency	Miscible when cast from methyl ethyl ketone; immiscible when cast from tetrahydrofuran	610
	Chloroalkyl methacrylate	Single T_g; transparency	II had chloromethyl or 2-chloroethyl group (2 blend systems)	610
	Hexafluoroacetone-*co*-vinylidene fluoride	Single T_g	II had 8.9 mol% hexafluoroacetone	748,1073
	Maleic anhydride-*co*-styrene hydrolyzed	Single T_g	1.8–43% hydrolyzed	67
	Vinyl nitrate	Single T_g; phase contrast microscopy	–	12
	Vinylidene fluoride	Single T_g	Semicrystalline	53,57
Vinyl acetate-*co*-vinyl chloride	*n*-Butyl methacrylate-*co*-isobutyl methacrylate	Single T_g	Miscibility range depended on compositions of I and II; I had ≥ 81 wt.% vinyl chloride	748
	Hexyl acrylate-*co*-methyl acrylate	Single T_g	I had 5–23.7 vol% vinyl acetate; II had 15–88 vol% hexyl acrylate; miscibility depended on compositions of I and II	379
	n-Butyl methacrylate	Single T_g	I had 5.9–15.1 wt.% vinyl acetate	497
Vinyl alcohol	Ethylene imine	Single T_g	Semicrystalline	1024
Vinyl alcohol	Methacrylic acid	NMR	–	1255,1256,1257
Vinyl alkanoate	Vinyl alkanoate	Single T_g; microscopy	The alkanoate was butyrate, caprate, caproate, caprylate or laurate (5 miscible blend systems)	925
Vinyl butyral	*N*-Vinylpyrrolidone	Single T_g; transparency	$\leq 50\%$ II	209
	Urethane elastomer	Single T_g	II from methylene bisdiphenyl diurethane and polytetramethylene ether glycol; miscible with hard segment	762
Vinyl chloride	Acetonyl methacrylate	Single T_g; transparency	–	123
	Acrylic acid-*co*-carbitylacrylate-*co*-α-methylstyrene-*co*-styrene	Single T_g	II was an oligomer with $M_n = 1.07$ and $M_w = 3.32$ kg/mol	683
	Acrylonitrile-*co*-*n*-butyl acrylate	Optical microscopy	II had 53, 67 or 84 mol% butyl acrylate	655
	Alkyl acrylate	Single T_g	II had pentyl or propyl group (2 blend systems)	851
	Alkyl methacrylate	Single T_g	II had cyclohexyl or isopropyl group (2 blend systems)	319
	Butadiene, epoxidized	Single T_g	II had 50 mol% epoxidation	546
	Butadiene-*co*-styrene, epoxidized	Single T_g	II had 45 wt.% styrene; epoxidation > 40 mol%	544
	Butyl acrylate-*co*-ethyl acrylate	Single T_g	II had 22.9, 43.5 or 52.8% butyl acrylate	851
	Butyl acrylate-*co*-hexyl acrylate	Single T_g	II had 47.8% butyl acrylate	851
	Butyl acrylate-*co*-methyl acrylate	Single T_g	II had 44.6% butyl acrylate	851
	Butyl methacrylate-*co*-methyl methacrylate	Single T_g	II had 30 or 70% methyl methacrylate	880
	Caprolactone-*co*-L-lactide	Single T_g	II had ≤ 40 wt.% lactide	831
	Caprolactone-*co*-lignin	Single T_g; microscopy	II was a 7-armed starlike polymer containing 20 wt.% lignin derivative	984
	Caprolactone-*co*-methylcaprolactone	Single T_g	Whatever composition of II	831
	2,2-Dimethyl-1,3-propylene sebacate	Single T_g; transparency	–	611
	Ethyl acrylate-*co*-hexyl acrylate	Single T_g	II had 41.7 or 43.2% ethyl acrylate	851
	Ethyl acrylate-*co*-methyl methacrylate	Single T_g	II had 10% ethyl acrylate	875
	Ethylene-*co*-vinyl acetate	Permittivity measurements	II had 70% vinyl acetate; composition dependent; miscible when blend contained $\geq 25\%$ II	678
	Methyl acrylate-*co*-hexyl acrylate	Single T_g	II had 9.7% methyl acrylate	851
	Methyl methacrylate-*b*-styrene	–	No gross phase separation when I had $M_n = 43$ kg/mol; PMMA and PS block had the same $M_n = 40$ kg/mol in II	376

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Nitrile rubber, carboxylated	Single T_g	II was Krynac-221	1170
	Pentyl acrylate-*co*-propyl acrylate	Single T_g	II had 48.1% propyl acrylate	851
	Vinyl acetate	Single T_g	Ref. 59 stated miscible when cast from methyl ethyl ketone and immiscible when cast from tetrahydrofuran; Ref. 183 stated blends cast from both THF and MEK were immiscible	59,183
Vinyl chloride, chlorinated	Alkyl methacrylate	Single T_g; transparency	I had 65 or 68 wt.% Cl; II had *n*-butyl, cyclohexyl, ethyl, *n*-hexyl, *n*-propyl or isopropyl group (6 blend systems)	319,812
	Butadiene, epoxidized	Single T_g	II had 20 or 43 mol% epoxidation	779
	Butadiene-*co*-acrylonitrile	Single T_g	Depended on Cl-content and acrylonitrile content	96,152,355,356
	Ethylene terephthalate	Single T_g	Probably semicrystalline	36
	Hexamethylene sebacate	Single T_g	I had 67.2 wt.% Cl; semicrystalline when ≥ 50 wt.% II	54
	Hexamethylene terephthalate	Single T_g	Semicrystalline	36
	Maleic anhydride-*ran*-styrene	Single T_g	I was Goodrich CPVC 3010; II had 86% styrene	68,69
	α-Methyl-α-*n*-propyl-β-propiolactone	Single T_g	I had 67.2 wt.% Cl	54
	Urethane	Single T_g	I had 67 wt.% Cl; II had a soft poly (tetramethylene adipate) segment capped with 2-hydroxyethyl acrylate	246
	Valerolactone	Single T_g	I had 67.2 wt.% Cl	54
Vinyl chloride-*co*-vinylidene chloride	Alkyl methacrylate	Single T_g	I had 12% vinyl chloride; II had phenyl or isopropyl group (2 blend systems)	409
	Butylene adipate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
	Butylene sebacate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
	Dodecamethylene adipate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
	Dodecamethylene decamethylene dicarboxylate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
	Dodecamethylene dodecamethylene dicarboxylate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
	Hexadecamethylene dodecamethylene dicarboxylate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
	Hexamethylene sebacate	Single T_g	I had 13.5 wt.% vinyl chloride; semicrystalline	873
Vinyl fluoride	Vinylidene fluoride	Single T_g	Semicrystalline; later work found the blends immiscible (Ref. 298)	252,298
Vinyl *p*-methoxycinnamate	*p*-Chloro-(3-ethenoxypropyl) cinnamate	Single T_g	–	515
	Vinyl *p*-chlorocinnamate	Single T_g	–	515
	Vinyl cinnamate	Single T_g	–	515
Vinyl *p*-methylcinnamate	*p*-Chloro-(3-ethenoxypropyl) cinnamate	Single T_g	–	515
	p-Cyano-(3-ethenoxypropyl) cinnamate	Single T_g	–	515
	3-Ethyoxypropyl cinnamate	Single T_g	–	515
	Vinyl *p*-chlorocinnamate	Single T_g	–	515
	Vinyl cinnamate	Single T_g	–	515
Vinyl methyl ether	Acrylonitrile-*co*-styrene	Single T_g	II had < 10-11% acrylonitrile	576
	Alkyl acrylate	Single T_g	II had an alkyl group of ethyl, *n*-propyl or *n*-butyl (3 miscible blend systems)	941
	2-Chlorostyrene	Single T_g; FTIR; SAXS	–	1203
	Epichlorohydrin	NMR, dielectric spectroscopy	–	911,1129
	Maleic anhydride-*co*-styrene	Single T_g	II had 15% maleic anhydride	576
	Methyl methacrylate-*co*-styrene	Single T_g	II had < 60 mol% methyl methacrylate	108,321
	α-Methylstyrene	Light scattering	–	318
	α-Methylstyrene-*co*-4-(2-hydroxyethyl)-α-methylstyrene	Single T_g	II had 6–89 mol% α-methylstyrene	170

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	α-Methylstyrene-*co*-4-(1,1,1-trifluoro-2-hydroxyethyl)-α-methylstyrene	Single T_g	II had 0–96 mol% α-methylstyrene	170
	α-Methylstyrene-*co*-styrene	Light scattering	II had 77.5 or 88 wt.% styrene	318
	m-Methylstyrene-*co*-styrene	FTIR; light scattering	II had 76.5 or 87.5 wt.% styrene	1028
	o-Methylstyrene-*co*-styrene	FTIR; light scattering	II had 76.2 or 86.8 wt.% styrene	1028
	p-Methylstyrene-*co*-styrene	Light scattering	II had ≥ 61 mol% styrene	318,1016
	Nitrostyrene-*co*-styrene	Single T_g	II had ≤ 25.6 mol% nitrostyrene	158,166,192
	Styrene-*co*-1-vinylnaphthalene	Light scattering	II had 17.4, 23, 50 or 80 wt.% styrene; depended on composition of blend	381,406
	Styrene-*co*-2-vinylnapthalene	Single T_g; FTIR; light scattering	II had 19.2, 51 or 84 wt.% styrene	318,1175
	Vinyl alkanoate	Single T_g; IGC	The alkanoate was butyrate or propionate (2 miscible blend systems)	988
	1-Vinylnaphthalene	Single T_g; FTIR	II had $M_n = 5.4$ kg/mol; blend contained 65–85 wt.% II	407
	Vinylidene fluoride	Single T_g; transparent melt	Semicrystalline	58
Vinyl methyl ketone	Vinylidene fluoride	Single T_g; transparent melt	Semicrystalline	58
p-Vinylphenol	Acetonyl methacrylate	Single T_g; transparency	–	118
	4-Acetoxystyrene	Single T_g; FTIR	–	340
	Amide	Single T_g	Polymer II was nylon 6, nylon 6,6 or nylon 11 (3 miscible systems); semicrystalline	1088
	Butyl acrylate-*co*-*t*-butyl acrylate	Single T_g	II had 64 mol% butyl acrylate	897
	Butylene adipate	Single T_g; FTIR; NMR	Semicrystalline	667,919,1088,1089
	Butylene terephthalate	Single T_g; FTIR	Semicrystalline	1088,1089
	Caprolactone	Single T_g; FTIR; IGC	Semicrystalline	143,667,1088,1096
	Cellulose tripropionate	Single T_g	–	1088
	Copolyester	Single T_g; FTIR	II was five different copolyesters	1089
	Dialkyl itaconate	Single T_g; FTIR	II had a dialkyl group or methyl, ethyl, bis[2-[2-(2-methoxyethoxy)ethoxy] ethyl or bis[2-(2-methoxyethoxy)ethyl (4 miscible blend systems)	1034,1086
	N,N-dimethylacrylamide	Single T_g	Formed complexes in dioxane or acetone	487,795,857, 1088,1089
	2,2-Dimethylpropylene terephthalate	Single T_g; FTIR	–	1088,1089
	Ethyl acrylate	FTIR	–	143
	γ-Ethyl L-glutamate	FTIR; microscopy	–	639,902
	Ethyl methacrylate	Single T_g; FTIR	–	146,282,733,1164
	Ethyl methacrylate-*co*-methyl methacrylate	Single T_g; FTIR	II had 30, 60 or 70 wt.% MMA	1162,1164
	Ethylene adipate	Single T_g; NMR	Semicrystalline	667,919,1089
	Ethylene 2,6-naphthalene dicarboxylate	Single T_g; FTIR	–	1088,1089
	Ethylene succinate	Single T_g	Semicrystalline	919
	Ethylene terephthalate	Single T_g; FTIR	Semicrystalline	1089
	Ethylene-*co*-vinyl acetate	Single T_g; FTIR	II had 70% vinyl acetate	143,144,588
	Hexamethylene sebacate	Single T_g	Semicrystalline	667
	n-Hexyl methacrylate-*co*-methyl methacrylate	Single T_g; FTIR	II had 20, 38 or 48 wt.% *n*-hexyl methacrylate	958
	Hexylene-*m*-xylene dicarboxamide	Single T_g	–	1088
	2-(2-Methoxyethoxy)ethyl methacrylate	Single T_g; FTIR	–	1086
	γ-Methyl L-glutamate	FTIR; microscopy	–	639,902
	Methyl acrylate	FTIR; NMR	–	143,889,894,1195,1224
	Methyl methacrylate	Single T_g; FTIR; NMR	–	146,282,487,733,1164,1224
	n-Propyl acrylate	FTIR	–	143,641
	n-Propyl methacrylate	FTIR; single T_g	–	146,282,733
	Isopropyl methacrylate	Single T_g	–	280
	Styrene-*co*-4-vinylbenzenephosphonic acid diethyl ester	Single T_g; FTIR; NMR	II had >7.5 mol% phosphorus groups	1249
	Styrene-*co*-4-vinylpyridine	Single T_g	II had 50 mol% 4-vinylpyridine	832
	Styrene-*co*-2-vinylpyridine	Single T_g; FTIR	Formed complexes in ethanol; II had 70 mol% 2-vinylpyridine	976
	Tetrahydrofuran	FTIR; transparency	–	734

TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Tetrahydrofurfuryl methacrylate	Single T_g	–	282
	2,2,5-Trimethylene terephthalamide	Single T_g	–	1088
	Vinyl acetate	Single T_g; FTIR	–	143,144,588
	Vinyl methyl ether	Single T_g; FTIR	–	1150
	Vinylpyridine	Single T_g; FTIR	Formed complexes; II was 2- or 4-vinylpyridine (2 miscible systems)	832,976
	N-vinylpyrrolidone	Single T_g	Formed complexes from methanol	857
Vinyl propionate	Ethyl acrylate	Single T_g; transparency; IGC	–	60,61
N-vinylpyrrolidone	Alkyl methacrylate	Single T_g	II had an alkyl group or methyl or ethyl; miscible when cast from chloroform (Ref. 1141); immiscible when cast from DMF (Ref. 607)	607,1141
	Allyl alcohol-*co*-styrene	Single T_g; transparency	II had 5.4–6.0 or 7.3–8.0 wt.% OH	284,977
	Aramide	Single T_g; transparency	Polymer II was five different types of aramides	947
	Benzimidazole	Single T_g; transparency	–	947
	n-Butyl methacrylate-*co*-2-hydroxyethyl methacrylate	Single T_g; transparency	II had $\geq$20.9 mol% 2-hydroxyethyl methacrylate	501
	Haloalkyl methacrylate	Single T_g; FTIR	II had a haloalkyl group of chloromethyl, 2-chloroethyl, 3-chloropropyl, 2-bromoethyl or 2-iodoethyl (5 miscible blend systems)	607,1109,1141
	Copolyamide	Single T_g	II had 1/1/1 = caprolactam/hexamethylene adipamide/hexamethylene sebacamide structural unit	315
	Dialkyl itaconate	Single T_g	II had an dialkyl group of dimethyl, di-2-chloroethyl or di-3-chloropropyl (3 miscible blend systems)	1141
	Epoxy resin	Single T_g; FTIR	–	370
	Ethersulfone	Single T_g	–	307
	Ethylene glycol	Single T_g	I had MW = 360 kg/mol; II had MW = 0.3 kg/mol	780
	Epichlorohydrin	Single T_g	–	300
	Ethyl methacrylate-*co*-2-hydroxyethyl methacrylate	Single T_g; transparency	II had $\geq$7.5 mol% 2-hydroxyethyl methacrylate	265
	2-Hydroxyethyl methacrylate	Single T_g; transparency	–	284
	2-Hydroxyethyl methacrylate-*co*-methyl methacrylate	Single T_g; transparency	II had $\geq$1.9 mol% 2-hydroxyethyl methacrylate	501
	2-Hydroxypropyl methacrylate	Single T_g; transparency	–	284,977
	Methacrylic acid	NMR	Formed complexes	1128
	Monoalkyl itaconate	FTIR	II had an alkyl group of benzyl or ethyl (2 blend systems); formed complexes	95,938
	Sulfone	Single T_g; transparency	–	255
	Sulfone, carboxylated	Single T_g; transparency	II had degree of carboxylation 0.43–1.93	255
	Vinyl alcohol	Single T_g; NMR	Semicrystalline	624,659,805,856,890,998
	Vinyl alcohol-*co*-vinyl acetate	Single T_g	II had $\geq$70% vinyl alcohol	207
	Vinyl chloride	Single T_g	–	300
	Vinyl formal	Single T_g: FTIR	–	349,1044
Vinylidene fluoride	Acetonyl methacrylate	Single T_g	Semicrystalline	122
	N,*N*-Dimethylacrylamide	Single T_g	Semicrystalline	242
	Ethyl methacrylate-*co*-methyl methacrylate	T_m-depression	II had 16–80 wt.% methyl methacrylate	283
	Methacrylic acid-*co*-methyl methacrylate	Single T_g; T_m-depression	Semicrystalline; II had 2.2–9.5 mol% methacrylic acid	1094
	Methyl methacrylate-*co*-styrene	Single T_g	II had < 13 vol% styrene	388
	N-Methyl-*N*-vinylacetamide	Single T_g	Semicrystalline	242
	Methoxymethyl methacrylate	Single T_g	Semicrystalline	267
	Pivalolactone	T_m-depression	Semicrystalline	1038
	N-Vinylpyrrolidone	Single T_g	Semicrystalline	17,94,241,408
Vinylpyridine	Hydroxyalkyl methacrylate	Single T_g; FTIR	I was 2- or 4-vinylpyridine; II had an alkyl group of 2-hydroxyethyl or 3-hydroxypropyl (4 miscible systems)	937

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TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Monoalkyl itaconate	Single T_g; FTIR	I was 2- or 4-vinylpyridine; II had an alkyl group or methyl or ethyl (4 miscible systems); formed complexes	939,1014, 1212
	Vinyl acetate-*co*-vinyl alcohol	Single T_g; FTIR	I was 2- or 4-vinylpyridine (2 miscible systems); II had 29–88 mol% vinyl alcohol	934,935,991
	Vinyl butyral	SALS	I was 2- or 4-vinylpyridine (2 miscible systems)	1003
2-Vinylpyridine	Aramide	Single T_g; FTIR	II was made from hexamethylene-diamine and a mixture of tereph-thaloyl and isophthaloyl dichlorides	767
4-Vinylpyridine	Methylocellulose	Single T_g; NMR	–	559
	Sulfone, carboxylated	Single T_g; transparency	II had degree of carboxylation 0.43–1.93	256
	p-Phenylene terephthalamide	Transparency; microscopy	–	329
2,3-Xylenyl methacrylate	2,6-Xylenyl methacrylate	Single T_g	–	1158

TABLE 2. POLYMER PAIRS CONTAINING ONE MONOMER IN COMMON, MISCIBLE IN THE AMORPHOUS STATE AT ROOM TEMPERATURE

Polymer I of	Polymer II of	Method	Comments	Refs.
Acrylic acid-*co*-styrene	Methyl methacrylate-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	72
Acrylonitrile-*co*-butadiene	Acrylonitrile-*co*-butadiene	Single T_g; clear films; electron microscopy	Difference in composition between I and II ≤22% acrylonitrile	19,47,101,106, 149,390,452
	Acrylonitrile-*co*-styrene	Single T_g	–	162
	Acrylonitrile-*co*-vinylidene chloride	Single T_g	I had 23.6–49.6 vol% AN; II had 19 wt.% AN	966
Styrene-*co*-maleic anhydride--*co*-acrylonitrile	Acrylonitrile-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	965
	Maleic anhydride-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	965
Acrylonitrile-*co*-methyl methacrylate	Acrylonitrile-*co*-*N*-phenylitaconimide	Single T_g	–	168
	Itaconic anhydride-*co*-methyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	920
	Methyl methacrylate-*co*-*N*-phenylitaconimide	Single T_g	–	168
Acrylonitrile-*co*-methyl methacrylate-*co*-α-methylstyrene	Methyl methacrylate	Single T_g	I had 20/20/60 = acrylonitrile/methyl methacrylate/α-methylstyrene	633
Acrylonitrile-*co*-methyl methacrylate-*co*-styrene	Acrylonitrile-*co*-styrene	Light scattering	–	358
	Methyl methacrylate	Light scattering	–	358
Acrylonitrile-*co*-α-methylstyrene	Acrylonitrile-*co*-methyl methacrylate	Single T_g	–	152
	Acrylonitrile-*co*-styrene	Single T_g	I had 32.3 wt.% acrylonitrile; II had 27 wt.% acrylonitrile	155,684
Acrylonitrile-*co*-α-methylstyrene-*co*-styrene	Acrylonitrile-*co*-α-methyl styrene-*co*-styrene	Clear films	Difference in composition between I and II < 12% acrylonitrile	769
Acrylonitrile-*co*-styrene	Acrylic acid-*co*-styrene	Single T_g	–	380
	Acrylonitrile-*co*-benzyl methacrylate	Single T_g	–	1180
	Acrylonitrile-*co*-fumaronitrile-*co*-styrene	Single T_g	I had 32–40 wt.% AN; II had 11–17 wt.% fumaronitrile	1222
	Acrylonitrile-*co*-methyl methacrylate	Single T_g	–	164,620
	Acrylonitrile-*co*-*N*-phenylitaconimide	Single T_g	–	168
	Acrylonitrile-*co*-styrene	Single T_g; no visible phase separation	Difference in composition between I and II < 3.5% acrylonitrile	485,582
	p-(2-Hydroxy-hexafluoroisopropyl)-styrene-*co*-styrene	Single T_g; clear film	I had 70% styrene; II had 90.3% styrene	571,646
	Maleic anhydride-*co*-styrene	Single T_g	I had 44.4–94.6 wt.% styrene; II had 50–91.5 wt.% styrene	25,462,554, 745,1008

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TABLE 1. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	Monoalkyl itaconate	Single T_g; FTIR	I was 2- or 4-vinylpyridine; II had an alkyl group or methyl or ethyl (4 miscible systems); formed complexes	939,1014, 1212
	Vinyl acetate-*co*-vinyl alcohol	Single T_g; FTIR	I was 2- or 4-vinylpyridine (2 miscible systems); II had 29–88 mol% vinyl alcohol	934,935,991
	Vinyl butyral	SALS	I was 2- or 4-vinylpyridine (2 miscible systems)	1003
2-Vinylpyridine	Aramide	Single T_g; FTIR	II was made from hexamethylene-diamine and a mixture of tereph-thaloyl and isophthaloyl dichlorides	767
4-Vinylpyridine	Methylocellulose	Single T_g; NMR	–	559
	Sulfone, carboxylated	Single T_g; transparency	II had degree of carboxylation 0.43–1.93	256
	p-Phenylene terephthalamide	Transparency; microscopy	–	329
2,3-Xylenyl methacrylate	2,6-Xylenyl methacrylate	Single T_g	–	1158

TABLE 2. POLYMER PAIRS CONTAINING ONE MONOMER IN COMMON, MISCIBLE IN THE AMORPHOUS STATE AT ROOM TEMPERATURE

Polymer I of	Polymer II of	Method	Comments	Refs.
Acrylic acid-*co*-styrene	Methyl methacrylate-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	72
Acrylonitrile-*co*-butadiene	Acrylonitrile-*co*-butadiene	Single T_g; clear films; electron microscopy	Difference in composition between I and II ≤22% acrylonitrile	19,47,101,106, 149,390,452
	Acrylonitrile-*co*-styrene	Single T_g	–	162
	Acrylonitrile-*co*-vinylidene chloride	Single T_g	I had 23.6–49.6 vol% AN; II had 19 wt.% AN	966
Styrene-*co*-maleic anhydride--*co*-acrylonitrile	Acrylonitrile-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	965
	Maleic anhydride-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	965
Acrylonitrile-*co*-methyl methacrylate	Acrylonitrile-*co*-*N*-phenylitaconimide	Single T_g	–	168
	Itaconic anhydride-*co*-methyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	920
	Methyl methacrylate-*co*-*N*-phenylitaconimide	Single T_g	–	168
Acrylonitrile-*co*-methyl methacrylate-*co*-α-methylstyrene	Methyl methacrylate	Single T_g	I had 20/20/60 = acrylonitrile/methyl methacrylate/α-methylstyrene	633
Acrylonitrile-*co*-methyl methacrylate-*co*-styrene	Acrylonitrile-*co*-styrene	Light scattering	–	358
	Methyl methacrylate	Light scattering	–	358
Acrylonitrile-*co*-α-methylstyrene	Acrylonitrile-*co*-methyl methacrylate	Single T_g	–	152
	Acrylonitrile-*co*-styrene	Single T_g	I had 32.3 wt.% acrylonitrile; II had 27 wt.% acrylonitrile	155,684
Acrylonitrile-*co*-α-methylstyrene-*co*-styrene	Acrylonitrile-*co*-α-methyl styrene-*co*-styrene	Clear films	Difference in composition between I and II < 12% acrylonitrile	769
Acrylonitrile-*co*-styrene	Acrylic acid-*co*-styrene	Single T_g	–	380
	Acrylonitrile-*co*-benzyl methacrylate	Single T_g	–	1180
	Acrylonitrile-*co*-fumaronitrile-*co*-styrene	Single T_g	I had 32–40 wt.% AN; II had 11–17 wt.% fumaronitrile	1222
	Acrylonitrile-*co*-methyl methacrylate	Single T_g	–	164,620
	Acrylonitrile-*co*-*N*-phenylitaconimide	Single T_g	–	168
	Acrylonitrile-*co*-styrene	Single T_g; no visible phase separation	Difference in composition between I and II < 3.5% acrylonitrile	485,582
	p-(2-Hydroxy-hexafluoroisopropyl)-styrene-*co*-styrene	Single T_g; clear film	I had 70% styrene; II had 90.3% styrene	571,646
	Maleic anhydride-*co*-styrene	Single T_g	I had 44.4–94.6 wt.% styrene; II had 50–91.5 wt.% styrene	25,462,554, 745,1008

TABLE 2. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	N-phenylitaconimide-*co*-styrene	Single T_g	–	164
	N-phenylmaleimide-*co*-styrene	Single T_g	–	25,26
3-Bromo-2,6-dimethyl-1,4-phenylene ether	3-Bromo-2,6-dimethyl-1,4-phenylene ether-*co*-2,6-dimethyl-1,4-phenylene ether	Single T_g; microscopy	II had $\geq$48 mol% 3-bromo-2,6-dimethyl-1,4-phenylene oxide	402
3-Bromo-2,6-dimethyl-1,4-phenylene ether-*co*-2,6-dimethyl-1,4-phenylene ether	2,6-dimethyl-1,4-phenylene ether	Single T_g; microscopy	I had $\geq$62 mol% 2,6-dimethyl-1,4-phenylene ether	402
p-Bromostyrene-*co*-styrene	Styrene	Single T_g	I had $\geq$90 mol% styrene	402,785
Butadiene	Butadiene	Single T_g	Semicrystalline; I was SKD (87% *cis*-1,4) and II was SKBM (Ref. 251); I had 50% vinyl-1,2, 35% *cis*-1,4 and 15% *trans*-1,4, and II had 98% *cis*-1,4 (Ref. 736); I had 50% vinyl-1,2, 35% *cis*-1,4 and 15% *trans*-1,4, and II had 55% *trans*-1,4, 35% *cis*-1,4 and 10% vinyl-1,2 (Ref. 736)	251,736
	Butadiene-*co*-styrene	Single T_g	II had >70% butadiene; immiscible when II had <60% butadiene	92,149,182, 237,238,520,548, 549,737,770,771, 787,882
Butadiene-*co*-styrene	Butadiene-*co*-styrene	Single T_g; microscopy	Difference in composition between I and II <20% styrene; two T_g's when composition difference >20%	182,519,520, 455,757,771
	Styrene	Single dynamic mechanical loss peak	I had 25% styrene; II had $M_w \leq 917$; $\leq$50% II; two loss peaks when 75% II	138,139
Butyl acrylate-*co*-butyl methacrylate	Butyl acrylate-*co*-butyl methacrylate	Clear films	Difference in composition between I and II 25% butyl acrylate; immiscible when composition difference 50% butyl acrylate	453
Butyl acrylate-*co*-*N*-hydroxyethylcarbozolyl acrylate	Butyl acrylate-*co*-β-hydroxyethyl-3,5-dinitrobenzoyl acrylate	Single T_g	I had 6 or 48 mol% electron donating carbozoyl groups; II had 10 or 63 mol% electron withdrawing dinitrobenzoyl groups	723
Butyl acrylate-*co*-ethyl acrylate	Butyl acrylate-co-ethyl acrylate	Clear films	Difference in composition between I and II 25% ethyl acrylate; immiscible when composition difference 50% ethyl acrylate	453
	Ethyl acrylate	Clear films	I had 75% ethyl acrylate; immiscible when I had $\leq$50% ethyl acrylate	453
Butyl acrylate-*co*-methyl methacrylate	Butyl acrylate-*co*-methyl methacrylate	Single T_g; clear films	Difference in composition between I and II $\leq$10% methyl methacrylate	447,448
n-Butyl methacrylate	*n*-Butyl methacrylate-*co*-styrene	Single T_g; clear films	II had $\geq$90 wt.% *n*-butyl methacrylate	238
n-Butyl methacrylate-*co*-*p*-chlorostyrene	*n*-Butyl methacrylate-*co*-*p*-chlorostyrene	Single T_g; microscopy	–	76
n-Butyl methacrylate-*co*-*N*-hydroxyethylcarbazoyl acrylate	*n*-Butyl methacrylate-*co*-β-hydroxyethyl-3,5-dinitrobenzoyl acrylate	Single T_g	I had 9 mol% carbazoyl groups; II had 9 mol% dinitrobenzoyl groups	723
Butyl methacrylate-*co*-methyl methacrylate	Butyl methacrylate-*co*-methyl methacrylate	Clear films	Difference in composition between I and II $\leq$20–30% butyl methacrylate, depending on compositions of I and II	76,447
n-Butyl methacrylate-*co*-styrene	*n*-Butyl methacrylate-*co*-styrene	Single T_g; microscopy		76
	Styrene	Single T_g; clear films	I had $\geq$90 wt.% styrene	239
Caprolactam-*co*-caprolactone	Caprolactone-*co*-laurolactam	Single T_g	I and II had various compositions	1126
Caprolactam-*co*-caprolactone-*co*-laurolactam	Caprolactam-*co*-laurolactam	Single T_g	I and II had various compositions	992
2,6-Dimethyl-1,4-phenylene ether, sulfonylated	2,6-Dimethyl-1,4-phenylene ether, sulfonylated	Single T_g	Difference in degree of sulfonylation between I and II in the range of 20–26 wt.%	410
Dimethylsiloxane, functionalized	Dimethylsiloxane, functionalized	Single T_g	I had 4–15 mol% electron-donating carbazoyl or *N*-methylaniline groups; II had 4–15 mol% electron-accepting	723

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TABLE 2. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			dinitrobenzoyl groups; donor/ acceptor = 1/1	
Epichlorohydrin	Epichlorohydrin-*co*-ethylene glycol	Single T_g	I was Hydrin 100; II was Hydrin 200	373
Ethyl acrylate-*co*-ethyl methacrylate	Ethyl acrylate-*co*-ethyl methacrylate	Clear films	I and II had 25, 50 or 75% ethyl acrylate	453
	Ethyl methacrylate	Clear films	I had 75 wt.% ethyl methacrylate; immiscible when I had $\leq$ 50 wt.% ethyl methacrylate	453
Ethyl acrylate-*co*-methyl methacrylate	Ethyl acrylate-*co*-methyl methacrylate	Clear films	Difference in composition between I and II < 20–27% ethyl acrylate depending on compositions of I and II	447
Ethylene, chlorinated	Ethylene, chlorinated	Single T_g; clear films	Difference in composition between I and II $\leq$ 1.2–13.3 wt.% Cl depending on compositions of I and II	97,98, 636,817
	Ethylene-*co*-methyl acrylate	Single T_g; phase contrast microscopy	Semicrystalline when I had 25 wt.% Cl; I had 25 or 48 wt.% Cl	396
	Ethylene-*co*-vinyl acetate	Single T_g; microscopy	I had 35.4–52.6 wt.% Cl; II had 50–60 wt.% ethylene	849
Ethylene-*co*-vinyl acetate	Ethylene, low density	Single T_g	I:II = 50 : 50	1172
	Ethylene-*co*-vinyl acetate	Single T_g; microscopy	I and II had 7–100 wt.% vinyl acetate	925
	Ethylene-*co*-vinyl alcohol	Single T_g; FTIR	I had 21 mol% vinyl acetate; II had 21 mol% vinyl alcohol	960
	Vinyl acetate-*co*-vinyl chloride	Single T_g	–	745,746
Ethylene-*co*-vinyl chloride	Ethylene-*co*-vinyl chloride	Single T_g	Difference in vinyl chloride or ethylene content of I and II < 15 mol%	70,71
	Vinyl chloride	Single T_g	I had > 80 mol% vinyl chloride	70
Ethylene naphthalene-2,6-dicarboxylate	Ethylene naphthalene-2,6-dicarboxylate-*co*-4-hydroxybenzoate	NMR	II had 20 mol% 4-hydroxybenzoate	1027
Ethyl methacrylate-*co*-methyl methacrylate	Ethyl methacrylate-*co*-methyl methacrylate	Single T_g	–	98
o-Fluorostyrene-*co*-*p*-fluorostyrene	*o*-Fluorostyrene-*co*-*p*-fluorostyrene	Single T_g	I and II had 10 and 23 mol% *p*-fluorostyrene, respectively	1144
o-Fluorostyrene-*co*-styrene	*o*-Fluorostyrene-*co*-styrene	Single T_g	I had 18 or 49% *o*-fluorostyrene; II had 40 or 77% *o*-fluorostyrene	716,1144
	Styrene	Single T_g	I had 18, 40 or 49% *o*-fluorostyrene and II had M_n = 15 kg/mol I had 18% *o*-fluorostyrene and II had M_n = 110 kg/mol	716,1144
p-Fluorostyrene-*co*-styrene	Styrene	Single T_g	I had 8 or 16 mol% *p*-fluorostyrene; II had M_n = 40 or 326 kg/mol	1144
Hydrocarbon polymer, chlorinated	Hydrocarbon polymer, chlorinated	Clear films	One series derived from reduction of polyvinyl chloride and one series derived from chlorination of polyethylene	75
p-Hydroxybenzoic acid-*co*-6-hydroxy-2-naphthoic acid-*co*-terephthalic acid-*co*-hydroquinone	*p*-Hydroxybenzoic acid-*co*-6-hydroxy-2-naphthoic acid	Single T_g; X-ray diffraction	X-ray diffraction showed no significant transesterification occurred in the mixture	92
Hydroxybutyrate	Hydroxybutyrate	Microscopy; SAXS	I was isotactic; II was atactic	903
	Hydroxybutyrate-*co*-hydroxyvalerate	Microscopy; melting behavior	II had 3.8–22.3 mol% hydroxyvalerate	1142,1143
Isoprene	Isoprene-styrene block copolymer	Electron microscopy	I had M_n = 6.5–53.9 kg/mol; II was diblock, triblock or four-arm star copolymer having total M_n = 26–622 kg/mol	378
Maleic anhydride-*co*-styrene	Acrylonitrile-*co*-styrene	Single T_g, transparency, microscopy	I had 15.3 wt.% maleic anhydride; II had 15.0, 19.5 or 25.0 wt.% acrylonitrile	436,555
	Maleic anhydride-*co*-styrene	Single T_g	Miscibility occurred when difference in MA contents between I and II was < 2.5 vol%	1159
	Methyl methacrylate-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	1008
Maleimide-*co*-styrene	Styrene-*co*-2-vinylpyridine	Single T_g; FTIR	I had 86 wt.% styrene; IH had 30 wt.% styrene	1214

TABLE 2. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Methacrylic acid-*co*-methyl methacrylate	Methyl methacrylate-*co*-4-vinylpyridine	Phase diagram	I had 91.48 or 77.7 mol% methyl methacrylate; II had 80.2 mol% methyl methacrylate	198
Methacrylic acid-*co*-styrene	Butyl methacrylate-*co*-methacrylic acid	Single T_g	I and II had 13.7 and 20.2 mol% methacrylic acid, respectively; both were Na-neutralized	1051
	Styrene-*co*-4-vinylpyridine	Phase diagram	I had 89.5 mol% styrene; II had 83.9 mol% styrene	198
Methacrylonitrile-*co*-styrene	Methacrylonitrile-*co*-methyl methacrylate	Single T_g	Miscibility depended on compositions of I and II	970
	Methacrylonitrile-*co*-styrene	Single T_g	Miscibility depended on compositions of I and II	970
[4-(Methacryloyloxy)-butyl]-pentamethyldisiloxane	[4-(Methacryloyloxy)-butyl]-pentamethyldisiloxane-*co*-methyl methacrylate	Single T_g; clear films	II had 67% methyl methacrylate	64
[4-(Methacryloyloxy)-butyl]-pentamethyldisiloxane-*co*-methyl methacrylate	Methyl methacrylate	Single T_g; clear films	I had 67 or 75% methyl methacrylate	64
Methyl acrylate	Methyl acrylate-*co*-vinyl acetate	Clear films	II had 25–75% methyl acrylate	453
Methyl acrylate-*co*-methyl methacrylate	Methyl acrylate-*co*-methyl methacrylate	Clear films	Difference in composition between I and II 28–48% methyl acrylate when I and II had degree of polymerization = 400 and 20–35% methyl acrylate when I and II had degree of polymerization = 3000, depending on compositions of I and II	447
Methyl acrylate-*co*-vinyl acetate	Vinyl acetate	Clear films	I had 25–75% vinyl acetate	453
Methyl methacrylate	Ethyl methacrylate-*co*-methyl methacrylate	Single T_g	I was isotactic; II had $\leq$45% ethyl methacrylate	727
	Methyl methacrylate	Single T_g	I was isotactic; II was sydiotactic	727
	Methyl methacrylate-*alt*-styrene	Single T_g; microscopy	Deuterated blends were miscible; miscibility affected by deuteration of I	1006
Methyl methacrylate-*co*-(*N*-ethylcarbazol-3-yl)methyl methacrylate	Methyl methacrylate-*co*-2-[(3,5-dinitrobenzoyl)oxy]ethyl methacrylate	Single T_g	I and II had similar acceptor or donor content	1160
Methyl methacrylate-*co*-styrene	Acrylonitrile-*co*-styrene	Single T_g	–	164,404
	Maleic anhydride-*co*-styrene	Single T_g	–	404
	Methyl methacrylate-*co*-*N*-phenylitaconimide	Single T_g	–	168
	Methyl methacrylate-*co*-styrene	Single T_g; microscopy	–	76,444
	N-Phenylitaconimide-*co*-styrene	Single T_g	–	168
p-Nitrostyrene-*co*-styrene	*p*-Nitrostyrene-*co*-styrene	Single T_g	–	158
Novolac resin	Novolac resin	Single T_g	I was formaldehyde and 13/17/70 mol% = *p*-*tert*-butyl phenol/*m*-cresol/*o*-cresol; II was formaldehyde and 15/85 mol% = 2-*tert*-butyl phenol/*o*-cresol; I and II had MW 0.8–1.6 kg/mol	221
N-Phenylmaleimide-*co*-styrene	4-Cyanostyrene-*co*-styrene	Single T_g	I had 39 wt.% styrene; II had 58.5–83.1 mol% styrene	187
	2-Cyanostyrene-*co*-4-cyanostyrene-*co*-styrene	Single T_g	II had 23.5 or 22.7 mol% styrene; ratios of 2-cyanostyrene/4-cyano-styrene were 25:75 or 78:22	187
Styrene	Styrene	Single T_g	I had MW = 0.8 kg/mol; II had MW = 8420 kg/mol; I/II = 31.7/68.5	102
	Styrene, iodinated	Transparency	II had degree of iodination of 6 or 15%	261
Styrene-*co*-styrenesulfonic acid	Styrene-*co*-*p*-vinylphenol	Single T_g; FTIR	I had 86 mol% styrene; II had 22 mol% vinylphenol	1086
	Styrene-*co*-4-vinylphenol	FTIR	I had 1.8–9.9 mol% acid; II had 1.9–9.9 mol% pyridine	1190
Styrene-*co*-vinylphenol	Styrene-*co*-vinylphenol	FTIR	–	349
	Vinylphenol	Single T_g; FTIR	I had > 11 mol% OH groups	1247,1088
Sulfone	Sulfone, carboxylated	Single T_g	Degree of carboxylation of II $\leq$1.3	1258
Vinyl acetate-*co*-vinyl chloride	Vinyl chloride	Single T_g; microscopy of fibers	I had 78 or 86 wt.% vinyl chloride	449
	Vinyl chloride, chlorinated	Single T_g	–	745

TABLE 2. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Vinyl acetate-*co*-vinyl sterate	Vinyl acetate-*co*-vinyl sterate	Single T_g; microscopy	I and II had 21–98 wt.% vinyl acetate	925
Vinyl chloride	Propylene-*co*-vinyl chloride	Single T_g; microscopy of fibers	II had 89 or 91 wt.% vinyl chloride	449
Vinyl chloride, chlorinated	Vinyl chloride	Single T_g	Up to 61.3 or 65.2% Cl in I with dependence on mol% CCl_2 groups	91,504,505
	Vinyl chloride, chlorinated	Single T_g	Difference in composition between I and II $\leq$3–4% Cl depending on composition of I and II with dependence on number of CCl_2 groups	98,504

TABLE 3. CHEMICALLY DISSIMILAR POLYMER TRIADS (AND TETRADS) MISCIBLE IN THE AMORPHOUS STATE AT ROOM TEMPERATURE

Polymer I of	Polymer II of	Polymer III of (and Polymer IV of)	Method	Comments	Refs.
Acrylic acid-*co*-styrene	Ethylene glycol	Methyl methacrylate	Single T_g	I had 12.2, 20.8 or 33.1 mol% acrylic acid	384
Acrylonitrile-*co*-butadiene	Vinyl chloride	Vinyl chloride-*co*-vinylidene chloride	Single T_g	Semicrystalline; I had 30 or 40 wt.% acrylonitrile; III had 65 wt.% vinylidene chloride	860
Acrylonitrile-*co*-butadiene-*co*-styrene	Carbonate of bisphenol-A	Propylene-*co*-vinyl chloride	Single T_g	I was Blendex 701; II was Merlon M39, M-60; III had 3.2 or 3.8% propylene; I/II/III = 1/1/2; two T_g's when I/II/III = 3/7/10	107
Acrylonitrile-*co*-methyl methacrylate	Acrylonitrile-co-styrene	Maleic anhydride-*co*-styrene	Single T_g	I had 12% acrylonitrile; II had 25% acrylonitrile; III had 25% maleic anhydride	74
	Acrylonitrile-*co*-styrene	Methyl methacrylate-*co*-*N*-phenylitaconimide	Single T_g	I had 68 or 95 vol% MMA; II had 63 or 70 vol% styrene; III had 12 or 45 vol% MMA; three miscible binary pairs; there was an immiscibility loop	967
	Acrylonitrile-*co*-styrene	Methyl methacrylate-*co*-styrene	Single T_g	I had 2.7–7.4 vol% acrylonitrile; II had 14.5–49.5 vol% acrylonitrile; III had 11.2–16.0 vol% styrene	163,165
Acrylonitrile-*co*-α-methylstyrene	Acrylonitrile-*co*-styrene	Vinyl chloride	Single T_g	I had 32.3 wt.% acrylonitrile; II had 27 wt.% acrylonitrile; >25% I	684
	Ethyl methacrylate	Methyl methacrylate	Single T_g	I had 30 wt.% acrylonitrile	290
Acrylonitrile-*co*-*N*-phenylitaconimide	Acrylonitrile-*co*-styrene	*N*-phenylitaconimide-*co*-styrene	Single T_g	I had 6 or 9 vol% acrylonitrile; II had 22, 44 or 65 vol% acrylonitrile; III had 12 or 42 vol% styrene	157
Acrylonitrile-*co*-styrene	Butylene adipate	Carbonate of bisphenol-A	Single T_g	I had 12 or 25% acrylonitrile	738
	Caprolactone	Carbonate of bisphenol-A	Single T_g	–	738
	Caprolactone	Hydroxyether of bisphenol-A (phenoxy resin)	Single T_g	I had 5.7–30 wt.% AN	1209,1052
	Caprolactone	Maleic anhydride-*co*-styrene	Single T_g	I had 15 wt.% AN; III had 14 wt.% maleic anhydride	1210
	Caprolactone	Vinyl chloride	Single T_g	Miscible when I/II/III = 68/16/16	351
	Carbonate of bisphenol-A	Cyclohexane dimethylene succinate	Single T_g	–	738
	Ethyl methacrylate	Maleic anhydride-*co*-styrene	Single T_g	I had 25% acrylonitrile; III had 14–25% acrylonitrile	74
	Ethyl methacrylate	Methyl methacrylate	Single T_g	I had 30 wt.% acrylonitrile; some blends showed LCST	280
	Methyl methacrylate	Vinyl chloride	Single T_g	I had 23 wt.% acrylonitrile	349

TABLE 3. *cont'd*

Polymer I of	Polymer II of	Polymer III of (and Polymer IV of)	Method	Comments	Refs.
n-Amyl methacrylate	*n*-Butyl methacrylate	Vinyl chloride	Single T_g	Blend had >70 wt.% III	1157
	n-Propyl methacrylate	Vinyl chloride	Single T_g	Blend had >70 wt.% III	1157
Arylate	Butylene therphthalate	Hydroxyether of bisphenol-A (phenoxy)	Single T_g	I was Arilef U-100; III >30 wt.%	7,208,366
3-Bromo-2,6-dimethyl-1,4-phenylene ether-*co*-2,6-dimethyl-1,4-phenylene ether	*p*-Bromostyrene-*co*-styrene	2,6-dimethyl-1,4-phenylene ether	Single T_g; microscopy	≤37 mol% brominated monomer in I and in II	402
	p-Bromostyrene-*co*-styrene	Styrene	Single T_g; microscopy	≤16 mol% brominated monomer in I and in II	402
	2,6-Dimethyl-1,4-phenylene ether	Styrene	Single T_g; microscopy	≤45 mol% brominated monomer in I	402
	p-Bromostyrene-*co*-styrene	2,6-Dimethyl-1,4-phenylene ether (polymer IV of styrene)	Single T_g; microscopy	≤26 mol% brominated monomer in I and in II	402
p-Bromostyrene-*co*-styrene	2,6-dimethyl-1,4-phenylene ether	Styrene	Single T_g; microscopy	≤29 mol% *p*-bromostyrene in I	402
Butylene terephthalate	Carbonate of bisphenol-A	Hydroxyether of bisphenol-A (phenoxy)	Single T_g	–	608,681
	Hydroxyether of bisphenol-A (Phenoxy)	Methyl methacrylate	Single T_g, microscopy	Blend had >50 wt.% II	1053
Caprolactone	Carbonate of bisphenol-A	Carbonate of tetramethylbisphenol-A	Single T_g	Miscible at all compositions	1070
	Carbonate of bisphenol-A	Hydroxyether of bisphenol-A (phenoxy)	Single T_g	Generally miscible when >60 wt.% I in blend	125
	Hydroxyether of bisphenol-A (Phenoxy)	Vinyl methyl ether	Single T_g	Miscible at all compositions; all blends showed LCST	303
	Vinyl chloride	Vinyl chloride, chlorinated	Single T_g	II had 67.2 wt.% Cl; generally miscible when I >40% at high II/III ratio and miscible when I >26% at low II/III ratio	20
Carbonate of bisphenol-A	Carbonate of bisphenol chloral	Methyl methacrylate	Single T_g	–	427
	Carbonate of tetra-methylbisphenol-A	Acrylonitrile-*co*-styrene	Single T_g	III had 2.7–19.7 wt.% AN	1068
	Carbonate of tetra-methylbisphenol-A	Methyl methacrylate-*co*-styrene	Single T_g	III had 4.5–58.5 wt.% MMA	1068
	Carbonate of tetra-methylbisphenol-A	Styrene	Single T_g	–	488,1068
Carbonate of tetra-methylbisphenol-A	Methyl methacrylate	Methyl methacrylate-*co*-styrene	Single T_g	–	884
2-Chlorostyrene	Cyclohexyl acrylate	Styrene	Single T_g; light scattering	Three miscible binary pairs; there was an immiscibility loop in the phase diagram	1167
Copolyester	Epoxy	Hydroxyether of bisphenol-A (phenoxy)	Single T_g, microscopy	II/III = 1/1; I was made from 65/30/5 = terephthalate/isophthalate/sebacate and 70/20/10 = ethylene glycol/resorcinal di(β-hydroxy ethyl)ether/poly(tetra-methylene ether)glycol; II was 4/1 by wt. = Araldite 6099/Araldite 6010	2
Epichlorohydrin	Ethylene glycol	Methyl methacrylate	Single T_g	Miscible at all compositions	573
	Methyl methacrylate	Vinyl acetate	Single T_g	Miscible at all compositions; all blends showed LCST	304
Etherimide	Amideimide	Ether ether ketone, sulfonated	Single T_g	I was Ultem 1000; II was Torlon 4000T; III had degree of sulfonation of 0.53 or 1.00	415
	Ether ether ketone	Liquid crystalline polymer	Single T_g	I was Ultem 1000; II was Victrex 450G; III was HX4000	78
Ether urethane	Oxytetramethylene-*co*-oxyditetramethylene-*co*-terephthalic acid	Vinyl chloride	Single T_g	I was Adiprene L-100 and 4,4′-methylene-bis-2-chloro-aniline: I/II/III = 1/1/2; two T_g's when I/II/III = 1/2/1 and 1/1/1	344

TABLE 3. *cont'd*

Polymer I of	Polymer II of	Polymer III of (and Polymer IV of)	Method	Comments	Refs.
Ethyl methacrylate	Methyl methacrylate	*p*-Vinylphenol	Single T_g; FTIR; microscopy	Blend had ≥60 wt.% III	1161,1163
	Methyl methacrylate	Vinylidene fluoride	Single T_g	Blend had 30–80 wt.% III	474
Ethylene, chlorinated	Natural rubber, epoxidized	Vinyl chloride	Single T_g	II was 50 mol% epoxidized	394
Ethylene, chlorosulfonated	Natural rubber, epoxidized	Nitrile rubber, carboxylated	Single T_g	I had 35% Cl and 1% S (Hypalon-40); II was 50 mol% epoxidized; III was Krynac-211	702
Ethylene glycol	Vinyl acetate	*p*-Vinyl phenol	Single T_g; FTIR	Three miscible binary pairs; there was an immiscibility loop in the phase diagram	491,1240
Hexafluoroacetone-*co*-vinylidene fluoride	Methyl methacrylate	Vinyl acetate	Single T_g	I had 9 mol% hexafluoro-acetone	1073
Methyl acrylate	Vinyl acetate	*p*-Vinylphenol	Single T_g	Miscible at all compositions	1240
Methyl acrylate-*co*-styrene	Vinyl acetate	*p*-Vinylphenol	Single T_g	I had 28 wt.% styrene	1240
Methyl methacrylate	Vinyl acetate	Vinylidene fluoride	Single T_g	–	956
Natural rubber, epoxidized	Nitrile rubber, carboxylated	Chloroprene	Single T_g	I was 50 mol% epoxidized; II was Krynac-211; I/II/III = 1/1/1	14
Neopentyl glycol adipate	Vinyl chloride	Vinylidene fluoride	Single T_g	III < 50 wt.%	490
Styrene-*co*-4-vinylpyridine	Vinyl acetate	*p*-Vinylphenol	Single T_g	I had 30 wt.% styrene	1240

TABLE 4. POLYMER PAIRS MISCIBLE IN THE AMORPHOUS STATE AT ROOM TEMPERATURE, MOLECULAR WEIGHT DEPENDENCE INVESTIGATED

Polymer I of	Polymer II of	Method	Comments	Refs.
Acrylonitrile-*co*-α-methylstyrene	Carbonate of bisphenol-A	Single T_g; transparency	I had 9–12 wt.% AN; miscible when II had $M_w = 3.8$ kg/mol; immiscible when II had $M_w = 9.9$ kg/mol	930
Acrylonitrile-*co*-styrene	Carbonate of bisphenol-A	Single T_g; transparency	I had 24.6 wt.% AN and II had $M_w =$ 3.8 kg/mol; miscible when I had $M_w =$ 3.137 kg/mol and immiscible with I had $M_w = 6.085$ kg/mol	932
3-Bromo-2,6-dimethyl-1,4-phenylene ether	Styrene	Single T_g; transparency	I had MW ≤40 kg/mol; II had MW ≤30 kg/mol	529
n-Butyl methacrylate	Styrene	Single T_g; transparency	I had $M_w = 320$ kg/mol; II had MW = 171 kg/mol; two T_g's when II had MW = 1100 kg/mol	193
Carbonate of bisphenol-A	Ester	Single T_g	II was made from 4,4′-(2-norbornyl-idene)di-phenol and a mixture of terephthalic acid and azelaic acid; miscible with I had $M_w = 28.1$ kg/mol; immiscible when I had $M_w = 73.2$ kg/mol	1232
2,6-Dimethyl-1,4-phenylene ether	Alkylstyrene	Transparency	I had $M_w = 5$–500 kg/mol and II was a ring-alkyl (with various carbon atoms) styrene. Raising MW of II eventually produced a transition from clear to hazy or cloudy films in each system except that containing poly-α-methylstyrene. With this resin, clear single-T_g films were obtained even with M_w of I = 500 kg/mol and M_w of II = 800 kg/mol	403
	p-Bromostyrene	Transparency	II had $M_n = 29.1$ kg/mol and $M_w = 32$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 6.2 ± 2.4 kg/mol. When II had $M_n = 6.4$ kg/mol and $M_w = 7.04$ kg/mol, M_w limit for miscibility of I was 14 ± 4 kg/mol	403
	p-*tert*-Butylstyrene	Transparency	II had $M_n = 113$ kg/mol and $M_w = 289$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 4.5 kg/mol ± 0.7 kg/mol	403

TABLE 4. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
	4-Ethylstyrene	Transparency	II had $M_n = 139$ kg/mol and $M_w = 158$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 22.4 kg/mol	403
	4-Methoxystyrene	Transparency	II had $M_n = 282$ kg/mol and $M_w = 457$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 3.6 kg/mol	403
	4-Methylstyrene	Transparency	II had $M_n = 118$ kg/mol and $M_w = 265$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 35.5 kg/mol	403
	4-*n*-Propylstyrene	Transparency	II had $M_n = 128$ kg/mol and $M_w = 267$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 14 ± 4 kg/mol	403
	Vinylbenzylchloride	Transparency	II had $M_n = 16.8$ kg/mol and $M_w = 29.3$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 14 ± 4 kg/mol	403
	4-Vinylbiphenyl	Transparency	II had $M_n = 79$ kg/mol and $M_w = 153$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 7 ± 1.6 kg/mol	403
	Vinylnaphthalene	Transparency	II had $M_n = 13$ kg/mol and $M_w = 32.6$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 10.2 kg/mol	403
	Vinyltoluene	Transparency	II had $M_n = 20.7$ kg/mol and $M_w = 40.4$ kg/mol; M_w limit for miscibility in 50/50 blend of I with II was 69 ± 25 kg/mol	403
Ethylene	Dimethylsiloxane	Cloud point curve	I was oligomeric polyethylene with $M_w = 0.254$ to 2.234 kg/mol and II was oligomeric polydimethylsiloxane with $M_w = 0.505$ to 4.5 kg/mol	584
Ethylene glycol	Propylene glycol	Miscibility stated	I and II both had MW < 1 kg/mol	65
	Vinyl acetate	Single T_g	I had $M_w = 20$ kg/mol miscible with II; I had $M_w = 100$ kg/mol miscible with II when blend had $\leq 50\%$ II	328
	Sulfone	Scattering turbidimetry	Blends with II >40 wt.% were homogeneous when I had MW = 3.5–4.5 kg/mol and II had MW = 35.6 kg/mol. Blends were heterogeneous at all compositions when I had MW = 200 kg/mol	796
Hydroxybutyrate	Lactide	Microscopy	Miscible when II had $M_n = 1.759$ kg/mol; immiscible when II had $M_n = 159.4$ kg/mol	923
cis-Isoprene	Styrene	Single dynamic mechanical loss peak	I was natural rubber; II had $M_w \leq 0.375$ kg/mol; two peaks when II had $M_w \geq 0.6$ kg/mol	140
	Vinyl cyclohexane	Single dynamic mechanical loss peak	I was natural rubber; II had $M_w \leq 0.375$ kg/mol; two peaks when II had $M_w \geq 0.65$ kg/mol	140
Methyl methacrylate	Carbonate of bisphenol-A	Single T_g; transparency	Miscible when M_w of I/II were 2.4 kg/mol/38 kg/mol, 10.55 kg/mol, 38 kg/mol, 60 kg/mol/9.9 kg/mol, 105 kg/mol;/9.9 kg/mol; immiscible when M_w of I/II were 20.3 kg/mol;/38 kg/mol, 33.5 kg/mol;/25.9 kg/mol, 33.5 kg/mol;/38 kg/mol and 60 kg/mol;/38 kg/mol	930
	Carbonate of hexafluorobisphenol-A-*co*-carbonate of tetramethylbisphenol-A	Single T_g; transparency	II had 60 wt.% HFPC and $M_w = 33$ kg/mol, and miscible when I had $M_w =$ 4–9.9 kg/mol; when II had $M_w =$ 103 kg/mol, it was miscible with I having $M_w = 4$ kg/mol and 11 kg/mol only	1194
	Styrene	Single T_g, transparency	Miscible when I had $M_w = 2.4$ kg/mol and II had $M_w = 2.95$ kg/mol; blends showed UCST when I and II had higher M_w (Ref. 929)	640,804, 929
	α-Styrene	Single T_g; transparency	Immiscible when I had $M_w = 6.7$ kg/mol and II had $M_w = 105.5$ kg/mol; miscible when I and II had lower M_w	929
	Sulfone	Single T_g; transparency	Miscible when I had $M_w = 1.21$ kg/mol or and 2.4 kg/mol and II had $M_w = 12$ kg/mol; immiscible when I had $M_w = 4.25$ kg/mol and II had $M_w = 34$ or 44 kg/mol	931

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TABLE 4. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Methyl methacrylate-*co*-styrene	Styrene	Single T_g; transparency	I had 26% styrene and II had MW = 0.6 kg/mol or I had 62.6% styrene and II had MW ≤ 2.1 kg/mol or I had 80% styrene and II had MW ≤ 4 kg/mol	557,804
α-Methylstyrene	Styrene	Single T_g; transparency; neutron scattering	Miscible when I had M_w = 55 kg/mol and II had M_w = 22 or 52 kg/mol; immiscible when II had M_w = 341 kg/mol (Ref.929)	38,42,63, 159,203, 691,710, 721,822, 865,929
	Styrene, deuterated	Single T_g	I had M_n = 25.8–78.3 kg/mol; II had M_n = 36.1–84.1 kg/mol	671
α-Methylstyrene-*co*-styrene	Styrene	Single T_g	I had M_n = 59–818 kg/mol; II had 3–79 mol% α-methylstyrene	159
Propylene	Ethylene-*co*-propylene	Single T_g	Miscible when I had M_w = 33 kg/mol and II had M_w = 44.5 kg/mol; immiscible when I and II had higher M_w	1101
Styrene	Carbonate of bisphenol-A	Single T_g; transparency	I had M_w = 0.58, 0.68, 0.95 or II had M_w = 3.8, 9, 25.9 or 38 kg/mol; miscibility depended on M_w and composition of blend	930
	Carbonate of dimethylbisphenol-A	Single T_g; transparency	II had M_w = 30 kg/mol; miscible when I had M_w = 0.58, 0.68 or 0.95 kg/mol; immiscible when I had M_w = 2.95 kg/mol	930
	Carbonate of tetramethylbisphenol	Single T_g; transparency	II had M_w = 31 kg/mol; miscible when I had M_w = 2.95 kg/mol; partially miscible when I had M_w = 9.2 or 17.5 kg/mol; immiscible when I had M_w = 341 kg/mol	930
	o-Chlorostyrene-*co*-*p*-chlorostyrene	Single T_g	I had M_n = 2.2–93 kg/mol; II had 7–100 mol% *o*-chlorostyrene	131
	Vinyl methyl ether	Single T_g	I had mol. wt. 0.8–233 kg/mol; II had mol. wt. 1.0–97.5 kg/mol	878,724
	2-Vinyl naphthalene	Single T_g	I had MW = 2.2 kg/mol; II had MW ≤ 70 kg/mol	731
p-Vinylphenol	Diethyl itaconate	Single T_g	II had M_w = 9.4 kg/mol and was miscible with I having M_w = 1.5–7 kg/mol, 9–11 kg/mol;, 22 or 30 kg/mol; II had M_w = 61 kg/mol and was miscible with I having M_w = 1.5–7 kg/mol and 9–11 kg/mol	1034

TABLE 5. POLYMER PAIRS THAT APPEAR TO HAVE HIGH TEMPERATURE MISCIBILITY, ALTHOUGH IMMISCIBLE AT OR BELOW ROOM TEMPERATURE (UCST BEHAVIOR)

Polymer I of	Polymer II of	Comments	References
Acrylonitrile-*co*-styrene	Sulfone of tetramethylbisphenol-A	I had 9 wt.% AN and II had M_w = 4.8 kg/mol; I had 11 wt.% AN and II had M_w = 12.4 kg/mol	931
Aramide	Imide	I was Aramid 341; II was Polyimide UR	1136
Butadiene	Butadiene	I had 98% *cis*-1,4; II had 71% vinyl-1,2 and 19% *trans*-1,4	736
	Butadiene, perdeuterated	Both I and II were *cis*-1,4	49
	Butadiene-*co*-styrene	I was *cis*-1,4; II had 23–30 wt.% styrene	362,650,737, 797,1121
	Styrene	II was hydrogenated or partly deuterated, I and II had MW = 2.0 kg/mol (Ref. 516); I had M_w = 0.96 kg/mol and II had M_w = 9.0 kg/mol (Ref. 808)	516,808
	Terpene resin, hydrogenated	I had 10–70.4% 1,2-content	1062
Butadiene-*co*-styrene	Styrene	II was hydrogenated or partly deuterated; II was 68.4 wt.% styrene and had MW of 10 kg/mol and II had MW of 100 kg/mol	516

TABLE 5. *cont'd*

Polymer I of	Polymer II of	Comments	References
Caprolactone	Ester	II was made from adipoyl chloride and 4,4′-bis(6-hydro-hexyloxy)biphenyl	821
Carbonate of bisphenol-A	Methacrylic acid-*co*-styrene	II had 4–23 wt.% methacrylic acid	10
	Liquid crystalline polymer of biphenyl-4,4′-ylene sebacate	Blend had 50–80 wt.% II	387
	Segmented copolyetherester	I had a hard tetramethylene terephthalate segment and a soft polytetramethylene-ether-glycol terephthalate segment	1015
Chlorostyrene-*co*-styrene	2,6-dimethyl-1,4-phenylene oxide	I had 32.9 mol% styrene	234,863
Cyclohexyl methacrylate	Cyclohexyl acrylate	–	765
2,2-Dimethyl-1,3-propylene sebacate	Haloalkyl methacrylate	II had a haloalkyl group of 2-bromoethyl, 2-chloroethyl, 3-chloropropyl or 2-iodoethyl (4 blend systems)	611,1137,1111
Dimethylsiloxane	Methyl ethyl siloxane	–	341
	Phenyl methyl siloxane	–	469
Epoxy	Acrylonitrile-*co*-butadiene, carboxyl terminated	I was Epon 828, $M_n = 0.38$ kg/mol; II had 17 wt.% acrylonitrile, $M_n = 3.5$ kg/mol	492
	2,6-Dimethyl-1,4-phenylene oxide	II was diglycidyl ether of bisphenol-A	1148
Ether ether sulfone	Ether ether ketone-*co*-ether ether sulfone	II had 50% ether ether sulfone	740
Etherimide	Ethylene terephthalate-*co*-ethylene naphthalate	The higher the ethylene naphthalate content in II, the lower the UCST	1072
Ethyl methacrylate	Ethyl acrylate	–	766
Ethylene	Propylene	II was atactic; no UCST when II was isotactic; from high temperature phase diagrams	452
Ethylene, chlorinated	Ethylene, chlorinated	Cl contents = 40-50 wt.%	816
Hemicellulose	Lignin	Blend had 10, 80 or 90 vol% of II	1188
Isophthalamide-6I (iminoiso-phthaloyl-iminohexamethylene)	Hexamethylene adipamide (nylon 6,6)	Interchange reaction slow	899
Isoprene	Vinylethylene	II was syndiotactic and had 92% vinyl-1,2-	363
Maleic anhydride-*co*-styrene	Sulfone of tetramethylbisphenol-A	I had 14 wt.% maleic anhydride; II had $M_w = 4.8$ kg/mol	931
Methyl methacrylate	Carbonate of dimethylbisphenol-A	I had $M_w = 1.21$ or 2.4 kg/mol; II had $M_w = 33$ kg/mol	930
	Carbonate of tetrachlorobisphenol-A	I had $M_w = 1.21$ kg/mol; II had $M_w = 41$ kg/mol	930
	Carbonate of tetramethylbisphenol-P	I had $M_w = 1.21$ or 2.4 kg/mol; II had $M_w = 31$ kg/mol	930
	Hydroxybutyrate	–	1189
	Styrene	I had $M_w = 2.03$–6.0 kg/mol; II had $M_w =$ 1.95–9.2 kg/mol	558,929,1146
	Sulfone of tetramethylbisphenol-A	I had $M_w = 1.21$ or 2.4 kg/mol; II had $M_w = 4.8$ or 12.4 kg/mol	931
	Sulfone of tetramethylhexafluoro-bisphenol-A	I had $M_w = 1.21$ kg/mol; II had $M_w = 40$ kg/mol	931
	Sulfone of tetramethylbisphenol-P	I had $M_w = 1.21$ kg/mol; II had $M_w = 40$ kg/mol	931
	Vinyl chloride	–	674
1,3-Phenylene adipamide	Hexamethylene adipamide (nylon 6,6)	I was made from *m*-phenylenediamine and adipic acid; interchange reaction slow	899
Styrene	Caprolactone	I had $M_n = 0.95$ kg/mol	629
	Carbonate of bisphenol chloral	I had $M_w = 0.58$ or 0.68 kg/mol; II had $M_w = 30$ kg/mol	930
	α-Methylstyrene	UCST increased with molecular weight	514
	o-Methylstyrene	–	24
	p-Methylstyrene	–	24,786
	m-Methylstyrene	–	24
	Styrene, brominated	II had 27 or 29 mol% brominated units	784
	Styrene, deuterated	–	48,879
	Sulfone of tetramethylbisphenol-A	I had $M_w = 1.21$ or 2.4 kg/mol; II had $M_w = 4.8$ or 12.4 kg/mol	931
	Sulfone of tetramethylbisphenol-P	I had $M_w = 1.21$ kg/mol; II had $M_w = 40$ kg/mol	931
	Sulfone of tetramethylhexafluorobisphenol-A	I had $M_w = 1.21$ kg/mol; II had $M_w = 40$ kg/mol	931
	Vinyl methyl ether	By extrapolation of solution data	168
Vinyl chloride	Acrylonitrile-*co*-methyl methacrylate-*co*-α-methylstyrene	II had 32.3 wt.% AN, 8.1 wt.% MMA and 59.6 wt.% α-MS; blend had 50–80 wt.% II	1078
Vinylidene fluoride	Methyl methacrylate	–	809
Vinylidene fluoride-*co*-tetrafluoroethylene	Vinylidene fluoride-*co*-hexafluoroacetone	I had 80 mol% vinylidene fluoride; II had 92 mol% vinylidene fluoride	951

TABLE 6. POLYMER PAIRS MISCIBLE AT ROOM TEMPERATURE THAT APPEAR TO HAVE A LOWER CRITICAL SOLUTION TEMPERATURE (LCST) ABOVE ROOM TEMPERATURE

Polymer I of	Polymer II of	Comments	Refs.
Acrylic acid, Li-neutralized	Ethylene oxide	0.1–0.4 mole fraction of I was neutralized	1115
Acrylic acid-*co*-styrene	Ethyl methacrylate	I had 8.84 wt.% acrylic acid	72
	Methyl methacrylate	I had 2.65–20.0 wt.% acrylic acid	384,856
	n-Propyl methacrylate	I had 2.65–8.84 wt.% acrylic acid	856
Acrylonitrile-*co*-butadiene-*co*-methyl acrylate	Ethylene-*alt*-maleic anhydride	I was Barex 210	1156
Acrylonitrile-*co*-α-methyl styrene	Acetonyl methacrylate	I had 30 wt.% acrylonitrile (AN)	266
	n-Butyl methacrylate	I had 12 wt.% AN	152
	n-Butyl methacrylate-*co*-methyl methacrylate	I had 30 wt.% AN; II had 70 wt.% methyl methacrylate	289
	Carbonate of tetramethylbisphenol-A	I had 4–16.5 wt.% AN	1010
	Ethyl methacrylate	I had 30 wt.% AN (Ref. 277); II had 10–28 wt.% AN (Ref. 152)	152,277
	Ethyl methacrylate-*co*-methyl methacrylate	I had 30 wt.% AN; II had 60 wt.% methyl methacrylate	289
	Methoxymethyl methacrylate	I had 30 wt.% AN	266
	Methyl methacrylate	I had 30 wt.% AN and II was atactic or isotactic (Ref. 277); I had 31.3, 33.1, 34.8 or 41.3 wt.% AN (Ref. 790); I had 10–37 wt.% AN (Ref. 152)	152,277,790, 1010
	Methyl methacrylate-*co*-2,2,6,6-tetramethyl-piperidinyl methacrylate	I had 30 wt.% AN; II had ≥76.2 wt.% methyl methacrylate)	272,274
	Methylthiomethyl methacrylate	I had 30 wt.% AN	268
	n-Propyl methacrylate	I had 17–20 wt.% AN	152
	Tetrahydrofurfuryl methacrylate	I had 30 wt.% AN	281
	Vinyl chloride	I had 11.9–30 wt.% AN	1010
Acrylonitrile-*co*-*p*-methylstyrene	Acetonyl methacrylate	I had 43.0–61.0 wt.% AN	121
	n-Butyl methacrylate	I had 13.6 wt.% AN	285
	Cyclohexyl methacrylate	I had 15.8–21.3 wt.% AN	120
	Ethyl methacrylate	I had 26.5–32.3 wt.% AN	285
	n-Propyl methacrylate	I had 21.3–26.5 wt.% AN	285
	Tetrahydrofurfuryl methacrylate	I had 32.3–46.5 wt.% AN	285
	Tetrahydropyranyl-2-methyl methacrylate	I had 23.8–26.5 wt.% AN	119
Acrylonitrile-*co*-styrene	Acetonyl methacrylate	I had 33–58 wt.% AN	121
	Acrylonitrile-*co*-methyl methacrylate	Some blends showed LCST	620
	Butyl methacrylate-*co*-methyl methacrylate	Some blends showed LCST	405
	Caprolactone	I had 24–28 wt.% AN	565,1145
	Copolycarbonate of bisphenol-A and tetramethylbisphenol-A	Some blends showed LCST, depending on compositions of I and II	431
	Cyclohexyl methacrylate	I had 13.4–19.8 wt.% AN	120
	2,6-Dimethyl-1,4-phenylene ether, benzoylated	I and 18 mol% AN; II had 35% benzoylated unit	776
	Ethyl methacrylate	I had 5.5–28 wt.% AN	229,489
	Maleic anhydride-*co*-styrene	Some blends showed LCST	436,462,555
	Methoxymethyl methacrylate	I had 30 wt.% AN	258
	Methyl methacrylate	I had 9.4, 9.8, 27.0, 28.2, 30.5 or 34.4 wt.% AN (Ref. 506); I had 29.4–39.3 wt.% AN (Ref. 164)	56,164, 460,506,566
	Methyl methacrylate-*co*-2,2,6,6-tetramethyl-piperidinyl methacrylate	I had 22 or 30 wt.% AN; II had 69, 74 or 85.5 wt.% methyl methacrylate	272,274
	Methyl methacrylate-*co*-*N*-phenylmaleimide	I had 24.6 wt.% AN; II had 23.5 wt.% *N*-phenylmaleimide	185
	Methylthiomethyl methacrylate	I had 34.5 wt.% AN	269
	Phenyl acrylate	I had 14.6, 29.9 or 34.1 wt.% AN	717
	n-Propyl methacrylate	I had 5.7–19.5 wt.% AN	229,1090
	Tetrahydrofurfuryl methacrylate	I had 34.5–46.6 wt.% AN	286
	Tetrahydropyranyl-2-methyl methacrylate	I had 2.2 or 22–30.5 wt.% AN	119
	Vinyl chloride	I had 11.5–26 wt.% AN	437
Aniline, *N*-octadecylated	Ethylene-*co*-vinyl acetate	I was 60.2% alkylated; II had 20 wt.% vinyl acetate	1246
Aramide	Caprolactam-*co*-laurolactam	I was Trogmid T; II had 43.8 mol% caprolactam	213
Arylsulfone	Imide	I was Radel A; II was XU 218	375
2-Bromoethyl methacrylate	Vinyl acetate	Blends cast from methyl ethyl ketone	610
Butadiene	Butadiene	I had 50% vinyl-1,2, 35% *cis*-1,4 and 15% *trans*-1,4; II had 55% *trans*-1,4, 35% *cis*-1,4 and 10% vinyl-1,2	736
	Isoprene	I had ≤59% 1,4 content and II was *cis*-1,4 isomer (Ref. 810); I was deuterated and II was protonated (Ref. 335)	335,810
Butyl acrylate	Ethylene, chlorinated	–	100
	Vinyl chloride	–	655,845,850,851

TABLE 6. *cont'd*

Polymer I of	Polymer II of	Comments	Refs.
Butyl methacrylate	*p*-(2-Hydroxy-hexafluoroisopropyl)styrene-*co*-styrene	II had 90.3–90.8 mol% styrene	646
N-butyl-3-hydroxymethyl-carbazoyl methacrylate	ω-Hydroxybutyl-3,5-dinitrobenzoyl methacrylate	–	298
p-tert-Butylstyrene	Cyclohexyl acrylate	–	765
	Cyclohexyl methacrylate	–	765
Caprolactone	Ethylene, chlorinated	II had 30 or 42.1 wt.% Cl	53,191
	Vinylidene fluoride	Blends rich in I showed LCST	386
Carbon monoxide-*co*-ethyl acrylate-*co*-ethylene	Vinyl chloride	I had 13.8/7.41/78.8 = carbon monoxide/ethyl acrylate/ethylene	692
Carbonate of bisphenol-A	Caprolactone	–	56,177,645
	Cyclohexyl methacrylate-*co*-methyl methacrylate	II had ≤ 3.3 wt.% cyclohexyl methacrylate (Ref. 574); II had 14.7–34.3 wt.% cyclohexyl methacrylate (Ref. 81)	81,574
	Methyl methacrylate	Blends prepared by precipitation of tetrahydrofuran solutions by *n*-heptane; or by solution casting from tetrahydrofuran at high temperature	109,481,486
	Methyl methacrylate-*co*-*p*-methylstyrene	II had ≥ 70 wt.% methyl methacrylate	357
	Methyl methacrylate-*co*-*N*-phenylmaleimide	II had ≥ 70 wt.% methyl methacrylate	357
	Methyl methacrylate-*co*-phenyl methacrylate	II had 16–63 wt.% phenyl methacrylate	81
	Methyl methacrylate-*co*-styrene	II had ≤ 14 wt.% styrene	577
Carbonate of hexafluorobisphenol-A	Alkyl methacrylate	II had an alkyl group of ethyl, *n*-propyl or isopropyl (3 blend systems)	427,430
Carbonate of tetramethylbisphenol-A	Acrylonitrile-*co*-styrene	II had 2 or 11.5% acrylonitrile	225
	Methyl methacrylate-*co*-styrene	II had 4.5, 32.5, 33.5 or 35 wt.% methyl methacrylate (Ref. 575); II had 4.5–33.5 wt.% methyl methacrylate (Ref. 429)	429,575,884
	Styrene	I had M_w = 341 kg/mol; II had M_w = 33 kg/mol	359,428,741,930
Carbonate of tetramethylbisphenol-P	Styrene	I had M_w = 9.2 kg/mol; II had M_w = 31 kg/mol	930
Caprolactone	Styrene-*co*-*p*-vinylphenol	II had 10 wt.% vinylphenol	905
	Vinyl methyl ether	–	1145
Cellulose acetate	4-Vinylpyridine	I was 10H/2 glucose	86
1-Chloroethyl methacrylate	Alkyl methacrylate	II had an alkyl group of ethyl, *n*-propyl, isopropyl or *n*-butyl (4 blend systems)	1152
2-Chloroethyl methacrylate	Ethyl methacrylate	–	612
Chloromethyl methacrylate	Alkyl methacrylate	II had an alkyl group of ethyl, isopropyl or *n*-propyl (3 blend systems)	273
o-Chlorostyrene	Styrene	–	15
o-Chlorostyrene-*co*-*p*-chlorostyrene	Styrene	I had 71–92 mol% *o*-chlorostyrene	803
2,2-Dichloroethyl methacrylate	Alkyl methacrylate	II had an alkyl group of *n*-propyl, isopropyl, *n*-butyl or isoamyl (4 blend systems)	1110
2,6-Dimethyl-1,4-phenylene ether	Acrylic acid-*co*-styrene	II had 6.3 or 8.5 wt.% acrylic acid	1022
	Acrylonitrile-*co*-styrene	II had 6.3 wt.% acrylonitrile	1022
	o-Chlorostyrene-*co*-*p*-chlorostyrene	–	16
	o-Chlorostyrene-*co*-*o*-fluorostyrene	II had about 14–40 mol% *o*-chlorostyrene	840,841
	p-Chlorostyrene-*co*-*o*-fluorostyrene	II had 66–74 mol% *p*-chlorostyrene	840,841
	o-Fluorostyrene-*co*-*p*-fluorostyrene	II had 10–38% *p*-fluorostyrene	835
	o-Fluorostyrene-*co*-*p*-bromostyrene	II had 68 or 73 mol% bromostyrene	834
	o-Fluorostyrene-*co*-styrene	II had 9–20 mol% styrene	839,842
	p-Fluorostyrene-*co*-styrene	II had about 22–54 mol% styrene	531,839,842
	Maleic anhydride-*co*-styrene	II had 4.6–9.9 wt.% MA (Ref. 1226); II had 7.3–12.5 wt.% MA (Ref. 1022)	1022,1226
	Methyl methacrylate-*co*-styrene	II had 12.5–20 wt.% methyl methacrylate	1022
2,6-dimethyl-1,4-phenylene ether, sulfonylated	*o*-Fluorostyrene	I had 4–17 mol% sulfonylated units	1220
	p-Fluorostyrene	I had 17–66 mol% sulfonylated units	1220
	Phenylvinyl *sec*-butyl ether-*alt*-*N*-phenylmaleimide	I had 87 mol% sulfonylated units	1219
	Phenylvinyl ethyl ether-*alt*-*N*-phenylmaleimide	I had 87 or 91 mol% sulfonylated units	1219
Dodecamethylene decamethylene dicarboxylate	Vinyl chloride	–	872
Dodecamethylene dodecamethylene dicarboxylate	Vinyl chloride	–	872
	Vinyl chloride-*co*-vinylidene chloride	II had 13.5 wt.% vinyl chloride	873

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TABLE 6. *cont'd*

Polymer I of	Polymer II of	Comments	Refs.
Epichlorohydrin	Alkyl acrylate	II had an alkyl group of ethyl or *n*-propyl (2 blend systems)	224
	Alkyl methacrylate	II had an alkyl group of methyl, ethyl, *n*-propyl, *n*-butyl or cyclohexyl (5 blend systems)	224
	Ethyl acrylate rubber	–	226
	Vinyl acetate	–	305
	N-vinylpyrrolidone	–	300
Ether sulfone	Imide	II was Matrimide 5218	510
Ethyl acrylate	Hexafluoroacetone-*co*-vinylidene fluoride	II had 8 mol% hexafluoroacetone	411,1059
	Vinylidene fluoride	–	56,844
2-Ethylhexyl methacrylate, modified	Hexyl methacrylate-*co*-styrene, modified	I had 3–5% acrylic acid; II had 30% styrene and 5–15% 3-(dimethylamino) 2,2-dimethylpropyl methacrylate	766
N-ethyl-3-hydroxymethylcarbazoyl methacrylate	ω-Hydroxyalkyl-3,5-dinitrobenzoyl methacrylate	II had an alkyl group of butyl, hexyl, pentyl or propyl (4 blend systems)	694
Ethyl methacrylate	*p*-(2-hydroxy-hexafluoroisopropyl)styrene-*co*-styrene	II had 90.3–98.8 mol% styrene	646
	Vinyl chloride-*co*-vinylidene chloride	II had 86.5 wt.% vinylidene fluoride	870
	Vinylidene fluoride	I was syndiotactic or atactic; LCST below T_m of II if I had high MW isotactic	56,695,802
Ethyloxazoline	Aramid	–	532
	Ether sulfone	–	599
Ethylene, chlorinated	Ethylene-*co*-vinyl acetate	I had 35.4–52.6 wt.% Cl; II had 40–45 wt.% vinyl acetate	849
	Methyl methacrylate	I had 50–52 wt.% Cl	99,848
Ethylene orthophthalate	Vinyl acetate	I had $M_n = 9.5$ kg/mol; no LCST when I had $M_n = 5.1$ kg/mol	829
Ethylene ether	Enaminonitrile	–	585
	Ether sulfone	–	317,534,743,853
	Ethylene-*co*-vinyl acetate	–	129
	Sulfone	M_n of I = 3.5–4.5 kg/mol; II was Udel P1700	796
Ethylene-*co*-vinyl acetate	Hexafluoroacetone-*co*-vinylidene fluoride	I had 70% vinyl acetate; II had 8.9 mol% hexafluoroacetone	336
	Vinyl chloride	I had 30 or 37 wt.% ethylene	631,678
2-Fluoroethyl methacrylate	Alkyl methacrylate	II had an alkyl group of methyl or ethyl (2 blend systems)	1153
3-Fluoropropyl methacrylate	Methyl methacrylate	–	1155
Hexadecamethylene dodecamethylene dicarboxylate	Vinyl chloride	–	872
n-Hexyl methacrylate	Styrene-*co*-*p*-vinylphenol	II had 7 or 9 wt.% vinylphenol	922
Hydroxyether of bisphenol-A (phenoxy)	Alkyl methacrylate	II had an alkyl group of methyl, tetrahydrofurfuryl or tetrahydropyranyl-2-methyl (3 blend systems)	111,118,253
	Ether sulfone	–	714,764
	Ethylene oxide-*co*-propylene oxide	II had 22, 50 or 66 mol% ethylene oxide	1025
	Vinyl methyl ether	–	818
Hydroxyether of phenolphthalein	Butylene terephthalate	–	310
	Ether sulfone	–	306
	Ethylene glycol	–	309
β-Hydroxyethyl-3,5-dinitrobenzoyl methacrylate	*N*-alkyl-3-hydroxymethylcarbazoyl methacrylate	II had an alkyl group of butyl, decyl, dodecyl, ethyl, hexadecyl, hexyl, octyl or tetradecyl	693
2-(Hydroxyhexafluoroisopropyl) styrene-*co*-styrene	Methyl methacrylate	I had 90.3–96.1 mol% styrene	646
	Vinyl methyl ether	I had 90.3–99.9 mol% styrene	646
Hydroxypropyl Glutamine	Styrene-*co*-*p*-(hexafluoro-2-hydroxy-2-propyl)-α-methylstyrene	II had 98.5 mol% styrene; blend had < 50 vol% I	971
2-Iodoethyl methacrylate	Tetrahydrofurfuryl methacrylate	–	1107
Isoprene	*cis*-Butadiene-*co*-1,2-vinylbutadiene	II had $\leq$ 24.3% vinylbutadiene	420
Maleic anhydride-*co*-styrene	Ethyl methacrylate	I had 0–33 wt.% maleic anhydride	73
	Methyl methacrylate	I had 8, 10, 13 or 33 wt.% maleic anhydride	73
	n-Propyl methacrylate	I had 0–18.1 wt.% maleic anhydride	73
Methacrylonitrile-*co*-*p*-methylstyrene	*n*-Butyl methacrylate	I had 15–25 wt.% MAN	944
	Ethyl methacrylate	I had 40, 46 or 53 wt.% MAN	944
	Methyl methacrylate	I had 34, 53, 56 or 68 wt.% MAN	944
	Isopropyl methacrylate	I had 22–31 wt.% MAN and I had $M_n = 161$ kg/mol; II had 17–31 wt.% MAN and I had $M_n = 41.6$ kg/mol	944
	n-Propyl methacrylate	I had 37 or 40 wt.% MAN	944
Methacrylonitrile-*co*-styrene	Ethyl methacrylate	I had 5.6, 35.4 or 40.1 wt.% MAN	943

TABLE 6. *cont'd*

Polymer I of	Polymer II of	Comments	Refs.
	Methyl methacrylate	I had 46.6–62.8 wt.% MAN	1018
	n-Propyl methacrylate	I had 2–32 wt.% MAN	943
Methyl acrylate	Vinylidene fluoride	–	56,844
Methyl methacrylate	Acrylonitrile-*co*-methyl methacrylate-*co*-styrene	II had 40.0/39.1/20.9 or 61.1/19.6/19.3 of S/MMA/AN	620
	Carbonate of bisphenol chloral	–	110,930
	Copolycarbonate of bisphenol-A and hexafluorobisphenol-A	II had 5.3–14 wt.% hexafluorobisphenol-A	430
	Epichlorohydrin-*co*-ethylene glycol	II had 50 mol% ethylene glycol	224
	Ethylene, chlorinated	II had 56–68 wt.% Cl; I was atactic, isotactic or syndiotactic	1204
	Ethylene glycol	–	224
	Hexafluoroacetone-*co*-vinylidene fluoride	–	443
	N-maleimide-*co*-styrene	II had 8, 14 or 21 wt.% *N*-maleimide	1213
	Styrene-*co*-*p*-vinylphenol	I was syndiotactic; II had 5 mol% vinylphenol	1055
	Sulfone of hexafluorobisphenol-A	I had $M_w = 2.4$ kg/mol;, 1.21 or 4.25 kg/mol; II had $M_w = 27$ kg/mol or 56 kg/mol	931
	Tetrafluoroethylene-*co*-vinylidene fluoride	II had 80 mol% vinylidene fluoride	324
	Vinyl acetate	Blends cast from chloroform or cyclohexanone	302,777,778,1092
	Vinyl chloride	–	368,506,653,742
	Vinyl chloride, chlorinated	II had 63, 65 or 68 wt.% Cl	506,833
	Vinyl chloride-*co*-vinylidene chloride	I was atactic or isotactic; II had 86.5 wt.% vinylidene chloride	506,870
	Vinylidene fluoride	LCST above decomposition temperature of I	55
Methyl methacrylate, imidized	Acrylonitrile-*co*-styrene	I had 53–91 wt.% imidized unit; II had 5.7–33 wt.% acrylonitrile; some blends showed LCST	230
α-Methylstyrene	Carbonate of tetramethylbisphenol-A	I had $M_w = 3.5$ or 6.7 kg/mol; II had $M_w = 33$ kg/mol	930
	Carbonate of tetramethylbisphenol-P	I had $M_w = 3.5$ or 6.7 kg/mol; II had $M_w = 31$ kg/mol	930
	Ethyl methacrylate	–	765
	Methyl methacrylate	–	167,765
	n-Propyl methacrylate	–	765
	Styrene	–	710,722,865,929
	Tetrahydropyranyl-2-methyl methacrylate	–	116
α-Methylstyrene-*ran*-4-(2-hydroxyethyl)-α-methylstyrene	Alkyl acrylate	II had an alkyl group of methyl, ethyl or *tert*-butyl (3 blend systems)	968
	Alkyl methacrylate	II had an alkyl group of methyl, ethyl or *tert*-butyl (3 blend systems)	968
	Dialkyl itaconate	II had an alkyl group of methyl, ethyl, *n*-propyl, *n*-butyl or *tert*-butyl (5 blend systems)	968
	Vinyl acetate	–	969
	Vinyl pyrrolidone	–	969
	4-Vinylpyridine	–	969
α-Methylstyrene-*stat*-[4-(1,1,1-trifluoro-2-hydroxyethyl)-α-methylstyrene	Alkyl acrylate	II had an alkyl group of methyl, ethyl or *t*-butyl (3 blend systems)	968
	Alkyl methacrylate	II had an alkyl group of methyl, ethyl or *t*-butyl (3 blend systems)	968
	Dialkyl itaconate	II had an alkyl group of methyl, ethyl, *n*-propyl, *n*-butyl or *t*-butyl (4 systems)	968
	Vinyl acetate	–	969
	Vinyl pyrrolidone	–	969
	4-Vinylpyridine	–	969
Neopentyl glycol adipate (2,2-dimethyl-1,3-propylene adipate)	Hydroxyether of bisphenol-A (phenoxy)	–	332
Neopentyl glycol succinate (2,2-dimethyl-1,3-propylene succinate)	Hydroxyether of bisphenol-A (phenoxy)	–	332
	Vinyl chloride-*co*-vinylidene chloride	II was Saran, 86.5 wt.% vinylidene chloride; LCST above T_m when ≤ 50 wt.% I	868
Oxymethylene	Novolac	–	858
Phenol-formaldehyde	Methyl methacrylate-*co*-styrene	II had 30.4–83.5% MMA	433
p-Phenylene benzobisoxazole	Nylon	II was Zytel 330 (Du Pont) or nylon 6,6 (2 blend systems)	945
2,2′-(*m*-Phenylene)-5,5′-bibenzimidazole	Imide	II was Ultem 1000 or XU218 (2 blend systems)	114

TABLE 6. *cont'd*

Polymer I of	Polymer II of	Comments	Refs.
n-Propyl methacrylate	Vinyl chloride-*co*-vinylidene chloride	II had 86.5 wt.% vinylidene chloride	870
Styrene	Copolycarbonate of bisphenol-A and tetramethylbisphenol-A	II had ≥ 85 wt.% tetramethylbisphenol-A	431
	o-Fluorostyrene-*co*-*p*-fluorostyrene	I had $M_n = 7$ kg/mol; II had 10 or 33 mol% *p*-fluorostyrene	1144
Styrene, sulfonated and Zn-neutralized	Caprolactam (nylon 6)	I had 6.5, 8.1 or 9.0 mol% sulfonated units	1083
Styrene, sulfonated and neutralized	Caprolactam (nylon 6)	I was neutralized by Li, Mg or Zn	1223
Vinyl acetate	Hexafluoroacetone-*co*-vinylidene fluoride	–	1073
	Maleic anhydride-*alt*-styrene, hydrolyzed	II was 1.8–43% hydrolyzed; LCST increased with increasing degree of hydrolysis	67
Vinyl acetate-*co*-vinyl chloride	*n*-Butyl methacrylate	I had 5.9–15.1 vol% vinyl acetate	497
	Hexyl acrylate-*co*-methyl acrylate	I had 5–23.7 vol% vinyl acetate; II had 15–88 vol% hexyl acrylate; some blends showed LCST	379
	Methyl methacrylate	I had 5.9–15.1 vol% vinyl acetate	497
Vinyl butyral	Vinylpyridine	II was 2- or 4-vinylpyridine (2 blend systems)	1003
Vinyl chloride	Acrylonitrile-*co*-*n*-butyl acrylate	II had 53, 67 or 84 mol% butyl acrylate	655
	Alkyl acrylate	II had an alkyl group of *n*-propyl or *n*-amyl (2 blend systems)	851
	Alkyl methacrylate	II had an alkyl group of *n*-butyl or *n*-amyl (2 blend systems)	649,653
	Butyl acrylate-*co*-ethyl acrylate	II had 22.9, 43.5 or 52.8% butyl acrylate	851
	Butyl acrylate-*co*-hexyl acrylate	II had 47.8% butyl acrylate	851
	Butyl acrylate-*co*-methyl acrylate	II had 44.6% butyl acrylate	851
	Butyl acrylate-*co*-methyl methacrylate	II had 75% butyl acrylate	654
	Butyl methacrylate-*co*-methyl methacrylate	II had 30 or 70% methyl methacrylate	653
	Ethyl acrylate-*co*-hexyl acrylate	II had 41.7 or 43.2% ethyl acrylate	851
	Methyl acrylate-*co*-hexyl acrylate	II had 9.7% methyl acrylate	851
	Pentyl acrylate-*co*-propyl acrylate	II had 48.1% propyl acrylate	851
Vinyl methyl ether	Acrylonitrile-*co*-styrene	II had ≤ 10–11% acrylonitrile	575
	Alkyl acrylate	II had an alkyl group of ethyl or *n*-butyl (2 blend systems)	941
	2-Chlorostyrene	–	1203
	Hydrogeneous styrene-*b*-deuterated styrene	–	1019
	Maleic anhydride-*co*-styrene	II had < 15% maleic anhydride	575
	α-Methylstyrene	–	318
	α-Methylstyrene-*co*-4-(2-hydroxyethyl)-α-methylstyrene	II had 6–89 mol% α-methylstyrene	170
	α-Methylstyrene-*co*-4-(1,1,1-trifluoro-2-hydroxyethyl)-α-methylstyrene	II had 0–93 mol% α-methylstyrene	170
	α-Methylstyrene-*co*-styrene	II had 77.5 or 88 wt.% styrene	318
	m-Methylstyrene-*co*-styrene	II had 76.5 or 87.5 wt.% styrene	1028
	o-Methylstyrene-*co*-styrene	II had 76.2 or 86.8 wt.% styrene	1028
	p-Methylstyrene-*co*-styrene	II had 61–95 wt.% styrene	318,1016,1028
	Methyl methacrylate-*co*-styrene	II had < 60 mol% methyl methacrylate	108
	Nitrostyrene-*co*-styrene	II had ≤ 25.6 mol% Nitrostyrene	165,192
	Styrene-*co*-1-vinyl naphthalene	II had 17.4 wt.% styrene	318
	Styrene-*co*-2-vinyl naphthalene	II had 19.2 wt.% styrene	318
Vinyl methyl ketone	Styrene-*co*-4-vinylstilbene	Cloud point was sensitive to the *cis*- fraction of 4-stilbenzyl groups	365
p-Vinylphenol	4-Acetoxystyrene	–	340
2-Vinylpyridine	Aramide	II made from hexamethylenediamine and a mixture of isomers of phthalic acid	767
	2-Hydroxyethyl methacrylate	–	937
4-Vinylpyridine	Vinyl acetate-*co*-vinyl alcohol	II had 32–55 mol% vinyl alcohol	1046
Vinylidene fluoride	Methoxymethyl methacrylate	–	267

TABLE 7. POLYMER PAIRS THAT APPEAR TO HAVE BOTH A LOWER CRITICAL SOLUTION TEMPERATURE AND A UPPER CRITICAL SOLUTION TEMPERATURE

Polymer I of	Polymer II of	Comments	Refs.
Acrylonitrile-*co*-styrene	Acrylonitrile-*co*-butadiene	I had 25 wt.% acrylonitrile; II had 40 wt.% acrylonitrile	636
Butadiene	Butadiene-*co*-styrene	II had 45 wt.% styrene	797
Caprolactone	Acrylonitrile-*co*-styrene	II had 12.4–26.4 wt.% acrylonitrile	1193

Table 7. *cont'd*

Polymer I of	Polymer II of	Comments	Refs.
Carbonate of bisphenol-A	Methyl methacrylate	Blends showed a LCST-UCST loop	72,479,1085
Dimethylsiloxane	Methylphenylsiloxane	–	467
2-Hydroxyethyl Acrylate-*co*-liquid crystalline acrylate	2-Hydroxyethyl acrylate-*co*-liquid crystalline acrylate	Both I and II had 6% 2-hydroxyethyl acrylate; the liquid crystalline polyacrylates had different spacer groups	1252
o-Methylated phenol formaldehyde	Methyl methacrylate	I had 20 or 50% of OH group methylated	432
	Methyl methacrylate-*co*-styrene	I had 20 or 50% of OH group methylated; II had 50 or 60% methyl methacrylate	432
Styrene	2,6-Dimethyl-1,4-phenylene ether, carboxylated	II had 8.0–10.3 mol% carboxyl group	148

TABLE 8. POLYMER PAIRS THAT *CO*-CRYSTALLIZE

Polymer I of	Polymer II of	Method	Comments	Refs.
Butylene terephthalate	Butylene glycol-*b*-butylene terephthalate	T_g and T_m by DSC, dielectric loss measurements	Two T_g's when I was Valox 310 (General Electric) having $M_n = 20$ kg/mol and II contained 44–67 wt.% butylene terephthalate; single T_g and single T_m when II contained 85 wt.% butylene terephthalate; single T_m indicated that only one type of crystal was present	554
	Butylene glycol-*b*-butylene terephthalate	T_g and T_m by DSC, dielectric loss measurements, microscopy	Single T_g and single T_m when I was Valox 310 (General Electric) with $M_n = 33$ kg/mol, II contained 84 wt.% butylene terephthalate and I/II = 1/3 to 3/1; thermal analysis and morphological evidence pointed to extensive *co*-crystallization in this mixture; two T_g's when II contained 50 wt.% butylene terephthalate	703
	Ester–ether segmented polymer	Dielectric loss peak and T_m by DSC	I was Valox 310 (General Electric) with $M_n = 20$ kg/mol; II was comprised of a poly(butylene oxide) soft segment and a hard segment 4GT-butylene terephthalate, and had total MW = 25 to 30 kg/mol; single beta dielectric loss peak and single T_m were found when II was 44 or 67 wt.% 4GT; single T_m between the T_m's of the pure components indicated *co*-crystallization; two dielectric loss peaks and two T_m when II was 84 wt.% 4GT	704
Ether ether ketone	Ether ether ether ketone	T_g and T_m by DSC	Single T_g and single T_m when I contained 33% ketone linkages and had melt flow = 3.0 dg/min at 400°C and II had melt flow = 10 dg/min; I/II = 1/1	333
	Ether ether ketone ketone	T_g and T_m by DSC	Single T_g and single T_m when I contained 33% ketone linkages and had melt flow = 3.0 dg/min at 400°C and II contained 50% ketone linkages and had melt flow = 4.0 dg/min; I/II = 1/1	333
	Ether ketone	T_g and T_m by DSC	Single T_g and single T_m when I contained 33% ketone linkages and had melt flow = 3.0 dg/min and II contained 50% ketone linkages and had melt flow = 1.5 dg/min; I/II = 1/1	333
	Ether ketone	T_g and T_m by DSC; WAXD	Single composition-dependent melting endotherms obtained upon quenching when I had intrinsic viscosity = 1.124 dl/g in sulfuric acid at 30°C and II had intrinsic viscosity = 1.107 dl/g in sulfuric acid at 30°C, but it did not happen when other thermal histories were imposed	739
	Ether-*co*-ketone	T_g and T_m by DSC	Single T_g and single T_m when I contained 33% ketone linkages and had melt flow = 3.0	333

TABLE 8. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
			dg/min and II contained 57% ketone linkages and had melt flow = 1.5 dg/min; I/II = 1/1	
	Ether ketone (polymer II), etherimide (polymer III)	T_g and T_m by DSC	I had reduced viscosity = 1.05 dl/g in 1 wt.% conc. sulfuric acid at 23°C; II had reduced viscosity = 1.9 dl/g in the same condition as for I; III was Ultem 1000 from GE with reduced viscosity = 0.5 dl/g in 0.2 wt.% chloroform at 25°C; single T_g and single T_m for I/II/III = 25/25/50	334
Ethylene	Butadiene, hydrogenated	DSC, SALS and SEM	I was narrow MW fraction with $M_w = 113$ kg/mol and $M_n = 105$ kg/mol; II contained 2.2–5.5 mol% ethyl branches and had $M_w = 103–420$ kg/mol and $M_n = 83–156$ kg/mol; stated that I and II *co*-crystallized upon rapid crystallization from the melt when II contained up to 2 mol% of ethyl branches	13
	Ethylene	DSC and SALS	I was polyethylene and II was UHMWPE with MW = 5,000 kg/mol; I was LLDPE (GRSN-7047 from Union Carbide with $M_w = 134$ kg/mol and $M_w/M_n = 4$), or I was HDPE (Chemplex 6186 with $M_w =$ 134.8 kg/mol and $M_w/M_n = 7.4$); only a single composition dependent T_m was observed; SALS showed the *co*-crystallization took place; but when I was LDPE ($M_w =$ 114 kg/mol and $M_w/M_n = 5.2$), separate crystals were formed	483
		DSC, SAXS and X-ray diffraction	I was linear LLDPE and II was HDPE; co-crystallization was evidenced by a single T_m by DSC; stated that X-ray diffraction peak width, SAXS and Raman spectra were all consistent with a single crystallizing species; but for HDPE/LDPE and LLDPE/LDPE, separate crystals were seen with two T_m's being found by DSC	783
			I was HDPE with $M_w = 100$ kg/mol and $M_n = 11$ kg/mol and II was LLDPE with $M_w = 350$ kg/mol and $M_n = 16$ kg/mol; after the blend with I/II = 25/75 by weight was crosslinked either by irradiation or by peroxides in the liquid state above a critical degree of cross-linkage, the DSC curve of the blend showed only one single melting point on heating and only one single crystallization peak on cooling; Refs. 45, 348, 478, 579 and 676 also discussed the miscibility of PE/PE blends	360
	Ethylene, deuterated	T_m by DSC	Single T_m varying smoothly with composition and no gross segregation occurred	217
Ethylene	Ethylene-*co*-vinyl acetate	DSC, SALS and SEM	I was narrow MW fraction with $M_w = 113$ kg/mol and $M_n = 105$ kg/mol; II contained 1.12–6.6 mol% of acetate branches and had $M_w = 60.3–105$ kg/mol and $M_n =$ 23.5–43.6 kg/mol; stated that I and II co-crystallized upon rapid crystallization from the melt contained up to 2 mol% of acetate branches	13
Ethylene-*co*-vinyl acetate	Ethylene-*co*-vinyl acetate	DSC, SALS and SEM	I and II had $M_w = 60.3–105$ kg/mol, $M_n =$ 23.5–43.6 kg/mol, and they were different in the content of acetate branches; stated that these copolymers containing about 1–2 mol% of acetate branches were found to co-crystallize with one another	13

TABLE 8. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Glutamate	Glutamate	Dynamic mechanical measurements, X-ray diffraction	I or II was poly(L-glutamate) or poly(D-glutamate) having *m* number of methylene group in the ester group of a general formula as $-CH_2CH_2COO-(CH_2)_m-C_6H_5-$, *m* might be 1, 2 or 3 so the component polymer would be represented as L*m* or D*m*; the MW of both components were 135 to 380 kg/mol and $M_w/M_n = 1.1$ to 1.2; stated that binary blends of L2, D2, L3 and D3 were miscible and formed isomorphous mixed crystals at all compositions, whereas other pairs, with the exception of L1/D1, were immiscible	717
Isopropyl vinyl ether, isotactic	*sec*-Butyl vinyl ether, isotactic	Unit cell dimension from X-ray diffraction	Co-crystallization at all compositions	605
4-Methyl-1-hexene, isotactic	4-Methyl-1-pentene, isotactic	Unit cell dimensions from X-ray diffraction	Co-crystallization only below 25 wt.% I and above 75 wt.% I	605
Tetrafluoroethylene	Tetrafluoroethylene-*co*-perfluoroalkyl vinyl ether	Dynamic mechanical measurements	II had 98–99 mol% tetrafluoroethylene; single α-transition from DMA	1173
Trifluoroethylene-*co*-vinylidene fluoride	Trifluoroethylene-*co*-vinylidene fluoride	DSC, X-ray and phase-contrast microscopy	No phase separation by phase-contrast microscopy, a sharp single X-ray peak, intermediate in spacing between those of the individual copolymers, and clearly different from their superposition, and only one ferroelectric transition and only one melting point by DSC, indicated co-crystallization within the same lattice when I was 52/48 mol% vinylidene fluoride (VDF)/trifluoroethylene (TFE), II was 65/35 mol% VDF/TFE, or I was 65/35 mol% VDF/TFE, and II was 73/27 mol% VDF/TFE; but two X-ray peaks and two ferroelectric transitions and two melting points when I was 52/48 and II was 73/27 mol% VDF/TFE	800
Vinyl alcohol	Vinyl alcohol	DSC	I and II had a diad syndiotacticity of 54 and 58 mol%, respectively	1197
Vinylidene fluoride-*co*-tetrafluoroethylene	Vinylidene fluoride		I had 9.1, 14.3 or 17.6 mol% tetrafluoroethylene	980
	Hexafluoroacetone-*co*-vinylidene fluoride	DSC	I had 80 mol% vinylidene fluoride; II had 92 mol% vinylidene fluoride; single melting peak	951

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TABLE 8. *cont'd*

Polymer I of	Polymer II of	Method	Comments	Refs.
Glutamate	Glutamate	Dynamic mechanical measurements, X-ray diffraction	I or II was poly(L-glutamate) or poly(D-glutamate) having *m* number of methylene group in the ester group of a general formula as $-CH_2CH_2COO-(CH_2)_m-C_6H_5-$, *m* might be 1, 2 or 3 so the component polymer would be represented as L*m* or D*m*; the MW of both components were 135 to 380 kg/mol and $M_w/M_n = 1.1$ to 1.2; stated that binary blends of L2, D2, L3 and D3 were miscible and formed isomorphous mixed crystals at all compositions, whereas other pairs, with the exception of L1/D1, were immiscible	717
Isopropyl vinyl ether, isotactic	*sec*-Butyl vinyl ether, isotactic	Unit cell dimension from X-ray diffraction	Co-crystallization at all compositions	605
4-Methyl-1-hexene, isotactic	4-Methyl-1-pentene, isotactic	Unit cell dimensions from X-ray diffraction	Co-crystallization only below 25 wt.% I and above 75 wt.% I	605
Tetrafluoroethylene	Tetrafluoroethylene-*co*-perfluoroalkyl vinyl ether	Dynamic mechanical measurements	II had 98–99 mol% tetrafluoroethylene; single α-transition from DMA	1173
Trifluoroethylene-*co*-vinylidene fluoride	Trifluoroethylene-*co*-vinylidene fluoride	DSC, X-ray and phase-contrast microscopy	No phase separation by phase-contrast microscopy, a sharp single X-ray peak, intermediate in spacing between those of the individual copolymers, and clearly different from their superposition, and only one ferroelectric transition and only one melting point by DSC, indicated co-crystallization within the same lattice when I was 52/48 mol% vinylidene fluoride (VDF)/trifluoroethylene (TFE), II was 65/35 mol% VDF/TFE, or I was 65/35 mol% VDF/TFE, and II was 73/27 mol% VDF/TFE; but two X-ray peaks and two ferroelectric transitions and two melting points when I was 52/48 and II was 73/27 mol% VDF/TFE	800
Vinyl alcohol	Vinyl alcohol	DSC	I and II had a diad syndiotacticity of 54 and 58 mol%, respectively	1197
Vinylidene fluoride-*co*-tetrafluoroethylene	Vinylidene fluoride		I had 9.1, 14.3 or 17.6 mol% tetrafluoroethylene	980
	Hexafluoroacetone-*co*-vinylidene fluoride	DSC	I had 80 mol% vinylidene fluoride; II had 92 mol% vinylidene fluoride; single melting peak	951

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Heat Capacities of High Polymers*,**

M. Pyda and B. Wunderlich
Department of Chemistry, The University of Tennessee, Knoxville, TN 37996-1600, USA
Chemical and Analytical Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6197, USA

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† General Note: The letters in parenthesis (after polymer names) correspond to the author's file number in Ref. 40, and are not necessarily the accepted abbreviation.

A. INTRODUCTION

The molar heat capacity at constant pressure, C_p, is defined as the amount of heat, Q, needed to raise the temperature, T, of one mole of substance at constant (atmospheric) pressure by one kelvin in the absence of latent heat effects, such as heats of fusion, crystallization,

reaction, etc. In differential form, one writes: $C_p \equiv dQ/dT = (\partial H/\partial T)_{p,n}$, [= heat capacity at constant pressure p, and number of moles, n (for polymers usually expressed per mole of repeating unit, *i.e.* for poly(propylene) per 0.04208 kg); H = enthalpy = $U + pV$ (U = total energy, V = molar volume)]. Frequently, one makes use of the specific heat capacity, c_p, which refers commonly to the heat capacity of one gram of material ($c_p \equiv C_p/M$, where M represents the molar mass of the repeating unit in Da).

The heat capacity is not only of theoretical interest, but has also considerable importance for practical applications, *e.g.*, for calculation of enthalpy differences between two temperatures or as the basis for interpretation of differential scanning calorimetry (DSC) curves. Furthermore, C_p is a basic quantity of thermodynamics. All integral functions can be derived from the data on C_p: the enthalpy, $H = \int C_p\,dT$, equal to the total heat content when integrated from 0 K to the temperature of interest and adding all intervening heats of transition, ΔH, at their equilibrium transition temperatures (energy and enthalpy are conserved as expressed by the first law of thermodynamics); the entropy, $S = \int (C_p/T)\,dT$, a measure of the degree of disorder of the sample, also to be integrated from 0 K to the temperature of interest and to be corrected by the intervening entropies of transition, ΔS (S = 0 J/K/mol for equilibrium crystals at 0 K and positive for all other temperatures and states–third law of thermodynamics; and the free enthalpy, $G = H - TS$, a measure of the stability of the sample (the state with the lowest free enthalpy is most stable – second law of thermodynamics). Figure 1 displays these integral functions for the example of polyethylene (PE, see Table 4) (34).

A representative experimental heat capacity measured by differential scanning calorimetry (DSC) is given in Fig. 2 for semicrystalline poly(oxyethyleneoxyterephthaloyl) (PET, see Table 37) (35). It can be seen that the heat capacity, C_p, given in J/K/mol, is not a single-valued function of temperature. It depends on the state of the polymer [crystalline, amorphous (solid or liquid), or semicrystalline]. The common semicrystalline samples, characterized by their weight fraction (or percentage) crystallinity w_c, are not in equilibrium, and their heat capacity depends on the thermal history since different cooling or annealing conditions may lead to different values of w_c. In addition, particularly in the melting region, the method of measurement, such as DSC or temperature-modulated DSC (TMDSC), may also yield different experimental answers (35). The TMDSC (heavy curve) is a measure of the limited reversibility of the melting of polymers, while the DSC curve is a measure of the breadth of the melting which arises from crystallite size-distributions and reorganization during melting (36).

In case of amorphous polymers (or the amorphous portion of a semicrystalline polymer) the heat capacity changes at the glass transition temperature, T_g, by ΔC_p, proportional to the weight fraction of amorphous material present, as shown in Fig. 3. In addition, the value of ΔC_p is often proportional to the number of flexible parts (beads) into which the repeating unit can be divided [$\approx$ 11 J/K (mol of beads)$^{-1}$ (34)]. The detailed apparent heat-capacity response of the sample in the glass-transition region is dependent on the thermal history of the substance under investigation and also on the heating rate of measurement. A maximum of heat capacity may be caused by enthalpy relaxation and may easily be confused with a melting process, as illustrated in Fig. 3, for atactic poly(styrene) (PS, see Table 20.). A number of other non-equilibrium processes that change the appearance of the heat capacity are (34): minima (exotherms) caused by stress relaxation that may be confused with a crystallization process, crystal perfection, annealing or fusion that add to or subtract from the heat capacity. Positive (endothermic) effects are usually indicative of disordering, negative (exothermic) effects are usually indicative of ordering (36).

Plotting ΔC_p versus ΔH allows extrapolation of data of semicrystalline samples to the completely amorphous and crystalline states, as shown in Fig. 4 (37). Negative deviations from the straight line exist for many stiffer polymers and indicate the presence of a rigid–amorphous fraction, *i.e.* a third phase in a semicrystalline sample that does not become mobile at the glass transition, but is not crystalline (three-phase model with the third phase most likely placed at the surfaces of the crystals where molecules continue into the amorphous phase). The effect of a rigid–amorphous phase on the heat capacity of poly(oxymethylene) is shown in Fig. 5 (38).

The heat capacity tables of this chapter contain mean values of the best data available in the literature. To make the tables universal, effects of broad glass transitions, thermal history, rigid–amorphous fractions, and effects of fusion, annealing, or crystallization were eliminated by appropriate extrapolation. Data for the "solid" refer to crystals as well as glasses. Only in the temperature range from 0 to perhaps 70 K are the heat capacities of glasses slightly higher than that for crystals. For semicrystalline samples between glass transition and melting, the crystallinity must be known. The heat capacity is then the sum of the heat capacities of the crystalline weight fraction and the melt weight fraction, as shown in Fig. 6. Fusion, annealing and crystallization, as well as glass transition broadening, must be added from additional experimental information, as illustrated above.

The tables given in this chapter are based on the ATHAS Data Bank of experimental heat capacities and its update for 1990 [U. Gaur, H. C. Shu, A. Mehta, S. F. Lau, B. B. Wunderlich, M. Varma-Nair, and B. Wunderlich, J. Phys. Chem. Ref. Data, **10**, 89, 119, 1001, 1051, (1981), **11**, 313, 1065, (1982), **12**, 29, 65, 91 (1983), and **20**, 349, (1991)]. The term "NA" in the value-column indicates that no recommendation of experimental data can be made at present; "NA" in the index-column is a reminder that the data point is gained by extrapolation of the experimental data due to transition effect.

The experimental data bank, as presented in this chapter, has been interpreted in terms of the molecular motion of the

polymers (39). The results of this extended data bank can be accessed over the World Wide Web (40). It contains data tables for over 200 polymer and polymer-related materials, including all poly(amino acids) and some proteins. In addition to the experimental data as shown in Tables 1–50, the ATHAS Data Bank contains a link of the solid heat capacity to approximate vibrational spectra as illustrated in Fig. 7 for poly(ethylene). Also, empirical addition schemes for the heat capacity of liquid and solid polymers have been developed, based on the molecular structure (41). An example is given in Fig. 8, for a series of aliphatic nylons (see also Tables 38–40).

B. EXPERIMENTAL CURVES

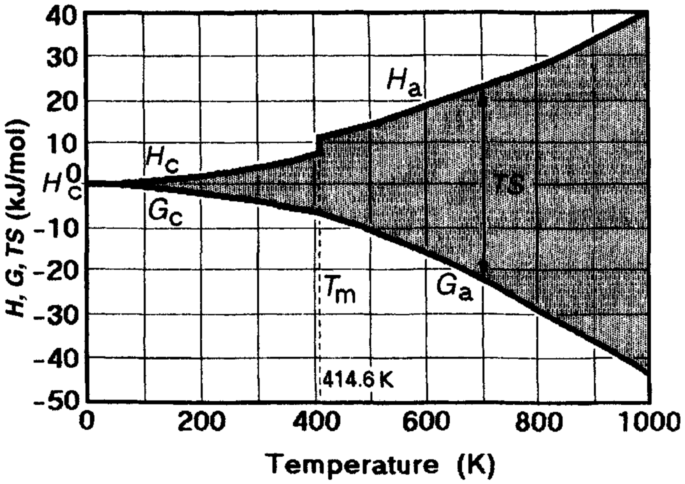


Figure 1. The integral thermodynamic functions H, G, and $TS = H - G$ for PE. The subscripts "a" refer to the amorphous, "c" to the crystalline samples; the equilibrium melting occurs at T_m; H_c^0 is set arbitrarily to zero, it can also be adjusted to the heat of formation $\Delta H_f(T)$ by adding the integral of C_p from 298.15 to 0 K to ΔH_f (298.15) (Ref. 34).

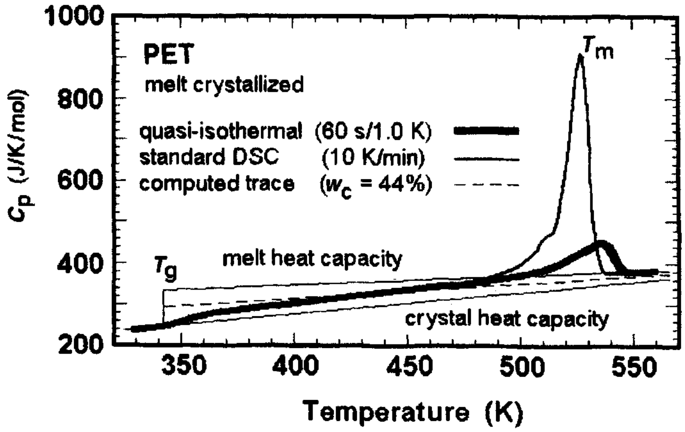


Figure 2. Experimental heat capacities of PET. The glass-transition region is marked by T_g, the melting region by T_m. The solid, thin lines indicate the data of Table 37, the dashed line indicates the crystallinity-corrected heat capacity for the semicrystalline sample, 44% crystalline, 56% amorphous. The quasi-isothermal data were measured by TMDSC at 2 K intervals with a sinusoidal temperature modulation of ± 1.0 K and a modulation period of 60 s (Ref. 35).

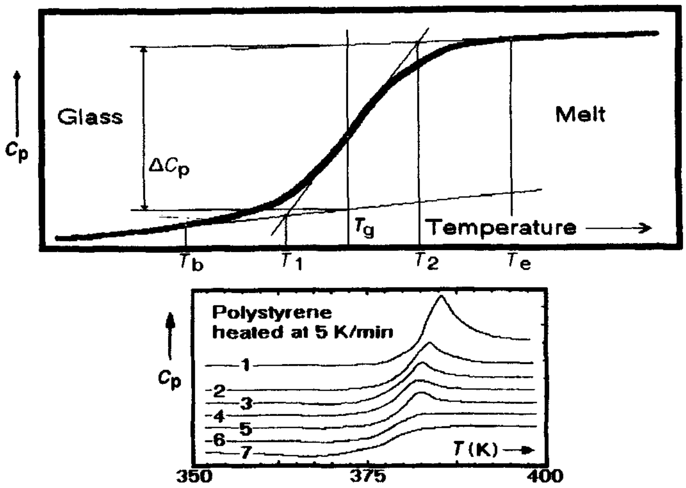


Figure 3. Schematic of the change of the heat capacity at the glass transition (top) and experimental data by DSC for polystyrene after cooling at different rates (bottom). The five characteristic temperatures of the glass transition (T_b, T_1, T_g, T_2, T_e) are marked and apply to a given time scale only. The experimental data display an enthalpy relaxation (endothermic peak if the cooling rate that sets the thermal history is less than the heating rate). The samples 1–7 were cooled at 0.084, 0.20, 0.52, 1.10, 2.50, 5.00, and 30.0 K/min, respectively.

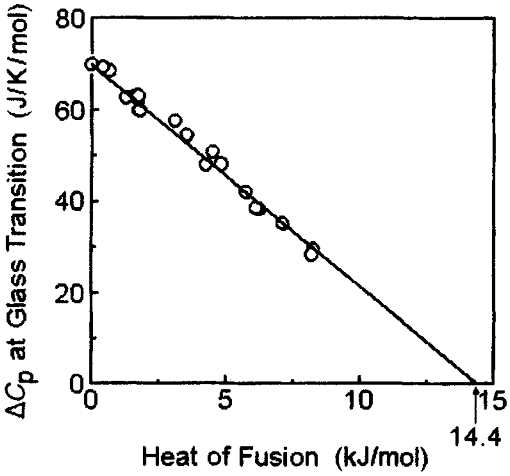


Figure 4. Change of the heat capacity of poly(oxymethylene-carbonyloxyethylene) (poly-p-dioxanone) at the glass transition with heat of fusion. (Ref. 37).

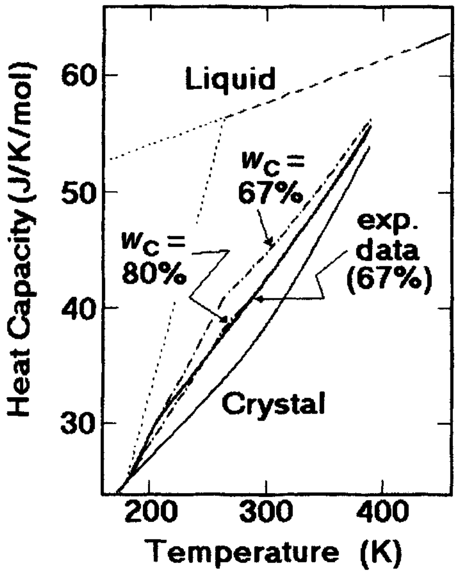


Figure 5. Effect of a rigid-amorphous fraction on the heat capacity of semicrystalline poly(oxymethylene). The measured C_p of a 67% crystalline sample (as determined from its heat of fusion) shows the heat capacity expected for an 80% crystalline sample. The 13% difference from w_c is attributed to the rigid-amorphous phase (Ref. 38).

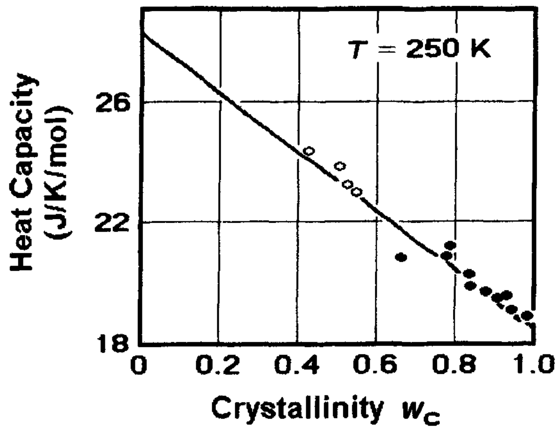


Figure 6. Heat capacity of poly(ethylene) as a function of crystallinity above the glass transition temperature ($T_g = 237$ K). The extrapolated data for zero crystallinity are entered into Table 4 for the amorphous (melt) state, for crystallinity one, for the solid.

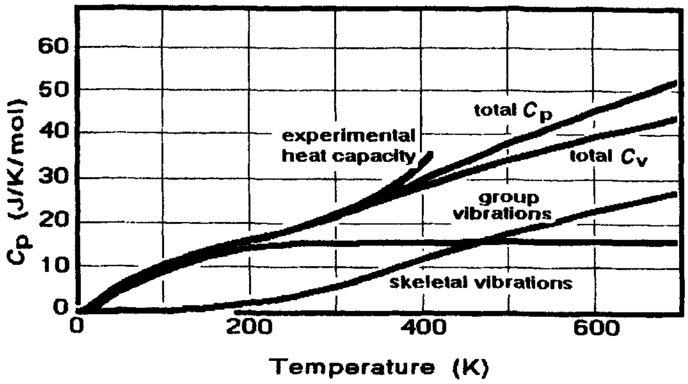


Figure 7. The contributions of skeletal and group vibrations to the heat capacity of polyethylene at constant volume, C_v. Note that, once established, the vibrational heat capacity can be extended safely beyond the range of measurement and deviations from the calculated heat capacity can be interpreted in terms of large-amplitude motion and ordering or disordering.

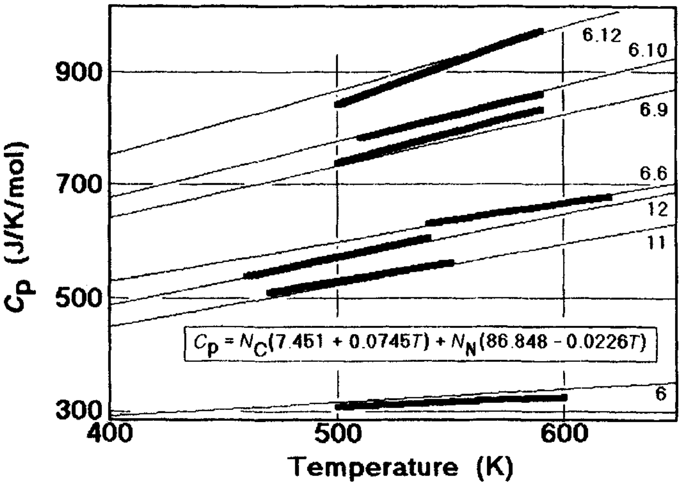
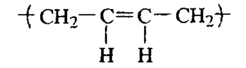


Figure 8. Heat capacity of various aliphatic nylons as measured (heavy lines) and computed from the equation (thin lines) (N_C = number of carbon atoms, N_N number of nitrogen atoms per repeating unit).

C. DATA TABLES FOR SOLIDS AND LIQUIDS

TABLE 1. *cis*-1,4-POLY(BUTADIENE) (PBDc)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	1.18	NA	NA
20	NA	6.52	NA	NA
30		11.79	NA	NA
40		16.15	NA	NA
50		19.98	NA	NA
60		23.18	NA	NA
70		26.16	NA	NA
80		29.07	NA	NA
90		31.87	NA	NA

TABLE 1. *cont'd*

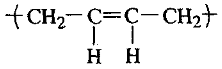
	Solid		Melt	
T (K)	Index	Value	Index	Value
100		34.63	NA	NA
110		37.34	NA	NA
120		40.05	NA	NA
130		42.82	NA	NA
140		45.62	NA	NA
150		48.50	NA	NA
160		53.93	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230	NA	NA	NA	NA
240	NA	NA	NA	NA
250	NA	NA	NA	NA
260	NA	NA	NA	NA
270	NA	NA	NA	NA
280	NA	NA	NA	NA
290	NA	NA		104.20
300	NA	NA		106.00
310	NA	NA		107.70
320	NA	NA		109.50
330	NA	NA		111.30
340	NA	NA		113.10
350	NA	NA		114.90
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

References: 1. U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 41 (1983).
2. J. Grebowicz, W. Aycock, B. Wunderlich, Polymer, **27**, 575 (1986).

T_g:	171.0 K	(ΔC_p = 29.10)
T_m:	284.0 K	(C_p = 86.78–103.1)
Solid:	10–20 K	Calculated C_p value by fitting experimental data above 22 K to the Debye function (Data Bank, 1980)
	30–160 K	Experimental C_p data (Data Bank, 1980)
	170–600 K	C_p data are not available
Melt:	10–280 K	Melt unstable
	290–350 K	Experimental C_p data (Data Bank, 1985)
	360–600 K	C_p data are not available

TABLE 2. ***trans*-1,4-POLY(BUTADIENE) (PBD*t*)**



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	0.80	NA	NA
20	NA	4.82	NA	NA
30		9.70	NA	NA
40		14.39	NA	NA
50		18.74	NA	NA
60		22.56	NA	NA
70		25.89	NA	NA
80		29.00	NA	NA
90		32.02	NA	NA
100		34.98	NA	NA
110		37.86	NA	NA
120		40.70	NA	NA
130		43.53	NA	NA
140		46.26	NA	NA
150		48.99	NA	NA
160		51.71	NA	NA
170		54.52	NA	NA
180		57.88	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230	NA	NA	NA	NA
240	NA	NA	NA	NA
250	NA	NA	NA	NA
260	NA	NA	NA	NA
270	NA	NA	NA	NA
280	NA	NA	NA	NA
290	NA	NA	NA	NA
300	NA	NA	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	116.60
370	NA	NA	NA	118.40
380	NA	NA	NA	120.20
390	NA	NA	NA	122.00
400	NA	NA	NA	123.70
410	NA	NA	NA	125.50
420	NA	NA	NA	127.30
430	NA	NA	NA	129.10
440	NA	NA		130.90
450	NA	NA		132.60
460	NA	NA		134.40
470	NA	NA		136.20
480	NA	NA		138.00
490	NA	NA		139.00
500	NA	NA		141.50
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

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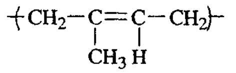
TABLE 2. *cont'd*

Notes

References:	1. U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Data, **12** (1), 41 (1983).	
	2. J. Grebowicz, W. Ayock, B. Wunderlich, Polymer, **27**, 575 (1986).	
T_g:	180.0 K	(ΔC_p = 28.20)
T_m :	356.0 K	(C_p = 107.5–115.9) (Crystal → Condis Crystal)
	437.0 K	(Condis Crystal → Melt)
Solid:	10–20 K	Calculated C_p value by fitting C_p data above 22 K into the Debye function (Data Bank, 1980)
	30–180 K	Experimental C_p data (Data Bank, 1980)
	190–600 K	C_p data are not available
Melt:	10–350 K	Melt unstable
	360–430 K	Extrapolated data from C_p in the region of 440–500 K (Condis Cryst. Region; Ref. 2)
	440–500 K	Experimental C_p data (Data Bank, 1985)
	510–600 K	C_p data are not available

TABLE 3. ***cis*-1,4-POLY(2-METHYLBUTADIENE) (PMBD)**



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		2.41	NA	NA
20		8.32	NA	NA
30		14.24	NA	NA
40		19.54	NA	NA
50		24.34	NA	NA
60		28.83	NA	NA
70		33.06	NA	NA
80		37.07	NA	NA
90		40.90	NA	NA
100		44.58	NA	NA
110		48.12	NA	NA
120		51.57	NA	NA
130		54.93	NA	NA
140		58.23	NA	NA
150		61.48	NA	NA
160		64.70	NA	NA
170		67.89	NA	NA
180		71.06	NA	NA
190		74.85	NA	NA
200	NA	78.03	NA	108.90
210	NA	NA		111.00
220	NA	NA		112.80
230	NA	NA		114.70
240	NA	NA		116.70
250	NA	NA		118.70
260	NA	NA		120.90
270	NA	NA		123.20
280	NA	NA		125.40
290	NA	NA		127.80
300	NA	NA		130.20
310	NA	NA		132.60
320	NA	NA		135.00
330	NA	NA		137.50
340	NA	NA		139.90
350	NA	NA		142.40
360	NA	NA		144.80
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA

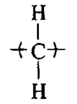
TABLE 3. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

References:	U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 41 (1983).	
T_g:	200.0 K	(ΔC_p = 78.03–108.9)
Solid:	10–190 K	Experimental C_p data (Data Bank, 1980)
	200 K	Extrapolated value from C_p in the region of 170–190 K (Data Bank, 1980)
	210–600 K	C_p data are not available
Melt:	10–190 K	Melt unstable
	200 K	Extrapolated data from C_p in the region of 210–360 K (Data Bank, 1980)
	210–360 K	Experimental C_p data (Data Bank, 1980)
	370–600 K	C_p data are not available

TABLE 4. **POLY(ETHYLENE) (PE)**



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		0.10	NA	NA
20		0.73	NA	NA
30		1.84	NA	NA
40		3.19	NA	NA
50		4.52	NA	NA
60		5.74	NA	NA
70		6.83	NA	NA
80		7.79	NA	NA
90		8.66	NA	NA
100		9.45	NA	NA
110		10.20	NA	NA
120		10.92	NA	NA
130		11.60	NA	NA

TABLE 4. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
140		12.25	NA	NA
150		12.87	NA	NA
160		13.45	NA	NA
170		14.00	NA	NA
180		14.53	NA	NA
190		15.05	NA	NA
200		15.57	NA	NA
210		16.10	NA	NA
220		16.66	NA	NA
230		17.25	NA	NA
240		17.88		28.30
250		18.55		28.73
260		19.23		29.16
270		19.91	NA	29.60
280		20.58	NA	30.03
290		21.21	NA	30.46
300		21.81	NA	30.89
310		22.38	NA	31.33
320		22.95	NA	31.76
330		23.56	NA	32.19
340		24.30	NA	32.62
350		25.25	NA	33.06
360		26.51	NA	33.49
370		28.13	NA	33.92
380		30.12	NA	34.35
390		32.36		34.79
400		34.19		35.22
410		36.19		35.65
420		38.27		36.08
430		40.44		36.52
440		42.68		36.95
450		44.98		37.38
460		47.35		37.81
470	NA	NA		38.25
480	NA	NA		38.68
490	NA	NA		39.11
500	NA	NA		39.54
510	NA	NA		39.98
520	NA	NA		40.41
530	NA	NA		40.84
540	NA	NA		41.27
550	NA	NA		41.71
560	NA	NA		42.14
570	NA	NA		42.57
580	NA	NA		43.00
590	NA	NA		43.44
600	NA	NA		43.87

Notes

References: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (1), 119 (1981).

T_g:	252.0 K	(C_p = 18.69–28.79)
T_m:	414.6 K	(C_p = 37.13–35.85)
Glass:	10–70 K	Experimental glass C_p data shows a slightly higher value than cryst. C_p data from 10 K to 70 K, respectively: 0.371, 1.40, 2.60, 3.90, 5.14, 6.26, 7.25 (Data Bank, 1980)
Melt:	10–230 K	Melt unstable
	240–260 K	C_p obtained from crystallinity extrapolation and molten PE, match at 252 K (Data Bank, 1980)
	270–380 K	Extrapolated value from C_p in the region of 390–600 K
	390–600 K	Experimental C_p data (Data Bank, 1980)
Crystal:	10–460 K	Experimental C_p data (Data Bank, 1980)
	470–600 K	C_p data are not available

TABLE 5. POLY(PROPYLENE) (PP)

$-\!\!\!+CH_2-CH(CH_3)+\!\!\!-$

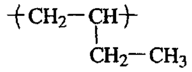
	Solid		Melt	
T (K)	Index	Value	Index	Value
10		0.55	NA	NA
20		3.57	NA	NA
30		7.07	NA	NA
40		10.20	NA	NA
50		13.02	NA	NA
60		15.67	NA	NA
70		18.27	NA	NA
80		20.90	NA	NA
90		23.65	NA	NA
100		26.25	NA	NA
110		28.69	NA	NA
120		31.03	NA	NA
130		33.28	NA	NA
140		35.45	NA	NA
150		37.57	NA	NA
160		39.64	NA	NA
170		41.68	NA	NA
180		43.68	NA	NA
190		45.66	NA	NA
200		47.63	NA	NA
210		49.59	NA	NA
220		51.54	NA	NA
230		53.50	NA	NA
240		55.16	NA	NA
250		56.83	NA	NA
260		58.75	NA	82.29
270		60.87	NA	83.80
280		63.18		85.32
290		65.64		86.83
300		68.24		88.34
310		70.95	NA	89.86
320		73.77	NA	91.37
330		76.68	NA	92.88
340		79.67	NA	94.39
350		82.73	NA	95.91
360		85.86	NA	97.42
370		89.04	NA	98.93
380		92.27	NA	100.45
390		95.55	NA	101.96
400		98.97	NA	103.47
410		102.20	NA	104.99
420		105.60		106.50
430		109.00		108.01
440		112.50		109.52
450		116.00		111.04
460		119.50		112.55
470	NA	NA		114.06
480	NA	NA		115.58
490	NA	NA		117.09
500	NA	NA		118.60
510	NA	NA		120.11
520	NA	NA		121.63
530	NA	NA		123.14
540	NA	NA		124.65
550	NA	NA		126.17
560	NA	NA		127.68
570	NA	NA		129.19
580	NA	NA		130.70
590	NA	NA		132.22
600	NA	NA		133.73

TABLE 5. *cont'd*

Notes

References:	U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1051 (1981).	
T_g:	260.0 K	(C_p = 64.92–82.29)
T_m:	460.7 K	(C_p = 119.7–112.7)
Glass:	10–250 K	Experimental glass C_p data shows a slightly higher value than cryst. C_p data from 10 K to 250 K, respectively: 1.876, 5.077, 8.721, 11.89, 15.01, 18.36, 20.91, 23.54, 26.07, 28.51, 30.85, 33.11, 35.30, 37.42, 39.48, 41.48, 43.43, 45.35, 47.44, 49.63, 51.92, 54.31, 56.80, 59.40, 62.10. (Data Bank, 1980)
Melt:	10–250 K	Melt unstable
	260–270 K	Extrapolated value from C_p in the region of 280–300 K and region of 420–600 K (Data Bank, 1980)
	280–300 K	C_p of amorphous PP obtained from crystallinity extrapolation of experimental C_p data of semicrystalline samples (Data Bank, 1980)
	310–410 K	Extrapolated value from C_p in the region of 420–600 K (Data Bank, 1980)
	420–600 K	Experimental C_p data (Data Bank, 1980)
Crystal:	10–460 K	Experimental C_p data (Data Bank, 1980)
	470–600 K	C_p data are not available

TABLE 6. POLY(1-BUTENE) (PB)



T (K)	Solid		Melt	
	Index	Value	Index	Value
10		0.96	NA	NA
20		5.42	NA	NA
30		10.20	NA	NA
40		14.86	NA	NA
50		19.26	NA	NA
60		23.27	NA	NA
70		27.01	NA	NA
80		30.69	NA	NA
90		34.30	NA	NA
100		37.78	NA	NA
110		41.16	NA	NA
120		44.35	NA	NA
130		47.47	NA	NA
140		50.48	NA	NA
150		53.38	NA	NA
160		56.22	NA	NA
170		59.08	NA	NA
180		62.06	NA	NA
190		65.14	NA	NA
200		68.40	NA	NA
210		71.88	NA	NA
220	NA	75.05	NA	NA
230	NA	78.32	NA	NA
240	NA	81.59	NA	NA
250	NA	NA	NA	107.81
260	NA	NA	NA	109.65
270	NA	NA	NA	111.49
280	NA	NA	NA	113.33
290	NA	NA	NA	115.18
300	NA	NA	NA	117.02
310	NA	NA	NA	118.86
320	NA	NA	NA	120.71
330	NA	NA	NA	122.55

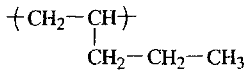
TABLE 6. *cont'd*

T (K)	Solid		Melt	
	Index	Value	Index	Value
340	NA	NA	NA	124.39
350	NA	NA	NA	126.24
360	NA	NA	NA	128.08
370	NA	NA	NA	129.02
380	NA	NA	NA	131.76
390	NA	NA		133.61
400	NA	NA		135.45
410	NA	NA		137.29
420	NA	NA		139.14
430	NA	NA		140.98
440	NA	NA		142.82
450	NA	NA		144.67
460	NA	NA		146.51
470	NA	NA		148.35
480	NA	NA		150.19
490	NA	NA		152.04
500	NA	NA		153.88
510	NA	NA		155.72
520	NA	NA		157.57
530	NA	NA		159.41
540	NA	NA		161.25
550	NA	NA		163.10
560	NA	NA		164.94
570	NA	NA		166.78
580	NA	NA		168.62
590	NA	NA		170.47
600	NA	NA		172.31

Notes

Reference:	U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 34 (1983).	
T_g:	249.0 K	(C_p = 84.54–107.6)
T_m:	411.2 K	
Solid:	10–210 K	Experimental C_p data of semicrystalline sample (Data Bank, 1980)
	220–240 K	Extrapolated value from C_p in the region of 180–210 K (Data Bank, 1980)
	250–600 K	C_p data are not available
Melt:	10–230 K	Melt unstable
	240–380 K	Extrapolated value from C_p in the region of 390–630 K
	390–600 K	Experimental C_p data (Data Bank, 1980)

TABLE 7. POLY(1-PENTENE) (PPE)



T (K)	Solid		Melt	
	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA

TABLE 7. *cont'd*

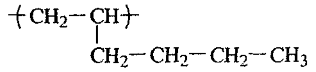
	Solid		Melt	
T (K)	Index	Value	Index	Value
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200		87.90	NA	NA
210		90.86	NA	NA
220		93.82	NA	NA
230		96.78	NA	NA
240	NA	NA		126.70
250	NA	NA		129.64
260	NA	NA		132.58
270	NA	NA		135.52
280	NA	NA		138.46
290	NA	NA		141.40
300	NA	NA		144.34
310	NA	NA		147.28
320	NA	NA		150.22
330	NA	NA		153.16
340	NA	NA		156.10
350	NA	NA		159.04
360	NA	NA		161.98
370	NA	NA		164.92
380	NA	NA		167.86
390	NA	NA		170.80
400	NA	NA		173.74
410	NA	NA		176.68
420	NA	NA		179.62
430	NA	NA		182.56
440	NA	NA		185.50
450	NA	NA		188.44
460	NA	NA		191.38
470	NA	NA		194.32
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 36 (1983).

T_g:	233.0 K	(C_p = 97.67–124.7)
T_m:	403.2 K	
Solid:	10–190 K	C_p data are not available
	200–230 K	Experimental C_p data of semicrystalline isotactic sample agree with amorphous atactic sample (Data Bank, 1980)
	240–600 K	C_p data are not available
Melt:	10–230 K	Melt unstable
	240–470 K	Experimental C_p data from atactic sample above T_g and isotatic sample above T_m (Data Bank, 1980)
	480–600 K	C_p data are not available

TABLE 8. POLY(1-HEXENE) (PHE)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20		9.09	NA	NA
30		16.42	NA	NA
40		24.00	NA	NA
50		30.16	NA	NA
60		36.71	NA	NA
70		42.67	NA	NA
80		48.33	NA	NA
90		53.74	NA	NA
100		59.08	NA	NA
110		64.30	NA	NA
120		69.61	NA	NA
130		74.68	NA	NA
140		79.88	NA	NA
150		84.96	NA	NA
160		89.69	NA	NA
170		95.11	NA	NA
180		100.90	NA	NA
190		106.45	NA	NA
200	NA	112.09	NA	NA
210	NA	117.74	NA	NA
220	NA	123.38	NA	NA
230	NA	NA		152.77
240	NA	NA		156.47
250	NA	NA		160.18
260	NA	NA		163.88
270	NA	NA		167.58
280	NA	NA		171.28
290	NA	NA		174.98
300	NA	NA	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

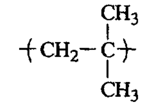
TABLE 8. *cont'd*

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 37 (1983).

T_g:	233.0 K	(C_p = 125.1–150.2)
Solid:	20–190 K	Experimental C_p data of total amorphous sample (Data Bank, 1980)
	200–220 K	Extrapolated value from C_p in the region of 170–190 K (Data Bank, 1980)
	230–600 K	C_p data are not available
Melt:	10–220 K	Melt unstable
	230–290 K	Experimental C_p data from amorphous sample above T_g (Data Bank, 1980)
	300–600 K	C_p data are not available outside the region of 223–290 K

TABLE 9. POLY(ISOBUTENE) (PIB)



T (K)	Solid		Melt	
	Index	Value	Index	Value
10	NA	NA	NA	NA
20		4.66	NA	NA
30		7.84	NA	NA
40		10.76	NA	NA
50		13.69	NA	NA
60		16.78	NA	NA
70		20.10	NA	NA
80		23.65	NA	NA
90		27.34	NA	NA
100		30.97	NA	NA
110		34.58	NA	NA
120		38.15	NA	NA
130		41.72	NA	NA
140		45.20	NA	NA
150		48.59	NA	NA
160		51.82	NA	NA
170		55.01	NA	NA
180		58.07	NA	NA
190	NA	61.22	NA	NA
200	NA	63.34	NA	85.63
210	NA	NA		88.08
220	NA	NA		90.52
230	NA	NA		92.97
240	NA	NA		95.41
250	NA	NA		97.86
260	NA	NA		100.31
270	NA	NA		102.75
280	NA	NA		105.20
290	NA	NA		107.64
300	NA	NA		110.09
310	NA	NA		112.54
320	NA	NA		114.98
330	NA	NA		117.43
340	NA	NA		119.87
350	NA	NA		122.32
360	NA	NA		124.77
370	NA	NA		127.21
380	NA	NA		129.66
390	NA	NA	NA	NA

TABLE 9. *cont'd*

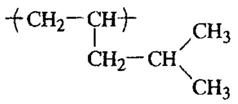
T (K)	Solid		Melt	
	Index	Value	Index	Value
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 38 (1983).

T_g:	200.0 K	(C_p = 63.34–85.63)
T_m:	317.0 K	
Solid:	20–180 K	Experimental C_p data of glassy amorphous sample (Data Bank, 1980)
	190–200 K	Extrapolated value from C_p in the region of 160–180 K (Data Bank, 1980)
	210–600 K	C_p data are not available
Melt:	10–190 K	Melt unstable
	200 K	Extrapolated value from C_p in the region of 210–380 K
	210–380 K	Experimental C_p data from amorphous sample above T_g (Data Bank, 1980)
	390–600 K	C_p data are not available

TABLE 10. POLY(4-METHYL-1-PENTENE) (P4MPE)



T (K)	Solid		Melt	
	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80		47.21	NA	NA
90		52.54	NA	NA

TABLE 10. *cont'd*

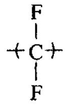
	Solid		Melt	
T (K)	Index	Value	Index	Value
100		57.52	NA	NA
110		62.22	NA	NA
120		66.72	NA	NA
130		71.06	NA	NA
140		75.29	NA	NA
150		79.45	NA	NA
160		83.57	NA	NA
170		87.66	NA	NA
180		91.75	NA	NA
190		95.87	NA	NA
200		100.00	NA	NA
210		104.20	NA	NA
220		108.40	NA	NA
230		112.80	NA	NA
240		117.10	NA	NA
250		121.60	NA	NA
260		126.20	NA	NA
270		130.80	NA	NA
280		135.60	NA	NA
290		140.40	NA	NA
300		145.40	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 39 (1983).

T_g:	303.0 K	(C_p = 147.0–180.7)
T_m:	523.2 K	
Solid:	10–70 K	C_p data are not available
	80–300 K	Experimental C_p data (Data Bank, 1980)
	310–600 K	C_p data are not available
Melt:	10–600 K	C_p data are not available

TABLE 11. POLY(TETRAFLUOROETHYLENE) (PTFE)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		1.23	NA	NA
20		3.92	NA	NA
30		6.30	NA	NA
40		8.44	NA	NA
50		10.31	NA	NA
60		12.27	NA	NA
70		14.17	NA	NA
80		16.02	NA	NA
90		17.75	NA	NA
100		19.37	NA	NA
110		21.20	NA	NA
120		22.90	NA	NA
130		24.53	NA	NA
140		26.13	NA	NA
150		27.65	NA	NA
160		29.13	NA	NA
170		30.62	NA	NA
180		31.98	NA	NA
190		33.24	NA	NA
200		34.47	NA	NA
210		35.67	NA	NA
220		36.82	NA	NA
230		37.94	NA	NA
240		39.03	NA	46.85
250		40.10	NA	47.61
260		41.13	NA	48.36
270		42.15	NA	49.12
280		43.15	NA	49.89
290		44.13	NA	50.65
300		45.09	NA	51.42
310		46.02	NA	52.19
320		46.95	NA	52.96
330		47.86	NA	53.74
340		48.76	NA	54.52
350		49.63	NA	55.30
360		50.49	NA	56.08
370		51.35	NA	56.87
380		52.17	NA	57.66
390		52.99	NA	58.45
400		53.81	NA	59.24
410		54.60	NA	60.04
420		55.39	NA	60.84
430		56.15	NA	61.64
440		56.91	NA	62.44
450		57.65	NA	63.25
460		58.39	NA	64.06
470		59.10	NA	64.87
480		59.82		65.39
490		60.51		65.72
500		61.20		66.05
510		61.88		66.38
520		62.55		66.72
530		63.20		67.05
540		63.86		67.38
550		64.48		67.71
560		65.12		68.04
570		65.75		68.38
580		66.36		68.71

TABLE 11. *cont'd*

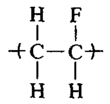
	Solid		Melt	
T (K)	Index	Value	Index	Value
590		66.96		69.04
600		67.58		69.37

Notes

Reference: S. F. Lau, H. Suzuki, B. Wunderlich, J. Polym. Sci., Polym. Phys. Ed., **22**, 379 (1984).

T_g:	240.0 K	(C_p = 39.03–46.85)
T_m:	605.0 K	(C_p = 67.88–69.54)
Solid:	10–600 K	All data are taken from the experimental C_p data of cryst. PTFE (Recommended Data, 1984)
Melt:	10–230 K	Melt unstable
	240–470 K	Extrapolated value from C_p in the region of 480–700 K
	480–600 K	Experimental C_p data, preliminary recommended data, 1984, based on experiments from 560 to 700 K and crystallinity extrapolation at low temperature (Eqs. 4 and 4′ of reference)

TABLE 12. POLY(VINYL FLUORIDE) (PVF)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	0.47	NA	NA
20	NA	2.80	NA	NA
30	NA	5.70	NA	NA
40	NA	8.50	NA	NA
50	NA	11.80	NA	NA
60	NA	14.50	NA	NA
70	NA	17.10	NA	NA
80		20.27	NA	NA
90		22.18	NA	NA
100		23.96	NA	NA
110		25.64	NA	NA
120		27.25	NA	NA
130		28.83	NA	NA
140		30.39	NA	NA
150		31.95	NA	NA
160		33.51	NA	NA
170		35.09	NA	NA
180		36.70	NA	NA
190		38.34	NA	NA
200		40.02	NA	NA
210		41.75	NA	NA
220		43.52	NA	NA
230		45.34	NA	NA
240		47.23	NA	NA
250		49.17	NA	NA
260		51.18	NA	NA
270		53.25	NA	NA
280		55.40	NA	NA
290		57.62	NA	NA
300		59.91	NA	NA
310		62.29	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA

TABLE 12. *cont'd*

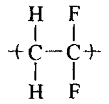
	Solid		Melt	
T (K)	Index	Value	Index	Value
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 43 (1983).

T_g:	314.0 K	(C_p = 63.27–81.07)
T_m:	503.2 K	
Solid:	10–70 K	C_p data are calculated from the Tarasov eq. (Data Bank, 1980)
	80–310 K	Experimental C_p data (Data Bank, 1980)
	320–600 K	C_p data are not available
Melt:	10–600 K	C_p data are not available

TABLE 13. POLY(VINYLIDENE FLUORIDE) (PVF2)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		1.28	NA	NA
20		5.25	NA	NA
30		9.10	NA	NA
40		12.20	NA	NA
50		15.00	NA	NA
60		17.90	NA	NA

TABLE 13. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
70		20.90	NA	NA
80		23.80	NA	NA
90		26.10	NA	NA
100		28.40	NA	NA
110		30.90	NA	NA
120		33.00	NA	NA
130		35.20	NA	NA
140		37.50	NA	NA
150		39.60	NA	NA
160		41.80	NA	NA
170		44.00	NA	NA
180		46.10	NA	NA
190		48.30	NA	NA
200		50.30	NA	NA
210		52.80	NA	NA
220		54.90	NA	NA
230		57.10	NA	NA
240	NA	NA	NA	NA
250	NA	NA	NA	NA
260	NA	NA	NA	NA
270	NA	NA	NA	NA
280	NA	NA	NA	NA
290	NA	NA	NA	NA
300	NA	NA	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 45 (1983).

T_g: 233.0 K (C_p = 57.80–80.60)

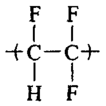
T_m: 483.2 K

Solid: 10–230 K Experimental C_p data (Data Bank, 1980)

240–600 K C_p data are not available

Melt: 10–600 K C_p data are not available

TABLE 14. POLY(TRIFLUOROETHYLENE) (P3FE)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30		12.29	NA	NA
40		15.24	NA	NA
50		17.61	NA	NA
60		20.28	NA	NA
70		23.65	NA	NA
80		26.43	NA	NA
90		29.99	NA	NA
100		33.21	NA	NA
110		36.15	NA	NA
120		38.89	NA	NA
130		41.48	NA	NA
140		43.97	NA	NA
150		46.39	NA	NA
160		48.78	NA	NA
170		51.16	NA	NA
180		53.56	NA	NA
190		55.99	NA	NA
200		58.46	NA	NA
210		61.00	NA	NA
220		63.61	NA	NA
230		66.31	NA	NA
240		69.11	NA	NA
250		72.01	NA	NA
260		75.02	NA	NA
270		78.16	NA	NA
280		81.43	NA	NA
290		84.84	NA	NA
300		88.40	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA

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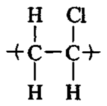
TABLE 14. *cont'd*

T (K)	Solid Index	Solid Value	Melt Index	Melt Value
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 46 (1983).
T_g: 304.0 K (C_p = 89.87–110.87)
T_m: 495.2 K
Solid: 30–300 K Experimental C_p data (Data Bank, 1980)
310–600 K C_p data are not available
Melt: 10–600 K C_p data are not available

TABLE 15. POLY(VINYL CHLORIDE) (PVC)



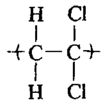
T (K)	Solid Index	Solid Value	Melt Index	Melt Value
10		1.81	NA	NA
20		5.91	NA	NA
30		9.95	NA	NA
40		13.38	NA	NA
50		16.28	NA	NA
60		18.77	NA	NA
70		20.99	NA	NA
80		23.05	NA	NA
90		24.98	NA	NA
100		26.82	NA	NA
110		28.59	NA	NA
120		30.29	NA	NA
130		31.94	NA	NA
140		33.56	NA	NA
150		35.15	NA	NA
160		36.73	NA	NA
170		38.31	NA	NA
180		39.88	NA	NA
190		41.45	NA	NA
200		43.03	NA	NA
210		44.61	NA	NA
220		46.21	NA	NA
230		47.79	NA	NA
240		49.37	NA	NA
250		50.99	NA	NA
260		52.63	NA	NA
270		54.29	NA	NA
280		55.95	NA	NA
290		57.64	NA	NA
300		59.35	NA	NA
310	NA	61.11	NA	NA
320	NA	62.94	NA	NA
330	NA	64.88	NA	NA
340	NA	66.96	NA	NA
350	NA	68.85	NA	NA
360	NA	NA		91.08
370	NA	NA		94.56
380	NA	NA		98.05

TABLE 15. *cont'd*

T (K)	Solid Index	Solid Value	Melt Index	Melt Value
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 49 (1983).
T_g: 354.0 K (C_p = 69.62–88.99)
T_m: 546.0 K
Solid: 10–350 K All data are taken from the experimental C_p of glass (Data Bank, 1980)
360–600 K C_p data are not available
Melt: 10–350 K Melt unstable
360–380 K Experimental C_p data (Data Bank, 1980)
390–600 K C_p data are not available

TABLE 16. POLY(VINYLIDENE CHLORIDE) (PVC2)



T (K)	Solid Index	Solid Value	Melt Index	Melt Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	7.32	NA	NA
40	NA	12.53	NA	NA
50	NA	17.38	NA	NA
60		21.49	NA	NA
70		26.08	NA	NA
80		30.01	NA	NA
90		33.38	NA	NA
100		36.31	NA	NA
110		38.91	NA	NA
120		41.26	NA	NA
130		43.45	NA	NA
140		45.53	NA	NA
150		47.53	NA	NA

TABLE 16. *cont'd*

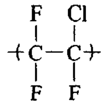
	Solid		Melt	
T (K)	Index	Value	Index	Value
160		49.50	NA	NA
170		51.46	NA	NA
180		53.44	NA	NA
190		55.45	NA	NA
200		57.51	NA	NA
210		59.64	NA	NA
220		61.84	NA	NA
230		64.12	NA	NA
240		66.50	NA	NA
250		69.98	NA	NA
260	NA	NA	NA	NA
270	NA	NA	NA	NA
280	NA	NA	NA	NA
290	NA	NA	NA	NA
300	NA	NA	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 52 (1983).

T_g:	255.0 K	(C_p = 70.26)
T_m:	463.0 K	
Solid:	30–50 K	C_p data are calculated from the Tarasov eq. (Data Bank, 1980)
	60–250 K	Experimental C_p data (Data Bank, 1980)
	260–600 K	C_p data are not available
Melt:	30–600 K	C_p data are not available

TABLE 17. POLY(CHLOROTRIFLUOROETHYLENE) (PC3FE)



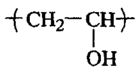
	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80		32.46	NA	NA
90		36.77	NA	NA
100		40.81	NA	NA
110		44.63	NA	NA
120		48.24	NA	NA
130		51.69	NA	NA
140		55.00	NA	NA
150		58.18	NA	NA
160		61.26	NA	NA
170		64.26	NA	NA
180		67.18	NA	NA
190		70.05	NA	NA
200		72.87	NA	NA
210		75.66	NA	NA
220		78.41	NA	NA
230		81.15	NA	NA
240		83.87	NA	NA
250		86.57	NA	NA
260		89.27	NA	NA
270		91.98	NA	NA
280		94.68	NA	NA
290		97.39	NA	NA
300		100.10	NA	NA
310	NA	102.90	NA	NA
320	NA	105.60	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA

TABLE 17. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 54 (1983).
T_g: 325.0 K (C_p = 107.0)
T_m: 493.0 K
Solid: 10–70 K C_p data are not available
80–300 K Experimental C_p data (Data Bank, 1980)
310–320 K Extrapolated value from C_p in the region of 80–300 K (Data Bank, 1980)
330–600 K C_p data are not available
Melt: 30–600 K C_p data are not available

TABLE 18. POLY(VINYL ALCOHOL) (PVA)



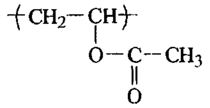
	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60		11.78	NA	NA
70		15.05	NA	NA
80		17.94	NA	NA
90		20.46	NA	NA
100		22.69	NA	NA
110		24.69	NA	NA
120		26.54	NA	NA
130		28.29	NA	NA
140		29.98	NA	NA
150		31.66	NA	NA
160		33.34	NA	NA
170		35.06	NA	NA
180		36.84	NA	NA
190		38.69	NA	NA
200		40.64	NA	NA
210		42.69	NA	NA
220		44.85	NA	NA
230		47.16	NA	NA
240		49.60	NA	NA
250		52.21	NA	NA
260		54.99	NA	NA
270		57.95	NA	NA
280		61.12	NA	NA
290		64.50	NA	NA
300		68.11	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA

TABLE 18. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 56 (1983).
Solid: 10–50 K C_p data are not available
60–300 K Experimental C_p data (Data Bank, 1980)
310–600 K C_p data are not available
Melt: 30–600 K C_p data are not available

TABLE 19. POLY(VINYL ACETATE) (PVAc)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80		27.81	NA	NA
90		31.17	NA	NA
100		34.54	NA	NA
110		37.91	NA	NA
120		41.27	NA	NA
130		44.64	NA	NA

TABLE 19. *cont'd*

T (K)	Solid Index	Solid Value	Melt Index	Melt Value
140		48.00	NA	NA
150		51.37	NA	NA
160		54.74	NA	NA
170		58.10	NA	NA
180		61.47	NA	NA
190		64.83	NA	NA
200		68.20	NA	NA
210		71.57	NA	NA
220		74.93	NA	NA
230		78.30	NA	NA
240		81.66	NA	NA
250		85.03	NA	NA
260		88.40	NA	NA
270		91.76	NA	NA
280		95.13	NA	NA
290		98.49	NA	NA
300		101.86	NA	NA
310	NA	NA		157.50
320	NA	NA		158.48
330	NA	NA		159.45
340	NA	NA		160.43
350	NA	NA		161.41
360	NA	NA		162.39
370	NA	NA		163.37
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 56 (1983).

T_g:	304.0 K	(C_p = 103.2–156.9)
Solid:	10–70 K	C_p data are not available
	80–300 K	Experimental C_p data (Data Bank, 1980)
	310–600 K	C_p data are not available
Melt:	10–300 K	Melt unstable
	310–370 K	Experimental C_p data (Data Bank, 1980)
	380–600 K	C_p data are not available

TABLE 20. POLY(STYRENE) (PS)

$$-\!\!\left(CH_2-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}\right)\!\!-$$

T (K)	Solid Index	Solid Value	Melt Index	Melt Value
10		3.33	NA	NA
20		10.77	NA	NA
30		17.47	NA	NA
40		23.13	NA	NA
50		28.01	NA	NA
60		32.37	NA	NA
70		36.38	NA	NA
80		40.17	NA	NA
90		43.81	NA	NA
100		47.37	NA	NA
110		50.88	NA	NA
120		57.38	NA	NA
130		57.89	NA	NA
140		61.43	NA	NA
150		65.01	NA	NA
160		68.65	NA	NA
170		72.36	NA	NA
180		76.14	NA	NA
190		80.01	NA	NA
200		83.97	NA	NA
210		88.03	NA	NA
220		92.19	NA	NA
230		96.01	NA	NA
240		100.16	NA	NA
250		104.45	NA	NA
260		108.85	NA	NA
270		113.36	NA	NA
280		117.96	NA	NA
290		122.64	NA	NA
300		127.38	NA	NA
310		132.18	NA	NA
320		137.02	NA	NA
330		141.92	NA	NA
340		146.85	NA	NA
350		151.82	NA	NA
360		156.81	NA	NA
370		161.84	NA	NA
380	NA	NA		195.93
390	NA	NA		198.59
400	NA	NA		201.24
410	NA	NA		203.89
420	NA	NA		206.55
430	NA	NA		209.20
440	NA	NA		211.85
450	NA	NA		214.51
460	NA	NA		217.16
470	NA	NA		219.81
480	NA	NA		222.46
490	NA	NA		225.12
500	NA	NA		227.77
510	NA	NA		230.42
520	NA	NA		233.08
530	NA	NA		235.73
540	NA	NA		238.38
550	NA	NA		241.04
560	NA	NA		243.69
570	NA	NA		246.34
580	NA	NA		248.99
590	NA	NA		251.65
600	NA	NA		254.30

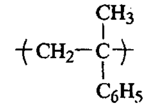
TABLE 20. *cont'd*

Notes

Reference: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (2), 313 (1982).

T_g:	373.0 K	(C_p = 163.4–194.1)
T_m:	516.2 K	
Solid:	10–70 K	Experimental C_p data of glassy samples (Data Bank, 1980)
	80–370 K	C_p data of glassy samples agree with C_p data of semi-crystalline samples. (Data Bank, 1980)
	380–600 K	C_p data are not available
Melt:	10–370 K	Melt unstable
	380–600 K	Experimental C_p data (Data Bank, 1980)

TABLE 21. POLY(α-METHYLSTYRENE) (PMS)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	0.18	NA	NA
20	NA	1.47	NA	NA
30	NA	4.61	NA	NA
40	NA	11.10	NA	NA
50	NA	19.50	NA	NA
60		28.97	NA	NA
70		38.52	NA	NA
80		45.22	NA	NA
90		51.84	NA	NA
100		55.69	NA	NA
110		61.13	NA	NA
120		66.16	NA	NA
130		70.89	NA	NA
140		75.09	NA	NA
150		79.38	NA	NA
160		83.77	NA	NA
170		88.23	NA	NA
180		92.76	NA	NA
190		97.36	NA	NA
200		102.01	NA	NA
210		106.71	NA	NA
220		111.46	NA	NA
230		116.26	NA	NA
240		121.09	NA	NA
250		125.95	NA	NA
260		130.85	NA	NA
270		135.78	NA	NA
280		140.73	NA	NA
290		145.70	NA	NA
300		150.70	NA	NA
310		155.71	NA	NA
320		160.74	NA	NA
330		165.79	NA	NA
340		170.84	NA	NA
350		175.91	NA	NA
360		180.98	NA	NA
370		186.06	NA	NA
380		191.15	NA	NA
390		196.24	NA	NA
400		201.33	NA	NA
410		206.42	NA	NA
420		211.52	NA	NA

TABLE 21. *cont'd*

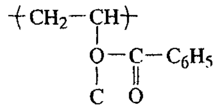
	Solid		Melt	
T (K)	Index	Value	Index	Value
430		216.61	NA	NA
440		221.69	NA	NA
450	NA	NA		252.68
460	NA	NA		258.44
470	NA	NA		264.20
480	NA	NA		269.96
490	NA	NA		275.72
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 58 (1983).

T_g:	441.0 K	(C_p = 222.2–247.5)
Solid:	10–50 K	C_p data are calculated from the Tarasov equation (Data Bank, 1980)
	60–440 K	Experimental C_p data of glassy samples (Data Bank, 1980)
	450–600 K	C_p data are not available
Melt:	10–440 K	Melt unstable
	450–490 K	Experimental C_p data (Data Bank, 1980)
	500–600 K	C_p data are not available

TABLE 22. POLY(VINYL BENZOATE) (PVBZ)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA

TABLE 22. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
190		106.39	NA	NA
200		111.57	NA	NA
210		116.75	NA	NA
220		121.93	NA	NA
230		127.10	NA	NA
240		132.28	NA	NA
250		137.46	NA	NA
260		142.64	NA	NA
270		147.82	NA	NA
280		152.99	NA	NA
290		158.17	NA	NA
300		163.35	NA	NA
310	NA	168.53	NA	NA
320	NA	173.71	NA	NA
330	NA	178.88	NA	NA
340	NA	184.06	NA	NA
350	NA	NA	NA	258.08
360	NA	NA	NA	260.96
370	NA	NA		263.84
380	NA	NA		266.71
390	NA	NA		269.59
400	NA	NA		272.47
410	NA	NA		275.35
420	NA	NA		278.23
430	NA	NA		281.10
440	NA	NA		283.98
450	NA	NA		286.86
460	NA	NA		289.74
470	NA	NA		292.62
480	NA	NA		295.49
490	NA	NA		298.37
500	NA	NA		301.25
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

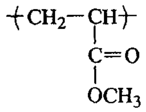
Notes

Reference: U. Gaur, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12** (1), 59 (1983).

T_g: 347.0 K

Solid:	10–180 K	C_p data are not available
	190–300 K	Experimental C_p data (Data Bank, 1980)
	310–340 K	Extrapolated value from C_p in the region of 190–300 K
	350–600 K	C_p data are not available
Melt:	10–340 K	Melt unstable
	350–360 K	Extrapolated value from C_p in the region of 370–500 K
	370–500 K	Experimental C_p data (Data Bank, 1980)
	510–600 K	C_p data are not available

TABLE 23. POLY(METHYL ACRYLATE) (PMA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	0.46	NA	NA
20	NA	4.64	NA	NA
30	NA	11.70	NA	NA
40	NA	19.35	NA	NA
50		26.57	NA	NA
60		33.09	NA	NA
70		38.90	NA	NA
80		44.08	NA	NA
90		48.75	NA	NA
100		52.98	NA	NA
110		56.88	NA	NA
120		60.50	NA	NA
130		63.91	NA	NA
140		67.14	NA	NA
150		70.23	NA	NA
160		73.21	NA	NA
170		76.12	NA	NA
180		78.95	NA	NA
190		81.75	NA	NA
200		84.51	NA	NA
210		87.25	NA	NA
220		89.99	NA	NA
230		92.72	NA	NA
240		95.46	NA	NA
250		98.21	NA	NA
260		100.98	NA	NA
270		103.77	NA	NA
280	NA	NA		148.74
290	NA	NA		150.37
300	NA	NA		151.99
310	NA	NA		153.62
320	NA	NA		155.24
330	NA	NA		156.87
340	NA	NA		158.49
350	NA	NA		160.12
360	NA	NA		161.74
370	NA	NA		163.37
380	NA	NA		164.99
390	NA	NA		166.62
400	NA	NA		168.24
410	NA	NA		169.87
420	NA	NA		171.49
430	NA	NA		173.12
440	NA	NA		174.14
450	NA	NA		176.37
460	NA	NA		177.99
470	NA	NA		179.62
480	NA	NA		181.24
490	NA	NA		182.87
500	NA	NA		184.49
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA

TABLE 23. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

T_g: 279.0 K ($\Delta C_p = 42.30$)

Solid: 10–40 K Extrapolated value from C_p in the region of 50–270 K (Data Bank, 1982)

50–270 K Experimental C_p data (Data Bank, 1982)

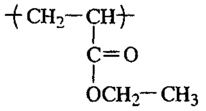
280–600 K C_p data are not available

Melt: 10–270 K Melt unstable

280–500 K Experimental C_p data (Data Bank, 1982)

510–600 K C_p data are not available

TABLE 24. POLY(ETHYL ACRYLATE) (PEA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90		57.99	NA	NA
100		62.50	NA	NA
110		66.83	NA	NA
120		71.06	NA	NA
130		75.20	NA	NA
140		79.28	NA	NA
150		83.31	NA	NA
160		87.32	NA	NA
170		91.30	NA	NA
180		95.26	NA	NA
190		99.20	NA	NA
200		103.13	NA	NA
210		107.05	NA	NA
220		110.96	NA	NA
230		114.87	NA	NA
240		118.76	NA	NA
250	NA	NA		168.06
260	NA	NA		170.22
270	NA	NA		172.39
280	NA	NA		174.55
290	NA	NA		176.72
300	NA	NA		178.88
310	NA	NA		181.04
320	NA	NA		183.21
330	NA	NA		185.37
340	NA	NA		187.54
350	NA	NA		189.70
360	NA	NA		191.86
370	NA	NA		194.03
380	NA	NA		196.19
390	NA	NA		198.36
400	NA	NA		200.52
410	NA	NA		202.68
420	NA	NA		204.85
430	NA	NA		207.01
440	NA	NA		209.18
450	NA	NA		211.34
460	NA	NA		213.50
470	NA	NA		215.67
480	NA	NA		217.83
490	NA	NA		220.00
500	NA	NA		222.16
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

T_g: 249.0 K ($\Delta C_p = 45.60$)

Solid: 10–80 K C_p data are not available

90–240 K Experimental C_p data (Data Bank, 1982)

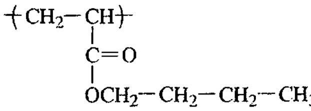
250–600 K C_p data are not available

Melt: 10–240 K Melt unstable

250–500 K Experimental C_p data (Data Bank, 1982)

510–600 K C_p data are not available

TABLE 25. POLY(*n*-BUTYL ACRYLATE) (P*n*BA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80		71.75	NA	NA
90		78.20	NA	NA
100		84.65	NA	NA
110		91.10	NA	NA

TABLE 25. *cont'd*

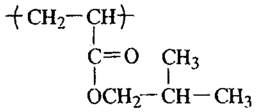
	Solid		Melt	
T (K)	Index	Value	Index	Value
120		97.55	NA	NA
130		104.01	NA	NA
140		110.46	NA	NA
150		116.91	NA	NA
160		123.36	NA	NA
170		129.81	NA	NA
180		136.27	NA	NA
190		142.72	NA	NA
200		149.17	NA	NA
210		155.62	NA	NA
220	NA	NA		206.90
230	NA	NA		210.19
240	NA	NA		213.49
250	NA	NA		216.79
260	NA	NA		220.09
270	NA	NA		223.39
280	NA	NA		226.68
290	NA	NA		229.98
300	NA	NA		233.28
310	NA	NA		236.58
320	NA	NA		239.88
330	NA	NA		243.17
340	NA	NA		246.47
350	NA	NA		249.77
360	NA	NA		253.07
370	NA	NA		256.37
380	NA	NA		259.66
390	NA	NA		262.96
400	NA	NA		266.26
410	NA	NA		269.56
420	NA	NA		272.86
430	NA	NA		276.15
440	NA	NA		279.45
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

T_g:	218.0 K	($\Delta C_p = 45.40$)
Solid:	10–70 K	C_p data are not available
	80–210 K	Experimental C_p data (Data Bank, 1982)
	220–600 K	C_p data are not available
Melt:	10–210 K	Melt unstable
	220–440 K	Experimental C_p data (Data Bank, 1982)
	450–600 K	C_p data are not available

TABLE 26. POLY(ISO-BUTYL ACRYLATE) (PIBA)



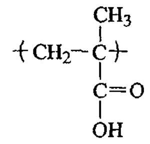
	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220		155.80	NA	NA
230		163.50	NA	NA
240		171.30	NA	NA
250	NA	NA		215.17
260	NA	NA		218.55
270	NA	NA		221.94
280	NA	NA		225.32
290	NA	NA		228.71
300	NA	NA		232.09
310	NA	NA		235.47
320	NA	NA		238.86
330	NA	NA		242.24
340	NA	NA		245.63
350	NA	NA		248.01
360	NA	NA		252.39
370	NA	NA		255.78
380	NA	NA		259.16
390	NA	NA		262.55
400	NA	NA		265.93
410	NA	NA		269.31
420	NA	NA		272.70
430	NA	NA		276.08
440	NA	NA		279.47
450	NA	NA		282.85
460	NA	NA		286.23
470	NA	NA		289.62
480	NA	NA		293.00
490	NA	NA		296.39
500	NA	NA		299.77
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA

TABLE 26. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).
T_g: 249.0 K ($\Delta C_p = 36.60$)
Solid: 10–210 K C_p data are not available
220–240 K Experimental C_p data (Data Bank, 1982)
250–600 K C_p data are not available
Melt: 10–240 K Melt unstable
250–500 K Experimental C_p data (Data Bank, 1982)
510–600 K C_p data are not available

TABLE 27. POLY(METHACRYLIC ACID) (PMAA)



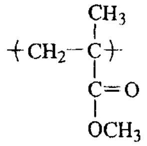
	Solid		Melt	
T (K)	Index	Value	Index	Value
10		1.23	NA	NA
20		5.50	NA	NA
30		10.85	NA	NA
40		16.38	NA	NA
50		21.76	NA	NA
60		26.90	NA	NA
70		31.80	NA	NA
80		36.46	NA	NA
90		40.91	NA	NA
100		45.18	NA	NA
110		49.27	NA	NA
120		53.23	NA	NA
130		57.06	NA	NA
140		60.77	NA	NA
150		64.39	NA	NA
160		67.93	NA	NA
170		71.39	NA	NA
180		74.78	NA	NA
190		78.12	NA	NA
200		81.41	NA	NA
210		84.65	NA	NA
220		87.85	NA	NA
230		91.02	NA	NA
240		94.16	NA	NA
250		97.27	NA	NA
260		100.40	NA	NA
270		103.40	NA	NA
280		106.50	NA	NA
290		109.50	NA	NA
300		112.50	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA

TABLE 27. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).
Solid: 10–300 K Experimental C_p data (Data Bank, 1982)
310–600 K C_p data are not available
Melt: 10–600 K C_p data are not available

TABLE 28. POLY(METHYL METHACRYLATE) (PMMA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		1.67	NA	NA
20		7.97	NA	NA
30		14.67	NA	NA
40		21.38	NA	NA
50		27.67	NA	NA
60		34.53	NA	NA
70		41.30	NA	NA
80		47.29	NA	NA
90		52.64	NA	NA
100		57.49	NA	NA
110		61.97	NA	NA
120		66.18	NA	NA
130		70.20	NA	NA
140		74.10	NA	NA

TABLE 29. *cont'd*

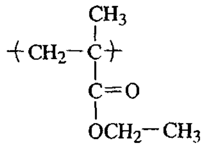
	Solid		Melt	
T (K)	Index	Value	Index	Value
150		77.94	NA	NA
160		81.74	NA	NA
170		85.55	NA	NA
180		89.40	NA	NA
190		93.52	NA	NA
200		97.52	NA	NA
210		101.52	NA	NA
220		105.53	NA	NA
230		109.54	NA	NA
240		113.56	NA	NA
250		117.58	NA	NA
260		121.60	NA	NA
270		125.63	NA	NA
280		129.66	NA	NA
290		133.69	NA	NA
300		137.72	NA	NA
310		141.75	NA	NA
320		145.78	NA	NA
330		149.82	NA	NA
340		153.85	NA	NA
350		157.89	NA	NA
360		161.93	NA	NA
370		165.97	NA	NA
380	NA	NA		203.16
390	NA	NA		205.54
400	NA	NA		207.91
410	NA	NA		210.28
420	NA	NA		212.66
430	NA	NA		215.03
440	NA	NA		217.41
450	NA	NA		219.78
460	NA	NA		222.15
470	NA	NA		224.53
480	NA	NA		226.90
490	NA	NA		229.28
500	NA	NA		231.65
510	NA	NA		234.02
520	NA	NA		236.40
530	NA	NA		238.77
540	NA	NA		241.15
550	NA	NA		243.52
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1068 (1982).

T_g:	378.0 K	(C_p = 169.2–202.7)
Solid:	10–370 K	Experimental C_p data (Data Bank, 1982)
	380–600 K	C_p data are not available
Melt:	10–370 K	Melt unstable
	380–550 K	Experimental C_p data (Data Bank, 1982)
	560–600 K	C_p data are not available

TABLE 29. POLY(ETHYL METHACRYLATE) (PEMA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80		58.84	NA	NA
90		63.60	NA	NA
100		68.42	NA	NA
110		73.28	NA	NA
120		78.17	NA	NA
130		83.08	NA	NA
140		88.01	NA	NA
150		92.94	NA	NA
160		97.88	NA	NA
170		102.83	NA	NA
180		107.79	NA	NA
190		112.75	NA	NA
200		117.71	NA	NA
210		122.67	NA	NA
220		127.64	NA	NA
230		132.61	NA	NA
240		137.58	NA	NA
250		142.55	NA	NA
260		147.52	NA	NA
270		152.49	NA	NA
280		157.47	NA	NA
290		162.44	NA	NA
300		167.42	NA	NA
310		172.39	NA	NA
320		177.37	NA	NA
330		182.34	NA	NA
340	NA	NA		218.77
350	NA	NA		222.47
360	NA	NA		226.17
370	NA	NA		229.87
380	NA	NA		233.57
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA

TABLE 29. *cont'd*

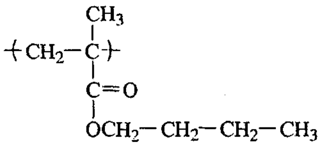
	Solid		Melt	
T (K)	Index	Value	Index	Value
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

T_g:	338.0 K	(ΔC_p = 31.70)
Solid:	10–70 K	C_p data are not available
	80–330 K	Experimental C_p data (Data Bank, 1982)
	340–600 K	C_p data are not available
Melt:	10–330 K	Melt unstable
	340–380 K	Experimental C_p data (Data Bank, 1982)
	390–600 K	C_p data are not available

TABLE 30. POLY(*n*-BUTYL METHACRYLATE) (P*n*BMA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80		77.81	NA	NA
90		84.85	NA	NA
100		91.96	NA	NA
110		99.13	NA	NA
120		106.32	NA	NA
130		113.54	NA	NA
140		120.77	NA	NA
150		128.01	NA	NA
160		135.27	NA	NA
170		142.53	NA	NA
180		149.80	NA	NA
190		157.07	NA	NA
200		164.34	NA	NA
210		171.62	NA	NA
220		178.90	NA	NA
230		186.18	NA	NA
240		193.47	NA	NA
250		200.75	NA	NA
260		208.04	NA	NA
270		215.33	NA	NA
280		222.62	NA	NA
290		229.91	NA	NA
300	NA	NA		263.41
310	NA	NA		268.29
320	NA	NA		273.17

TABLE 30. *cont'd*

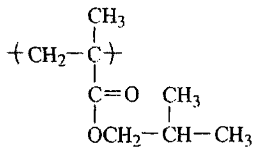
	Solid		Melt	
T (K)	Index	Value	Index	Value
330	NA	NA		278.05
340	NA	NA		282.93
350	NA	NA		287.82
360	NA	NA		292.70
370	NA	NA		297.58
380	NA	NA		302.46
390	NA	NA		307.34
400	NA	NA		312.22
410	NA	NA		317.10
420	NA	NA		321.98
430	NA	NA		326.86
440	NA	NA		331.74
450	NA	NA		336.63
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

T_g:	293.0 K	(ΔC_p = 29.70)
Solid:	10–70 K	C_p data are not available
	80–290 K	Experimental C_p data (Data Bank, 1982)
	300–600 K	C_p data are not available
Melt:	10–290 K	Melt unstable
	300–450 K	Experimental C_p data (Data Bank, 1982)
	460–600 K	C_p data are not available

TABLE 31. POLY(ISO-BUTYL-METHACRYLATE) (PIBMA)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA

TABLE 32. *cont'd*

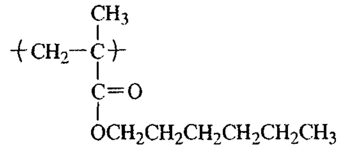
T (K)	Solid Index	Solid Value	Melt Index	Melt Value
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230		173.90	NA	NA
240		181.00	NA	NA
250		188.00	NA	NA
260		195.10	NA	NA
270		202.20	NA	NA
280		209.20	NA	NA
290		216.30	NA	NA
300		223.40	NA	NA
310		230.40	NA	NA
320		237.50	NA	NA
330	NA	NA		281.77
340	NA	NA		284.43
350	NA	NA		287.10
360	NA	NA		289.77
370	NA	NA		292.43
380	NA	NA		295.10
390	NA	NA		297.76
400	NA	NA		300.43
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

T_g:	326.0 K	($\Delta C_p = 39.00$)
Solid:	10–220 K	C_p data are not available
	230–320 K	Experimental C_p data (Data Bank, 1982)
	330–600 K	C_p data are not available
Melt:	10–320 K	Melt unstable
	330–400 K	Experimental C_p data (Data Bank, 1982)
	410–600 K	C_p data are not available

TABLE 32. POLY(HEXYL METHACRYLATE) (PHMA)



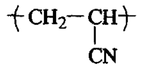
T (K)	Solid Index	Solid Value	Melt Index	Melt Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230	NA	NA	NA	NA
240	NA	NA	NA	NA
250	NA	NA	NA	NA
260	NA	NA	NA	NA
270	NA	NA		310.77
280	NA	NA		315.46
290	NA	NA		320.14
300	NA	NA		324.83
310	NA	NA		329.52
320	NA	NA		334.20
330	NA	NA		338.89
340	NA	NA		343.57
350	NA	NA		348.26
360	NA	NA		352.95
370	NA	NA		357.63
380	NA	NA		362.32
390	NA	NA		367.00
400	NA	NA		371.69
410	NA	NA		376.38
420	NA	NA		381.06
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA

TABLE 32. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).
Solid: 10–600 K C_p data are not available
Melt: 10–260 K Melt unstable
270–420 K Experimental C_p data (Data Bank, 1982)
430–600 K C_p data are not available

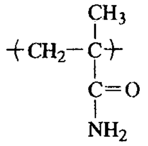
TABLE 33. POLY(ACRYLONITRILE) (PAN)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	1.17	NA	NA
20	NA	1.93	NA	NA
30	NA	4.94	NA	NA
40	NA	9.55	NA	NA
50	NA	13.77	NA	NA
60		18.09	NA	NA
70		21.69	NA	NA
80		24.87	NA	NA
90		27.69	NA	NA
100		30.22	NA	NA
110		32.54	NA	NA
120		34.67	NA	NA
130		36.68	NA	NA
140		38.59	NA	NA
150		40.44	NA	NA
160		42.23	NA	NA
170		44.00	NA	NA
180		45.75	NA	NA
190		47.51	NA	NA
200		49.27	NA	NA
210		51.04	NA	NA
220		52.85	NA	NA
230		54.68	NA	NA
240		56.56	NA	NA
250		58.47	NA	NA
260		60.43	NA	NA
270		62.45	NA	NA
280		64.51	NA	NA
290		66.64	NA	NA
300		68.83	NA	NA
310		71.08	NA	NA
320		73.41	NA	NA
330		75.80	NA	NA
340		78.27	NA	NA
350		80.82	NA	NA
360		83.45	NA	NA
370		86.16	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes
Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).
T_g: 378.0 K
T_m: 593.2 K
Solid: 10–50 K C_p value are calculated from the Tarasov equation (Data Bank, 1982)
60–370 K Experimental C_p data (Data Bank, 1982)
380–600 K C_p data are not available
Melt: 10–600 K C_p data are not available

TABLE 34. POLY(METHACRYLAMIDE) (PMAM)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	0.21	NA	NA
20	NA	2.81	NA	NA
30	NA	8.14	NA	NA
40	NA	14.70	NA	NA
50	NA	21.50	NA	NA
60		28.07	NA	NA
70		34.25	NA	NA
80		39.99	NA	NA
90		45.31	NA	NA
100		50.25	NA	NA
110		54.86	NA	NA
120		59.20	NA	NA
130		63.29	NA	NA
140		67.18	NA	NA
150		70.90	NA	NA

TABLE 34. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
160		74.48	NA	NA
170		77.94	NA	NA
180		81.30	NA	NA
190		84.59	NA	NA
200		87.81	NA	NA
210		90.98	NA	NA
220		94.11	NA	NA
230		97.21	NA	NA
240		100.30	NA	NA
250		103.30	NA	NA
260		106.40	NA	NA
270		109.50	NA	NA
280		112.50	NA	NA
290		115.60	NA	NA
300		118.70	NA	NA
310	NA	NA	NA	NA
320	NA	NA	NA	NA
330	NA	NA	NA	NA
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **11** (4), 1074 (1982).

Solid: 10–50 K — C_p value are calculated from the Tarasov equation (Data Bank, 1982)
60–300 K — Experimental C_p data (Data Bank, 1982)
310–600 K — C_p data are not available

Melt: 10–600 K — C_p data are not available

TABLE 35. POLY(OXY-1-OXOETHYLENE) (PGL)

$$-\!\!\left(CH_2-\underset{\underset{O}{\|}}{C}-O\right)\!\!-$$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10		0.78	NA	NA
20		3.98	NA	NA
30		8.02	NA	NA
40		12.12	NA	NA
50		16.04	NA	NA
60		19.57	NA	NA
70		22.72	NA	NA
80		25.55	NA	NA
90		28.11	NA	NA
100		30.47	NA	NA
110		32.67	NA	NA
120		34.74	NA	NA
130		36.69	NA	NA
140		38.53	NA	NA
150		40.28	NA	NA
160		41.96	NA	NA
170		43.58	NA	NA
180		45.15	NA	NA
190		46.69	NA	NA
200		48.22	NA	NA
210		49.99	NA	NA
220		51.71	NA	NA
230		53.42	NA	NA
240		55.14	NA	NA
250		56.85	NA	NA
260		58.57	NA	NA
270		60.28	NA	NA
280		62.00	NA	NA
290		63.71	NA	NA
300	NA	65.42	NA	NA
310	NA	67.14	NA	NA
320	NA	68.85	NA	NA
330	NA	70.57	NA	NA
340	NA	72.28	NA	NA
350	NA	74.00	NA	114.13
360	NA	75.71	NA	114.51
370	NA	77.43	NA	114.90
380	NA	79.14	NA	115.28
390	NA	80.86	NA	115.66
400	NA	82.57	NA	116.04
410	NA	84.29	NA	116.42
420	NA	86.00	NA	116.80
430	NA	87.72	NA	117.18
440	NA	89.43	NA	117.56
450	NA	91.15	NA	117.94
460	NA	92.86	NA	118.32
470	NA	94.58	NA	118.70
480	NA	96.29	NA	119.09
490	NA	98.01	NA	119.47
500	NA	99.72	NA	119.85
510	NA	NA		120.23
520	NA	NA		120.61
530	NA	NA		120.99
540	NA	NA		121.37
550	NA	NA		121.75
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

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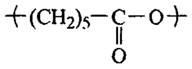
TABLE 35. *cont'd*

Notes

References:	1. B. Lebedev, A. Yevstropov, Makromol. Chem., 185 (6), 1235 (1984).	
	2. R. Pan, Master Thesis, Dept. of Chemistry, Rensselaer Polytechnic Institute, Dec. 1986.	
T_g:	318.0 K	(ΔC_p = 44.7)
T_m:	501.0 K	(ΔC_p = 20.0)
Solid:	10–290 K	Experimental C_p data interpolated by Spline function (Data Bank, 1985)
	300–500 K	Linear extrapolated data from the region of 200–290 K (Data Bank, 1985)
	510–600 K	C_p data are not available
Melt:	10–310 K	Melt unstable
	350–500 K	Linear extrapolated data from the region of 500–550 K (Data Bank, 1985)
	510–550 K	Experimental C_p data (Data Bank, 1985)
	560–600 K	C_p data are not available

TABLE 36. POLY(OXY-1-OXOHEXAMETHYLENE) (PCL)

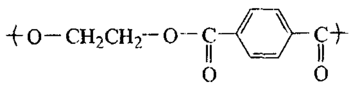


T (K)	Solid Index	Solid Value	Melt Index	Melt Value
10		2.42	NA	NA
20		10.72	NA	NA
30		20.66	NA	NA
40		30.17	NA	NA
50		37.95	NA	NA
60		45.74	NA	NA
70		53.02	NA	NA
80		59.61	NA	NA
90		65.62	NA	NA
100		71.14	NA	NA
110		76.25	NA	NA
120		81.02	NA	NA
130		85.55	NA	NA
140		89.91	NA	NA
150		94.19	NA	NA
160		98.73	NA	NA
170		103.28	NA	NA
180		107.83	NA	NA
190		112.38	NA	NA
200		116.92	NA	NA
210		121.47	NA	180.81
220		126.02	NA	183.72
230		130.57	NA	186.64
240		135.12	NA	189.55
250		139.67	NA	192.47
260		144.22	NA	195.38
270		148.77	NA	198.30
280		153.32	NA	201.21
290	NA	157.87	NA	204.13
300	NA	162.42	NA	207.04
310	NA	166.97	NA	209.96
320	NA	171.51	NA	212.87
330	NA	176.06	NA	215.79
340	NA	180.61		218.70
350	NA	NA		221.62
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

References:	1. B. Lebedev, A. Yevstropov, Makromol. Chem., 185 (6), 1235 (1984).	
	2. R. Pan, Master Thesis, Dept. of Chemistry, Rensselaer Polytechnic Institute, Dec. 1986.	
T_g:	209.0 K	(ΔC_p = 60.0)
T_m:	342.0 K	(ΔC_p = 38.0)
Solid:	10–200 K	Experimental C_p data interpolated by Spline function (Data Bank, 1985)
	210–340 K	Linear extrapolated data from the region of 150–200 K (Data Bank, 1985)
	350–600 K	C_p data are not available
Melt:	10–200 K	Melt unstable
	210–300 K	Linear extrapolated data from the region of 342–350 K (Data Bank, 1985)
	340–350 K	Experimental C_p data (Data Bank, 1985)
	360–600 K	C_p data are not available

TABLE 37. POLY(OXYETHYLENEOXYTEREPHTHALOYL) (PET)



T (K)	Solid Index	Solid Value	Melt Index	Melt Value
10		12.43	NA	NA
20	NA	NA	NA	NA
30		22.91	NA	NA
40		36.18	NA	NA
50		48.24	NA	NA
60		56.68	NA	NA
70		63.92	NA	NA
80		69.95	NA	NA
90		77.18	NA	NA
100		84.42	NA	NA
110		91.70	NA	NA
120		100.10	NA	NA
130		105.90	NA	NA
140		112.60	NA	NA

TABLE 37. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
150		119.40	NA	NA
160		126.20	NA	NA
170		133.10	NA	NA
180		140.10	NA	NA
190		147.10	NA	NA
200		154.10	NA	NA
210		161.20	NA	NA
220		168.20	NA	NA
230		175.30	NA	NA
240		182.40	NA	NA
250		189.50	NA	NA
260		196.70	NA	NA
270		203.80	NA	NA
280		210.90	NA	NA
290		218.10	NA	NA
300		225.20	NA	NA
310		232.40	NA	NA
320		239.60	NA	NA
330		246.70	NA	NA
340		253.90	NA	NA
350	NA	NA		335.70
360	NA	NA		338.50
370	NA	NA		341.30
380	NA	NA		344.10
390	NA	NA		346.90
400	NA	NA		349.80
410	NA	NA		352.60
420	NA	NA		355.40
430	NA	NA		358.20
440	NA	NA		361.00
450	NA	NA		363.90
460	NA	NA		366.70
470	NA	NA		369.50
480	NA	NA		372.30
490	NA	NA		375.10
500	NA	NA		378.00
510	NA	NA		380.80
520	NA	NA		383.60
530	NA	NA		386.40
540	NA	NA		389.20
550	NA	NA		392.10
560	NA	NA		394.90
570	NA	NA		397.70
580	NA	NA		400.50
590	NA	NA		403.30
600	NA	NA	NA	406.15

Notes

Reference:	U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12**, (1), 70 (1983).	
T_g:	342.0 K	(C_p = 255.6–333.4)
T_m:	553.0 K	
Solid:	10–340 K	Experimental C_p (Data Bank, 1983)
	350–600 K	C_p data are not available
Melt:	10–340 K	Melt unstable
	350–590 K	Experimental C_p data (Data Bank, 1983)
	600 K	Linear extrapolated data from C_p in the region of 350–590 K (Data Bank, 1985)

TABLE 38. POLY(IMINO-(1-OXOHEXAMETHYLENE)) (NYLON 6)

$$-\!\!\left[(CH_2)_5-\underset{\underset{O}{\|}}{C}-NH\right]\!\!-$$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70		49.78	NA	NA
80		56.40	NA	NA
90		62.45	NA	NA
100		68.06	NA	NA
110		73.34	NA	NA
120		78.38	NA	NA
130		83.26	NA	NA
140		88.01	NA	NA
150		92.70	NA	NA
160		97.35	NA	NA
170		102.00	NA	NA
180		106.70	NA	NA
190		111.40	NA	NA
200		116.20	NA	NA
210		121.00	NA	NA
220		126.00	NA	NA
230		131.00	NA	NA
240		136.20	NA	NA
250		141.40	NA	NA
260		146.90	NA	NA
270		152.40	NA	NA
280		158.10	NA	NA
290		164.00	NA	NA
300		170.00	NA	NA
310		176.20	NA	NA
320	NA	NA	NA	272.80
330	NA	NA	NA	274.30
340	NA	NA	NA	275.80
350	NA	NA	NA	277.40
360	NA	NA	NA	278.90
370	NA	NA	NA	280.40
380	NA	NA	NA	281.90
390	NA	NA	NA	283.50
400	NA	NA	NA	285.00
410	NA	NA	NA	286.50
420	NA	NA	NA	288.00
430	NA	NA	NA	289.60
440	NA	NA	NA	291.10
450	NA	NA	NA	292.60
460	NA	NA	NA	294.10
470	NA	NA	NA	295.70
480	NA	NA	NA	297.20
490	NA	NA	NA	298.70
500	NA	NA		300.20
510	NA	NA		301.80
520	NA	NA		303.30
530	NA	NA		304.80
540	NA	NA		306.30
550	NA	NA		307.90
560	NA	NA		309.40
570	NA	NA		310.90
580	NA	NA		312.40
590	NA	NA		314.00
600	NA	NA		315.50

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TABLE 38. *cont'd*

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12**, (1), 83 (1983).

T_g:	313.0 K	(C_p = 178.1–271.7)
T_m:	553.0 K	
Solid:	10–60 K	C_p data are not available
	70–310 K	Experimental C_p data (Data Bank, 1983)
	320–600 K	C_p data are not available
Melt:	10–310 K	Melt unstable
	320–600 K	Experimental C_p data (Data Bank, 1983)

TABLE 39. POLY(IMINOADIPOYLIMINOHEXAMETHYLENE) (NYLON 66)

$-[NH-(CH_2)_6-NH-C(=O)-(CH_2)_4-C(=O)]-$

	Solid		Melt	
T (K)	**Index**	**Value**	**Index**	**Value**
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230		252.10	NA	NA
240		263.40	NA	NA
250		274.70	NA	NA
260		286.00	NA	NA
270		297.30	NA	NA
280		308.60	NA	NA
290		320.00	NA	NA
300		331.30	NA	NA
310		342.60	NA	NA
320		354.00	NA	NA
330	NA	NA		505.70
340	NA	NA		510.40
350	NA	NA		515.00
360	NA	NA		519.70
370	NA	NA		524.40
380	NA	NA		529.70
390	NA	NA		533.80
400	NA	NA		538.50
410	NA	NA		543.10
420	NA	NA		547.80
430	NA	NA		552.50
440	NA	NA		557.20
450	NA	NA		561.90
460	NA	NA		566.50
470	NA	NA		571.20
480	NA	NA		575.90
490	NA	NA		580.60
500	NA	NA		585.30
510	NA	NA		590.00
520	NA	NA		594.60
530	NA	NA		599.30
540	NA	NA		604.00
550	NA	NA		608.70
560	NA	NA		613.40
570	NA	NA		618.10
580	NA	NA		622.70
590	NA	NA		627.40
600	NA	NA		632.10

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12**, (1), 84 (1983).

T_g:	323.0 K	(C_p = 357.4–502.4)
T_m:	553.0 K	
Solid:	10–220 K	C_p data are not available
	230–320 K	Experimental C_p data (Data Bank, 1983)
	330–600 K	C_p data are not available
Melt:	10–320 K	Melt unstable
	330–600 K	Experimental C_p data (Data Bank, 1983)

TABLE 40. POLY(IMINOADIPOYLIMINODODECAMETHYLENE) (NYLON 612)

$-[NH-(CH_2)_6-NH-C(=O)-(CH_2)_{10}-C(=O)]-$

	Solid		Melt	
T (K)	**Index**	**Value**	**Index**	**Value**
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230		362.40	NA	NA
240		378.70	NA	NA

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TABLE 40. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
250		395.00	NA	NA
260		411.20	NA	NA
270		427.50	NA	NA
280		443.80	NA	NA
290		460.10	NA	NA
300		476.30	NA	NA
310		492.60	NA	NA
320	NA	NA		723.00
330	NA	NA		729.10
340	NA	NA		735.10
350	NA	NA		741.10
360	NA	NA		747.20
370	NA	NA		753.20
380	NA	NA		759.30
390	NA	NA		765.30
400	NA	NA		771.30
410	NA	NA		777.40
420	NA	NA		783.40
430	NA	NA		789.50
440	NA	NA		795.50
450	NA	NA		801.50
460	NA	NA		807.60
470	NA	NA		831.60
480	NA	NA		819.60
490	NA	NA		825.70
500	NA	NA		831.70
510	NA	NA		837.80
520	NA	NA		843.80
530	NA	NA		849.80
540	NA	NA		855.90
550	NA	NA		861.90
560	NA	NA		867.90
570	NA	NA		874.00
580	NA	NA		880.00
590	NA	NA		886.10
600	NA	NA		892.10

Notes

Reference: U. Gaur, S. F. Lau, B. B. Wunderlich, B. Wunderlich, J. Phys. Chem. Ref. Data, **12**, (1), 87 (1983).

T_g:	319.0 K	(C_p = 507.3–722.1)
Solid:	10–220 K	C_p data are not available
	230–310 K	Experimental C_p data (Data Bank, 1983)
	330–600 K	C_p data are not available
Melt:	10–320 K	Melt unstable
	320–600 K	Experimental C_p data (Data Bank, 1983)

TABLE 41. POLY(OXYMETHYLENE) (POM)

$$-\!\!\left(O-CH_2\right)\!\!-$$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10		0.42	NA	NA
20		2.46	NA	NA
30		5.41	NA	NA
40		7.97	NA	NA
50		10.10	NA	NA
60		11.85	NA	NA
70		13.30	NA	NA
80		14.54	NA	NA
90		15.65	NA	NA
100		16.68	NA	NA

TABLE 41. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
110		17.68	NA	NA
120		18.68	NA	NA
130		19.71	NA	NA
140		20.75	NA	NA
150		21.82	NA	NA
160		22.89	NA	NA
170		23.97	NA	NA
180		25.05	NA	NA
190		26.11	NA	53.58
200		27.15	NA	53.95
210		28.18	NA	54.32
220		29.20	NA	54.69
230		30.21	NA	55.07
240		31.24	NA	55.44
250		32.29	NA	55.81
260		33.39	NA	56.18
270		34.55	NA	56.55
280		35.79	NA	56.93
290		37.11	NA	57.30
300		38.52	NA	57.67
310		40.02	NA	58.04
320		41.61	NA	58.41
330		43.27	NA	58.79
340		45.00	NA	59.16
350		46.77	NA	59.53
360		48.57	NA	59.90
370		50.38	NA	60.27
380		52.20	NA	60.65
390		54.00	NA	61.02
400	NA	NA	NA	61.39
410	NA	NA	NA	61.76
420	NA	NA	NA	62.13
430	NA	NA		62.51
440	NA	NA		62.88
450	NA	NA		63.25
460	NA	NA		63.62
470	NA	NA		63.99
480	NA	NA		64.37
490	NA	NA		64.74
500	NA	NA		65.11
510	NA	NA		65.48
520	NA	NA		65.85
530	NA	NA		66.23
540	NA	NA		66.60
550	NA	NA	NA	66.97
560	NA	NA	NA	67.34
570	NA	NA	NA	67.71
580	NA	NA	NA	68.09
590	NA	NA	NA	68.46
600	NA	NA	NA	68.83

Notes

References: 1. U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1005 (1981).
2. H. Suzuki, B. Wunderlich, J. Polym. Sci., Polym. Phys. Ed., **23**, 1671 (1985).

T_g:	190.0 K	(C_p = 26.11–53.58)
T_m:	457.2 K	
Solid:	10–390 K	Experimental C_p data (Data Bank, 1981)
	400–600 K	C_p data are not available
Melt:	10–180 K	C_p data are not available
	190–420 K	Extrapolated value from C_p in the region of 430–540 K (Data Bank, 1985)
	430–540 K	Experimental C_p data (Data Bank, 1985)
	550–600 K	Extrapolated value from C_p in the region of 430–540 K (Data Bank, 1985)

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TABLE 42. POLY(OXYETHYLENE)

$-(O-CH_2CH_2)-$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	0.51	NA	NA
20	NA	3.18	NA	NA
30	NA	7.24	NA	NA
40	NA	11.16	NA	NA
50	NA	14.62	NA	NA
60	NA	17.60	NA	NA
70	NA	20.13	NA	NA
80	NA	22.33	NA	NA
90		24.90	NA	NA
100		26.93	NA	NA
110		28.78	NA	NA
120		30.44	NA	NA
130		32.10	NA	NA
140		33.57	NA	NA
150		35.05	NA	NA
160		36.53	NA	NA
170		37.80	NA	NA
180		39.11	NA	NA
190		40.40	NA	NA
200		41.88	NA	NA
210		43.17	NA	81.88
220		44.64	NA	82.55
230	NA	45.91	NA	83.21
240	NA	47.26	NA	83.88
250	NA	48.61	NA	84.55
260	NA	49.96	NA	85.22
270	NA	51.31	NA	85.89
280	NA	52.66	NA	86.55
290	NA	54.01	NA	87.22
300	NA	55.36	NA	87.89
310	NA	56.71	NA	88.56
320	NA	58.06	NA	89.23
330	NA	59.41		89.89
340	NA	60.76		90.56
350	NA	NA		91.23
360	NA	NA		91.90
370	NA	NA		92.57
380	NA	NA		93.23
390	NA	NA		93.90
400	NA	NA		94.57
410	NA	NA		95.24
420	NA	NA		95.91
430	NA	NA		96.57
440	NA	NA	NA	97.24
450	NA	NA	NA	97.91
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

TABLE 42. *cont'd*

Notes

References:
1. U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1010 (1981).
2. H. Suzuki, B. Wunderlich, J. Polym. Sci., Polym. Phys. Ed., **23**, 1671 (1985).

T_g:	260.0 K	(C_p = 42.65–81.61)
T_m:	342.0 K	(C_p = 61.03–90.70)
Solid:	10–80 K	Value estimated by additivity (Data Bank, 1981)
	90–220 K	Experimental C_p data (Data Bank, 1981)
	230–340 K	Extrapolated value from C_p in the region of 160–220 K (Data Bank, 1981)
	350–600 K	C_p data are not available
Melt:	10–200 K	C_p data are not available
	210–320 K	Extrapolated value from C_p in the region of 430–540 K (Data Bank, 1985)
	330–450 K	Experimental C_p data (Data Bank, 1985)
	460–600 K	C_p data are not available

TABLE 43. POLY(OXYTRIMETHYLENE) (PO3M)

$-[O-(CH_2)_3]-$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10		0.86	NA	NA
20		4.68	NA	NA
30		9.31	NA	NA
40		13.65	NA	NA
50		17.64	NA	NA
60		21.37	NA	NA
70		25.82	NA	NA
80		29.59	NA	NA
90		32.90	NA	NA
100		35.87	NA	NA
110		38.58	NA	NA
120		41.11	NA	NA
130		43.51	NA	NA
140		45.83	NA	NA
150		48.11	NA	NA
160		50.37	NA	NA
170		52.65	NA	NA
180		54.97	NA	NA
190	NA	57.33	NA	NA
200	NA	59.01		109.24
210	NA	61.08		110.25
220	NA	63.15		111.26
230	NA	65.23		112.27
240	NA	67.30		113.28
250	NA	69.37		114.29
260	NA	71.44		115.30
270	NA	73.51		116.31
280	NA	75.59		117.32
290	NA	77.66		118.33
300	NA	79.73		119.34
310	NA	NA		120.35
320	NA	NA		121.36
330	NA	NA		122.37
340	NA	NA	NA	NA
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA

TABLE 43. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1015 (1981).

T_g:	195.0 K	(C_p = 57.97–108.7)
T_m:	308.0 K	(C_p = 81.39–120.1)
Solid:	10–180 K	Experimental C_p data (Data Bank, 1981)
	190–300 K	Extrapolated value from C_p in the region of 150–180 K (Data Bank, 1981)
	310–600 K	C_p data are not available
Melt:	10–190 K	Melt unstable
	200–330 K	Experimental C_p data (Data Bank, 1981)
	340–600 K	C_p data are not available

TABLE 44. POLY(OXYTETRAMETHYLENE) (PO4M)

$$-\!\!\left[\mathrm{O}-(\mathrm{CH_2})_4\right]\!\!-$$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10		1.47	NA	NA
20		6.59	NA	NA
30		12.42	NA	NA
40		18.32	NA	NA
50		24.63	NA	NA
60		29.74	NA	NA
70		34.61	NA	NA
80		39.41	NA	NA
90		43.67	NA	NA
100		47.27	NA	NA
110		50.72	NA	NA
120		54.70	NA	NA
130		57.99	NA	NA
140		61.12	NA	NA
150		64.46	NA	NA
160		67.96	NA	NA
170	NA	71.20	NA	NA
180	NA	74.52	NA	NA
190	NA	NA	NA	124.20
200	NA	NA	NA	125.92
210	NA	NA	NA	127.64
220	NA	NA	NA	129.36
230	NA	NA	NA	131.09
240	NA	NA	NA	132.81
250	NA	NA	NA	134.53
260	NA	NA	NA	136.26
270	NA	NA	NA	137.98
280	NA	NA		139.70
290	NA	NA		141.42
300	NA	NA		143.15
310	NA	NA		144.87
320	NA	NA		146.59
330	NA	NA		148.32
340	NA	NA		150.04
350	NA	NA	NA	NA
360	NA	NA	NA	NA
370	NA	NA	NA	NA
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1023 (1981).

T_g:	189.0 K	(C_p = 77.51–124.0)
T_m:	330.0 K	
Solid:	10–160 K	Experimental C_p data (Data Bank, 1981)
	170–180 K	Extrapolated value from C_p in the region of 130–160 K (Data Bank, 1981)
	190–600 K	C_p data are not available
Melt:	10–180 K	Melt unstable
	190–270 K	Extrapolated value from C_p in the region of 280–340 K (Data Bank, 1981)
	280–340 K	Experimental C_p data (Data Bank, 1981)
	350–600 K	C_p data are not available

TABLE 45. POLY(OXYPROPYLENE) (POPr)

$$-\!\!\left[\mathrm{O}-\mathrm{CH_2}-\underset{\displaystyle\mathrm{CH_3}}{\underset{|}{\mathrm{CH}}}\right]\!\!-$$

	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA

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TABLE 45. *cont'd*

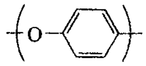
	Solid		Melt	
T (K)	Index	Value	Index	Value
70	NA	NA	NA	NA
80	NA	31.21	NA	NA
90	NA	34.33	NA	NA
100	NA	37.37	NA	NA
110	NA	40.34	NA	NA
120	NA	43.22	NA	NA
130	NA	46.03	NA	NA
140	NA	48.76	NA	NA
150	NA	51.41	NA	NA
160	NA	53.98	NA	NA
170	NA	56.48	NA	NA
180	NA	58.89	NA	NA
190	NA	61.23	NA	NA
200	NA	NA		95.46
210	NA	NA		97.04
220	NA	NA		98.61
230	NA	NA		100.19
240	NA	NA		101.77
250	NA	NA		103.35
260	NA	NA		104.92
270	NA	NA		106.50
280	NA	NA		108.08
290	NA	NA		109.65
300	NA	NA		111.23
310	NA	NA		112.81
320	NA	NA		114.38
330	NA	NA		115.96
340	NA	NA		117.54
350	NA	NA		119.12
360	NA	NA		120.69
370	NA	NA		122.27
380	NA	NA	NA	NA
390	NA	NA	NA	NA
400	NA	NA	NA	NA
410	NA	NA	NA	NA
420	NA	NA	NA	NA
430	NA	NA	NA	NA
440	NA	NA	NA	NA
450	NA	NA	NA	NA
460	NA	NA	NA	NA
470	NA	NA	NA	NA
480	NA	NA	NA	NA
490	NA	NA	NA	NA
500	NA	NA	NA	NA
510	NA	NA	NA	NA
520	NA	NA	NA	NA
530	NA	NA	NA	NA
540	NA	NA	NA	NA
550	NA	NA	NA	NA
560	NA	NA	NA	NA
570	NA	NA	NA	NA
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

Reference: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1033 (1981).

T_g:	198.0 K	(C_p = 63.05–95.20)
T_m:	348.0 K	
Solid:	10–70 K	C_p data are not available
	80–190 K	Experimental C_p data (Data Bank, 1981)
	200–600 K	C_p data are not available
Melt:	10–190 K	Melt unstable
	200–370 K	Experimental C_p data (Data Bank, 1981)
	380–600 K	C_p data are not available

TABLE 46. POLY(OXY-1,4-PHENYLENE) (POPh)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180	NA	NA	NA	NA
190	NA	NA	NA	NA
200	NA	NA	NA	NA
210	NA	NA	NA	NA
220	NA	NA	NA	NA
230	NA	NA	NA	NA
240	NA	NA	NA	NA
250	NA	NA	NA	NA
260	NA	NA	NA	NA
270	NA	NA	NA	NA
280	NA	NA	NA	NA
290	NA	NA	NA	NA
300		109.10	NA	NA
310		112.40	NA	NA
320		115.80	NA	NA
330		119.20	NA	NA
340		122.50	NA	NA
350		125.90	NA	NA
360	NA	NA		150.30
370	NA	NA		151.70
380	NA	NA		153.10
390	NA	NA	NA	154.60
400	NA	NA	NA	156.00
410	NA	NA	NA	157.40
420	NA	NA	NA	158.80
430	NA	NA	NA	160.30
440	NA	NA	NA	161.70
450	NA	NA	NA	163.10
460	NA	NA	NA	164.50
470	NA	NA	NA	166.00
480	NA	NA	NA	167.40
490	NA	NA	NA	168.80
500	NA	NA	NA	170.20
510	NA	NA	NA	171.70
520	NA	NA	NA	173.10
530	NA	NA	NA	174.50
540	NA	NA	NA	175.90
550	NA	NA	NA	177.40
560	NA	NA	NA	178.80
570	NA	NA	NA	180.20
580	NA	NA	NA	181.60
590	NA	NA		183.10
600	NA	NA		184.50

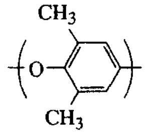
TABLE 46. *cont'd*

Notes

Reference: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10** (4), 1033 (1981).

T_g:	358.0 K	(C_p = 128.6–150.0)
T_m:	535.0 K	
Solid:	10–290 K	C_p data are not available
	300–350 K	Experimental C_p data (Data Bank, 1981)
	360–600 K	C_p data are not available
Melt:	10–350 K	Melt unstable
	360–380 K	Experimental C_p data (Data Bank, 1981)
	390–580 K	Extrapolated value from C_p in the region of 360–380 K & 590–620 K (Data Bank, 1981)
	590–600 K	Experimental C_p data (Data Bank, 1981)

TABLE 47. POLY(OXY-2,6-DIMETHYL-1,4-PHENYLENE) (PPO)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		4.05	NA	NA
20		11.52	NA	NA
30		19.12	NA	NA
40		26.45	NA	NA
50		33.44	NA	NA
60		40.12	NA	NA
70		46.49	NA	NA
80		52.50	NA	NA
90		57.80	NA	NA
100		63.01	NA	NA
110		68.07	NA	NA
120		72.91	NA	NA
130		77.45	NA	NA
140		82.04	NA	NA
150		86.42	NA	NA
160		89.74	NA	NA
170		94.14	NA	NA
180		98.48	NA	NA
190		102.80	NA	NA
200		107.00	NA	NA
210		111.20	NA	NA
220		115.33	NA	NA
230		119.57	NA	NA
240		123.81	NA	NA
250		128.04	NA	NA
260		132.33	NA	NA
270		136.60	NA	NA
280		140.91	NA	NA
290		145.27	NA	NA
300		149.66	NA	NA
310		154.08	NA	NA
320		158.58	NA	NA
330		162.10	NA	NA
340		166.20	NA	NA
350		170.20	NA	NA
360		174.50	NA	NA
370		178.60	NA	NA
380		182.70	NA	NA
390		186.80	NA	NA
400		190.50	NA	NA
410		194.50	NA	NA

TABLE 47. *cont'd*

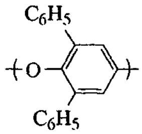
	Solid		Melt	
T (K)	Index	Value	Index	Value
420		198.20	NA	NA
430		201.30	NA	NA
440		204.70	NA	NA
450		208.10	NA	NA
460		211.60	NA	NA
470		215.00	NA	NA
480		218.40	NA	NA
490	NA	NA		252.80
500	NA	NA		255.10
510	NA	NA		257.30
520	NA	NA		259.60
530	NA	NA		261.90
540	NA	NA		264.20
550	NA	NA		266.50
560	NA	NA		268.70
570	NA	NA		271.00
580	NA	NA	NA	NA
590	NA	NA	NA	NA
600	NA	NA	NA	NA

Notes

References:
1. U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10**, 1036 (1981).
2. B. V. Lebedev, V. G. Vasil'ev, T. A. Bykova, E. G. Kiparisova, and B. Wunderlich, Vysokomol. Soedin. A, **38**, 216; Engl. Translat., Polym. Sci. Ser. A, **38** (2), 104 (1996)

T_g:	482.0 K	(C_p = 219.1–251.0)
T_m:	545.0 K	
Solid:	10–70 K	Experimental C_p data from Ref. 2
	80–320 K	Average experimental C_p data from Ref. 1 and 2
	320–480 K	Experimental C_p data from Ref. 1
	490–600 K	C_p data are not available
Melt:	10–480 K	Melt metastable
	490–570 K	Experimental C_p data from Ref. 1
	580–600 K	C_p data are not available

TABLE 48. POLY(OXY-2,6-DIPHENYL-1,4-PHENYLENE) (POPPO)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10	NA	NA	NA	NA
20	NA	NA	NA	NA
30	NA	NA	NA	NA
40	NA	NA	NA	NA
50	NA	NA	NA	NA
60	NA	NA	NA	NA
70	NA	NA	NA	NA
80	NA	NA	NA	NA
90	NA	NA	NA	NA
100	NA	NA	NA	NA
110	NA	NA	NA	NA
120	NA	NA	NA	NA
130	NA	NA	NA	NA
140	NA	NA	NA	NA
150	NA	NA	NA	NA

TABLE 48. *cont'd*

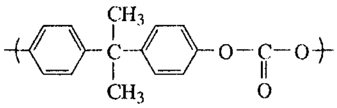
	Solid		Melt	
T (K)	Index	Value	Index	Value
160	NA	NA	NA	NA
170	NA	NA	NA	NA
180		180.60	NA	NA
190		189.20	NA	NA
200		198.20	NA	NA
210		207.30	NA	NA
220		215.90	NA	NA
230		223.10	NA	NA
240		229.40	NA	NA
250		235.90	NA	NA
260		243.30	NA	NA
270		251.20	NA	NA
280		259.30	NA	NA
290		267.00	NA	NA
300		274.10	NA	NA
310		280.50	NA	NA
320		287.00	NA	NA
330		294.50	NA	NA
340		302.50	NA	NA
350		309.50	NA	NA
360		315.00	NA	NA
370		320.20	NA	NA
380		326.30	NA	NA
390		333.00	NA	NA
400		339.40	NA	NA
410		344.80	NA	NA
420		350.10	NA	NA
430		356.30	NA	NA
440		363.00	NA	NA
450		369.50	NA	NA
460		375.20	NA	NA
470		380.30	NA	NA
480	NA	387.20	NA	NA
490	NA	393.30	NA	NA
500	NA	NA		476.50
510	NA	NA		483.40
520	NA	NA		490.30
530	NA	NA		497.30
540	NA	NA	NA	504.10
550	NA	NA	NA	510.90
560	NA	NA	NA	517.80
570	NA	NA	NA	524.70
580	NA	NA	NA	531.60
590	NA	NA	NA	538.50
600	NA	NA	NA	545.40

Notes

Reference: U. Gaur, B. Wunderlich, J. Phys. Chem. Ref. Data, **10**, (4) 1036 (1981).

T_g:	493.0 K	(C_p = 395.1–471.7)
T_m:	735.0 K	
Solid:	10–170 K	C_p data are not available
	180–470 K	Experimental C_p data (Data Bank, 1981)
	480–490 K	Extrapolated value from C_p in the region of 420–470 K (Data Bank, 1981)
	500–600 K	C_p data are not available
Melt:	10–490 K	Melt unstable
	500–530 K	Experimental C_p data (Data Bank, 1981)
	540–600 K	Extrapolated value from C_p in the region of 500–530 K & 780–820 K

TABLE 49. POLY(OXYCARBONYLOXY-1,4-PHENYLENE-ISOPROPYLIDENE-1,4-PHENYLENE) (PC)



	Solid		Melt	
T (K)	Index	Value	Index	Value
10		5.95	NA	NA
20		25.38	NA	NA
30		39.85	NA	NA
40		52.46	NA	NA
50		63.75	NA	NA
60		73.72	NA	NA
70		82.62	NA	NA
80		91.39	NA	NA
90		100.40	NA	NA
100		109.70	NA	NA
110		118.80	NA	NA
120		128.90	NA	NA
130		139.00	NA	NA
140		148.90	NA	NA
150		158.80	NA	NA
160		168.70	NA	NA
170		178.50	NA	NA
180		188.30	NA	NA
190		198.00	NA	NA
200		207.80	NA	NA
210		217.60	NA	NA
220		227.30	NA	NA
230		237.10	NA	NA
240		247.00	NA	NA
250		256.80	NA	NA
260		266.70	NA	NA
270		276.70	NA	NA
280		286.70	NA	NA
290		296.70	NA	NA
300		306.80	NA	NA
310		316.90	NA	NA
320		327.10	NA	NA
330		337.40	NA	NA
340		347.70	NA	NA
350		358.10	NA	NA
360		368.50	NA	NA
370		379.10	NA	NA
380		389.70	NA	NA
390		400.30	NA	NA
400		411.10	NA	NA
410		421.90	NA	NA
420		NA		480.30
430		NA		486.00
440		NA		491.80
450		NA		497.60
460		NA		503.40
470		NA		509.20
480		NA		515.00
490		NA		520.80
500		NA		526.60
510		NA		532.40
520		NA		538.20
530		NA		543.90
540		NA		549.70
550		NA		555.50
560		NA		561.30

TABLE 49. *cont'd*

	Solid		Melt	
T (K)	Index	Value	Index	Value
570		NA	NA	NA
580		NA	NA	NA
590		NA	NA	NA
600		NA	NA	NA

Notes

Reference: U. Gaur, S. F. Lau, B. Wunderlich, J. Phys. Chem. Ref. Data, **12**, (1) 93 (1983).

T_g:	418.0 K	(C_p = 430.6–479.1)
T_m:	608.2 K	
Solid:	10–410 K	Experimental C_p data of glassy sample (Data Bank, 1983)
	420–600 K	C_p data are not available
Melt:	10–410 K	Melt unstable
	420–560 K	Experimental C_p data (Data Bank, 1983)
	570–600 K	C_p data are not available

TABLE 50. TRIGONAL SELENIUM (SeT)

—(Se)—

	Solid		Melt	
T (K)	Index	Value	Index	Value
10		0.64	NA	NA
20		3.45	NA	NA
30		6.34	NA	NA
40		8.85	NA	NA
50		10.98	NA	NA
60		12.80	NA	NA
70		14.39	NA	NA
80		15.80	NA	NA
90		17.10	NA	NA
100		18.19	NA	NA
110		19.10	NA	NA
120		19.84	NA	NA
130		20.49	NA	NA
140		21.07	NA	NA
150		21.58	NA	NA
160		22.03	NA	NA
170		22.41	NA	NA
180		22.75	NA	NA
190		23.05	NA	NA
200		23.32	NA	NA
210		23.56	NA	NA
220		23.78	NA	NA
230		23.99	NA	NA
240		24.18	NA	NA
250		24.36	NA	NA
260		24.52	NA	NA
270		24.68	NA	NA
280		24.83	NA	NA
290		24.97	NA	NA
300		25.11	NA	NA
310		25.25		40.11
320		25.38		39.82
330		25.51		39.54
340		25.63		39.26
350		25.75		38.98
360		25.88		38.72
370		26.00		38.46
380		26.12		38.21
390		26.24		37.96
400		26.36		37.72
410		26.48		37.49
420		26.60		37.26
430		26.72		37.04
440		26.84		36.82
450		26.96		36.62
460		27.08		36.42
470		27.20		36.22
480		27.33		36.03
490		27.45		35.85
500		27.58		35.68
510	NA	NA		35.51
520	NA	NA		35.35
530	NA	NA		35.19
540	NA	NA		35.04
550	NA	NA		34.90
560	NA	NA		34.76
570	NA	NA		34.64
580	NA	NA		34.51
590	NA	NA		34.40
600	NA	NA		34.29

Notes

Reference: U. Gaur, H. C. Shu, A. Mehta, B. Wunderlich, J. Phys. Chem. Ref. Data, **10**, (1) 89 (1981).

T_g:	303.4 K	(C_p = 27.02–40.31)
T_m:	492.2 K	(C_p = 27.51–35.78)
Solid:	10–500 K	Experimental C_p data (Data Bank, 1981)
	510–600 K	C_p data are not available
Melt:	10–300 K	Melt unstable
	310–600 K	Experimental C_p data (Data Bank, 1981)

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Surface and Interfacial Tensions of Polymers, Oligomers, Plasticizers, and Organic Pigments

Souheng Wu
E. I. du Point de Nemours & Company, Central Research and Development Department, Experimental Station, Wilmington, Delware, USA

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A. INTRODUCTION

1. Definition

The surface (interfacial) tension is the reversible work required to create a unit surface (interfacial) area at constant temperature (T), pressure (P), and composition (n) (1), i.e.,

$$\gamma = (\partial G/\partial A)_{T,P,n} \tag{A1}$$

where γ is the surface (interfacial) tension, G the Gibbs free energy of the system, and A the surface (interfacial) area.

The specific surface free energy f_s is the free energy per unit surface area (1), i.e.,

$$f_s = \gamma + (C_1\mu_1 + C_2\mu_2) \tag{A2}$$

where C_j is the surface concentration (the number of moles per unit area) of component j, and μ_j is the chemical potential of component j. Thus $\gamma = f_s - (C_1\mu_1 + C_2\mu_2)$, which means that the surface tension is the *excess* specific surface free energy. The *excess* means in excess of the bulk phase. This distinguishes the surface tension and the specific surface free energy (1).

2. Temperature Dependence

The surface tension of polymers, just as with small-molecule liquids, varies with temperature (1) by

$$\gamma = \gamma_0(1 - T/T_c)^{11/9} \tag{A3}$$

where γ_0 is the surface tension at $T = 0\,\text{K}$, and T_c is the critical temperature. The temperature coefficient of surface tension is thus given (1) by

$$-d\gamma/dT = (11/9)(\gamma_0/T_c)(1 - T/T_c)^{2/9} \tag{A4}$$

Since $T_c \simeq 1000\,\text{K}$ for most polymers (1), $-d\gamma/dT$ is therefore practically constant at ordinary temperatures, i.e., $T \ll T_c$.

For polymer pairs that have an upper consolute curve and an UCST (upper critical solution temperature), the interfacial tension decreases with increasing temperature and vanishes at the upper consolute temperature. This is the case for most pairs of immiscible polymers. On the other hand, for polymers that have a lower consolute curve and an LCST (lower critical solution temperature), the interfacial tension vanishes at the lower consolute point and increases with increasing temperature in the immiscible region. A few polymer pairs appear to behave this way (24).

3. Macleod's Relation

The surface tension varies with density ρ according to Macleod's relation (1)

$$\gamma = \gamma^0\rho^\beta \tag{A5}$$

where γ^0 and β are constants, independent of temperature. β is known as the Macleod's exponent, and usually has a value of 3.0–4.5 for polymers (1). Thus the surface tension is "solely" determined by the density for a given chemical composition.

γ^0 is, to a close approximation, dependent only on the chemical constitution, and is related to Sugden's parachor (1) by

$$\gamma^0 = \left(\sum P_r\right)/M_r \tag{A6}$$

where $\sum P_r$ is the parachor of the repeat unit and M_r its formula weight. Equation (A6) neglects the end group effect (1). The parachor is a group additive quantity, independent of temperature, and its values have been tabulated elsewhere (104,105).

Macleod's relation provides a number of important relationships for analyzing the effects of molecular weight, glass transition, phase transition (crystallization), and chemical constitution on surface tension, as discussed below.

4. Molecular Weight Dependence

The surface tension varies with the number-average molecular weight M_n (1) by

$$\gamma^{1/4} = \gamma_\infty^{1/4} - k_1/M_n \tag{A7}$$

where γ_∞ is the surface tension at infinite molecular weight and k_1 is a constant. Equation (A7) follows directly from Macleod's relation (1). Alternatively, an empirical relation is given (1,81) as

$$\gamma = \gamma_\infty - k_2/M_n^{2/3} \tag{A8}$$

where k_2 is a constant. Equations (A7) and (A8) fit the experimental data equally well.

Usually, the surface tension increases with increasing molecular weight. When the molecular weight is greater than about 2000–3000, the surface tension reaches within about 1 mN/m (dyne/cm) of the value at infinite molecular weight. Therefore, the effect of molecular weight may usually be neglected for polymers, except for oligomers. Several exceptions have however been observed and explained in terms of end-group effects (1,4,103).

Relationships similar to Eqs. (A7) and (A8) may be written for the interfacial tension (1,81), i.e.,

$$\gamma^{1/4} = k_0 - k_3/M_{n1} - k_4/M_{n2} \tag{A9}$$

and

$$\gamma_{12} = k_0' - k_3'/M_{n1}^{2/3} - k_4'/M_{n2}^{2/3} \tag{A10}$$

where $k_0, k_3, k_4, k_0', k_3'$, and k_4' are constants, as discussed elsewhere (1).

5. Effects of Glass and Crystal-Melt Transitions

Macleod's relation also provides relationships for the effects of glass and crystal-melt transitions. At the glass transition, the surface tension is continuous, but its temperature coefficient is discontinuous. $(d\gamma/dT)_g$ below the glass temperature, T_g, is related to $(d\gamma/dT)_r$ above T_g (1) by

$$(d\gamma/dT)_g = (\alpha_g/\alpha_r)(d\gamma/dT)_r \tag{A11}$$

where α_g is the isobaric volumetric thermal expansion coefficient in the glassy region and α_r is that in the rubbery region. Since α_g is usually smaller than α_r, the surface tension varies less with temperature in the glassy region than in the rubbery region. Since $-d\gamma/dT$ is usually small, this effect is often neglected when the temperature range of interest is small.

On the other hand, both the surface tension and its temperature coefficient are discontinuous at the crystal-melt transition. The surface tension of crystalline surface, γ_c, is related to that of amorphous surface γ_a (1) by

$$\gamma_c = (\rho_c/\rho_a)^{\beta}\gamma_a \tag{A12}$$

where ρ_c is the crystalline density, and ρ_a the amorphous density. Since $\beta = 3.0–4.5$, and usually $\rho_c > \rho_a$, the crystalline surface can have a much higher surface tension than the amorphous surface. For example, polyethylene has $\beta = 3.2$, $\rho_a = 0.855$ g/cc, $\rho_c = 1.0$ g/cc, and $\gamma_a = 35.7$ mN/m at 20°C. Thus its crystalline surface tension is given by

$$\gamma_c = (35.7)(1/0.855)^{3.2} = 58.9\,\text{mN/m}$$

Note that the value given above refers to a truly crystalline surface. Most "melt-crystallized" semicrystalline polymers, however, have amorphous surface. Only when they are nucleated in the melt against certain nucleating surfaces, or their single crystals are grown from solutions, are crystalline surfaces obtained.

6. Effect of Surface Chemical Constitution

The Macleod–Sugden equation shows that the surface tension depends on surface chemical constitution and density. Since the density is roughly a function of chemical constitution (105), it is expected that a given surface constitution will have a certain "characteristic" surface tension. Some of these values are listed in Table 1. These values should, however, be used only qualitatively.

7. Dispersion (Nonpolar) and Polar Components

The surface tension can be separated into dispersion (nonpolar) and polar components (1) i.e.,

$$\gamma = \gamma^d + \gamma^p \tag{A13}$$

where γ^d is the dispersion component (arising from dispersion-force interactions) and γ^p the polar component (arising from various dipolar and specific interactions). The polarity x^p is defined as

$$x^p = \gamma^p/\gamma \tag{A14}$$

which is independent of temperature (1), i.e.,

$$dx^p/dT = 0 \tag{A15}$$

The interfacial tension is related to the surface tension and the polarity of the two contiguous phases by the harmonic-mean equation (1),

$$\gamma_{12} = \gamma_1 + \gamma_2 - \frac{4\gamma_1^d\gamma_2^d}{\gamma_1^d + \gamma_2^d} - \frac{4\gamma_1^p\gamma_2^p}{\gamma_1^p + \gamma_2^p} \tag{A16}$$

or the geometric-mean equation (1,54,108,109),

$$\gamma_{12} = \gamma_1 + \gamma_2 - 2(\gamma_1^d\gamma_2^d)^{1/2} - 2(\gamma_1^p\gamma_2^p)^{1/2} \tag{A17}$$

where the subscripts 1 and 2 refer to the two individual phases. The harmonic-mean equation has been shown to predict the interfacial tension between polymers adequately, whereas the geometric-mean equation is often less satisfactory (1,4).

The γ^d and γ^p components can be determined either from the interfacial tension or the contact angles by using Eq. (A16), the harmonic-mean equation, or less satisfactorily by Eq. (A17), the geometric-mean equation, as discussed elsewhere (1).

The polarity may also be defined in terms of the cohesive energy density (1), i.e.,

$$x^p = (\Delta E^p/\Delta E) = (\delta^p/\delta)^2 \tag{A18}$$

where ΔE is the cohesive energy density, ΔE^p its polar component, δ the solubility parameter, and δ^p its polar component. The polarity values determined from interfacial properties have been found to agree with those determined from cohesive energy densities for a number of polymers (1). It should be cautioned, however, that Eq. (A14) defines the surface polarity, while Eq. (A18) defines the bulk polarity. These two values may not be the same, if the polymer has sufficiently long surface-active segments, which tend to preferentially adsorb on the surfaces.

B. TABLES

Table 1 lists typical values of surface tension for some surface chemical constitutions.

Table 2 lists the surface tension, its temperature coefficient, polarity, and Macleod's exponent for amorphous surfaces. The surface tension for crystalline surface may be calculated from the amorphous value by using the Macleod's exponent. All data were obtained by direct reversible measurements in the melt. The values for the solid were obtained by extrapolation from the melts. These are the most reliable and preferred. On the other hand, some values were obtained by the contact angle method. These are denoted with the symbol (c). The two values usually agree well.

Table 3 lists the interfacial tension and its temperature coefficient for amorphous interfaces. All data were obtained by direct reversible measurements in the melt. The values for the solid were obtained by extrapolation from the melt and have been shown to be reliable. The interfacial tension

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may also be estimated from the surface tension and the polarity of the two phases by using the harmonic-mean equation (Eq. (A16)).

TABLE 1. SURFACE CHEMICAL CONSTITUTION AND SURFACE TENSION

Surface chemical constitution	Surface tension at 20°C (mN/m ≡ dyn/cm)
1.1. HYDROCARBON SURFACES	
$-CH_3$	30
$-CH_2$	36
$-CH_2-$ and $=CH-$	43
$=CH-$ (phenyl ring edge)	45
1.2. FLUOROCARBON SURFACES	
$-CF_3$	15
$-CF_2H$	26
$-CF_3$ and $-CF_2-$	17
$-CF_2-$	23
$-CH_2CF_3$	23
$-CF_2-CFH-$	30
$-CF_2-CH_2-$	33
$-CFH-CH_2-$	37
1.3. CHLOROCARBON SURFACES	
$-CHCl-CH_2-$	42
$-CCl_2-CH_2-$	45
$=CCl_2$	50
1.4. SILICONE SURFACES	
$-O-Si(CH_3)_2-O-$	20
$-O-Si(CH_3)(C_6H_5)-O-$	26

TABLE 2. SURFACE TENSION, POLARITY, AND MACLEOD'S EXPONENT FOR AMORPHOUS SURFACES

Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
2.1. HYDROCARBON POLYMERS							
Poly(acetylene)							
cis-isomer	51 (c)	–	–	–	0.08	–	5
trans-isomer	52 (c)	–	–	–	0.05	–	5
Poly(butadiene), $M_n = 5400$							
carboxyl acid end group	48.6	29.9	22.7	0.1440	–	–	70
methyl ester end group	43.1	28.8	23.3	0.1098	–	–	70
Poly(butadiene-*stat*-acrylonitrile), carboxyl end group							
18% by weight AN $M_n = 5300$	51.3	40.0	35.7	0.0866	–	–	70
27% by weight AN $M_n = 5900$	52.6	40.2	35.4	0.0955	–	–	70
Poly(ethylene), branched							
$M_n = 7000$	35.3	26.6	23.3	0.067	0	3.3	1–3,7–14
$M_n = 2000$	33.7	25.9	22.9	0.060	0	–	15
Poly(ethylene), linear							
$M_n = \infty$	36.8	29.4	26.6	0.056	0	3.2	9
$M_w = 67000$	35.7	28.2	25.4	0.057	0	3.2	1–3,7,11 14,15
Poly(ethylene-*stat*-acrylic acid)							
mol% acrylic acid 20	59 (c)	–	–	–	–	–	19
14	55 (c)	–	–	–	–	–	19
8	44 (c)	–	–	–	–	–	19
3	41 (c)	–	–	–	–	–	19
Poly(ethylene-*stat*-propylene)							
mol% PP M_w							
34 37000	33.8	25.7	22.6	0.062	0	3.0	13
36 33000	33.1	25.4	22.4	0.059	0	3.0	13
44 15000	32.0	24.1	21.0	0.061	0	3.3	13
50 63000	31.0	23.5	20.6	0.058	0	3.2	13
60 58000	30.7	23.2	20.3	0.058	0	2.8	13
Poly(ethylene-*stat*-propylene-*stat*-hexadiene), EPDM, E/PP/HD/ = 69.5/26.5/4.0 weight ratio comonomers							
$M_n = 17000$, $M_w = 70000$	34.5	26.2	23.0	0.064	0	–	20

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	− dγ/dT (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
Poly(ethylene-*stat*-vinyl acetate)							
E/VA weight ratio 75/25	35.5	26.8	23.5	0.067	0.050	–	12
82.3/17.7	34.1	27.1	24.4	0.054	0.025	–	21–24
73.4/26.6	31.3	26.5	24.7	0.037	0.064	–	21–24
69.1/30.9	30.6	26.4	24.7	0.033	0.083	–	21–24
61.3/38.7	33.0	26.9	24.6	0.047	0.108	–	21–24
Poly(isobutene)							
$M_n = 2700$	33.6	25.3	22.1	0.064	–	4.1	7,11,17,26
Poly(isoprene)							
cis-isomer	32 (c)	–	–	–	–	–	6
cyclized	34 (c)	–	–	–	–	–	6
trans isomer	31 (c)	–	–	–	–	–	6
Poly(4-methyl-1-pentene)	25 (c)	–	–	–	–	–	6
Poly(propylene)							
atactic	29.4	22.1	19.3	0.056	0	3.2	4,11,13,16
isotactic	29.4	22.1	19.3	0.056	0	3.2	4,13
isotactic and atactic mixture	30.1	22.5	19.6	0.058	0.020	3.2	17,18
Poly(styrene) and copolymers, see Styrene Polymers							
Poly(xylylenes), see Styrene Polymers							
2.2. STYRENE POLYMERS							
Poly(2-methylstyrene)							
$M_n = 3000$	38.7	31.1	28.2	0.058	–	4.0	4,17,21
Poly(styrene)							
$M_v = 44000$	40.7	31.4	27.8	0.072	0.168	4.4	8,28–30
$M_n = 9300$	39.4	31.0	27.7	0.065	–	–	31
$M_n = 1700$	39.3	29.2	25.4	0.077	–	–	31
Poly(styrene-*stat*-acrylonitrile)							
mol% acrylonitrile 32.7	43 (c)	–	–	–	–	–	32
27.6	42 (c)	–	–	–	–	–	32
16.8	40 (c)	–	–	–	–	–	32
6.9	37 (c)	–	–	–	–	–	32
Poly(styrene-*stat*-2,2,3,3-tetrafluoropropyl methacrylate							
mol% styrene 98	31 (c)	–	–	–	–	–	33
95	30 (c)	–	–	–	–	–	33
90	29 (c)	–	–	–	–	–	33
80	28 (c)	–	–	–	–	–	33
70	27 (c)	–	–	–	–	–	33
60	26 (c)	–	–	–	–	–	33
50	25 (c)	–	–	–	–	–	33
40	25 (c)	–	–	–	–	–	33
30	21 (c)	–	–	–	–	–	33
20	20 (c)	–	–	–	–	–	33
10	19 (c)	–	–	–	–	–	33
2	19 (c)	–	–	–	–	–	33
1	18 (c)	–	–	–	–	–	33
Poly(xylylene), see also Halogenated Hydrocarbons	46.3 (c)	–	–	–	0.013	–	27
2.3. HALOGENATED HYDROCARBON POLYMERS							
Poly(2-chloro-1,4-xylylene), poly((3-chloro-1,4-phenylene)ethylene)	47.1 (c)	–	–	–	0.019	–	27
Poly(chloroprene) $M_v = 30000$	43.6	32.3	28.0	0.086	0.108	4.2	2,3
Poly(chlorotrifluoroethylene)	30.9	22.2	18.9	0.067	0.282	–	1–3,37
Poly(chlorotrifluoroethylene-*stat*-tetrafluoroethylene)							
Wt.% TFE							
60	25.2 (c)	–	–	–	0.348	–	1–3
80	21.3 (c)	–	–	–	0.354	–	1–3
Poly(dichloro-1,4-xylylene), poly((dichloro-1,4-phenylene)ethylene)	46.3 (c)	–	–	–	0.009	–	27

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
Poly(hexachlorobutadiene)	41.5 (c)	–	–	–	0.019	–	34
Poly(hexafluoropropylene)	17.0 (c)	–	–	–	0.120	–	1–3
	12.8 (c)	–	–	–	0.065	–	1–3
Poly(tetrafluoroethylene)							
$M = \infty$	23.9	16.3	13.4	0.058	0.089	–	9
$C_{21}F_{44}$ ($M = 1088$)	21.5	13.1	9.8	0.065	–	–	9,38,39
Poly(tetrafluoroethylene-*stat*-ethylene)							
50/50 weight ratio TFE/E	27.6 (c)	–	–	–	0.286	–	1–3
Poly(trifluoroethylene)	27.3 (c)	–	–	–	0.118	–	1–3
Poly(vinyl chloride)	41.9 (c)	–	–	–	0.146	–	1–3
Poly(vinyl fluoride)	38.4 (c)	–	–	–	0.292	–	1–3
Poly(vinylidene chloride)	45.4 (c)	–	–	–	0.196	–	1–3
Poly(vinylidene fluoride)	33.2 (c)	–	–	–	0.376	–	1–3
2.4. VINYL POLYMERS - ESTERS							
Poly(ethylene-*stat*-vinyl acetate), see Hydrocarbon Polymers							
Poly(vinyl acetate) $M_w = 11000–120000$	36.5	27.9	24.6	0.066	0.329	3.4	7.12
Poly(vinyl butyrate)	31.1	22.0	18.5	0.070	0.172	3.5	4,40
Poly(vinyl decanoate)	28.9	20.9	17.8	0.062	0.061	3.3	4,40
Poly(vinyl dodecanoate)	29.1	20.9	17.8	0.063	0.044	3.2	4,40
Poly(vinyl hexadecanoate)	30.9	22.5	19.0	0.066	0.035	3.2	4,40
Poly(vinyl hexanoate)	29.4	21.2	18.1	0.063	0.128	3.4	4,40
Poly(vinyl propionate)	34.0	24.7	21.1	0.072	0.221	3.6	4,40
Poly(vinyl octanoate)	28.7	20.7	17.7	0.061	0.078	3.3	4,40
2.5. VINYL POLYMERS - OTHERS							
Poly(acrylamide)	52.3 (c)	–	–	–	0.493	–	41
Poly(acrylonitrile)	50 (c)	–	–	–	–	–	1
Poly(heptafluoroisopropoxy)ethylene)	15 (c)	–	–	–	–	–	42
Poly(1-(heptafluoroisopropoxy)methyl) propylene-*stat*-maleic acid)	19 (c)	–	–	–	–	–	43
Poly(1-heptafluoroisopropoxy)propylene)	21 (c)	–	–	–	–	–	42
Poly(methacrylonitrile)	39 (c)	–	–	–	–	–	1
Poly(styrene-*stat*-acrylonitrile), see Styrene Polymers							
Poly(vinyl alcohol)	37 (c)	–	–	–	–	–	44
Poly(vinyl butyral)	38 (c)	–	–	–	–	–	1
Poly(vinyl ethyl ether), poly(ethoxyethylene)	36 (c)	–	–	–	–	–	45
Poly(vinyl methyl ether), poly(methoxyethylene)							
$M_n = 46500$, $M_w = 99000$	31.8	22.1	18.3	0.075	–	–	70
Poly(vinyl formal)	39 (c)	–	–	–	–	–	35
2.6. ACRYLIC POLYMERS - NONFLUORINATED							
Poly(acrylamide) see Vinyl Polymers (nonesters)							
Poly(acrylonitrile), see Vinyl Polymers (nonesters)							
Poly(*n*-butyl acrylate)							
$M_n = 32000$	33.7	24.6	21.1	0.070	0.098	–	1
	30.7	22.8	19.7	0.061	0.127	–	46,107
Poly(ethyl acrylate)							
$M_n = 28000$	37.0	27.0	23.2	0.070	0.174	–	1
	33.7	26.4	23.6	0.056	0.205	–	46,107
Poly(ethylene-*stat*-acrylic acid), see Hydrocarbon Polymers							
Poly(2-ethylhexyl acrylate)							
$M_n = 34000$	30.2	21.1	17.6	0.070	0.028	–	1
	29.2	21.1	18.0	0.062	0.076	–	46,107
Poly(methyl acrylate)							
$M_n = 25000$	41.0	31.0	27.2	0.070	0.248	–	1
	42.7	31.0	26.5	0.090	0.210	–	46,107

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm)			$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
	20°C	150°C	200°C				
2.7. ACRYLIC POLYMERS - FLUORINATED							
Poly((1-chlorodifluoromethyl)tetrafluoroethyl acrylate)	19 (c)	–	–	–	–	–	47
Poly(di(chlorodifluoromethyl) fluoromethyl acrylate)	20 (c)	–	–	–	–	–	47
Poly(1,1-dihydroheptafluorobutyl acrylate)	15 (c)	–	–	–	–	–	47
Poly(1,1-dihydropentafluoroisopropyl acrylate)	15 (c)	–	–	–	–	–	47
Poly(1,1-dihydropentadecafluorooctyl acrylate)	10 (c)	–	–	–	–	–	47
Poly(heptafluoroisopropyl acrylate)	14 (c)	–	–	–	–	–	47
Poly(5-(heptafluoroisopropoxy)pentyl acrylate)	18 (c)	–	–	–	–	–	47
Poly(11-(heptafluoroisopropoxy)undecyl acrylate)	20 (c)	–	–	–	–	–	47
Poly(2-heptafluoropropoxy)ethyl acrylate)	16 (c)	–	–	–	–	–	47
Poly(nonafluoroisobutyl acrylate)	14 (c)	–	–	–	–	–	47
2.8. METHACRYLIC POLYMERS - NONFLUORINATED							
Poly(benzyl methacrylate)	36 (c)	–	–	–	–	–	49
Poly(*n*-butyl methacrylate)							
$M_v = 37000$	31.2	23.5	20.6	0.059	0.158	4.2	8
Poly(isobutyl methacrylate)							
$M_v = 35000$	30.9	23.1	20.1	0.060	0.139	–	2
Poly(*t*-butyl methacrylate)							
$M_v = 6000$	30.4	22.7	19.8	0.059	0.120	–	2
Poly(*t*-butylaminoethyl methacrylate)	34 (c)	–	–	–	–	–	1,35
Poly(dodecyl methacrylate), poly(lauryl methacrylate)	32.8 (c)	–	–	–	–	–	1,35
Poly(ethyl methacrylate)							
$M_v = 5200$	35.9	26.8	23.3	0.070	–	–	1,35
Poly(2-ethylhexyl methacrylate)							
$M_v = 64000$	28.8	20.8	17.7	0.062	–	–	1,35
Poly(*n*-hexyl methacrylate)							
$M_v = 52000$	30.0	22.0	18.9	0.062	–	–	1,35
Poly(dimethylaminoethyl methacrylate)	36 (c)	–	–	–	–	–	1,35
Poly(hydroxyethyl methacrylate), see also Methacrylic Hydrogels	37 (c)	–	–	–	–	–1,	5
Poly(lauryl methacrylate), see Poly(dodecyl methacrylate)							
Poly(methyl methacrylate), see also Methacrylic Hydrogels							
$M = 3000$	41.1	31.2	27.4	0.076	0.281	4.2	8
Poly(phenyl methacrylate)	35 (c)	–	–	–	–	–	49
Poly(*n*-propyl methacrylate)							
$M = 8500$	33.3	24.7	21.5	0.065	–	–	1,35
Poly(stearyl methacrylate), poly(octadecyl methacrylate)	36.3 (c)	–	–	–	–	–	47
2.9. METHACRYLIC POLYMERS - FLUORINATED							
Poly(1,1-dihydropentadecafluorooctyl methacrylate)	10.5 (c)	–	–	–	0.048	–	50,53,54
Poly(heptafluoroisopropyl methacrylate)	15 (c)	–	–	–	–	–	47
Poly(heptadecafluorooctyl methacrylate)	15.3 (c)	–	–	–	0.094	–	51,52
Poly(1-hydrotetrafluoroethyl methacrylate)	15 (c)	–	–	–	–	–	47
Poly(1,1-dihydrotetrafluoropropyl methacrylate)	19 (c)	–	–	–	–	–	33
Poly(1-hydrohexafluoroisopropyl methacrylate)	15 (c)	–	–	–	–	–	47,55
Poly(*t*-nonafluorobutyl methacrylate)	15 (c)	–	–	–	–	–	48
Poly(styrene-*stat*-2,2,3,3-tetrafluoropropyl methacrylate), see Styrene Polymers							
2.10. METHACRYLIC HYDROGELS							
Poly(hydroxyethyl methacrylate)							
dry	37 (c)	–	–	–	–	–	1,35
40 wt.% water	69.0 (c)	–	–	–	–	–	56
Poly(hydroxyethyl methacrylate-*stat*-dimethylaminoethyl methacrylate)							
weight ratio / wt.% water							
99.9/0.1 / 40	68.2 (c)	–	–	–	0.701	–	56
97/3 / 59	65.3 (c)	–	–	–	0.657	–	56

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
Poly(hydroxyethyl methacrylate-*stat*-methoxyethyl methacrylate)							
weight ratio wt.% water							
75/25 33	69.1 (c)	–	–	–	0.670	–	56
50/50 23	67.8 (c)	–	–	–	0.608	–	56
25/70 19	68.0 (c)	–	–	–	0.496	–	56
Poly(hydroxyethyl methacrylate-*stat*-methacrylic acid)							
weight ratio wt.% water							
99.1/0.1 40	68.7 (c)	–	–	–	0.700	–	56
97/3 39	67.6 (c)	–	–	–	0.704	–	56
Poly(hydroxyethyl methacrylate-*stat*-methyl methacrylate)							
weight ratio wt.% water							
95/5 43	68.6 (c)	–	–	–	0.697	–	56
75/25 43	67.0 (c)	–	–	–	0.640	–	56
50/50 21	65.7 (c)	–	–	–	0.543	–	56
25/75 7	65.6 (c)	–	–	–	0.410	–	56
5/95 3	54.4 (c)	–	–	–	0.393	–	56
Poly(methyl methacrylate), see also Methacrylic Polymers for Dry Surfaces							
3 wt.% water	60.9 (c)	–	–	–	0.282	–	56
Poly(methyoxyethyl methacrylate)							
2 wt.% water	71.1 (c)	–	–	–	0.301	–	56

2.11. POLY(ETHERS) (see also POLY(ETHER) COPOLYMERS, POLY(SULFONE), POLY(CARBONATE), PHENOXY RESIN, EPOXY RESIN, VINYL POLYMERS)

Polymer	20°C	150°C	200°C	$-d\gamma/dT$	Polarity	β	Refs.
Poly(chloral)	37.9 (c)	–	–	–	0.037	–	34
Poly(epichlorohydrin)							
$M = 1500$	43.2 (25°C)	–	–	–	–	–	57
Poly(oxybutene)-diol	38.2	28.0	24.0	0.079	0.003	3.7	58
Poly(oxyisobutene)-diol							
$M = 30000$	27.5	19.0	15.7	0.066	–	3.8	61
Poly(oxydecamethylene)	36.1	27.2	23.8	0.068	–	2.8	58
Poly(oxyethylene)-diol							
$M = -17000$	42.9	30.1	25.2	0.098	0.284	3.0	9,59–61
Poly(oxyethylene)-diol							
$M = 6000$	42.9	33.0	29.2	0.076	0.284	3.0	9,11,12,
$M = 6000$	42.5	30.1	25.4	0.095	0.165	2.9	9,62
Poly(oxyethylene)-dimethylether							
$M = 114$	28.6	16.0	11.1	0.097	–	4.4	9,59–61
$M = 148$	31.1	18.6	13.8	0.096	–	4.4	9,59–61
$M = 182$	32.9	20.5	15.8	0.095	–	4.0	9,59–61
$M = 600$	37.5	26.1	21.7	0.088	–	3.5	9,59–61
$M = 5000$	44.1	32.7	28.3	0.088	–	3.5	9,59–61
$M = 100000$	44.2	32.8	28.4	0.088	–	3.5	9,56–61
Poly(oxyhexamethylene)-diol	37.4	27.5	23.7	0.076	–	3.2	58
Poly(oxymethylene)	44.6 (c)	–	–	–	0.316	–	1,35
Poly(oxypropylene)-diol							
$M = 2025$	31.5	21.1	17.1	0.080	–	3.4	13
$M = ?$	31.7	20.6	16.4	0.085	0.014	3.4	62
$M = 3000$	31.2	20.9	17.0	0.079	–	3.4	13,57,60,61
$M = 400–4100$	31.1	21.6	17.9	0.073	–	3.4	57,60,61
Poly(oxypropylene)-dimethylether							
$M = 3000$	30.7	18.3	13.6	0.095	–	3.6	57,60,61
Poly(oxytetramethylene)							
$M = 43000$	31.9	24.0	20.9	0.061	0142	–	2,12
$M = 2500$	38.2	27.9	24.0	0.079	–	3.7	13

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m $\equiv$ dyn/cm) 20°C	150°C	200°C	$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.

2.12. POLY(ETHER) COPOLYMERS

Poly(oxyethylene)-*block*-poly(oxypropylene)-*block*-poly(oxyethylene)

wt.% OP	DP of blocks OE	OP	OE	20°C	150°C	200°C	$-d\gamma/dT$	x^P	β	Refs.
19.0	46	16	46	36.8	27.8	24.3	0.069	0.129	2.8	57,60,62
48.9	11	16	11	34.2	25.0	21.5	0.071	0.105	3.0	57,60,62
56.9	8	16	8	33.7	24.3	20.7	0.072	0.094	3.1	57,60,62
84.1	2	16	2	32.9	22.8	18.9	0.078	0.047	3.4	57,60,62
19.0	75	30	75	34.7	26.6	23.5	0.062	0.096	2.5	57,60,62
55.1	13	30	13	33.4	24.7	21.3	0.067	–	2.7	57,60,62
59.6	10	30	10	32.7	23.7	20.2	0.069	–	2.8	57,60,62
85.5	3	30	3	31.8	22.1	18.4	0.074	–	3.3	57,60,62
18.9	110	39	110	33.8	26.3	23.4	0.058	0.095	2.6	57,60,62
20.2	122	47	122	33.2	26.0	23.2	0.056	0.074	2.4	57,60,62
20.2	139	56	139	32.3	25.5	22.9	0.052	0.069	2.5	57,60,62
38.3	56	56	56	32.4	25.0	22.1	0.057	–	2.6	57,60,62
57.7	28	56	28	32.1	24.4	21.4	0.059	–	2.7	57,60,62
66.7	19	56	19	31.9	23.8	20.7	0.062	–	2.8	57,60,62
86.7	6	56	6	31.7	23.2	20.0.0	0.065	–	2.9	57,60,62

Poly(oxyethylene-*stat*-oxypropylene)

mol% oxypropylene	20°C	150°C	200°C	$-d\gamma/dT$	x^P	β	Refs.
17	40.5	28.1	23.4	0.095	0.139	3.6	57,62
30	39.3	26.9	22.2	0.095	0.127	3.6	57,62
41	37.5	25.5	20.9	0.092	0.112	3.6	57,62
56	34.9	23.2	18.7	0.090	0.061	3.6	57,62
76	33.4	22.3	18.0	0.086	0.040	3.3	57,62
85	32.4	21.3	17.0	0.086	0.031	3.4	57,62

Poly(oxyethylene-*stat*-oxypropylene)-*block*-poly(oxydimethylsilylene)-*block*-poly(oxyethylene-*stat*-oxypropylene)]; i.e., Poly(oxyethylene-*stat*-oxypropylene) has a comonomer weight ratio of 50/50, $M_n = 2200$

wt.% of polysiloxane	DP of polysiloxane	20°C	150°C	200°C	$-d\gamma/dT$	x^P	β	Refs.
0	0	34.8 (25°C)	–	–	–	–	–	63
4.6	4.9	28.0 (25°C)	–	–	–	–	–	63
7.5	7.9	25.4 (25°C)	–	–	–	–	–	63
9.9	10.4	21.4 (25°C)	–	–	–	–	–	63
19.8	20.8	20.6 (25°C)	–	–	–	–	–	63
32.6	34.3	20.5 (25°C)	–	–	–	–	–	63

Poly(oxytetramethylene-*stat*-oxypropylene)

mol% oxypropylene	M_w	20°C	150°C	200°C	$-d\gamma/dT$	x^P	β	Refs.
25	2100	36.4	26.0	22.0	0.080	–	3.3	13
35	1200	36.0	25.7	21.8	0.079	–	3.2	13
46	1900	34.9	24.3	20.2	0.082	–	3.5	13
52	2250	34.3	23.8	19.7	0.081	–	3.5	13
67	2200	33.1	22.8	18.9	0.079	–	3.4	13
85	1700	31.9	21.6	17.7	0.079	–	3.5	13

2.13. POLY(ESTERS)

Polymer	20°C	150°C	200°C	$-d\gamma/dT$	x^P	β	Refs.
Poly(oxydecamethyleneoxyisophthaloyl), poly(decamethylene isophthalate)	42.7	33.3	29.7	0.072	0.192	3.0	98
Poly(oxydodecamethyleneoxyisophthaloyl), poly(dodecamethylene isophthalate)	40.0	30.9	27.4	0.070	0.149	3.0	98

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TABLE 2. *cont'd*

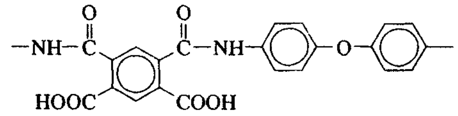
Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
Poly(oxyethyleneoxyterephthaloyl), poly(ethylene terephthalate) $M_n = 16000$ $M_w = 37000$	44.6	36.2 27.7 (280°C)	32.9 24.8 (325°C)	0.065	0.221	–	1,14,20,64
Poly(oxyhexamethyleneoxyisophthaloyl), poly hexamethylene isophthalate)	45.6	35.6	31.7	0.077	0.242	3.3	98
Poly(oxytetramethyleneoxyisophthaloyl), poly(butylene isophthalate)	47.8	37.4	33.4	0.080	0.270	3.2	98
Poly(oxytrimethyleneoxyisophthaloyl), poly(propylene isophthalate)	49.3	38.5	34.3	0.083	0.288	3.0	98
2.14. POLY(CARBONATES)							
Poly(oxycarbonyloxy-1, 4-phenyleneisopropylidene-1,4-phenylene), polycarbonate of bisphenol-A	42.9 45 (c)	35.1 –	32.1 –	0.060 –	0.246 –	– –	35 65
2.15. POLY(SULFONES)							
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneisoproypylidene-1,4-phenylene), polysulfone	46.6 (c)	–	–	–	0.347	–	35
2.16. PHENOXY RESINS							
Poly(oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-2-hydroxytrimethylene), phenoxy resin $M = 30000$	43.0	–	–	–	–	–	35
2.17. EPOXY RESINS							
Diglycidyl ether of bisphenol-A, 2,3-di(glycidoxy-1,4-phenylene) propane pure, $M = 340$	47.2 45.6	– –	– –	– –	– 0.432	– –	67 35,68
Diglycidyl ether of bisphenol-A, 2,3-(diglycidoxy-1,4-phenylene)propane chain extended with bisphenol-A	51.2(23 °C)	–	–	–	–	–	85
Diglycidyl ether of bisphenol-A with 6 wt.% of *N*-*N*-diethylaminopropylamine fresh, mixture, not cured	33.7	–	–	–	–	–	67,68
cured	46.8 (c)	–	–	–	–	–	35
Diglycidyl ether of bisphenol-A with stoichiometric amount of triethylenetetramine cured	39.1 (c)	–	–	–	0.166	–	35
Diglycidyl ether of bisphenol-A with 0.5 wt.% of *N*-methylaminopropyltrimethoxysilane fresh, mixture, not cured	39.1	–	–	–	–	–	68
Diglycidyl ether of bisphenol-A with 0.5 wt.% of γ-glycidoxypropyltrimethoxysilane fresh, mixture, not cured	32.9	–	–	–	–	–	68
Curing agent: γ-aminopropyltrimethoxysilane $M = 179$	25.5	–	–	–	–	–	68
Curing agent: *N*,*N*-dibutylaminopropylamine $M = 186$	25.3	–	–	–	–	–	68
Curing agent: *N*,*N*-diethylaminopropylamine $M = 130$	24.6	–	–	–	–	–	68
Curing agent: *N*,*N*-dimethylaminopropylamine $M = 102$	23.9	–	–	–	–	–	68
Curing agent: *N*-methylaminopropyltrimethoxysilane $M = 193$	27.0	–	–	–	–	–	68
Curing agent: γ-glycidoxypropyltrimethoxysilane $M = 236$	23.9	–	–	–	–	–	68
2.18. POLY(AMIDES)							
Poly(glycine), (nylon 2), see Poly(peptides)							
Poly(imino(1-oxodecamethylene))(nylon 11)	–	22.6 (225°C)	–	–	–	–	72

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
Poly(imino(1-oxododecamethylene) (nylon 12)	35.8 (c)	–	–	–	0.154	–	73
Poly(imino(1-oxohexamethylene)) (nylon 6)	38.4 (c)	–	–	–	0.188	–	35
	–	–	36.1 (265°C)		–	–	72
Poly(imino(1-oxotetramethylene)) (nylon 4)	48.5 (c)	–	–	–	0.427	–	52,73
Poly(imino-1,4-phenyleneiminoterephthaloyl), poly(1,4-phenylene terephthalamide)							
fiber (unsized)	48.5 (c)	–	–	–	0.216	–	74
cast sheet (H-bonding parallel to surface)	33.7 (c)	–	–	–	0.206	–	75
cast sheet (H-bonding vertical to surface)	31.3 (c)	–	–	–	0.202	–	75
Poly(iminoadipoyliminohexamethylene) (nylon 66)	46.5	38.1	34.8	0.065	0.344	–	1,14,20,
$M_n = 17000$, $M_w = 35000$		29.6 (280°C)	26.7 (325°C)				
Poly(iminoazelaoyliminononamethylene) (nylon 99)	36(c)	–	–	–	–	–	71
Poly(iminopimeloyliminoheptamethylene) (nylon 77)	43 (c)	–	–	–	–	–	71
Poly(iminosebacoyliminodecamethylene) (nylon 1010)	32 (c)	–	–	–	–	–	71
Poly(iminosebacoyliminohexamethylene) (nylon 610)	–	–	37.0 (265°C)		–	–	72
Poly(iminosuberoyliminooctamethylene) (nylon 88)	34 (c)	–	–	–	–	–	71

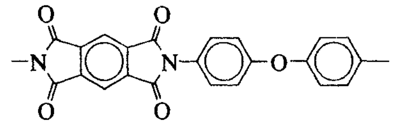
2.19. POLY(IMIDES)

Poly(iminocarbonyl-(4,6-dicarboxy-1,3-phenylene)-carbonylimino-1,4-phenyleneoxy-1,4-phenylene), KAPTON H film



Polymer	20°C	150°C	200°C	$-d\gamma/dT$	Polarity	Macleod's exponent	Refs.
KAPTON H film	41.0 (c)	–	–	–	0.358	–	35,76

Poly[(1,3,5,7-tetraoxo-2,3,6,7-tetrahydro-1H,5H-benzo[1,2-c:4,5-c] dipyrrol-2,6-diyl-1,4-phenyleneoxy-1,4-phenylene), cured KAPTON H film



Polymer	20°C	150°C	200°C	$-d\gamma/dT$	Polarity	Macleod's exponent	Refs.
cured KAPTON H film	37.7 (c)	–	–	–	0.223	–	35,76

2.20. POLY(IMINES)

Polymer	20°C	150°C	200°C	$-d\gamma/dT$	Polarity	Macleod's exponent	Refs.
Poly((benzoylimino)ethylene)	26 (c)	–	–	–	–	–	77
Poly((butyrylimino)ethylene)	25 (c)	–	–	–	–	–	77
Poly((dodecanoylimino)ethylene)	22 (c)	–	–	–	–	–	78
Poly((dodecanoylimino)ethylene-*stat*-(acetylimino) trimethylene)	22 (c)	–	–	–	–	–	78
Poly((heptanoylimino)ethylene)	22 (c)	–	–	–	–	–	77
Poly((hexanoylimino)ethylene)	23 (c)	–	–	–	–	–	77
Poly(((3-methyl)butyrylimino)ethylene)	24 (c)	–	–	–	–	–	77
Poly((pentadecafluorooctadecanoylimino)ethylene)	11 (c)	–	–	–	–	–	77
Poly((pentanoylimino)ethylene)	23 (c)	–	–	–	–	–	77

2.21. POLY(URETHANES)

Polymer	20°C	150°C	200°C	$-d\gamma/dT$	Polarity	Macleod's exponent	Refs.
Poly(methylenediphenyldiisocyanate-*alt*-(butanediol poly(oxytetramethylene)diol) (ESTANE 5714)	39 (c)	–	–	–	0.179	–	79
Poly(hexamethylene diisocyanate-*alt*-triethylene glycol)	38.6 (c)	–	–	–	0.194	–	73
Poly(4-methyl-1,3-phenylene diisocyanate-*alt*-tripropylene glycol)	36.3 (c)	–	–	–	0.344	–	73

2.22. POLY(SILOXANES) (see also ORGANOSILANES)

Polymer	20°C	150°C	200°C	$-d\gamma/dT$	Polarity	Macleod's exponent	Refs.
Poly(oxydiethylsilylene)							
158 cS	25.7	16.2	12.5	0.073	–	–	80
Poly(oxydimethylsilylene)							
$M = 75000$	20.39	14.15	11.75	0.048	0.042	3.5	2.9
	21.17	–	–	–	–	–	26
	21.01	13.47	10.57	0.058	–	–	83

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	−dγ/dT (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
$M = 3900$	20.17	13.93	11.53	0.048	0.042	3.5	2,9
	20.59	–	–	–		–	26
	20.47	12.93	10.03	0.058	–	–	83
60000 cS	19.8	13.5	11.1	0.048	0.042	3.5	2,11,14, 80,82
$M = 1274$	19.9	–	–	–	–	3.5	80–82
$M = 607$	18.8	–	–	–	–	3.7	80–82
$M = 310$	17.6	–	–	–	–	3.7	80–82
$M = 162$	15.7	–	–	–	–	4.0	80–82
Poly(oxydimethylsilylene), α,ω-difunctional $[R–(Si(CH_3)_2–O–)_n–Si(CH_3)_2–R]$							
$R = (CH_2)_3NH_2$							
$M_n = 2086$	20.88	14.12	11.52	0.052	–	–	70
$M_n = 7916$	19.86	12.97	10.32	0.053	–	–	70
Poly(oxydimethylsilylene), α,ω-difunctional $R–(Si(CH_3)_2–O–)_n–Si(CH_3)_2–R$							
$R = (CH_2)_5NH_2$; $M_n = 1132$	21.00	14.37	11.82	0.051	–	–	70
$R = (CH_2)_3COOH$; $M_n = 2194$	20.54	13.52	10.82	0.054	–	–	70
Poly(oxydimethylsilylene) block copolymers, see Poly(ester) Copolymers							
Poly(oxymethylphenylsilylene)							
102 cS	26.1	11.8	6.3	0.11	–	–	80
2.23. ORGANOSILANES – HYDROLYZED AND CONDENSED FILMS (see also POLYSILOXANES and EPOXY RESINS)							
2.23.1. ALKYL AND ALKYLENE SILANES							
Ethyltriethoxysilane, $CH_3CH_2Si(OC_2H_5)_3$							
on silica (no catalyst)	36.7 (c)	–	–	–	–	–	1,35
on silica (acetic acid catalyst)	34.5 (c)	–	–	–	–	–	1,35
on silica (propionic acid catalyst)	27.8 (c)	–	–	–	–	–	1,35
on silica (piperidine catalyst)	33.4 (c)	–	–	–	–	–	1,35
γ-Methacryloxypropyltrimethoxysilane, $CH_2{=}C(CH_3)–C({=}O)O(CH_2)_3Si(OCH_3)_3$							
on soda-lime glass	44.8 (c)	–	–	–	–	–	1,35
Methyltrimethoxysilane, $CH_3Si(OCH_3)_3$							
on soda-lime glass	28.0 (c)	–	–	–	–	–	1,35
Phenyltrimethoxysilane, $C_6H_5Si(OCH_3)_3$							
on soda-lime glass	43.0 (c)	–	–	–	–	–	1,35
Vinyltriethoxysilane, $CH_2{=}CHSi(OC_2H_5)_3$							
on silica	33.4 (c)	–	–	–	–	–	1,35
Vinytrimethoxysilane, $CH_2{=}CHSi(OCH_3)_3$							
on soda-lime glass	28.6 (c)	–	–	–	–	–	1,35
2.23.2. AMINO SILANES							
N-β-(aminoethyl)-γ-aminopropyltrimethoxysilane, $NH_2(CH_2)_2NH(CH_2)_3Si(OCH_3)_3$							
on soda-lime glass	33.7 (c)	–	–	–	–	–	1,35
γ-Aminopropyltriethoxysilane, $NH_2CH_2CH_2CH_2Si(OC_2H_5)_3$							
on soda-lime glass	35.7 (c)	–	–	–	–	–	1,35
2.23.3. EPOXY SILANE							
Glycidoxypropyltrimethoxysilane, $H_2C{-}CHCH_2O(CH_2)_3Si(OCH_3)_3$ (epoxide ring via O)							
on soda-lime glass (no catalyst)	49.4 (c)	–	–	–	–	–	1,35
on soda-lime glass (acetic acid catalyst, pH = 4)	66.9 (c)	–	–	–	–	–	1,35
2.23.4. HALOGENATED ALKYL SILANES							
p-Bromophenyltrimethoxysilane, $BrC_6H_5Si(OCH_3)_3$							
on soda-lime glass	49.3 (c)	–	–	–	–	–	1,35
p-Chlorophenylethyltrimethoxysilane, $ClC_6H_4CH_2CH_2Si(OCH_3)_3$							
on pyrex glass	51.0 (c)	–	–	–	–	–	1,35

TABLE 2. *cont'd*

Polymer	Surface tension γ (mN/m ≡ dyn/cm)			$-d\gamma/dT$ (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
	20°C	150°C	200°C				
on silica	49.9 (c)	–	–	–	–	–	1,35
on stainless steel	53.3 (c)	–	–	–	–	–	1,35
on α-alumina	49.9 (c)	–	–	–	–	–	1,35
γ-Chloropropyltrimethoxysilane, $Cl(CH_2)_3Si(OCH_3)_3$							
on soda-lime glass	40.7 (c)						
on pyrex glass	48.8 (c)	–	–	–	–	–	1,35
on stainless steel	49.9 (c)	–	–	–	–	–	1,35
3-(1,1-Dihydroperfluorooctoxy)propyltriethoxysilane, $CF_3(CF_2)_6CH_2O(CH_2)_3Si(OC_2H_5)_3$							
on gold	21.5 (c)	–	–	–	–	–	1,35
on pyrex glass	18.8 (c)	–	–	–	–	–	1,35
on stainless steel	18.8 (c)	–	–	–	–	–	1,35
γ-Perfluoroisopropoxypropyltrimethoxysilane, $(CF_3)_2CFO(CH_2)_3Si(OCH_3)_3$							
on pyrex glass	24.2 (c)	–	–	–	–	–	1,35
on silica	22.8 (c)	–	–	–	–	–	1,35
on stainless steel	18.8 (c)	–	–	–	–	–	1,35
2.23.5. MERCAPTO SILANE							
γ-Mercaptopropyltrimethoxysilane, $HS(CH_2)_3Si(OCH_3)_3$							
on soda-lime glass	41.9 (c)	–	–	–	–	–	1,35
2.24. CELLULOSICS							
Amylose	37 (c)	–	–	–	–	–	84
Amylopectin	35 (c)	–	–	–	–	–	84
Cellophane	45.4 (c)	–	–	–	0.344	–	51,52
Cellulose							
regenerated from cotton	42 (c)	–	–	–	–	–	86
regenerated from wood pulp	36–42 (c)	–	–	–	–	–	86
Cellulose acetate	45.9 (c)	–	–	–	0.296	–	51,52,87,88
Cellulose acetate butyrate	34 (c)	–	–	–	–	–	1
Ethyl cellulose	32 (c)	–	–	–	–	–	1
Hemicellulose							
arabinogalactan	33 (c)	–	–	–	–	–	86
galactoglucomannan	37 (c)	–	–	–	–	–	86
hardwood xylan	33–37 (c)	–	–	–	–	–	86
softwood xylan	35 (c)	–	–	–	–	–	86
Nitrocellulose	38 (c)	–	–	–	–	–	1
Starch	39 (c)	–	–	–	–	–	89
2.25. POLY(PEPTIDES)							
Casein	43 (c)	–	–	–	–	–	90
Poly(L-alanine)	45.2 (c)	–	–	–	0.203	–	52,91
Poly(γ-benyzl L-glutamate)	39.2 (c)	–	–	–	0.224	–	52,92
Poly(glycine), (nylon2)	50.1 (c)	–	–	–	0.443	–	52,92
Poly(γ-methyl L-glutamate)							
α-helix random tangle	44.0 (c)	–	–	–	0.375	–	52,92
α-sheet	48.0 (c)	–	–	–	0.192	–	41
α-helix on water	44.4 (c)	–	–	–	0.435	–	52,92
β-extended chain	35.5 (c)	–	–	–	0.191	–	52,92
β-sheet	37.8 (c)	–	–	–	0.119	–	41
β-random chain	45.4 (c)	–	–	–	0.440	–	52,92
Mixed α and β sheet	42.1 (c)	–	–	–	0.359	–	52,92
Wool	45 (c)	–	–	–	–	–	90
2.26. MISCELLANEOUS							
2.26.1. HYDROCARBONS							
Eicosane, $C_{20}H_{44}$ $M = 282$	28.9	25.6 (60°C)	–	0.0833	0	–	1,9,62,102
Hexatriacontane, $C_{36}H_{74}$ $M = 507$	31.4	26.1 (100°C)	–	0.066	0	–	1,9,94,102
	24 (c)	–	–	–	–	–	94

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TABLE 2. *cont'd*

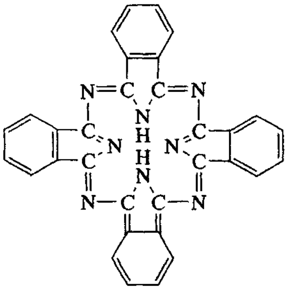
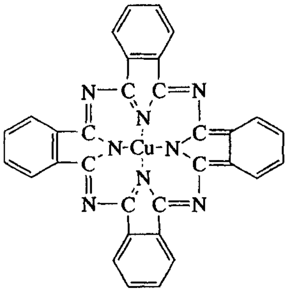
Polymer	Surface tension γ (mN/m ≡ dyn/cm)			$-d\gamma/($ (mN/m	Polarity (x^P)	Macleod's exponent (β)	Refs.
	20°C	150°C	200°C				
Paraffin wax (mp 65°C)	34.7	32.0 (65°C)	26.9 (150 °C)	0.06	0	–	1,94,95
	31.0 (c)	–	–	–	–	–	1
	25.5 (c)	–	–	–	–	–	108
2.26.2. ALKANE-DIOLS							
1,4-Butanediol, $M=90$	44.2	37.6 (90 °C)	–	0.094	0.330	3.6	58
1,10-Decanediol, $M=174$	39.3	34.2 (90 °C)	–	0.073	0.137	2.9	58
1,6-Hexanediol, $M=118$	42.2	36.5 (90 °C)	–	0.081	0.238	3.3	58
1,5-Pentanediol, $M=104$	41.6	36.7 (90 °C)	–	0.070	0.281	2.8	58
1,3-Propanediol, $M=76$	45.9	38.9 (90 °C)	–	0.100	0.375	3.6	58
2.26.3. ADHESIVES							
Natural rubber + ester rosin pressure sensitive adhesive	36 (c)	–	–	–	–	–	45,101
Poly(isobutene)-based pressure sensitive adhesive	30 (c)	–	–	–	–	–	101
Phenol-resorcinol adhesive	52 (c)	–	–	–	–	–	93
Resorcinol adhesive	51 (c)	–	–	–	–	–	90
Urea-formaldehyde adhesive	61 (c)	–	–	–	–	–	90
2.26.4. SULFUR							
"Monomeric" sulfur, below the floor temperature of 160 °C							
	$\gamma=72.95-0.1019T$, for $T=120-160$ °C						97
"Polymeric" sulfur, above the floor temperature of 160 °C							
	$\gamma=65.31-0.0553T$, for $T=160-440$ °C						97
Solid sulfur	128 (c)	–	–	–	–	–	96
2.26.5. PLASTICIZERS							
Di(n-butyl)-o-phthalate $M=278$	33.1	23.1	19.2	0.077	0.051	3.4	100
Di(n-dodecyl)-o-phthalate $M=502$	30.8	22.6	19.5	0.063	0.029	2.9	100
Di(ethyl)-o-phthalate $M=222$	36.6	24.6	20.0	0.092	0.115	3.8	100
Di(n-heptyl)-o-phthalate $M=362$	30.0	20.6	17.0	0.072	0.047	3.5	100
Di(methyl)-o-phthalate $M=194$	39.5	26.9	22.0	0.097	0.190	3.7	100
Di(n-nonyl)-o-phthalate $M=418$	28.9	19.9	16.5	0.069	0.028	3.4	100
Di(n-propyl)-o-phthalate $M=250$	34.4	23.3	19.1	0.085	0.067	3.3	100
Tricresyl phosphate	40.9	–	–	–	0.027	–	1
2.26.6 ORGANIC PIGMENTS							
Phthalocyanine (metal-free) (pure untreated surface) 	52.8 (c)	–	–	–	0.240	–	1,99
Copper phthalocyanine (pure untreated surface) 	46.9 (c)	–	–	–	0.147	–	1,99

TABLE 2. *cont'd*

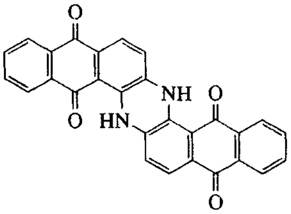
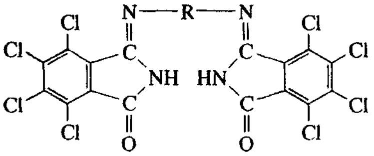
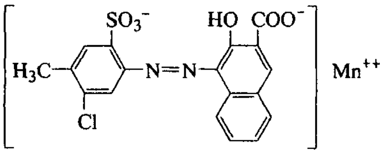
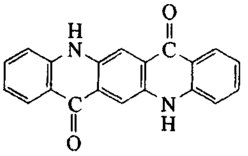
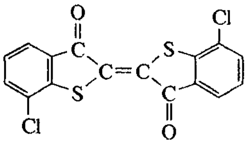
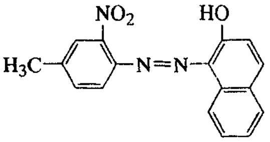
Polymer	Surface tension γ (mN/m ≡ dyn/cm) 20°C	150°C	200°C	− dγ/dT (mN/m/K)	Polarity (x^P)	Macleod's exponent (β)	Refs.
Chlorinated copper phthalocyanine (pure untreated surface)	42.0 (c)	–	–	–	0.148	–	1,99
Idanthrone (pure untreated surface) 	63.2 (c)	–	–	–	0.475	–	1,99
Isoindolinone (pure untreated surface) 	47.2 (c)	–	–	–	0.318	–	1,99
Manganese β-oxynaphthoic acid derivative (pure untreated surface) 	51.9 (c)	–	–	–	0.464	–	1,99
γ-Quinacridone (pure untreated surface) 	49.1 (c)	–	–	–	0.273	–	1,99
Thioindigoid red (pure untreated surface) 	51.4 (c)	–	–	–	0.317	–	1,99
Toluidine red (pure untreated surface) 	53.0 (c)	–	–	–	0.251	–	1,99

TABLE 3. INTERFACIAL TENSION FOR AMORPHOUS INTERFACES

Polymer	Interfacial tension γ_{12} (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$- d\gamma_{12}/dT$ (mN/m/k)	Refs.
3.1. HYDROCARBON POLYMERS vs. OTHERS					
3.1.1. POLY(BUTADIENE) vs. OTHERS					
Poly(butadiene) vs. poly(oxydimethylsilylene) PBD $M_n = 960$, PDMS $M_n = 3900$	2.48	2.07	1.91	0.00322	103

TABLE 3. *cont'd*

Polymer	Interfacial tension γ_{12} (mN/m ≡ dyn/cm)			$-d\gamma_{12}/dT$ (mN/m/k)	Refs.
	20°C	150°C	200°C		
Poly(butadiene) vs. poly(oxydimethylsilylene) PBD $M_n = 2350$, PDMS $M_n = 3900$	3.86	2.70	2.25	0.00895	103
Poly(butadiene) vs. poly(oxydimethylsilylene) PBD $M_n = 2350$ PDMS $M_n = 5200$	3.98	2.85	2.42	0.00865	103
Poly(butadiene) vs. poly(oxydiethylsilylene) PBD $M_n = 960$, PDMS $M_n = 5200$	2.58	2.25	2.13	0.00250	103
Poly(butadiene) vs. epoxy resin (diglycidyl ether of bisphenol-A, chain extended with bisphenol-A)	1.77 (23 °C)	1.40 (55°C)	–	0.0105	70
3.1.2. POLY(BUTADIENE-*stat*-ACRYLONITRILE) vs. OTHERS					
Poly(butadiene-*stat*-acrylonitrile) 18 wt.% AN vs. epoxy resin (same as above)	1.23	0.57 (55°C)	–	0.0198	70
Poly(butadiene-*stat*-acrylonitrile) 26 wt.% AN vs. epoxy resin (same as above)	–	0.58 (55°C)	–	–	70
3.1.3. POLY(ETHYLENE) vs. OTHERS					
Poly(ethylene) (branched) vs. poly(propylene) (atactic)	–	1.1	–	–	17
Poly(ethylene) (linear) vs. poly(styrene)	8.3	5.7	4.7	0.020	8
	–	–	4.4	–	106
Poly(ethylene) (branched) vs. poly(styrene)	5.6	5.0	4.8	0.0046	46
Poly(ethylene) (branched) vs. poly(chloroprene)	4.6	3.6	3.2	0.0075	2
Poly(ethylene) (linear) vs. poly(methyl acrylate)	10.6	8.2	7.3	0.018	1,35
Poly(ethylene) (branched) vs. poly(methyl acrylate)	–	6.5	–	–	46
Poly(ethylene) (linear) vs. poly(ethyl acrylate)	7.5	5.4	4.6	0.016	1,35
Poly(ethylene) (branched) vs. poly(ethyl acrylate)	–	5.5	–	–	46
Poly(ethylene) (linear) vs. poly(*n*-butyl acrylate)	5.0	3.3	2.7	0.014	1,35
Poly(ethylene) (branched) vs. poly(*n*-butyl acrylate)	5.5	3.8	3.2	0.013	46,107
Poly(ethylene) (linear) vs. poly(2-ethylhexyl acrylate)	3.1	1.8	1.3	0.010	1,35
Poly(ethylene) (branched) vs. poly(2-ethylhexyl acrylate)	3.5	2.5	2.1	0.0078	46,107
Poly(ethylene) (linear) vs. poly(methyl methacrylate)	11.8	9.5	8.6	0.018	8
Poly(ethylene) (linear) vs. poly(*n*-butyl methacrylate)	7.1	5.1	4.4	0.015	8
Poly(ethylene) (branched) vs. poly(iso-butyl methacrylate)	5.5	4.2	3.7	0.010	2
Poly(ethylene) (branched) vs. poly(*tert*-butyl methacrylate)	5.9	4.7	4.3	0.009	2
Poly(ethylene) (linear) vs. poly(poly(vinyl acetate)	14.6	11.0	9.7	0.027	7,12
Poly(ethylene) (branched) vs. poly(vinyl acetate)	–	10.5	–	–	18
Poly(ethylene) (branched) vs. poly(ethylene-*stat*-vinyl acetate), 25 wt.% VAc	2.0	1.3	1.1	0.005	12,18
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 12 wt.% VAc	–	0.3	–	–	23
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 17.7 wt.% VAc	–	0.8	–	–	23
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 25 wt.% VAc	–	1.5	–	–	23
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 26.6 wt.% VAc	–	1.7	–	–	23
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 30.9 wt.% VAc	–	2.2	–	–	23
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 38.7 wt.% VAc	–	2.9	–	–	23
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 50 wt.% VAc	–	4.1	–	–	35
Poly(ethylene) vs. poly(ethylene-*stat*-vinyl acetate), 75 wt.% VAc	–	7.3	–	–	35
Poly(ethylene) (linear) vs. poly(oxyethyleneoxyterephthaloyl)	9.4	6.5 (280°C)	6.0 (325°C)	–	35
Poly(ethylene) (branched) vs. poly(oxyethyleneoxyterephthaloyl)	13.7	9.8 (280°C)	9.2 (325°C)	–	14
Poly(ethylene) (branched) vs. poly(oxytrimethyleneoxy-isophthaloyl)	15.4	11.5	10.0	0.030	98
Poly(ethylene) (branched) vs. poly(oxytetramethyleneoxy-isophthaloyl)	13.5	10.1	8.8	0.026	98
Poly(ethylene) (branched vs. poly(oxyhexamethyleneoxy-isophthaloyl)	11.1	8.4	7.3	0.021	98
Poly(ethylene) (branched) vs. poly(oxyisophthaloyloxydeca-methylene)	8.3	6.4	5.6	0.015	98
Poly(ethylene) (branched) vs. poly(oxyisophthaloyloxydodeca-methylene)	5.9	4.5	3.9	0.011	98
Poly(ethylene) (linear) vs. poly(iminohexamethylene-iminoadipoyl) (nylon 66)	14.9	10.2 (280°C)	9.4 (325°C)	–	35
Poly(ethylene) (branched) vs. poly(iminohexamethylene-iminoadipoyl) (nylon 66)	–	17.0 (280°C)	15.2 (325°C)	0.041	14
Poly(ethylene) vs. poly(imino(1-oxohexamethylene)) (nylon 6)	–	–	10.7 (250°C)	–	106
Poly(ethylene) (branched) vs. poly(oxyethylene)	11.6	9.5	8.7	0.016	12

TABLE 3. *cont'd*

Polymer	Interfacial tension γ_{12} (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma_{12}/dT$ (mN/m/k)	Refs.
Poly(ethylene) (branched) vs. poly(oxytetramethylene)	5.1	4.1	3.8	0.007	2,12
Poly(ethylene) (branched) vs. poly(oxydimethylsilylene)	5.3	5.1	5.0	0.002	212,82
3.1.4. POLY(ETHYLENE-*stat*-PROPYLENE-*stat*-HEXADIENE), (EPDM) vs. OTHERS					
EPDM (E/P/HD 69.5/26.5/4.0 weight ratio) vs. poly-(oxyethyleneoxyterephthaloyl), poly(ethylene terephthalate)	8.6	6.2 (280°C)	5.7 (325°C)	0.0093	20,35
EPDM (E/P/HD 69.5/6.5/4.0 weight ratio) vs. poly(imino-hexamethyleneiminoadipoyl) (nylon 66)	14.7	9.7 (280°C)	8.8 (325°C)	0.0193	20,35
Poly(ethylene-*stat*-vinyl acetate) vs. poly(ethylene), see reverse					
Poly(ethylene-*stat*-vinyl acetate) vs. poly(vinyl acetate), see reverse					
Poly(ethylene-*stat*-vinyl acetate) vs. poly(ethylene *stat*-vinyl acetate)					
E/VAc (25 wt.% VAc) vs. E/VAc (12 wt.% VAc)	–	0.45	–	–	23
E/VAc (25 wt.% VAc) vs. E/VAc (17.7 wt.% VAc)	–	0.13	–	–	23
E/VAc (25 wt.% VAc) vs. E/VAc (38.7 wt.% VAc)	–	0.17	–	–	23
E/VAc (25 wt.% VAc) vs. E/VAc (50 wt.% VAc)	–	1.0	–	–	35
E/VAc (25 wt.% VAc) vs. E/VAc (75 wt.% VAc)	–	3.6	–	–	35
3.1.5. POLY(ISOBUTENE) vs. OTHERS					
Poly(isobutene) vs. poly(vinyl acetate)	9.9	7.3	6.3	0.020	7
Poly(isobutene) vs. poly(oxydimethylsilylene)	4.9	4.1	3.8	0.006	82
3.1.6. POLY(PROPYLENE) vs. OTHERS					
Poly(propylene) vs. poly(ethylene), see reverse					
Poly(propylene) vs. poly(styrene)					
Poly(propylene) vs. poly(oxydimethylsilylene)	3.2	2.9	2.8	0.002	17
3.1.7. HALOGENATED HYDROCARBON POLYMERS vs. OTHERS					
Poly(chloroprene) vs. poly(ethylene), see reverse					
Poly(chloroprene) vs. poly(*n*-butyl methacrylate)	2.2	1.5	1.3	0.0047	2
Poly(chloroprene) vs. poly(styrene), see reverse					
Poly(chloroprene) vs. poly(oxydimethylsilylene)	7.1	6.4	6.2	0.0050	2
3.2. STYRENE POLYMERS vs. OTHERS					
Poly(styrene) vs. poly(ethylene), see reverse					
Poly(styrene) vs. poly(chloroprene)	0.7	0.5	0.4	0.0014	2
Poly(styrene) vs. poly(methyl acrylate)	–	3.2	–	–	46
Poly(styrene) vs. poly(ethyl acrylate)	–	1.4	–	–	46
Poly(styrene) vs. poly(*n*-butyl acrylate)	–	1.4	–	–	46
Poly(styrene) vs. poly(2-ethylhexyl acrylate)	–	2.5	–	–	46
Poly(styrene) vs. poly(vinyl acetate)	4.2	3.7	3.4	0.0044	2.24
Poly(styrene) vs. poly(methyl methacrylate)	3.2	1.5	0.8	0.013	8
	–	–	1.3	–	106
Poly(styrene) vs. poly(oxydimethylsilylene)	6.1	6.1	6.1	~0	82
Poly(styrene) vs. poly(ethylene-*stat*-vinyl acetate), 17.7 wt.% VAc	1.8	2.8	3.2	–0.0074	24
Poly(styrene) vs. poly(ethylene-*stat*-vinyl acetate), 30.9 wt.% VAc	0.3	2.1	2.8	–0.0136	24
Poly(styrene) vs. poly(ethylene-*stat*-vinyl acetate), 38.7 wt.% VAc	2.3	2.0	1.9	0.0020	24
Poly(styrene) vs. poly(ethylene-*stat*-vinyl acetate), 26.6 wt.% VAc	3.3	2.6	2.3	0.0050	24
3.3. VINYL POLYMERS vs. OTHERS					
Poly(ethylene-*stat*-vinyl acetate) vs. poly(ethylene), see reverse					
Poly(ethylene-*stat*-vinyl acetate) vs. polystyrene, see reverse					
Poly(ethylene-*stat*-vinyl acetate) vs. self, see Hydrocarbon Polymers vs. Others					
3.3.1. POLY VINYL ACETATE vs. OTHERS					
Poly(vinyl acetate) vs. poly(isobutene), see reverse					
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 12 wt.% VAc	–	8.3	–	–	23
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 17.7 wt.% VAc	–	7.5	–	–	23.
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 25 wt.% VAc	6.3	5.8	5.5	0.0043	12
	–	6.5	–	–	23

TABLE 3. *cont'd*

Polymer	Interfacial tension γ_{12} (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma_{12}/dT$ (mN/m/k)	Refs.
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 26.6 wt.% VAc	–	6.1	–	–	23
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 30.9 wt.% VAc	–	5.6	–	–	23
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 38.7 wt.% VAc	–	4.7	–	–	23
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 50 wt.% VAc	–	3.5	–	–	35
Poly(vinyl acetate) vs. poly(ethylene-*stat*-vinyl acetate), 75 wt.% VAc	–	1.2	–	–	35
Poly(vinyl acetate) vs. poly(*n*-butyl methacrylate)	4.2	2.8	2.3	0.010	8
Poly(vinyl acetate) vs. poly(oxytetramethylene)	5.5	4.5	4.1	0.0081	12
Poly(vinyl acetate) vs. poly(oxydimethylsilylene)	8.4	7.3	6.9	0.0081	2,12,82
Poly(vinyl acetate) vs. eicosane, $C_{20}H_{44}$	7.1	4.6	3.6	0.0195	40
3.3.2. POLY(VINYL BUTYRATE) vs. OTHERS					
Poly(vinyl butyrate) vs. eicosane, $C_{20}H_{44}$	1.9	0.9	0.5	0.0078	40
3.3.3. POLY(VINYL PROPIONATE) vs. OTHERS					
Poly(vinyl propionate) vs. eicosane, $C_{20}H_{44}$	3.5	2.5	2.1	0.0080	40
3.4. ACRYLIC POLYMERS vs. OTHERS					
3.4.1. POLY(METHYL ACRYLATE) vs. OTHERS					
Poly(methyl acrylate) vs. poly(ethylene), see reverse					
Poly(methyl acrylate) vs. poly(styrene), see reverse					
Poly(methyl acrylate) vs. poly(ethyl acrylate)	2.4	13	0.9	0.008	1,35,46
Poly(methyl acrylate) vs. poly(*n*-butyl acrylate)	4.0	3.0	2.6	0.008	1,35,46
Poly(methyl acrylate) vs. poly(2-ethylhexyl acrylate)	6.6	5.7	5.4	0.007	1,35,46
3.4.2. POLY(ETHYL ACRYLATE) vs. OTHERS					
Poly(ethyl acrylate) vs. poly(ethylene), see reverse					
Poly(ethyl acrylate) vs. poly(styrene), see reverse					
Poly(ethyl acrylate) vs. poly(methyl acrylate), see reverse					
Poly(ethyl acrylate) vs. poly(*n*-butyl acrylate)	2.1	1.3	1.0	0.006	1,35,46
Poly(ethyl acrylate) vs. poly(2-ethylhexyl acrylate)	3.9	3.2	3.0	0.005	1,35,46
3.4.3. POLY(*n*-BUTYL ACRYLATE) vs. OTHERS					
Poly(*n*-butyl acrylate) vs. poly(ethylene), see reverse					
Poly(*n*-butyl acrylate) vs. poly(styrene), see reverse					
Poly(*n*-butyl acrylate) vs. poly(methyl acrylate), see reverse					
Poly(*n*-butyl acrylate) vs. poly(ethyl acrylate), see reverse					
Poly(*n*-butyl acrylate) vs. poly(2-ethylhexyl acrylate),	1.8	1.2	1.0	0.005	1,35,46
3.4.4. POLY(2-ETHYLHEXYL ACRYLATE) vs. OTHERS					
Poly(2-ethylhexyl acrylate) vs. poly(ethylene), see reverse					
Poly(2-ethylhexyl acrylate) vs. poly(styrene), see reverse					
Poly(2-ethylhexyl acrylate) vs. poly(methyl acrylate), see reverse					
Poly(2-ethylhexyl acrylate) vs. poly(ethyl acrylate), see reverse					
Poly(2-ethylhexyl acrylate) vs. poly(*n*-butyl acrylate), see reverse					
3.5. METHACRYLIC POLYMERS vs. OTHERS					
3.5.1. POLY(METHYL METHACRYLATE) vs. OTHERS					
Poly(methyl methacrylate) vs. poly(ethylene), see reverse					
Poly(methyl methacrylate) vs. poly(styrene), see reverse					
Poly(methyl methacrylate) vs. poly(*n*-butyl methacrylate)	3.4	1.9	1.3	0.012	8
Poly(methyl methacrylate) vs. poly(*tert*-butyl methacrylate)	3.0	2.2	1.9	0.006	2
3.5.2. POLY(*n*-BUTYL METHACRYLATE) vs. OTHERS					
Poly(*n*-butyl methacrylate) vs. poly(ethylene), see reverse					
Poly(*n*-butyl methacrylate) vs. poly(vinyl acetate), see reverse					

TABLE 3. *cont'd*

Polymer	Interfacial tension γ_{12} (mN/m ≡ dyn/cm) 20°C	150°C	200°C	$-d\gamma_{12}/dT$ (mN/m/k)	Refs.
Poly(*n*-butyl methacrylate) vs. poly(chloroprene), see reverse					
Poly(*n*-butyl methacrylate) vs. poly(oxydimethylsilylene), see reverse					
3.5.3. POLY(*iso*-BUTYL METHACRYLATE) vs. OTHERS					
Poly(iso-butyl methacylate) vs. poly(ethylene), see reverse					
3.5.4. POLY(*tert*-BUTYL METHACRYLATE) vs. OTHERS					
Poly(*t*-butyl methacrylate) vs. poly(ethylene), see reverse					
Poly(*t*-butyl methacrylate) vs. poly(oxydimethylsilylene), see reverse					
3.6. POLY(ETHERS) vs. OTHERS					
3.6.1. POLY(OXYETHYLENE) vs. OTHERS					
Poly(oxyethylene) vs. poly(ethylene), see reverse					
Poly(oxyethylene) vs. poly(ethylene-*stat*-vinyl acetate), 25 wt.% VAc	6.4	5.8	5.5	0.0045	12
Poly(oxyethylene) vs. poly(2-ethylhexyl, acrylate)	6.6	4.8	4.1	0.014	107
Poly(oxyethylene) vs. poly(*n*-butyl acrylate)	2.8	2.0	1.7	0.0065	107
Poly(oxyethylene) vs. poly(oxytetramethylene)	4.5	3.8	3.6	0.0051	12
Poly(oxyethylene) vs. poly(oxydimethylsilylene), see reverse					
Poly(oxyethylene) vs. eicosane, $C_{20}H_{44}$	–	9.3 (90 °C)	–	0.040	58
3.6.2. POLY(OXYTETRAMETHYLENE) vs. OTHERS					
Poly(oxytetramethylene) vs. poly(oxyethylene), see reverse					
Poly(oxytetramethylene) vs. poly(ethylene), see reverse					
Poly(oxytetramethylene) vs. poly(vinyl acetate), see reverse					
Poly(oxytetramethylene) vs. poly(ethylene-*stat*-vinyl acetate), 25 wt.% VAc	1.5	1.2	1.1	0.0023	12
Poly(oxytetramethylene) vs. poly(oxydimethylsiloxane), see reverse					
Poly(oxytetramethylene) vs. eicosane, $C_{20}H_{44}$	–	1.1 (90 °C)	–	0.013	58
3.7. POLY(ESTERS) vs. OTHERS					
Poly(oxyethyleneoxyterephthaloyl) vs. polyethylene, see reverse					
Poly(oxyethyleneoxyterephthaloyl) vs. poly(ethylene-*stat*-propylene-*stat*-hexadiene), see reverse					
Poly(oxytrimethyleneoxyisophthaloyl) vs. poly(ethylene), see reverse					
Poly(oxytetramethyleneoxyisophthaloyl) vs. poly(ethylene), see reverse					
Poly(oxyhexamethyleneoxyisophthaloyl) vs. poly(ethylene), see reverse					
Poly(oxyisophthaloyloxydecamethylene) vs. poly(ethylene), see reverse					
Poly(oxyisophthaloyloxydodecamethylene) vs. poly(ethylene), see reverse					
3.8. POLY(AMIDES) vs. OTHERS					
Poly(iminohexamethyleneiminoadipoyl) vs. polyethylene, see reverse					
Poly(iminohexamethyleneiminoadipoyl) vs. poly(ethylene-*stat*-propylene-*stat*-hexadiene), see reverse					
Poly(imino(1-oxohexamethylene)) vs. poly(ethylene), see reverse					
3.9. EPOXY RESIN vs. OTHERS					
Epoxy resin vs. poly(butadiene), see reverse					
Epoxy resin vs. poly(butadiene-*stat*-acrylonitrile), see reverse					
3.10. POLY(SILOXANES) vs. OTHERS					
Poly(oxydimethylsilylene) vs. poly(ethylene), see reverse					
Poly(oxydimethylsilylene) vs. poly(styrene), see reverse					
Poly(oxydimethylsilylene) vs. poly(propylene), see reverse					
Poly(oxydimethylsilylene) vs. poly(isobutene), see reverse					
Poly(oxydimethylsilylene) vs. poly(chloroprene), see reverse					
Poly(oxydimethylsilylene) vs. poly(vinyl acetate), see reverse					
Poly(oxydimethylsilylene) vs. poly(butadiene), see reverse					
Poly(oxydimethylsilylene) vs. poly(*n*-butyl methacrylate)	4.2	3.8	3.6	0.0037	2
Poly(oxydimethylsilylene) vs. poly(*t*-butyl methacrylate)	3.6	3.3	3.2	0.0025	2
Poly(oxydimethylsilylene) vs. poly(oxyethylene)	10.8	9.8	9.4	0.0078	12
Poly(oxydimethylsilylene) vs. poly(oxytetramethylene)	6.4	6.3	6.2	0.0012	2,12

TABLE 3. *cont'd*

Polymer	Interfacial tension γ_{12} (mN/m ≡ dyn/cm)			$-d\gamma_{12}/dT$ (mN/m/k)	Refs.
	20°C	150°C	200°C		
3.11. MISCELLANEOUS					
Eicosane ($C_{20}H_{44}$) vs. poly(oxyethylene), see reverse					
Eicosane ($C_{20}H_{44}$) vs. poly(oxytetramethylene), see reverse					
Eicosane ($C_{20}H_{44}$) vs. poly(vinyl acetate), see reverse					
Eicosane ($C_{20}H_{44}$) vs. poly(vinyl propionate), see reverse					
Eicosane ($C_{20}H_{44}$) vs. poly(vinyl butyrate), see reverse					
Eicosane ($C_{20}H_{44}$) vs. 1,3-propanediol 25 wt.% VAc	45.9	38.9 (90°C)	–	0.100	58
Eicosane ($C_{20}H_{44}$) vs. 1,4-butanediol	44.2	37.6 (90°C)	–	0.094	58
Eicosane ($C_{20}H_{44}$) vs. 1,5-pentanediol	41.6	36.7 (90°C)	–	0.070	58
Eicosane ($C_{20}H_{44}$) vs. 1,6-hexanediol	42.2	36.5 (90°C)	–	0.081	58
Eicosane ($C_{20}H_{44}$) vs. 1,10-decanediol	39.3	34.2 (90°C)	–	0.073	58

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Permeability and Diffusion Data

S. Pauly

Fachlaboratorium für Permeationsprüfung, Alte Schmelze 6, D-65201 Wiesbaden, FR Germany

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A. INTRODUCTION

The transmission of molecules through polymer films is named "permeability". There are many dimensions and units found in the literature for the general expression "permeability". In this paper the permeability coefficient is used. It has the dimension

$$P = \frac{(\text{quantity of permeant}) \times (\text{film thickness})}{(\text{area}) \times (\text{time}) \times (\text{pressure drop across the film})}$$

and is the best definition for permeability.

The permeability coefficient, in a strict sense, is not only a function of the chemical structure of the polymer. It also varies with the morphology of the polymer and depends on many physical factors such as density, crystallinity, and orientation. However, the chemical structure of a polymer can be considered to be the predominant factor which controls the magnitude of the permeability coefficient.

The following general trends in permeability, as related to some influencing factors, may be useful for the proper interpretation of the tables:

Density can be regarded as a measure of the free volume between the molecules of the polymer structure. In general, the higher the density, the lower is the permeability.

Crystallinity of a semicrystalline polymer reduces the permeability significantly compared to the value of the corresponding amorphous polymer; i.e., the higher the degree of crystallinity, the lower the permeability. The crystallinity and the density of a polymer are strongly related. The higher the crystallinity the higher is the density of a given polymer.

Molecular mass of a polymer has been found to have little effect on the permeability of polymers, except at a very low range of molecular masses.

Orientation of polymer molecules reduces the permeability.

Crosslinking decreases the permeability, especially for higher degrees of crosslinking and for large molecular size permeants.

The method and degree of vulcanization has a significant effect on the permeability of elastomers.

Plasticizers increase the permeability.

Humidity increases the permeability of some hydrophilic polymers.

Liquid permeants have the same permeabilities as their corresponding saturated vapors, though higher permeabilities may occur especially if parts of the polymer are being dissolved.

Solution cast films have variable permeabilities depending upon the kind of solvent used and the drying technique. Poor solvents tend to yield films of higher permeability.

Fillers, usually inorganic fillers, decrease the permeability; however, the effect is complicated by the type, shape, and amount of filler and its interaction with the polymer.

Thickness of film does not, in principle, affect the permeability coefficient, the diffusion coefficient, and the solubility coefficient. In practice, different values may be obtained from films of variable thickness, which in turn may be due to differences in drawing, orientation, and crystallinity.

If a permeant does not interact with the polymer under investigation, the permeability coefficient is characteristic for the permeant–polymer system. This is the case with the permeation of many gases, such as H_2, He, N_2, O_2, and CO_2, through many polymers. On the other hand, if a permeant interacts with the polymer, the permeation coefficient is no longer a constant, and may depend on the special conditions of the measurement and the history of the polymer film. In such cases, a single value of the permeability coefficient does not represent the characteristic permeability of the polymer, and it is necessary to know the dependency of the permeability coefficient on all possible variables in order to obtain the complete profile of the permeability of the polymer.

In these cases, the transmission rate, which has the dimension

$$Q = \frac{(\text{quantity of permeant})}{(\text{area}) \times (\text{time})}$$

is often used for practical purposes. Since the transmission rate, Q, includes neither the pressure of the permeant nor the thickness of the polymer in its dimension, it is necessary to know either the pressure or the concentration of the permeant and the thickness of the polymer under the conditions of measurement.

For both P and Q, the quantity of permeant can be expressed by mass, moles, or gaseous volume at standard temperature and pressure. These can readily be converted from one unit into another.

The preferred SI unit of the permeability coefficient used in this book is

$$\text{unit of } P : \frac{\text{cm}^3(273.15\,\text{K};\ 1.013 \times 10^5\,\text{Pa}) \times \text{cm}}{\text{cm}^3 \times \text{s} \times \text{Pa}}$$

where (273.15 K; 1.013×10^5 Pa) means standard temperature and pressure (STP). Therefore permeability coefficients given in this paper are in the range of 10^{-11} – $10^{-16}\,\text{cm}^3 \times \text{cm/cm}^2 \times \text{s} \times \text{Pa}$ for many polymers and permeants.

The mostly used units and their conversion factors are listed in Table B.

The permeation of molecules through flawless polymers occurs by the steps of dissolution of a permeant in the polymer and diffusion of the dissolved permeant. The product of the diffusion coefficient D and the solubility coefficient S is referred to as the permeability coefficient.

$$P = D \times S$$

Units of D and S used in these tables are

$$\text{unit of } D : \frac{\text{cm}^2}{\text{s}}$$

$$\text{unit of } S : \frac{\text{cm}^2(273.15\,\text{K};\ 1.013 \times 10^5\,\text{Pa})}{\text{cm}^3 \times \text{Pa}}$$

The solubility coefficients cited in the following tables are often calculated by

$$S = \frac{P}{D}$$

The temperature dependence of the permeability coefficient P, the diffusion coefficient D, and the solubility coefficient S can be represented by

$$P = P_0 \times \exp(-E_P/RT)$$
$$D = D_0 \times \exp(-E_D/RT)$$

and

$$S = S_0 \times \exp(-E_S/RT)$$

Consequently

$$E_P = E_D + E_S$$

where E_P is the activation energy of permeation, E_D the activation energy of diffusion, and E_S the heat of solution. P_0, D_0, and S_0 are the pre-exponential factors. Values of E_P, E_D, and E_S are given in kJ/mol in the following tables. R is the gas constant (8.3144×10^{-3} kJ/K mol); T is the temperature in K. In the following tables the temperature range is given in which P_0, E_P, E_D, and E_S are relevant, as far as the authors have reported it. The permeability coefficient can be determined for a given temperature by means of the pre-exponential factor P_0 and the activation energy of permeation E_P. In the following tables, permeability, diffusion, and solubility coefficients are listed for many polymers. The pre-exponential factor P_0, the activation energy of permeation E_P, the activation energy of diffusion E_D, and the heat of solution E_S are also given. The pre-exponential factors D_0 and S_0 can be determined by the following equations:

$$D_0 = D \times \exp(E_D/RT)$$
$$S_0 = S \times \exp(E_S/RT)$$

B. CONVERSION FACTORS FOR VARIOUS UNITS OF THE PERMEABILITY COEFFICIENT

	Multiplication factors to obtain P in:		
From	$\frac{[cm^3][cm]}{[cm^2][s][cm\ Hg]}$	$\frac{[cm^3][cm]}{[cm^2][s][Pa]}$	$\frac{[cm^3][cm]}{[m^2][day][atm]}$
$\frac{[cm^3][cm]}{[cm^2][s][cm\ Hg]}$	1	7.5×10^{-4}	6.57×10^{10}
$\frac{[cm^3][mm]}{[cm^2][s][cm\ Hg]}$	10^{-1}	7.5×10^{-5}	6.57×10^{9}
$\frac{[cm^3][cm]}{[cm^2][s][atm]}$	1.32×10^{-2}	9.87×10^{-6}	8.64×10^{8}
$\frac{[cm^3][mil]}{[cm^2][day][atm]}$	3.87×10^{-14}	2.90×10^{-17}	2.54×10^{-3}
$\frac{[in^3][mil]}{[100in^2][day][atm]}$	9.82×10^{-12}	7.37×10^{-15}	6.45×10^{-1}
$\frac{[cm^3][cm]}{[m^2][day][atm]}$	1.52×10^{-11}	1.14×10^{-14}	1
$\frac{[cm^3][cm]}{[m^2][day][bar]}$	1.54×10^{-11}	1.16×10^{-14}	1.01
$\frac{[cm^3][cm]}{[cm^2][s][Pa]}$	1.33×10^{3}	1	8.75×10^{13}

C. TABLES

TABLE 1. PERMEABILITY COEFFICIENTS, DIFFUSION COEFFICIENTS, AND SOLUBILITY COEFFICIENTS OF POLYMERS

Units used in the tables are as follows: P, P_0 in cm^3 (273.15 K; 1.013×10^5 Pa) × cm/(cm^2 × s × Pa); D in cm^2/s; S in cm^3(273.15 K; 1.013×10^5 Pa)/(cm^3 × Pa); E_p, E_D, E_S in kJ/mol; T in °C; (273.15 K; 1.013×10^5 Pa) means standard temperature and pressure (STP).

Polymer	Permeant	T	P (×10^{13})	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
1.1. POLY(ALKANES)											
Poly(ethylene) LLDPE	C_2H_4O	30	68.9	0.031	225						80
Poly(ethylene)	H_2	25	7.4	0.474	1.58						49
density 0.914 g/cm^3, LDPE	D_2	25	6.6	0.476	1.38						49
	He	25	3.7	6.8	0.0544	5–60	4.62	34.8	24.7	10.1	16
	O_2	25	2.2	0.46	0.472	5–60	66.5	42.7	40.2	2.5	16
	Ar	25	2.1	0.36	0.571	5–60	174	45.2	42.3	2.9	16
	Ne	25	0.48	2.42	0.020						49
	Kr	25	2.15	0.169	1.28						49
	Xe	25	4.01	0.069	5.82						49
	CO_2	25	9.5	0.372	2.54	5–60	62.0	38.9	38.5	0.4	16

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Polymer	Permeant	T	P (×10^13)	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
	CO	25	1.1	0.332	0.336	5–60	154	46.5	39.8	6.7	16
	N_2	25	0.73	0.320	0.228	5–60	329	49.4	41.5	7.9	16
	CH_4	25	2.2	0.193	1.13	5–60	425	47.3	45.6	1.7	16
	C_2H_6	25	5.1	0.068	7.55	5–60	985	47.3	53.6	−6.3	16
	C_3H_4	25	32	0.105	30.2	5–60	209	38.9	49.8	−10.9	16
	C_3H_6	25	11	0.058	18.8	5–60	459	43.5	52.3	−8.8	16
	C_3H_8	25	7.1	0.0322	21.3	5–60	1170	46.9	55.7	−8.8	16
	SF_6	25	0.13	0.0135	0.951	5–60	4050	59.9	62.0	−2.1	16
	H_2S	20	27.0								5
	NH_3	20	21.0								5
	CH_3Br	20	110								37
	C_2H_4O	30	75			0–60					37
	H_2O	25	68			10–90	48.8	33.5			21
density 0.964 g/cm³, HDPE	He	25	0.86	3.07	0.028	5–60	0.137	29.7	23.4	6.3	16
	O_2	25	0.30	0.17	0.18	5–60	0.423	35.1	36.8	−1.7	16
	Ar	25	1.30	0.12	1.1	5–60	5.23	37.7	38.9	−1.2	16
	CO_2	25	0.27	0.12	0.22	5–60	0.0506	30.1	35.6	−5.5	16
	CO	25	0.15	0.096	0.15	5–60	1.15	39.3	36.8	2.5	16
	N_2	25	0.11	0.093	0.15	5–60	0.991	39.7	37.7	2.0	16
	CH_4	25	0.29	0.057	0.51	5–60	3.76	40.6	43.5	−2.9	16
	C_2H_6	25	0.44	0.015	3.0	5–60	13.3	42.7	52.3	−9.6	16
	C_3H_4	25	3.0	0.025	12	5–60	1.89	33.1	47.3	−14.2	16
	C_3H_6	25	0.87	0.011	8.2	5–60	5.68	38.9	52.3	−13.4	16
	C_3H_8	25	0.404	0.0049	8.3	5–60	28.5	44.8	56.9	−12.1	16
	n-C_4H_{10}	40		0.02					62.3		64
	n-C_5H_{12}	25		0.0033					76.6		64
	n-C_6H_{14}	0		0.000075							64
	SF_6	25	0.0063	0.0016	0.39	5–60	29.5	55.2	62.8	−7.6	16
	H_2S	20	6.5								5
	NH_3	20	8.0								5
	H_2O	25	9.0								21
Poly(ethylene) HDPE	C_2H_4O	30	21.4	0.021	97.5						80
Poly(ethylene) (Hizex 7000F)											
Isotropic density 0.943 g/cm³	He	25	1.33	3.50	0.0379						74
draw ratio 8 0.958	He	25	1.46	3.20	0.0457						74
9 0.957	He	25	1.44	3.55	0.0406						74
10 0.958	He	25	0.885	2.38	0.0372						74
12 0.960	He	25	0.407	1.69	0.0241						74
14.5 0.962	He	25	0.278	1.14	0.0244						74
20.5 0.966	He	25	0.129	0.632	0.0204						74
Poly(ethylene) (Hizex 7000F)											
draw ratio 1.0 density 0.945 g/cm³	N_2	25	0.2	0.094	0.217						99
	O_2	25	0.76	0.196	0.395						99
	CO_2	25	3.2	0.148	2.16						99
6.6 0.954	He	25	1.1	3.3	0.0346						99
6.4	N_2	25	0.11	0.075	0.138						99
	O_2	25	0.34	0.099	0.346						99
	CO_2	25	1.4	0.080	1.82						99
11.8 0.959	He	25	0.37	1.5	0.0247						99
	O_2	25	0.074	0.032	0.237						99
	CO_2	25	0.28	0.02	1.41						99
12.0 0.959	He	25	0.3	1.7	0.0188						99
	O_2	25	0.10	0.0459	0.197						99
17.6	He	25	0.12	0.54	0.0217						99
	O_2	25	0.012	0.0055	0.217						99
	CO_2	25	0.045	0.0035	1.29						99
20.2	He	25	0.11	0.48	0.0237						99
	O_2	25	0.15	0.0065	0.168						99
Poly(ethylene-hexene-1) copolymer (Rigidex 002-55)											
Isotropic density 0.943 g/cm³	He	25	1.11	3.27	0.0340						74
draw ratio 7 0.955	He	25	0.23	3.32	0.0278						74
8.5 0.958	He	25	0.878								74
9.5 0.959	He	25	0.773								74
10 0.960	He	25	0.695								74
11 0.961	He	25	0.515								74
13 0.963	He	25	0.257								74
16.5 0.964	He	25	0.206								74
Poly(ethylene-hexene-1) copolymer (Rigidex 002-55)											
draw ratio 1.0 density 0.945 g/cm³	N_2	25	0.179	0.0945	0.188						99
	O_2	25	0.662	0.185	0.357						99
	CO_2	25	3	0.132	2.27						99
6.5	N_2	25	0.059	0.0411	0.148						99
	O_2	25	0.0522	0.0696	0.289						99
	CO_2	25	1.0	0.056	1.78						99

Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^6$)	S ($\times 10^6$)	Temp. range	P_0 ($\times 10^7$)	E_P	E_D	E_S	Refs.
11.7	He	25	0.242	1.2	0.0197						99
	O_2	25	0.044	0.0203	0.218						99
	CO_2	25	0.18	0.0113	1.58						99
14.7	He	25	0.14	0.713	0.0197						99
	O_2	25	0.025	0.0148	0.167						99
17.6	He	25	0.097	0.57	0.0168						99
	O_2	25	0.0098	0.0048	0.207						99
	CO_2	25	0.034	0.0025	1.32						99
Poly(ethylene-*co*-propylene) 40/60 amorphous	He	24.4	24.0	16.5	0.146	0–50	1.56	27.6	15.0	12.6	25
31.0 CH_3-groups per 100 carbons	Ne	24.4	9.0	4.5	0.20	0–50	2.48	31.8	28.5	3.3	25
	Ar	24.4	9.8	1.06	0.93	0–50	46.6	39.6	37.1	2.5	25
	N_2	24.4	3.7	0.67	0.545	0–50	167	43.8	45.8	−2.0	25
26.5 CH_3-groups per 100 carbons	He	24.1	21.8	17.9	0.121	0–50	1.93	28.1	24.8	3.3	25
	Ne	24.1	8.5	5.3	0.16	0–50	4.89	32.7	31.9	0.8	25
	Ar	24.1	11.0	1.3	0.83	0–50	46.7	37.8	42.0	−4.2	25
	N_2	24.1	4.1	0.94	0.44	0–50	97.5	42.1	42.9	−0.8	25
21.5 CH_3-groups per 100 carbons	He	26.6	16.0	9.4	0.17	0–50	2.37	29.7	27.0	2.7	25
	Ne	26.6	6.9	3.5	0.20	0–50	5.67	34.1	31.9	2.2	25
	Ar	26.6	9.2	1.06	0.87	0–50	27.2	37.2	39.6	−2.4	25
	N_2	26.6	3.7	0.79	0.46	0–50	54.2	41.2	44.0	−2.8	25
Poly(propylene)	He	20	0.28	19.5		20–70	0.153	32.2			13
density 0.907 g/cm^3	H_2	20	31.0	2.1		20–70	224	38.5			13
crystallinity 50%	N_2	30	0.33			20–70	1280	55.7			19
	O_2	30	1.7			20–70	278	47.7			19
	CO_2	30	6.9			20–70	24.0	38.1			19
	H_2O	30	51.0			10–90	900	42.3			19,21
	CH_3Br	30	15.0			0–50	1.56×10^6	64.2			19
	H_2S	20	2.4								5
	NH_3	20	6.9								5
(Trespaphan GND)	H_2O	23	15.8			10–50	0.249	23.8			73
density 0.8871 g/cm^3	He	33	10.6			30–55	0.631	28			47
crystallinity 43%	O_2	33	1.68			30–55	117	46			47
	N_2	33	0.424			30–55	1010	55			47
	CO_2	33	5.43			30–55	173	44			47
density 0.8931 g/cm^3	He	33	8.98			30–55	0.534	28			47
crystallinity 50%	O_2	33	1.48			30–55	103	46			47
	N_2	33	0.355			30–55	11500	55			47
	CO_2	33	4.64			30–55	148	44			47
density 0.8998 g/cm^3	He	33	7.7			30–55	0.458	28			47
crystallinity 58%	O_2	33	1.28			30–55	89.4	46			47
	N_2	33	0.306			30–55	732	55			47
	CO_2	33	4.05			30–55	129	44			47
density 0.9016 g/cm^3	He	33	8.69			30–55	0.236	26			47
crystallinity 60%	O_2	33	1.78			30–55	11.8	40			47
	N_2	33	0.494			30–55	34.5	46			47
Poly(propylene)	C_2H_4O	30	0.9	0.0022	45						80

1.2. POLY(STYRENES)

Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^6$)	S ($\times 10^6$)	Temp. range	P_0 ($\times 10^7$)	E_P	E_D	E_S	Refs.
Poly(styrene)	O_2	25	1.9								42
	H_2O	25	1350								42
biaxially oriented	He	25	14.0								41
	H_2	25	17.0								41
	O_2	25	2.0								41
	N_2	25	0.59								41
	CO_2	25	7.9								41
	H_2O	25	840	0.14							27
	H_2O	23	717			10–50	0.000028	−7.79			73
ultradrawn											
draw ratio 1.0	CO_2	25	6.0	0.0024	248						72
1.8	CO_2	25	4.35	0.0019	233						72
3.1	CO_2	25	2.18	0.00075	293						72
4.4	CO_2	25	1.13								72
5.0	CO_2	25	0.75	0.00046	158						72
Poly(styrene-*co*-styrenesulfonic acid) Na^+-polysalt											
sulfonated with 0 mol% SO_3^-	H_2	23	18.5								83
(Polystyrene)	N_2	23	0.368	0.055	0.67						83
	O_2	23	2.18	0.12	2.0						83
	CO_2	23	10.58	0.054	19.5						83
	CH_4	23	0.585	0.011	5.3						83
sulfonated with 15.2 mol% SO_3^-	H_2	23	10.13								83
	N_2	23	0.0975	0.0042	2.3						83
	O_2	23	0.743	0.021	3.6						83
	CO_2	23	3.53	0.0091	39.8						83
	CH_4	23	0.150	0.0026	5.8						83

Polymer	Permeant	T	P (×10^13)	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
sulfonated with 27.5 mol% SO_3^-	H_2	23	5.85								83
	N_2	23	0.0465	0.0012	4.1						83
	O_2	23	0.443	0.0080	5.5						83
	CO_2	23	2.18	0.0027	80.6						83
	CH_4	23	0.0443	0.00096	4.7						83
Poly(styrene-*co*-styrenesulfonic acid) Mg^{2+}-polysalt											
sulfonated with 15.2 mol% SO_3^-	H_2	23	7.20								83
	N_2	23	0.0563	0.0069	0.83						83
	O_2	23	0.510	0.028	1.8						83
	CO_2	23	2.25	0.0078	28.6						83
	CH_4	23	0.0525	0.0025	2.1						83
sulfonated with 27.5 mol% SO_3^-	H_2	23	5.18								83
	N_2	23	0.0270	0.0051	0.53						83
	O_2	23	0.315	0.017	1.9						83
	CO_2	23	1.65	0.0037	44.6						83
	CH_4	23	0.0255	0.0026	0.98						83
1.3. POLY(METHACRYLATES)											
Poly(methyl methacrylate)	H_2	35	2.78								88
	He	35	5.70								88
	Ar	35	0.0158								88
	N_2	35	6.15								88
	O_2	34	0.116								51
	O_2	35	0.0653								88
	CO_2	35	2.33								88
	CH_4	35	0.00263								88
	H_2O	23	480								73
Poly(methyl methacrylate) + (cellulose acetate butyrate) + (silicone) – Blend 50/40/10	O_2	34	4.52								51
Poly(methyl methacrylate) + (Styrene/acrylonitrile) – Blend											
80/20	CO_2	35	0.435								88
50/50	CO_2	35	0.938								88
20/80	CO_2	35	1.58								88
Poly(methyl acrylate) + Poly(epichlorohydrin) – Blend	He	35	7.95	7.88	0.101						77
100/0	Ar	35	0.383	0.0513	0.747						77
	N_2	35	0.140	0.0385	0.365						77
	CH_4	35	0.176	0.0121	1.46						77
75/25	He	35	6.78	7.15	0.0945						77
	Ar	35	0.410	0.0595	0.689						77
	N_2	35	0.144	0.0442	0.326						77
	CH_4	35	0.221	0.0167	1.32						77
50/50	He	35	5.59	6.54	0.0855						77
	Ar	35	0.443	0.0677	0.655						77
	N_2	35	0.159	0.0508	0.313						77
	CH_4	35	0.302	0.0242	1.25						77
25/75	He	35	4.61								77
	Ar	35	0.495	0.0792	0.625						77
	N_2	35	0.178	0.0595	0.299						77
	CH_4	35	0.411	0.0333	1.23						77
0/100	He	35	3.62	4.88	0.0743						77
	Ar	35	0.533	0.0918	0.580						77
	N_2	35	0.180	0.0655	0.275						77
	CH_4	35	0.493	0.0422	1.17						77
Poly(ethyl methacrylate)	He	25	5.18	42.5	0.0122	25–80	0.255	26.8	15.5	11.3	29
	Ne	25	2.28	1.5	0.152	25–80	0.242	28.7	23.9	4.8	29
	O_2	25	0.889	0.106	0.839	25–80	2.1	36.4	31.8	4.6	29
	Ar	25	0.433	0.0208	2.08	25–80	2.03	38.1	43.1	−5.0	29
	N_2	25	0.170	0.0301	0.565	25–80	2.18	40.6	42.7	−2.1	29
	CO_2	25	3.79	0.0336	11.3	25–80	0.435	28.9	33.1	−4.2	29
	Kr	25	0.287	0.0065	4.40	25–80	10.1	43.1	46.1	−3.0	29
	H_2S	25	2.88	0.0046	62.6	25–80	22.8	39.4	47.7	−8.3	29
	SF_6	25	0.0127	0.00023	5.62	25–80	0.885	44.8	64.5	−19.7	29
	H_2O	25	2380	0.102	2333	25–65	0.00555	2.1	36.4	−34.3	29
		65	2880	0.729	395	65–80	1.58	18.0	63.2	−45.2	29
Poly(2-hydroxyethyl-methacrylate) highly crosslinked	O_2[a]	34	2.72								51
	O_2[b]	34	5.43								51

Polymer	Permeant	T	P (×10^13)	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
1.4. POLY(NITRILES)											
Poly(acrylonitrile)	O_2	25	0.00015								42
	CO_2	25	0.00060								42
	H_2O	25	230								42
(Barex)	O_2	25	0.0041								42
		38	0.014								42
	CO_2	25	0.012								42
		38	0.022								42
	H_2O	25	490								42
		38	520								42
Poly(acrylonitrile-*co*-styrene) 86/14	O_2	25	0.0032								42
	CO_2	25	0.011								42
	H_2O	25	640								42
66/34	O_2	25	0.036								42
	CO_2	25	0.16								42
	H_2O	25	1500								42
57/43	O_2	25	0.14								42
	CO_2	25	0.27								42
	H_2O	25	1800								42
39/61	O_2	25	0.35								42
	CO_2	25	1.0								42
	H_2O	25	1900								42
Poly(acrylonitrile-*co*-methyl acrylate-	O_2	25	0.0041								42
co-butadiene) 79/15/6	CO_2	25	0.012								42
	H_2O	25	970								42
Poly(methacrylonitrile)	O_2	25	0.00090	0.0003	0.3						42
	CO_2	25	0.0024	0.0002	1.2						42
	H_2O	25	310								42
(Lopac)	O_2	25	0.0026								42
		38	0.0053								42
	CO_2	25	0.0081								42
		38	0.016								42
	H_2O	25	260								42
		38	270								42
Poly(methacrylonitrile-*co*-styrene) 97/3	O_2	25	0.0018								42
	CO_2	25	0.0059								42
	H_2O	25	370								42
82/18	O_2	25	0.0098	0.0026	0.38						42
	CO_2	25	0.038	0.0018	2.1						42
	H_2O	25	700								42
61/39	O_2	25	0.068								42
	CO_2	25	0.21								42
	H_2O	25	1300								42
53/47	O_2	25	0.12								42
	CO_2	25	0.38								42
	H_2O	25	1400								42
38/62	O_2	25	0.29								42
	CO_2	25	0.88								42
	H_2O	25	1600								42
18/82	O_2	25	0.81								42
	CO_2	25	2.4								42
	H_2O	25	1500								42
Poly(methacrylonitrile-*co*-styrene-	O_2	25	0.0036								42
co-butadiene) 88/7/5	CO_2	25	0.011								42
	H_2O	25	450								42
83/7/10	O_2	25	0.0052								42
	CO_2	25	0.015								42
	H_2O	25	500								42
78/7/15	O_2	25	0.0072								42
	CO_2	25	0.024								42
	H_2O	25	580								42
1.5. POLY(VINYLS)											
Poly(vinyl acetate)	He	10	4.95	6.46	0.0784	0–20	0.00134	13.2	17.4	−4.2	14
		30	9.44	9.55	0.101	25–40	2.23	31.2	22.4	8.8	14
	H_2	10	2.99	1.32	0.237	0–20	0.0023	15.7	21.6	−5.9	14
		30	6.84	2.63	0.254	25–40	10.4	41.7	31.4	10.3	14
	Ne	10	0.838	0.794	0.106	0–20	0.000111	11.5	30.8	−19.3	14
		30	1.97	1.66	0.118	25–40	14.1	39.8	35.4	4.4	14
	O_2	10	0.136	0.0178	0.766	0–20	0.00074	20.2	46.4	−26.2	14
		30	0.367	0.0562	0.637	25–40	1680	56.1	60.7	−4.6	14
	Ar	10	0.0569	0.00479	1.11	0–20	0.0471	32.1	47.6	−15.5	14
		30	0.143	0.0162	0.943	25–40	4950	61.2	69.1	−7.9	14
	Kr	10	0.0172	0.000602	2.78	0–20	0.00826	30.8	60.7	−29.9	15
		30	0.0582	0.00295	1.96	25–40	7.71×10^5	76.2	81.2	−5.0	15

Polymer	Permeant	T	P (×10¹³)	D (×10⁶)	S (×10⁶)	Temp. range	P_0 (×10⁷)	E_P	E_D	E_S	Refs.
	CH_4	25	0.0237	0.0017	1.39	25–40	0.72 × 10⁷	82.7	80.8	1.9	15
	CO_2	35	1.52	0.00747	20.4						86
Poly(vinyl alcohol)	He[c]	20	0.00075								10
	H_2[c]	25	0.00672								28
	D_2[c]	100	0.0134								57
	N_2[c]	14	0.0001								11
	N_2[d]	14	0.248	0.045	0.53						11
	O_2[c]	25	0.00665								28
	O_2[c]	23	0.00005								59
	CO_2[c]	25	0.00924								28
	CO_2[d]	25	65.0								28
	H_2S[c]	25	0.0052								28
	C_2H_4O[c]	0	0.0015								37
	H_2O	25	5.25								98
Poly(vinyl benzoate)	H_2	25	6.55	1.93	0.34	20–60	0.0055	16.7	21.9	− 5.2	65
		70	18.3	6.39	0.29	60–85	0.251	27.2	24.5	2.7	65
	He	25	6.67	6.17	0.11	20–60	0.00345	15.5	16.9	− 1.3	65
		70	17.1	16.1	0.11	60–85	0.458	29.1	22.4	6.7	65
	Ne	25	1.51	1.08	0.14	20–60	0.00137	16.9	23.2	− 6.3	65
		70	4.28	3.83	0.11	60–85	0.758	34.5	28.6	5.9	65
	Ar	25	0.358	0.033	1.08	20–60	0.0020	21.4	31.6	− 10.1	65
		35	0.459	0.0491	0.93						86
		70	1.24	0.181	0.69	60–85	0.863	38.4	38.1	0.29	65
	Kr	25	0.192	0.0059	3.25	20–60	0.00188	22.8	38.4	− 15.5	65
		70	0.712	0.049	1.45	60–85	2.565	43.1	50.7	− 7.7	65
	Xe	25	0.071	0.00064	11.1	20–60	0.00723	28.6	46.0	− 17.5	65
		70	0.43								65
	N_2	25	0.124	0.026	0.48	20–60	0.00104	22.4	33.0	− 10.6	65
		70	0.463	0.158	0.29	60–85	1.26	42.3	45.2	− 2.9	65
	O_2	25	0.715	0.079	0.91	20–60	0.00060	16.7	25.1	− 8.5	65
		70	2.11	0.309	0.68	60–85	2.76	40.2	30.5	9.8	65
	CO_2	25	4.17	0.020	20.9	20–60	0.00020	9.6	32.9	− 23.4	65
		35	4.74	0.030	16.2						86
		70	8.06	0.117	6.9	60–85	0.734	32.6	45.2	− 12.5	65
Poly(vinyl butyral)	H_2O	25	608								98
Poly(vinyl-*p*-isopropylbenzoate)	He	25	8.93	15.5	0.0578	20–67	0.590	27.5	18.4	9.1	86
		80	49.9	51.9	0.096	67–95	0.537	27.3	23.5	3.7	86
	Ne	25	3.88	2.72	0.0585	20–67	0.00251	16.0	17.1	− 1.1	86
		80	13.9	8.71	0.160	67–95	1.09	33.1	23.4	9.6	86
	Ar	25	1.90	0.165	1.15	20–67	0.00131	16.2	27.5	− 11.3	86
		80	7.67	1.11	0.691	67–95	11.6	41.8	39.7	2.1	86
	Kr	25	0.940	0.0388	3.91	20–67	0.000248	13.8	32.2	− 18.3	86
		80	6.25	0.393	1.61	67–95	40.6	46.1	47.3	− 1.3	86
	Xe	25	0.00942	0.00579	16.5	20–67	0.00000289	14.2	36.1	− 22.0	86
		80	4.62	0.0898	5.14	67–95	534.8	54.5	61.5	− 7.0	86
	O_2	25	2.44	0.279	0.0546	20–67	0.00180	16.4	26.8	− 10.4	86
		80	12.4	1.948	0.637	67–95	6.92	38.9	37.4	1.4	86
	N_2	25	0.647	0.117	0.550	20–67	0.000878	17.9	29.3	− 11.4	86
		80	2.99	0.874	0.348	67–95	19.4	46.1	42.4	3.6	86
	CO_2	25	15.7	0.0760	20.6	20–67	0.000110	4.8	30.4	25.5	86
		80	32.9	0.638	5.17	67–95	3.57	34.0	43.9	− 9.9	86
	CH_4	25	1.32	0.0462	2.84	20–67	0.000512	14.8	33.1	− 18.3	86
		80	5.65	0.478	1.163	67–95	58.7	47.4	48.1	− 0.6	86
Poly(vinyl-*m*-methylbenzoate)	Ar	35	0.642	0.0738	0.870						86
	CO_2	35	5.05	0.0361	14.0						86
Poly(vinyl chloride) unplasticized	He	25	1.5	2.8	0.055	25–80	0.212	29.9	20.7	9.2	32
	H_2	25	1.3	0.5	0.26	25–80	1.46	34.5	34.5	0	32
	Ne	25	0.29	0.25	0.12	25–80	0.274	34.1	31.5	2.6	32
	N_2	25	0.0089	0.0038	0.23	25–80	9380	69.0	61.9	7.1	32
	Ar	25	0.0086	0.0012	0.75	25–80	6.28	57.8	51.5	6.3	32
	Kr	25	0.0060	0.00041	0.54	25–70	24.2	55.3	62.8	− 7.5	32
		80	0.14			75–90	8.85 × 10⁵	86.6	128.5	− 41.9	32
	O_2	25	0.034	0.012	0.29	25–80	179	55.8	54.6	1.2	32
	CO_2	25	0.12	0.0025	4.7	25–90	930	56.8	64.6	− 7.8	32
	CH_4	25	0.021	0.0013	1.7	25–85	7950	66.2	70.3	− 4.1	32
	H_2O	25	206	0.024	870	25–80	2.04	22.9	41.8	− 18.9	32
	H_2S	20	0.14	0.000046	310						5
	NH_3	20	3.7								5
	C_2H_4O	30	4.4	0.0013	330						80
unplasticized (Pentaform Type TH 170/01)	He	35	2.52								75
	N_2	35	0.00709	0.00188							75
	Ar	35	0.0277	0.00339							75
	CO_2	35	0.182	0.00145							75
	CH_4	35	0.00810								75

Polymer	Permeant	T	$P\ (\times 10^{13})$	$D\ (\times 10^{6})$	$S\ (\times 10^{6})$	Temp. range	$P_0\ (\times 10^{7})$	E_P	E_D	E_S	Refs.
unplasticized	He	35	2.24								75
(CS 5760)	N_2	35	0.00501	0.00137							75
	Ar	35	0.0208	0.00242							75
	CO_2	35	0.138	0.00145							75
	CH_4	35	0.00638	0.000331							75
plasticized with tricresyl triphospate %											
0	H_2	27	1.8	0.48							45
5	H_2	27	1.4	0.456							45
10.2	H_2	27	1.3	0.422							45
15	H_2	27	1.3	0.444							45
20.1	H_2	27	1.6	0.473							45
30.8	H_2	27	2.1	1.56							45
40.0	H_2	27	2.7	2.25							45
0	CO	27	0.019	0.0023							45
5	CO	27	0.012	0.0021							45
10.2	CO	27	0.013	0.0016							45
15	CO	27	0.014	0.0025							45
20.1	CO	27	0.021	0.0029							45
30.8	CO	27	0.079	0.0054							45
40.0	CO	27	0.281	0.029							45
Poly(vinyl chloride)/Oligo(dimethylsiloxane)											
100/0	N_2	25	0.0226								85
	O_2	25	0.103								85
90/10	N_2	25	0.0281								85
	O_2	25	0.120								85
80/20	N_2	25	0.0316								85
	O_2	25	0.151								85
75/25	N_2	25	0.0359								85
	O_2	25	0.164								85
60/40	N_2	25	0.0656								85
	O_2	25	0.295								85
50/50	N_2	25	0.153								85
	O_2	25	0.678								85
40/60	N_2	25	0.320								85
	O_2	25	1.74								85
30/70	N_2	25	1.51								85
	O_2	25	3.83								85
Poly(vinyl chloride)-*g*-oligo(dimethylsiloxane)/Oligo(dimethylsiloxane)											
100/0	N_2	25	0.0269								85
	O_2	25	0.164								85
80/20	N_2	25	0.0271								85
	O_2	25	0.165								85
70/30	N_2	25	0.0431								85
	O_2	25	0.254								85
60/40	N_2	25	0.0609								85
	O_2	25	0.413								85
50/50	N_2	25	0.120								85
	O_2	25	0.795								85
40/60	N_2	25	0.417								85
	O_2	25	2.43								85
30/70	N_2	25	1.01								85
	O_2	25	4.99								85
Poly(vinyl flouride)	H_2	35	0.41								96
	He	35	0.98								96
	N_2	35	0.0068								96
	O_2	35	0.030								96
	CO_2	35	0.20								96
	CH_4	35	0.0075								96
Poly(vinylidene chloride)	O_2	35	0.00038								96
Poly(vinylidene chloride) (Saran)	He	34	0.233								10
	N_2	30	0.000706			0–90	900	70.3			37
	O_2	30	0.00383			0–90	825	66.6			37
	CO_2	30	0.0218			0–90	24.8	51.5			37
	CH_3Br	30	0.00218								37
	H_2S	30	0.027	9.6×10^{-5}	27.6	30–75	1.58×10^{5}	74.5			8
	H_2O	25	7.0			10–60	863	46.1			21
Poly(vinylidene chloride-*co*-vinyl chloride) 88/12 plasticized with acetyltributyl citrate (%)											
0.5	H_2O	30	1.38								50
2.7	H_2O	30	3.07								50

Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^{6}$)	S ($\times 10^{6}$)	Temp. range	P_0 ($\times 10^{7}$)	E_P	E_D	E_S	Refs.
4.9	H_2O	30	4.77								50
7.2	H_2O	30	7.38								50
Poly(vinyl cyclohexanecarboxylate)	He	25	9.69	7.33	0.148	15–52	0.0158	18.3	16.3	0.25	81
	He	70	33.5	20.3	0.166	52–85	0.547	27.7	23.7	4.4	81
	O_2	25	1.30	0.122	1.08	15–52	0.00302	19.2	30.9	− 11.7	81
	O_2	70	6.50	0.772	0.835	52–85	7.26	39.7	41.1	− 0.34	81
	Ar	25	0.851	0.0670	1.27	15–52	0.0115	23.6	34.6	− 11.1	81
	Ar	35	1.17	0.106	1.10						86
	Ar	70	4.75	0.570	0.934	52–85	20.2	43.5	43.5	− 0.011	81
	N_2	25	0.256	0.0421	0.609	15–52	0.00690	25.3	35.6	-11.1	81
	N_2	70	1.82	0.368	0.492	52–85	60.4	49.4	46.9	1.8	81
	CO_2	25	5.05	0.0254	20.0	15–52	0.00233	15.2	37.5	− 22.3	81
	CO_2	70	21.4	0.270	8.36	52–85	6.68	36.1	47.7	− 11.7	81
1.6. *FLUORINE CONTAINING POLYMERS*											
Poly(tetrafluoroethylene)	H_2	25	7.4			20–130	0.0415	21.4			23
	H_2	25	7.25	0.147	4.94						49
	N_2	25	1.0	0.088	1.2	20–130	0.0202	24.4	29.9	− 5.5	23
	O_2	25	3.2	0.0152	2.1	20–130	0.00698	19.1	26.3	− 7.2	23
	CO_2	25	7.5	0.095	9.2	20–130	0.00248	14.0	28.6	− 14.6	23
	NO_2	25	12.0	0.0037	320	20–130	0.00087	10.7	58.6	− 47.9	23
	N_2O_4	25	28.0	0.025	110	20–130	9.7×10^{-6}	− 2.1			23
	D_2	25	7.48	0.116	6.42						49
	T_2	25	6.19	0.052	11.9						49
	CH_4	25	0.56	0.023	2.46						49
	He	25	9.0	0.811	1.09						49
	Ne	25	2.69	0.251	1.09						49
	Ar	25	1.50	0.056	2.66						49
	Kr	25	0.73	0.015	4.83						49
	Xe	25	0.30	0.004	7.40						49
	H_2O	38	6								98
	CH_4	90	3.85	0.221	1.74	40–195	0.273	33.7	34.7	− 1.0	53
	C_2H_6	90	2.15	0.0763	2.81	40–195	0.251	35.2	36.2	− 1.0	53
	C_3H_8	90	0.96	0.0251	3.87	40–195	0.923	41.6	44.8	− 3.2	53
	n-C_4H_{10}	90	0.878	0.0187	4.69	40–195	1.22	42.7	51.5	− 8.8	53
	i-C_4H_{10}	90	0.345	0.0086	4.03	40–195	4.64	49.6	58.1	− 8.5	53
(Hostaflon PFA)	He	23	33.0			20–100	0.0119	14.5			73
	O_2	22	3.17			20–90	0.0386	23.1			73
	N_2	23	0.92			20–100	0.105	28.7			73
	CO_2	24	10.0			20–100	0.0236	19.2			73
	CH_4	25	0.79			20–100	0.292	31.8			73
	SO_2	24	2.11			5–100	0.0425	24.5			73
	Cl_2	23	1.35			20–100	0.0259	24.3			73
	HCl	22	2.04			20–80	0.122	27.0			73
	H_2O	23	13.4			10–80	0.0797	21.4			73
Poly(tetrafluorethylene-*co*-hexafluoropropene) (Teflon FEP)	N_2	25	1.19	0.0948	1.25	20–80	0.273	30.6	38.5	− 7.9	24
	O_2	25	3.68	0.184	2.02	20–80	0.109	25.5	34.7	− 9.2	24,67
	CO_2	25	9.53	0.105	9.08	20–80	0.0443	20.9	36.6	− 15.7	24
	CH_4	90	9.98	0.491	2.15	40–195	1.09	35.0	41.3	− 6.3	53,55
	C_2H_6	90	6.23	0.140	4.37	40–195	1.22	36.8	53.8	− 17.0	53,55
	C_3H_8	90	3.11	0.0489	6.38	40–195	6.30	43.9	59.5	− 15.6	53,55
	n-C_4H_{10}	90	2.18	0.0278	7.8	40–195	134	54.2	65.0	− 10.8	53,55
	i-C_4H_{10}	90	0.855	0.0146	5.86	40–195	4200	67.4	77.8	− 10.4	53,55
	CH_3Cl	25	0.763	0.00667	11.5	40–120	0.945	34.8	50.1	− 15.3	55
	C_6H_6	25	0.263	2.45×10^{-4}	107	40–120	122	49.5	69.1	− 19.6	55
	H_2O	25	12.8			25–60	0.494	26.2	56.4	− 30.2	56,66
		70	37.3			60–85	1.58×10^{-7}	− 15.6	16.5	− 32.1	56,66
Poly(tetrafluorethylene-*co*-ethylene) (Hostaflon ET)	He	23	4.23								54
	O_2	23	0.40								54
	N_2	23	0.137								54
	CO_2	23	1.49								54
	H_2O	23	2.8								54
	He	25	5.67			20–100	0.0557	22.8			73
	O_2	22	0.78			20–100	0.371	32.1			73
	N_2	23	0.25			5–100	0.0790	31.2			73
	CO_2	23	4.39			20–100	0.0562	23.3			73
	CH_4	23	0.23			20–100	0.326	34.9			73
	Cl_2	23	0.807			20–100	0.0349	26.3			73
	HCl	23	2.2			20–100	0.394	29.8			73
	SO_2	23	1.96			5–100	0.0137	21.8			73
	H_2O	25	74			20–55	0.000121	1.2			73
		80	115			55–95	0.0387	17.1			73
Poly(trifluorochloroethylene) unplasticized	He	20	5.1					23.4			10
	H_2	20	0.705					30.2			10
Kel-F 300 film of about 30% crystallinity	N_2	25	0.00375			25–75	150	59.9			20
	O_2	40	0.030			0–80	4.35	46.9			20
	CO_2	40	0.158			40–80	24.8	49.4			20
	H_2O	25	0.218								37

Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^{6}$)	S ($\times 10^{6}$)	Temp. range	P_0 ($\times 10^{7}$)	E_P	E_D	E_S	Refs.
	C_2H_2O	60	3.3								37
	CH_3Br	60	3.45								37
crystallinity 80%	N_2	25	0.00225			25–75	1.05	49.8			20
	O_2	40	0.0188			40–60	0.698	45.6			20
	CO_2	40	0.036			40–80	2.03	46.5			20
crystallinity 30%	N_2	50	0.413								20
plasticized[c]	O_2	30	0.42								20
	CO_2	50	5.63								20
Poly(trifluorochloroethylene-*co*-ethylene) (Halar)	He	23	4.0								54
	O_2	23	0.114								54
	N_2	23	0.0457								54
	CO_2	23	0.457								54
	H_2O	23	2.8								54
Poly(vinyl fluoride) (Tedlar)	He	23	0.347								54
	N_2	23	0.0012								54
	O_2	23	0.0139								54
	CO_2	23	0.069								54
	H_2O	23	10.1								54
Poly(vinyl fluoride) (Kynar)	He	35	1.29	1.87							78
	H_2	35	0.404	0.336							78
	Ar	35	0.0323	0.00985	0.394						78
	N_2	35	0.0167	0.00716	0.234						78
	O_2	35	0.0620	0.0172							78
	CH_4	35	0.0150	0.00294	0.457						78
	CO_2	35	0.388	0.00566	7.21						78

1.7. POLY(DIENES)

Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^{6}$)	S ($\times 10^{6}$)	Temp. range	P_0 ($\times 10^{7}$)	E_P	E_D	E_S	Refs.
Poly(butadiene)	H_2	25	31.6	9.6	0.326	25–50	2.15	27.6	21.3	6.3	35
	N_2	25	4.84	1.1	0.444	25–50	4.91	34.3	30.1	4.2	35
	O_2	25	14.3	1.5	0.957	25–50	2.27	29.7	28.5	1.2	35
	CO_2	25	104	1.05	9.87	25–50	0.683	21.8	30.6	− 8.8	35
cis-1,4	He	24	24.5	15.7	0.156	0–45	0.0855	20.3	17.3	2.9	25
	Ne	24	14.4	6.55	0.220	0–45	0.096	21.8	17.4	4.4	25
	Ar	24	30.8	4.06	0.758	0–45	0.084	19.4	21.3	− 1.9	25
	N_2	24	14.4	2.96	0.488	0–45	0.078	21.3	25.0	− 3.7	25
Poly(butadiene-*co*-acrylonitrile) 80/20 (Perbunan 18)	He	25	12.7	15.5	0.0819	25–50	1.24	28.5	17.6	10.9	35
	H_2	25	18.9	6.43	0.296	25–50	3.52	30.1	26.0	4.1	35
	N_2	25	1.89	0.51	0.375	25–50	34.9	41.5	35.6	5.9	35
	O_2	25	6.15	0.79	0.77	25–50	230	36.0	33.9	2.1	35
	CO_2	25	47.6	0.425	11.2	25–50	6.43	29.3	38.5	−9.2	35
73/27 (Perbunan, German)	He	25	9.2	11.7	0.0789	25–50	1.24	29.3	21.8	7.5	35
	H_2	25	11.9	4.5	0.267	25–50	7.43	33.1	28.9	4.2	35
	N_2	25	0.8	0.25	0.316	25–50	180	47.7	43.5	4.2	35
	O_2	25	2.9	0.43	0.671	25–50	37.3	40.6	38.5	2.1	35
	CO_2	25	23.2	0.19	12.2	25–50	20.0	33.9	44.8	− 10.9	35
	C_2H_2	25	18.7	0.0764	24.5	25–50	282	41.0	51.5	− 10.5	35
	C_3H_8	50	58.5	0.141	41.5						35
68/32 (Hycar OR 25)	He	25	7.4	11.2	0.0661	25–50	1.9	30.9	21.8	9.1	35
	H_2	25	8.85	3.85	0.227	25–50	8.97	34.3	29.3	5.0	35
	N_2	25	0.454	0.152	0.296	25–50	473	51.5	49.0	2.5	35
	O_2	25	1.76	0.28	0.632	25–50	85.6	43.9	43.1	0.8	35
	CO_2	25	13.9	0.107	13.0	25–50	55.5	37.7	50.2	− 12.5	35
61/39 (Hycar OR 15)	He	25	5.13	7.92	0.0592	25–50	2.23	32.2	23.0	9.2	35
	H_2	25	5.35	2.43	0.217	25–50	14.9	36.8	31.8	5.0	35
	N_2	25	0.177	0.064	0.276	25–50	2330	57.8	53.2	4.6	35
	O_2	25	0.721	13.6	0.533	25–50	444	50.2	45.6	4.6	35
	CO_2	25	5.59	0.038	14.7	25–50	272	43.9	56.1	− 12.2	35
Poly(butadiene-*co*-styrene) 92/8 (Ameripol 1502)	He	24	17.2	15.7	0.110	0–50	4.79	26.8	23.7	3.1	25
	Ne	24	7.28	5.47	0.133	0–50	0.908	29.2	29.4	− 0.2	25
	Ar	24	9.53	1.39	0.686	0–50	7.88	33.7	33.3	0.4	25
	N_2	24	3.83	1.05	0.365	0–50	8.63	36.3	36.0	0.3	25
80/20 (Hycar 2001)	He	24	10.1	16.0	0.0628	0–50	1.41	29.5	18.0	11.5	25
	Ne	24	3.76	4.23	0.0885	0–50	0.56	29.5	25.7	3.8	25
	Ar	24	3.37	58.0	0.581	0–50	19.2	42.2	41.3	0.9	25
	N_2	24	1.28	42.8	0.30	0–50	23.8	41.6	42.2	− 0.6	25
Poly(butadiene) hydrogenated crystallinity 29%, Hydropol density 0.894 g/cm^3	He	25	11.8	15.1	0.0781	5–60	17.2	35.2	24.7	10.5	16
	O_2	25	8.49	1.2	0.708	5–60	128	41.0	38.9	2.1	16
	Ar	25	8.29	0.96	0.864	5–60	292	43.1	40.2	2.9	16
	CO_2	25	36.3	0.91	3.99	5–60	85.8	36.4	36.8	− 0.4	16
	CO	25	4.64	0.82	0.566	5–60	324	44.8	37.3	7.5	16
	N_2	25	3.00	0.74	0.405	5–60	489	46.9	39.4	7.5	16
	CH_4	25	9.77	0.54	1.81	5–60	942	45.6	44.0	1.6	16
	C_2H_6	25	25.0	0.24	10.4	5–60	543	41.9	49.4	− 7.5	16
	C_3H_4	25	169	0.31	54.5	5–60	340	36.0	45.2	− 9.2	16
	C_3H_6	25	62.2	0.20	31.1	5–60	680	40.2	48.2	− 8.0	16
	C_3H_8	25	40.5	0.12	33.8	5–60	1680	43.5	52.3	− 8.8	16
	SF_6	25	0.849	0.056	1.52	5–60	7790	56.9	60.3	− 3.4	16

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Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^6$)	S ($\times 10^6$)	Temp. range	P_0 ($\times 10^7$)	E_P	E_D	E_S	Refs.
Poly(chloroprene) (Neoprene G)	H_2	25	10.2	3.8	0.286	15–50	8.80	33.9	27.6	6.3	33,36
	O_2	25	2.96	0.38	0.740	15–50	54.7	41.5	39.4	2.1	33,36
	N_2	25	0.88	0.24	0.355	15–50	224	44.4	43.1	1.3	33,36
	Ar	25	2.84	0.16							36
	CO_2	25	19.2	0.23	8.19	15–50	2499	35.6	45.2	−9.6	33,36
	CH_4	25	2.47								33
	H_2O	25	683								31
	NH_3	25			86.8						33
	SO_2	25			176						33
(Neoprene W)	H_2O	23	837			23–60	4.04×10^{11}	83.3			52
	H_2O^f	23	5130			23–60	2.4×10^6	49.2			52
(Neoprene)	He	35	15.0	60.4	0.0247						90
	H_2	35	20.7	9.33	0.221						90
	D_2	35	20.0	10.7	0.188						90
	O_2	35	6.62	1.01	0.656						90
	N_2	35	2.23	0.533	0.419						90
Poly(dimethylbutadiene)	He	25	10.8			25–50	0.735	27.6			35,58
(Methyl rubber)	H_2	25	12.8	3.9	0.326	25–50	9.40	33.5	31.4	2.1	35
	N_2	25	0.355	0.079	0.454	25–50	2010	55.7	51.9	3.8	35
	O_2	25	1.58	0.14	1.13	25–50	303	47.3	46.5	0.8	35
	CO_2	25	5.63	0.063	8.98	25–50	917	46.9	53.6	−6.7	35,33
	CH_4	25	0.622			25–50	50300	62.3			58
Poly(ethylene-*co*-propylene-*co*-diene)	H_2O	23	157			23–60	6.84×10^8	71.7			52
Poly(isobutene-*co*-isoprene) 98/2	H_2O^f	23	367			23–60	745000	52.8			52
(Butyl rubber)	He	25	6.32	5.93	0.109	25–50	2.34	31.8	24.3	7.5	35
	H_2	25	5.43	1.52	0.355	25–50	12.8	36.4	33.9	2.5	35
	N_2	25	0.243	0.045	0.543	25–50	349	52.3	50.7	1.6	35
	O_2	25	0.977	0.081	1.20	25–50	68.3	44.8	49.8	−5.0	35
	CO_2	25	3.89	0.0578	6.71	25–50	71.9	41.5	50.2	−8.7	35
	C_2H_2	25	1.26	0.0203	6.22	25–50	407	48.6	53.6	−5.0	35
	C_3H_8	50	10.3	0.0224	46.4						35
	H_2O	37.5	82.5								12
Poly(isoprene), amorphous	He	25		21.6					19.7		16
(Natural rubber)	O_2	25	17.6	1.73	1.02	20–50	2.38	29.3	33.5	−4.2	16,35
	Ar	25	17.2	1.36	1.26	20–50	9.15	32.7	33.1	−0.4	16
	CO_2	25	115	1.25	9.20	20–50	0.755	21.8	34.3	−12.5	16,35
	CO	25	11.8	1.35	0.874	20–50	3.16	31.0	31.0	0	16
Poly(isoprene)	N_2	25	7.11	1.17	0.608	20–50	12.2	35.6	33.5	2.1	16,35
	CH_4	25	22.7	0.89	2.55	20–50	6.08	31.0	36.4	−5.4	16
	C_2H_6	25		0.40					42.7		16
	C_3H_4	25	415	0.50	83.5	20–50	3.76	22.6	37.7	−15.1	16
	C_3H_6	25	154	0.31	49.7	20–50	17.7	28.9	42.7	−13.8	16
	C_3H_8	25	126	0.21	60.0	20–50	1.34	23.0	46.5	−23.5	16,35
	SF_6	25	2.70	0.115	2.35	20–50	4.62	35.6	50.2	−14.6	16
	C_2H_2	25	74.5	0.467	16.0	25–50	17.0	30.6	39.8	−9.2	35
	n-C_4H_{10}	50	526								58
	n-C_5H_{12}	50	1240								58
	H_2O	25	1720								31, 98
trans-	H_2	25	10.9	5.0	0.227	15–40	296	42.3	31.8	13.0	34
(Vulcanized purified gutta percha)		50	106	21	0.493	50–70	0.582	23.0	26.4	−0.4	34
	O_2	25	4.64	0.7	0.661	15–40	2560	49.8	38.5	13.8	34
		50	56.3	5.3	1.05	50–70	0.197	21.8	26.8	−2.1	34
	N_2	25	1.62	0.5	0.326	15–40	1560	52.3	41.0	13.8	34
		50	23.7	4.2	0.562	50–70	0.316	25.5	28.1	0.4	34
	CO_2	25	26.7	0.47	5.52	15–40	217	39.3	41.0	0.8	34
		50	281	4.1	6.81	50–70	0.0671	14.7	28.1	−10.5	34
	H_2O	25	379								31
Poly(isoprene-*co*-acrylonitrile) 74/26	He	25	5.85	8.01	0.0731	25–50	2.17	31.8	20.5	11.3	35
	H_2	25	5.58	2.47	0.227	25–50	26.2	38.1	31.0	7.1	35
	N_2	25	0.136	0.045	0.306	25–50	13500	62.8	60.7	2.1	35
	O_2	25	0.642	0.092	0.701	25–50	1330	53.2	50.7	2.5	35
	CO_2	25	3.26	0.031	10.6	25–50	4690	52.3	60.3	−8.0	35
Poly(isoprene-*co*-methacrylonitrile) 74/26	H_2	25	10.2	3.55	0.286	25–50	8.80	33.9	28.9	5.0	35
	N_2	25	0.449	0.123	0.365	25–50	1090	53.6	48.6	5.0	35
	O_2	25	1.77	0.24	0.740	25–50	209	46.1	40.2	5.9	35
	CO_2	25	10.7	0.091	11.8	25–50	273	42.3	51.1	−8.8	35
Poly(isoprene) hydrochloride	He	20	14.3								10
(Pliofilm FM-1)	N_2	30	0.113								37
	O_2	30	40.5								37
	CO_2	30	0.91			10–60	1.43	36.0			37,43
	H_2S	30	0.075	0.0002	38.5	30–60	403000	73.7			8
	C_2H_4O	0	548								37
	CH_3Br	60	25.5								37

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
(Pliofilm NO)	H_2O	25		4100		25–60			58.6		39
Poly(methyl-1-pentenylene)	He	25	75.8								41
	H_2	25	102								41
	N_2	25	5.87	0.55	1.07						41
	O_2	25	24.2	1.01	2.40						41
	CO_2	25	69.5	684	0.0102						41
Poly(2-methyl-1,3-pentadiene-*co*-4-methyl-1,3-pentadiene 85/15	H_2	25	32.0			25–50	5.08	29.7			35
	N_2	25	2.06	0.30	0.691	25–50	336	46.9	46.5	0.4	35
	O_2	25	7.52	0.555	1.36	25–50	59.6	39.4	41.0	−1.6	35
	CO_2	25	33.8			25–50	41.9	34.8			35

1.8. POLY(XYLYLENES)

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Poly(*p*-2,6-dichloroxylylene)	H_2O	25	4.97	0.00594	84.6	30–80	0.0129	19.5	36.0	−16.5	48
Poly(chloro-*p*-xylylene) (parylene C)	He	25	1.41	0.103	0.391	10–80		21.7	14.6	7.1	84
	H_2	25	0.717	0.0675	0.670	10–80		24.1	18.5	5.6	84
	N_2	25	0.00626	0.00178	0.0863	10–80		31.3	30.1	1.2	84
	O_2	25	0.0358	0.00351	0.567	10–80		29.5	32.5	−3.0	84
	CO_2	25	0.105	0.00164	4.62	10–80		27.8	51.3	−23.4	84

1.9. POLY(OXIDES)

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Poly(oxymethylene)	CO_2	25	1.35	0.014	9.64	25–100	0.462	31.4	49.0		38
	H_2O	25	683	0.027	2530	25–100	0.129	13.0			38
grafted with 2.8% butadiene	CO_2	25	3.83	0.044	8.69	25–100	0.095	25.1	38.5		38
	H_2O	25	998	0.070	1430	25–100	0.0126	6.3			38
(Hostaform)	O_2	23	0.057								73
	CO_2	23	1.28								73
	H_2O	23	422			23–60	0.129	14.1			73
Poly(oxy-2,6-dimethyl-1,4-phenylene)	He	25	58.5								41
	H_2	25	84.6								41
	N_2	25	2.86								41
	O_2	25	11.9								41
	CO_2	25	56.8	0.0601	94.6						41
	H_2O	25	3045	0.17	1797						40
Poly(phenylene oxide) brominated											
0% Br[a]	CO_2	35	38	0.17	21.7						100
	CH_4	35	2.2	0.021	10.6						100
36% Br	CO_2	35	38	0.16	23.7						100
	CH_4	35	2.0	0.016	11.8						100
91% Br	CO_2	35	51	0.20	25.4						100
	CH_4	35	2.6	0.02	13.1						100
106% Br	CO_2	35	81	0.30	27.2						100
	CH_4	35	4.7	0.033	14.3						100

1.10. POLY(ESTERS), POLY(CARBONATES)

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Poly(oxybutyleneoxyterephthaloyl), amorphous	He	25	1.28	0.13	0.888						44
	Ne	25	0.237	0.022	0.997						44
	Ar	25	0.078	0.0040	1.97						44
	CO_2	25	0.217	0.0062	3.46						44
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene) (Lexan)	He	25	7.5			25–125	0.0248	20.1			22
	H_2	25	9.0	0.64	1.38	25–175	0.0816	22.6	20.9	1.7	22
	Ne	100	10.9								22
	Ar	25	0.6	0.015	4.15	25–125	0.00544	22.6	25.1	−2.5	22
		175	32.3	0.53	6.12	125–175	70.2	54.4			22
	O_2	25	1.05	0.021	5.03	0–125	0.00252	19.3	32.2	−12.9	22
		175	22.5			125–175	0.0919	31.0			22
	CO_2	25	6.0	0.0048	124	25–100	0.00365	15.9	37.7	−21.8	22
	SF_6	25	4.88×10^{-6}	1.0×10^{-7}	4.94	25–125	0.0118	53.6	83.7	−30.1	22
		175	0.075			125–175	3.21×10^{7}	125.6			22
	H_2O	25	1050	0.68					26.0		22
	N_2	25	0.225			0–125	0.00559	25.1			22
		175	14.3			125–175	1.09	41.9			22
Poly(oxyethyleneoxyisophthaloyl)	O_2	30	0.012	0.0029	0.41						60
Poly(oxyethyleneoxyterephthaloyl), amorphous	He	25	2.37	3.1	0.077	20–60	0.0199	21.3	19.2	−1.1	17,18
	Ar	25	0.0217	0.0024	0.79	20–60	0.00319	28.9	48.2	−15.1	17,18
	N_2	25	0.0108	0.0019	0.55	20–60	0.00025	26.4	47.7	−23.9	17,18
	O_2	25	0.0444	0.0045	0.98	20–60	0.227	37.7	48.6	−14.7	17,18
	CH_4	25	0.0070	0.00030	2.3	20–60	0.00021	24.7	51.1	−27.2	17,18
	CO_2	25	0.227	0.00083	28.0	20–60	0.0232	27.6	52.3	−28.5	17,18
crystallinity 40%	He	25	1.09	2.0	0.052	20–80	0.00308	19.7	20.1	0.9	17,18
		90	6.3			80–130	0.0266	25.5	27.6	0.9	17,18
	N_2	25	0.00513	0.0013	0.45	20–80	0.00275	32.7	44.0	−18.4	17,18
		90	0.068			80–130	20.6	59.0	58.6	0	17,18

Polymer	Permeant	T	$P\ (\times 10^{13})$	$D\ (\times 10^{6})$	$S\ (\times 10^{6})$	Temp. range	$P_0\ (\times 10^{7})$	E_P	E_D	E_S	Refs.
	O_2	25	0.0257	0.0035	0.72	20–80	0.0122	32.2	46.1	−13.0	17,18
		90	0.31			80–130	0.744	44.4	50.7	0	17,18
	CH_4	25	0.00257	0.00013	2.0	20–80	0.00719	36.8	52.3	−22.2	17,18
		90	0.091			80–130	63.2	61.5	67.0	−12.9	17,18
	CO_2	25	0.118	0.00057	20.0	20–80	0.000197	18.4	50.2	−31.4	17,18
		90	1.0			80–130	22.2	51.1	64.5	−19.7	17,18
(Mylar A)	H_2	25	0.448								57
	D_2	25	0.073								57
	N_2	25	0.0038			−25–80	0.000945	30.8			37
	O_2	25	0.030			−25–80	0.000026	16.8			37
	CH_3Br	25	0.013			25–90	0.0163	34.8			37
	C_2H_4O	25	0.084			25–90	0.000534	21.7			37
	H_2O	25	98			10–60	0.00032	2.9			21
(Hostaphan)	H_2S	20	0.14	0.000071	195						5
	NH_3	20	1.1								5
	N_2	20	0.0034								61
	O_2	23	0.014								72
	O_2	30	0.042	0.0065	0.62						60
	H_2O	23	114			10–40	0.00012	0.1			73
Poly(ethylene terephthalate)	H_2O	25	113								98
Poly(ethylene terephthalate-*co*-isophthalate) 50/50	O_2	30	0.019	0.0035	0.49						60
Poly(ethylene terephthalate-*co*-2,6-naphthalene dicarboxylate) 50/50	O_2	30	0.031	0.0048	0.61						60
Poly(oxyterephthaloyloxymethylene-1,4-cyclohexylenemethylene)	O_2	30	0.19	0.014	1.3						60
Poly(tetramethylene adipate) diol molecular weight 1050 density 1.20 g/cm^3	O_2	35	0.0975	0.076	0.1275						76
	CO_2	35	0.525	0.027	1.95						76
	CO	35	0.0278	0.039	0.07125						76
	N_2	35									76
	CH_4	35	0.0353	0.027	0.1275						76
	H_2O	23	3900	0.041	9525						76
molecular weight 1510 density 1.19 g/cm^3	O_2	35	0.563	0.16	0.3525						76
	CO_2	35	4.8	0.057	8.25						76
	CO	35	0.195	0.074	0.2625						76
	N_2	35	0.113	0.053	0.2100						76
	CH_4	35	0.383	0.058	0.6600						76
	H_2O	23	5925	0.055	10875						76
molecular weight 2100 density 1.18 g/cm^3	O_2	35	1.5	0.39	0.375						76
	CO_2	35	15	0.13	6.53						76
	CO	35	0.9	0.11	0.750						76
	N_2	35	0.6	0.22	0.270						76
	CH_4	35	1.2	0.17	0.750						76
	H_2O	23	7425	0.078	9525						76
Poly(carbonate) (Lexan)	H_2O	25	1050								98
Poly(carbonate)	CO_2	35	4.5	0.0209	14.5						100
	CH_4	35	0.20	0.0046	4.0						100
Poly(carbonate-sulfone) (diphenyl carbonate + 1,10-decanediol)	CO_2	25	9.5								95
(diphenyl carbonate + 1,4-bis(3-hydroxypropylsulfonyl)butane	CO_2	25	0.035								95
Poly(tetrabutylene carbonate)	CO_2	35	3.17	0.0166	19.1						100
	CH_4	35	0.0945	0.0013	7.24						100
Poly(tetrachlorine carbonate)	CO_2	35	5.00	0.0253	19.6						100
	CH_4	35	0.168	0.0022	7.61						100
Poly(tetramethylene hexafluoro carbonate)	CO_2	35	82.5	0.24	32.6						100
	CH_4	35	3.45	0.0348	9.58						100
Poly(tetramethylene carbonate)	CO_2	35	13.2	0.061	21.5						100
	CH_4	35	0.60	0.0081	7.37						100
Poly(tetramethylene carbonate) diol molecular weight 1150 density 1.29 g/cm^3	O_2	35	0.105	0.029	0.368						76
	CO_2	35	0.675	0.012	5.40						76
	CO	35	0.0525	0.010	0.525						76
	N_2	35	0.0308	0.019	0.165						76
	CH_4	35	0.0375	0.008	0.473						76
	H_2O	23	825	0.012	7223						76

Polymer	Permeant	T	P ($\times 10^{13}$)	D ($\times 10^6$)	S ($\times 10^6$)	Temp. range	P_0 ($\times 10^7$)	E_P	E_D	E_S	Refs.
molecular weight 1570	O_2	35	0.143	0.054	0.263						76
density 1.27 g/cm^3	CO_2	35	1.35	0.017	7.50						76
	CO	35	0.105	0.033	0.315						76
	N_2	35	0.0660	0.050	0.105						76
	CH_4	35	0.105	0.019	0.540						76
	H_2O	23	2100	0.020	10575						76
molecular weight 3070	O_2	35	0.308	0.072	0.473						76
density 1.21 g/cm^3	CO_2	35	2.48	0.026	9.75						76
	CO	35	0.143	0.043	0.345						76
	N_2	35	0.0900	0.026	0.345						76
	CH_4	35	0.0975	0.015	0.675						76
	H_2O	23	1875	0.030	6143						76
Poly(hexamethylene carbonate) diol	O_2	35	0.188	0.022	0.825						76
molecular weight 1040	CO_2	35	1.05	0.022	6.98						76
density 1.29 g/cm^3	CO	35	0.0450	0.015	0.300						76
	N_2	35	0.0450	0.017	0.263						76
	CH_4	35	0.0375	0.0041	0.825						76
	H_2O	23	825	0.013	6825						76
molecular weight 1320	O_2	35	0.225	0.026	0.825						76
density 1.25 g/cm^3	CO_2	35	2.03	0.029	7.05						76
	CO	35	0.150	0.015	0.375						76
	N_2	35	0.0825	0.037	0.225						76
	CH_4	35	0.0675	0.012	0.563						76
	H_2O	23	1050	0.015	7230						76
molecular weight 1500	O_2	35	0.623	0.12	0.525						76
density 1.20 g/cm^3	CO_2	35	2.85	0.038	7.50						76
	CO	35	0.225	0.056	0.450						76
	N_2	35	0.173	0.076	0.225						76
	CH_4	35	0.165	0.019	0.900						76
	H_2O	23	1575	0.017	923						76
molecular weight 2380	O_2	35	1.65	0.19	0.825						76
density 1.18 g/cm^3	CO_2	35	11.3	0.21	5.33						76
	CO	35	0.750	0.14	0.525						76
	N_2	35	0.570	0.17	0.338						76
	CH_4	35	0.825	0.11	0.750						76
	H_2O	23	3450	0.070	4973						76
molecular weight 2860	O_2	35	2.18	0.22	0.975						76
density 1.18 g/cm^3	CO_2	35	9.00	0.27	3.38						76
	CO	35	0.975	0.23	0.450						76
	N_2	35	0.900	0.24	0.360						76
	CH_4	35	1.20	0.12	0.975						76
	H_2O	23	4200	0.076	5595						76
Poly(pentamethylene-hexamethylene carbonate) diol	O_2	35	0.825	0.079	1.05						76
molecular weight 2170	CO_2	35	7.50	0.089	8.25						76
density 1.18 g/cm^3	CO	35	0.443	0.074	0.600						76
	N_2	35	0.278	0.079	0.353						76
	CH_4	35	0.480	0.038	1.28						76
	H_2O	23	2475	0.034	7215						76
Poly(dipropylene glycol carbonate) diol	O_2	35	0.398	0.081	0.488						76
molecular weight 3010	CO_2	35	2.70	0.035	7.50						76
density 1.19 g/cm^3	CO	35	0.135	0.033	0.405						76
	N_2	35	0.0825	0.040	0.210						76
	CH_4	35	0.105	0.021	0.495						76
	H_2O	23	2025	0.019	10800						76
Poly(dipropylene glycol)poly(propylene glycol carbonate) diol	O_2	35	0.975	0.23	0.420						76
molecular weight 2020	CO_2	35	7.28	0.061	12.0						76
density 1.16 g/cm^3	CO	35	0.585	0.16	0.375						76
	N_2	35	0.278	0.13	0.218						76
	CH_4	35	0.570	0.048	1.20						76
	H_2O	23	3000	0.020	15000						76
Poly(triethylene glycol carbonate) diol	O_2	35	0.263	0.079	0.330						76
molecular weight 2580	CO_2	35	3.15	0.050	6.30						76
density 1.20 g/cm^3	CO	35	0.143	0.063	0.225						76
	N_2	35	0.0825	0.074	0.113						76
	CH_4	35	0.150	0.037	0.405						76
	H_2O	23	9750	0.034	25500						76

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Polymer	Permeant	T	$P\ (\times 10^{13})$	$D\ (\times 10^{6})$	$S\ (\times 10^{6})$	Temp. range	$P_0\ (\times 10^{7})$	E_P	E_D	E_S	Refs.
Poly(hexamethylene carbonate pentamethylene ester) diol	O_2	35	1.50	0.24	0.630						76
molecular weight 2470	CO_2	35	20.3	0.16	12.8						76
density 1.17 g/cm^3	CO	35	0.750	0.24	0.315						76
	N_2	35	0.600	0.18	0.330						76
	CH_4	35	1.28	0.14	0.900						76
	H_2O	23	655	0.11	59250						76
1.11. POLY(SILOXANES)											
Poly(oxydimethylsilylene) with 10% filler Scantocel CS, vulcanized silicon rubber	He	0	175	41	0.424	−40–25	0.0946	14.3	8.0	6.3	2,41
	Ne	0	143	16.1	0.888	−40–0	0.0543	13.5	8.4	5.1	2
	Ar	0	413	12.2	3.36	−40–0	0.0606	9.8	10.3	−0.5	2
	Kr	0	765	8.0	9.67	−40–0	0.0134	6.5	12.2	−5.7	2
	Xe	0	1910	4.8	39.4	−40–0	0.00781	3.2	14.0	−10.8	2
	H_2	0	348	47.0	0.73	−40–25	0.145	13.7	9.3	4.4	2,41
	N_2	0	170	8.5	2.00	−40–25	0.0197	10.8	11.3	−0.5	2,41
	O_2	0	367	12.0	3.06	−40–25	0.0169	8.7	9.0	−0.3	2,41
	CO_2	25	2430								41
	C_3H_8	25	319	12.0	2.4	0–70	0.00401	6.3	11.3	−5.0	46
	n-C_4H_{10}	0	14600	2.4	608	−40–0			14.2		2
	H_2O	35	32300			35–65	0.0303				3
Poly(dimethyl siloxane)	H_2	35	705								82
	He	35	420								82,94
	N_2	35	353								82
	O_2	35	695								82,94
	CO_2	35	3489								82,94
	CH_4	35	1002								82,94
	C_2H_4	35	2738								82
	C_2H_6	35	3150								82
	C_3H_8	35	6338								82
	H_2S	35	6413								82
	NH_3	35	9015								82
Poly(methyl ethyl siloxane)	He	35	172								94
	O_2	35	234								94
	CO_2	35	1130								94
	CH_4	35	356								94
Poly(methyl propyl siloxane)	He	35	191								94
	O_2	35	287								94
	CO_2	35	1727								94
	CH_4	35	428								94
Poly(methyl octyl siloxane)	H_2	35	233								82
	He	35	99.8								82,94
	N_2	35	65.3								82
	O_2	35	144								82,94
	CO_2	35	695								82,94
	CH_4	35	236								82,94
	C_2H_4	35	608								82
	C_2H_6	35	720								82
	C_3H_8	35	1493								82
	H_2S	35	1470								82
	NH_3	35	2213								82
Poly(triflouropropyl siloxane)	H_2O	25	16050								98
Poly(triflouropropyl methyl siloxane)	He	35	185								94
	O_2	35	163								94
	CO_2	35	1041								94
	CH_4	35	151								94
Poly(phenyl methyl siloxane)	He	35	25.5								94
	O_2	35	24.0								94
	CO_2	35	179								94
	CH_4	35	27.0								94
Poly(dimethyl silmethylene)	He	35	73.5								94
	O_2	35	75.8								94
	CO_2	35	412								94
	CH_4	35	97.5								94
Poly(silethylene siloxane)	He	35	204								94
	O_2	35	296								94
	CO_2	35	1412								94
	CH_4	35	448								94
Poly(silhexylene siloxane)	He	35	146								94
	O_2	35	199								94
	CO_2	35	980								94
	CH_4	35	296								94

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Poly(siloctylene siloxane)	He	35	131								94
	O_2	35	178								94
	CO_2	35	899								94
	CH_4	35	270								94
Poly(meta-silphenylene siloxane)	He	35	63.0								94
	O_2	35	55.5								94
	CO_2	35	389								94
	CH_4	35	79.5								94
Poly(para-silphenylene siloxane)	He	35	24.5								82, 94
	N_2	35	2.40								82
	O_2	35	8.21								82,94
	CO_2	35	38.3								82,94
	CH_4	35	7.65								82,94
	C_2H_4	35	15.0								82
	C_2H_6	35	11.3								82
	C_3H_8	35	19.5								82
	H_2S	35	141								82
	NH_3	35	223								82
1.12. POLY(AMIDES), POLY(IMIDES)											
Poly(iminoadipoyliminohexa-											
methylene) (Nylon 66)											
undrawn	CO_2	5	0.018	0.00018	9.97						4
	CO_2	25	0.052	0.00083	6.32						4
drawn	CO_2	5	0.023	0.00018	12.8						4
	CO_2	25	0.071	0.00048	14.8						4
Poly(imino-1-oxohexamethylene)	He	20	0.398					36.4			10
(Nylon 6)	N_2	30	0.00713			0–90	1.05	46.9			37
	O_2	30	0.0285			0–90	0.975	43.5			37
	CO_2	20	0.066			0–90	1.2	40.6			37
	H_2O	25	0.139								20
	H_2S	30	0.255	0.00047	55.7	0–80	2400	58.2			8
	NH_3	20	0.878								5
	CH_3Br	60	0.63			60–80	137	53.2			37
Poly(imino-1-oxoundecamethylene)	He	30	1.46	3.5	0.0424	10–50	0.0827	27.6	22.2	5.4	1
(Nylon 11)	H_2	30	1.34	0.984	0.136	20–60	0.342	31.4	29.7	1.7	1
	Ne	30	0.26	0.437	0.0592	20–60	0.30	35.2	32.7	2.5	1
	Ar	40	0.143	0.0372	0.385	40–60	1.38	41.9	44.8	−2.9	1
	CO_2	40	0.754	0.0191	3.94	40–60	0.338	33.9	51.9	−18.0	1
Poly(5,7-dihydro-1,3,5,7-tetraoxo-	O_2	160	1.7	0.168		135–240	0.00028	18.4	31.0	−12.6	67
benzo[1,2-c:4,5-c′]dipyrrole-	H_2O	30	431	0.0018	21400	30–80	0.00026	−1.28	42.0	−43.2	68
2,6[1H,3H]-diyl-1,4-phenylene-											
oxy-1,4-phenylene) (Kapton)											
Poly(2,2′-bis(*p*-trimellitoxyphenyl)	H_2	30	4.85	0.396	1.22						104
propane dianhydride-*co*-3,3′-	N_2	30	0.0384	0.00222	1.73						104
dimethyl-benzidine)	O_2	30	0.304	0.0106	2.87						104
Poly(2,2′-bis(*p*-trimellitoxyphenyl)	H_2	30	3.62	0.329	1.10						104
propane dianhydride-*co*-4,4′-	N_2	30	0.0363	0.00206	1.76						104
diaminodiphenyl ether)	O_2	30	0.233	0.00878	2.65						104
Poly(2,2′-bis(*p*-trimellitoxyphenyl)	H_2	30	3.49	0.289	1.21						104
propane dianhydride-*co*-4,4′-	N_2	30	0.0343	0.00187	1.83						104
diaminodiphenyl methylene)	O_2	30	0.220	0.00736	2.99						104
Poly(2,2′-bis(*p*-trimellitoxyphenyl)	H_2	30	0.542	0.0536	1.01						104
propane dianhydride-*co*-benzidine)	N_2	30	0.00485	0.000327	1.49						104
	O_2	30	0.0344	0.00167	2.06						104
Poly(2,2′-bis(*p*-trimellitoxyphenyl)	H_2	30	5.52	0.402	1.37						104
propane dianhydride-*co*-3,3′,4,4′-	N_2	30	0.0439	0.00223	2.32						104
tetraaminodiphenyl ether)	O_2	30	0.326	0.0102	3.19						104
Poly(3,3′,4,4′-benzophenone	O_2	25	0.0235								105
tetracarboxylic dianhydride-*co*-	CO_2	25	0.0340								105
m,m′-diaminodiphenyl methylene)	H_2O	25	291								105
Poly(3,3′,4,4′-benzophenone	O_2	25	0.0578								105
tetracarboxylic dianhydride-*co-m,p*′-	H_2O	25	573								105
diaminodiphenyl methylene)											
Poly(3,3′,4,4′-benzophenone	O_2	25	0.140								105
tetracarboxylic dianhydride-*co-p,p*′-	CO_2	25	0.324								105
diaminodiphenyl methylene)	H_2O	25	984								105
Poly(3,3′,4,4′-benzophenone	O_2	25	0.0927								105
tetracarboxylic dianhydride-*co-p,p*′-	CO_2	25	0.357								105
diaminodiphenyl ether)	H_2O	25	719								105

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Polymer	Permeant	T	P (×10^13)	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-benzidine)	O_2	25	0.00668								105
	CO_2	25	0.0234								105
	H_2O	25	94.4								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-*p*-phenylenediamine)	O_2	25	0.0103								105
	H_2O	25	231								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-*m*-phenylenediamine)	O_2	25	0.0308								105
	CO_2	25	0.0882								105
	H_2O	25	804								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-diaminodiphenyl sulfide)	O_2	25	0.0992								105
	CO_2	25	0.307								105
	H_2O	25	787								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-*m,m*′-diaminobenzophenone)	O_2	25	0.0219								105
	CO_2	25	0.0807								105
	H_2O	25	428								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-*m,p*′-diaminobenzophenone)	O_2	25	0.0450								105
	CO_2	25	0.0887								105
	H_2O	25	521								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-*p,p*′-diaminobenzophenone)	O_2	25	0.0451								105
	CO_2	25	0.132								105
	H_2O	25	599								105
Poly(3,3′,4,4′-benzophenone tetracarboxylic dianhydride-*co*-*p,p*′-diaminostilbene)	O_2	25	0.00214								105
	CO_2	25	0.00692								105
Poly(pyromellitic dianhydride-*co*-benzidine)	O_2	25	0.00451								105
	CO_2	25	0.00790								105
	H_2O	25	131								105
Poly(pyromellitic dianhydride -*co*-*m,m*′-diaminobenzophenone)	O_2	25	0.0260								105
	H_2O	25	727								105
Poly(pyromellitic dianhydride -*co*-p,p′-diaminobenzophenone)	O_2	25	0.110								105
	CO_2	25	0.135								105
	H_2O	25	1009								105
Poly(pyromellitic dianhydride -*co*-*p,p*′-diaminodiphenyl ether)	O_2	25	0.242								105
	CO_2	25	1.36								105
	H_2O	25	1882								105
Poly(pyromellitic dianhydride -*co*-*p,p*′-diaminodiphenyl sulfide)	O_2	25	0.336								105
	H_2O	25	1882								105
Poly(pyromellitic dianhydride -*co*-*p,p*′-diaminodiphenyl methylene)	O_2	25	0.368								105
	CO_2	25	1.32								105
	H_2O	25	1582								105

1.13. POLY(URETHANES)

Polymer	Permeant	T	P (×10^13)	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
Poly(2-methyl-2-dimethylaminomethylpropylenehexamethylene dicarbamate) (Poly(NPM-HMDI))	N_2	25	0.00975								91
	O_2	25	0.0645								91
Poly(2-methyl-2-dimethylaminomethyl-1,3-propylene-diphenylmethane-4,4′-dicarbamate) (Poly(NPM-MDI))	N_2	25	0.0105								91
	O_2	25	0.0675								91
Poly(urethane-sulfone) (tolylene diisocyanate + 1,10-decanediol)	CO_2	25	0.23								95
(tolylene diisocyanate + 1,3-bis(3-hydroxypropylsulfonyl)propane)	CO_2	25	0.0064								95
(tolylene diisocyanate + 1,4-bis(3-hydroxypropylsulfonyl)butane)	CO_2	25	0.0038								95

1.14. POLY(SULFONES)

Polymer	Permeant	T	P (×10^13)	D (×10^6)	S (×10^6)	Temp. range	P_0 (×10^7)	E_P	E_D	E_S	Refs.
Poly(sulfone)	CO_2	35	4.20	0.020	20.7						100
	CH_4	35	0.19	0.0034	5.60						100
Poly(tetramethylsulfone)	CO_2	35	15.8	0.064	24.7						100
	CH_4	35	0.71	0.0079	9.14						100

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Poly(dimethylsulfone)	CO_2	35	1.58	0.0094	16.8						100
	CH_4	35	0.0525	0.0010	5.09						100
Poly(tetramethylhexafluorosulfone)	CO_2	35	54	0.14	39.5						100
	CH_4	35	2.25	0.016	14.6						100

1.15. POLY(ARYL ETHER ETHER KETONE)

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Poly(aryl ether ether ketone)	He	25	5.24			25-75	17.2				101
		55	9.90								101
		75	14.0								101
	O_2	25	0.41			25-75	18.7				101
		55	0.82								101
		75	1.21								101
	CO_2	25	2.03			25-75	13.8				101
		55	3.40								101
		75	4.54								101
semicrystalline (30%)	H_2O	5		0.0017							102
		20		0.0053							102
		35		0.0082							103
		40		0.0152							102
		50		0.0190							103
		60		0.0356							102
		65		0.0390							103
		80		0.0660							103
		95		0.133							103

1.16. CELLULOSE AND DERIVATIVES

Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
Cellulose hydrate (Cellophane)	He[c]	20	0.000375					41.4			10
	H_2[c]	25	0.00472								28
	N_2[c]	25	0.0024								28
	O_2[c]	25	0.0016								28
	CO_2[c]	25	0.00353								28
	SO_2[c]	25	0.00129								28
	H_2S[c]	25	0.0086								28
	H_2S	45	0.0045	1.6×10^{-6}	276	45-60	2.1×10^6	89.6			8
	NH_3[c]	25	0.0118								28
	H_2O	25	18900								7
	H_2[h]	25	0.012								28
	N_2[h]	25	0.00507								28
	O_2[h]	25	0.00536								28
	CO_2[h]	25	0.00974								28
	H_2[i]	25	0.0244								28
	N_2[i]	25	0.00559								28
	O_2[i]	25	0.00665								28
	CO_2[i]	25	0.0539								28
	H_2[d]	25	0.0598								28
	N_2[d]	25	0.0138								28
	O_2[d]	25	0.0087								28
	CO_2[d]	25	0.192								28
	NH_3[d]	25	133								28
	SO_2[d]	25	28.4								28
	H_2S[d]		0.425								28
Cellulose acetate	He	20	10.2								10
	H_2	20	2.63								10
		35	11.2								87
	N_2[j]	30	0.21			−25–60	0.00975	27.1			37
		35	0.173								87
	O_2[j]	30	0.585			−25–60	0.00375	20.9			37
		35	0.788								87
	CO_2[j]	30	17.3				0.0218	18.0			37
		35	4.47								87
	H_2O	25	4130			10–60	0.0053	0			21
	H_2O[j]	25	5500			10–60	0.0053	0			21
	H_2S	30	2.63	0.0010	266	0–60	0.000668	20.5			8
	H_2S[j]	30	4.58	0.0022	207	0–60	0.00188	21.4			8
	CH_4	35	0.154								87
	C_2H_4O[j]	30	30.0								37
	CH_3Br[j]	30	4.2								37
Cellulose acetobutyrate	O_2	34	3.56								51
Cellulose nitrate	He	25	5.18	0.431	1.2						9
	H_2	20	1.5					23.8			10
	N_2	25	0.087	0.0193	0.45						9
	O_2	25	1.46	0.15	0.975						9
	Ar	25	0.0825	0.00753	1.05						9
	CO_2	25	1.59	0.0221	7.2						9
	SO_2	25	1.32	0.0018	73.3						9
	NH_3	25	42.8	0.00786	544						9
	H_2O	25	4720	0.0262	18000						9

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Polymer	Permeant	T	P (×10[13])	D (×10[6])	S (×10[6])	Temp. range	P_0 (×10[7])	E_P	E_D	E_S	Refs.
	C_2H_6	25	0.0473	0.00013	36.2						9
	C_3H_8	25	0.0063	0.000021	29.6						9
Ethyl cellulose	He	25	40.1	2.21	1.8						9
	H_2	20	65.3								10
	N_2	25	3.32	0.233	1.43						9
	O_2	25	11.0	0.639	1.73						9
	Ar	25	7.65	0.403	1.88						9
	CO_2	25	84.8	0.565	15.0						9
	SO_2	25	198	0.0734	270						9
	NH_3	25	529	0.146	363						9
	H_2O	25	6700	0.0286	23400						9
	C_2H_6	25	6.9	0.019	36.3						9
	C_2H_6	30	10.0								79
	C_2H_6	40	10.3								79
	C_2H_6	50	12.2								79
	C_2H_6	60	14.9								79
	C_2H_6	70	20.1								79
	C_3H_8	25	2.78	0.00293	94.7						9
	C_3H_8	30	4.73								79
	C_3H_8	40	5.32								79
	C_3H_8	50	6.36								79
	C_3H_8	60	9.05								79
	C_3H_8	70	10.8								79
	n-C_4H_{10}	25	2.9	0.00146	199						9
	n-C_4H_{10}	30	4.20								79
	n-C_4H_{10}	40	6.30								79
	n-C_4H_{10}	50	7.43								79
	n-C_4H_{10}	60	9.77								79
	n-C_4H_{10}	70	11.4								79
	n-C_5H_{12}	25	2.78	0.00138	201						9
	n-C_6H_{14}	25	5.75	0.00124	462						9
(Ethocel 610)	C_2H_4O[j]	30	308								37

[a] Thickness 0.29 mm.
[b] Thickness 0.84 mm.
[c] Relative humidity 0%.
[d] Relative humidity 100%.
[e] Plasticizer was low-molecular-weight polytrifluorochloroethylene.
[f] 3.5% aqueous sodium chloride solution (simulated sea water).
[g] The % bromination refers to 100 times the number of bromine atoms per repeat unit.
[h] Relative humidity 43%.
[i] Relative humidity 76%.
[j] Plasticized.

TABLE 2. PERMEABILTY COEFFICIENTS OF SIX DIFFERENT FLUORINATED HYDROCARBONS THROUGH POLYMERS[a]

Polymer	$CFCl_3$ (24.5°C)	CF_2Cl_2 (20°C)	CF_3Cl (20°C)	$CHFCl_2$ (20°C)	CHF_2Cl (20°C)	CF_2Cl–CF_2Cl (20°C)	N_2 (20°C)
Poly(ethylene) low density	37.5	152	2.03	1.88	0.795	0.212	0.914
high density	9.75	30	0.673	0.374	0.106	0.0683	0.219
high density, drawn	3.38	4.35	0.326	0.161	0.0266	0.0336	0.133
Poly(propylene)	4.88	137	0.132	0.00338	0.0018	0.00728	0.151
Poly(vinyl chloride) (Genotherm UG), unplasticized	0.697	0.00668	0.00585	0.0016	0.0016	0.00503	0.0247
Poly(vinyl chloride) (Guttagena T52), plasticized	656	63.8	1.88	0.359	0.185	0.054	0.0649
Poly(oxyethyleneoxyterephthaloyl) [Poly(ethylene terephthalate)] (Hostaphan)	0.00188	0.00135	0.0016	0.00135	0.00165	0.0039	0.00343
Poly(imino-1-oxohexamethylene) (Supronyl S)	0.0315	0.0329	0.0111	0.00623	0.00803	0.00923	0.0075
Poly(imino-1-oxohexamethylene) (Supronyl N), plasticized	52.5	3.6	0.254	0.00473	0.00143	0.00225	0.0133

[a] Ref. 61; P in $cm^3 \times cm/(cm^2 \times s \times Pa) \times 10^{-13}$.

TABLE 3. PERMEABILITY COEFFICIENTS OF VARIOUS ORGANIC COMPOUNDS THROUGH LOW-DENSITY POLY(ETHYLENE)[a]

Permeant	0°C	21.1°C	54.4°C	73.9°C
Acetaldehyde	1.34	2.36		
Acetanilide		0.008	0.16	1.34
Acetic acid	0.14	1.22	25.9	119

Permeant	0°C	21.1°C	54.4°C	73.9°C
Acetic anhydride	0.051	0.32	11.6	83.7
Acetone	0.55	2.67	72.3	295
Allyl alcohol	0.063	0.57	9.04	54.2
Amyl acetate	0.22	3.42	106	430
i-Amyl alcohol		0.078		
i-Amyl propionate		3.9		
n-Amyl propionate		11.8		
Aniline	0.098	0.67	23.4	116
Benzaldehyde	0.15	2.67	81.0	417
Benzene	17.7	173	1770	5400
Benzoic acid		0.028	2.24	14.2
Benzyl alcohol		0.16		
n-Butyl acetate		5.9		
n-Butyl alcohol	0.04	0.18	8.02	59
s-Butyl alcohol	0.05	0.24	14.8	109
t-Butyl alcohol	0.02	0.10	10.6	92.8
Butyraldehyde	0.35	3.93	229	393
n-Butyric acid	0.075	1.89	39.3	228
Camphor		0.12	8.5	63.7
Carbon tetrachloride	20	240	3080	17700
Chloroacetic acid		0.12	5.9	23.6
m-Chloroaniline		0.63		
Chlorobenzene	22.7	179	1730	8300
Chloromaleic anhydride		0.28		
p-Chlorotoluene	11.8	119	1640	7300
Cyclohexane	12.4	98.7	1470	5900
Decane	3.7	28.0	480	1620
1,2-Dibromoethane		55.0		
Dibutyl ether	4.4	33.6	582	1230
Dibutyl phthalate			5.7	10.9
o-Dichlorobenzene		60.9		
Diethylene glycol				0.30
Diethyl ether	18.9	123	3140	11800
Diethyl oxalate		0.28		
Dipentene	5.9	50.3	798	3190
Ethyl acetate	0.75	6.5	149	669
Ethyl alcohol		0.28		
Ethylene glycol				0.50
Ethylene glycol monobutyl ether		0.26	13.8	70.8
Ethyl formate		5.9		
Ethyl mercaptan	10.2	157	3931	15700
Ethyl propionate		9.8		
Formaldehyde		0.21		
Formamide		0.20		
Formic acid	0.10	0.26	4.7	20.0
Furfuryl alcohol		0.09		
Glycerin			0.14	0.63
n-Heptane	19.1	106	1040	3200
n-Heptene		106		
n-Heptyl acetate		7.1		
Heptyl alcohol		0.39		
n-Hexane	18.9	138	3540	11800
Hydroquinone			0.02	0.14
Methyl acetate		5.5		
Methyl alcohol	0.1	0.48	10.9	39.3
Methyl ethyl ketone	1.45	4.95	128	550
Methylcyclohexane		108		
Nitrobenzene	0.15	1.93	39.3	165
Nitroethane	0.38	1.06	25.1	113
Nitromethane		0.83		
Octadecane		0.71		
Octyl alcohol	0.039	0.20	10.1	73.9
Oxalic acid			0.08	0.09
i-Pentane	18.9	106	1970	7860
n-Pentane	38.1	206	5900	23600
Phenol	0.04	0.2	9.4	47.1

Permeant	0°C	21.1°C	54.4°C	73.9°C
n-Propyl alcohol	0.03	0.2	8.8	66.0
i-Propylamine	0.90	16.0	275	1260
Tetradecane	0.67	5.7	159	393
Tetradecene		4.7		
Toluene	22.7	199	2270	11300
1,1,1-Trichloroethane		102		
o-Xylene	14.2	101	1420	6530
p-Xylene	33.7	191	1890	6410

[a] Ref. 62; P in g × mm/(m² × d).

TABLE 4. PERMEABILITY COEFFICIENTS AND DIFFUSION COEFFICIENTS OF AN EQUIMOLAR MIXTURE OF VARIOUS COMPOUNDS (1.25 M EACH) THROUGH HIGH-DENSITY POLY(ETHYLENE)[a]

	P		*D* (×10⁶)	
Permeant	22°C	50°C	22°C	50°C
1,1,2-Trichlorethane (0.167 g/ml)	2.4	8.8	0.0142	0.0833
1,2-Dichloroethane (0.124 g/ml)	3.3	14.6	0.0225	0.114
Methylene chloride (0.106 g/ml)	5.3	5.9	0.0889	
Styrene (0.130 g/ml)	2.7	10.0	0.0500	0.167
Benzene (0.098 g/ml)	3.1	10.0	0.0417	0.361
Toluene (0.098 g/ml)	3.3	10.2	0.0722	0.417
Naphthalene (0.160 g/ml)	0.73	4.4		0.0333
2-Methyl naphthalene (0.178 g/ml)	0.49	2.7		0.0203

[a] Ref. 92; P in g × mm/(m² × d) and D in cm²/s.

TABLE 5. PERMEABILITY COEFFICIENTS OF VARIOUS ORGANIC COMPOUNDS THROUGH HIGH-DENSITY POLY(ETHYLENE) AND POLY(PROPYLENE)[a]

	High-density poly(ethylene)		Poly(propylene)	
Permeant	22.8°C	48.9°C	22.8°C	48.9°C
Acetic acid	0.39	2.36		
Acetone	0.67	3.9	0.28	8.84
n-Butyl ether	6.6	43.6		
Carbon tetrachloride	32	260	181	1100
n-Decane	7.3	39	22	153
Dipentene	7.6	54	29.5	161
Ethyl acetate	1.7	18.5	5.8	55
Methanol	0.1	2.0	0.08	1.5
Toluene	39	196	142	770

[a] Ref. 62; P in g × mm/(m² × d).

TABLE 6. PERMEABILITY COEFFICIENTS OF VARIOUS ORGANIC COMPOUNDS THROUGH IRRADIATION CROSSLINKED LOW-DENSITY POLY(ETHYLENE)[a]

	Poly(ethylene) unirradiated (crystallinity 58%)					Poly(ethylene) irradiated with 260 kGy (electron irradiation)				
Permeant	*T* (°C)	*P* $\left(\frac{g \times mm}{m^2 \times d}\right)$	Temp. range (°C)	P_0 $\left(\frac{g \times mm}{m^2 \times d}\right)$	E_P $\left(\frac{kJ}{mol}\right)$	*T* (°C)	*P* $\left(\frac{g \times mm}{m^2 \times d}\right)$	Temp. range (°C)	P_0 $\left(\frac{g \times mm}{m^2 \times d}\right)$	E_P $\left(\frac{kJ}{mol}\right)$
Acetic acid	21.1	1.27	20–75	1.108×10^{13}	72.9	21.1	1.55	20–75	2.783×10^{12}	68.8
Amyl acetate	21.1	3.80	20–75	2.016×10^{15}	83.0	21.1	5.03	20–75	3.269×10^{14}	77.9
Aniline	21.1	0.70	20–75	6.088×10^{14}	84.0	21.1	0.81	20–75	2.315×10^{14}	81.1
Benzaldehyde	21.1	2.76	20–75	6.375×10^{14}	80.7	21.1	3.36	20–75	4.513×10^{14}	79.6
Benzene	21.1	181	20–75	1.083×10^{13}	60.8	21.1	207	20–75	1.677×10^{12}	55.2

Permeant	Poly(ethylene) unirradiated (crystallinity 58%)					Poly(ethylene) irradiated with 260 kGy (electron irradiation)				
	T (°C)	P $\left(\frac{g \times mm}{m^2 \times d}\right)$	Temp. range (°C)	P_0 $\left(\frac{g \times mm}{m^2 \times d}\right)$	E_P $\left(\frac{kJ}{mol}\right)$	T (°C)	P $\left(\frac{g \times mm}{m^2 \times d}\right)$	Temp. range (°C)	P_0 $\left(\frac{g \times mm}{m^2 \times d}\right)$	E_P $\left(\frac{kJ}{mol}\right)$
Dibutyl ether	21.1	37.1	20–75	3.051×10^{13}	67.0	21.1	45.2	20–75	7.153×10^{12}	63.1
Ethyl acetate	21.1	9.39	20–75	6.831×10^{14}	78.2	21.1	11.4	20–75	1.797×10^{14}	74.4
n-Heptane	21.1	110	20–75	1.756×10^{12}	57.5	21.1	120	20–75	5.55×10^{11}	54.4
Methyl alcohol	21.1	0.43	20–75	1.160×10^{13}	75.7	21.1	0.49	20–75	7.843×10^{12}	74.0
Methyl ethyl ketone	21.1	5.03	20–75	3.195×10^{14}	77.7	21.1	5.86	20–75	4.310×10^{14}	78.1
n-Propyl alcohol	21.1	0.20	20–75	3.195×10^{15}	91.2	21.1	0.36	20–75	1.639×10^{14}	82.6
o-Xylene	21.1	116	20–75	8.599×10^{13}	67.0	21.1	120	20–75	6.676×10^{12}	60.4

[a]Ref. 63.

TABLE 7. PERMEABILITY COEFFICIENTS OF GASES THROUGH IRRADIATION CROSSLINKED LOW-DENSITY POLY(ETHYLENE)[a]

Gas	Irradiation Dose[b] (kGy)	T (°C)	D ($\times 10^6$) (cm²/s)	P ($\times 10^{13}$) (cm³ × cm/cm² × s × Pa)	E_D (kJ/mol)	E_P (kJ/mol)
He	0	40	3.5	82.5	20.7	26.0
	200	40			22.5	27.7
	500	40		78.8	26.3	28.1
N_2	0	40	0.52	18.0		28.1
	100	40		17.3		
	200	40		15.0		30.1
	500	40		12.8		31.3
CH_4	0	40	0.35	47.3	28.5	40.3
	200	40	0.33	44.3	30.1	40.7
	500	40	0.31	36.8	33.5	41.1
C_2H_6	0	40	0.18	82.5	34.5	41.0
	200	40	0.16	78.0	37.6	43.4
	500	40	0.15	69.0	39.8	45.9
C_3H_8	0	40	0.05	142	50.0	45.3
	200	40	0.04	112	54.7	48.1
	500	40	0.03	90	55.6	50.3

[a] Ref. 71.
[b] Films were irradiated in acetylene atmosphere; dose rate was 6.15 kGy/h.

TABLE 8. PERMEABILITY COEFFICIENTS OF CHEMICALLY CROSSLINKED POLY(OXYPROPYLENE)[a]

Polymer	Molecular mass of poly(oxypropylene) between crosslinks	Permeability coefficient for 23°C ($\times 10^{13}$)	
		H_2	CO
Poly(oxypropylene), crosslinked with	425	2.86	0.0608
stoichiometric quantities of tris	725	7.26	0.65
(*p*-isocyanatophenylthiophosphate)	1025	18.80	2.93
(Desmodur RF)	2000	28.73	7.65
	3000	44.10	12.60

[a] Refs. 69 and 70; P in cm³ × cm/(cm² × s × Pa).

TABLE 9. PERMEABILITY COEFFICIENTS OF GASES THROUGH VARIOUS ELASTOMERS[a]

Elastomer		Permeation coefficient									
		N_2		O_2		CO_2		H_2		He	
		20°C	80°C	20°C	80°C	20°C	80°C	20°C	80°C	20°C	80°C
NBR	shore 70	0.172	5.39	0.639	10.8	6.11	61.1	3.25	27.2	2.56	25.6
NBR	shore 60	0.161	6.11	0.75	16.1	6.11	83.3	3.75	47.2	2.33	33.1
NBR	shore 50	0.231	6.39	0.722	13.6	4.08	28.6	4.58	38.3	2.31	20.6
NEM	shore 70	0.275	4.78								
SBR	shore 52	0.583	10.8	2.14	24.2	13.1	77.8	6.67	48.6	4.31	28.9
NR	shore 66	1.72	33.9	5.06	55.6	35.6	239	9.17	86.1	4.53	34.7
CR	shore 42	0.611	12.8	1.31	30.6	6.94	75.0	5.00	61.1	3.42	26.4
VMQ	shore 50	128	331	286	528			225	583	156	444
ECO	shore 65	0.169	3.25								
FKM	shore 70	0.172	4.75	0.306	7.22	3.53	61.1	2.58	41.7	4.89	48.1
ACM	shore 70	0.694	13.3	2.58	18.6	27.8	52.8	10.6	80.6	6.39	43.1
EPDM	shore 68	2.08	22.5	6.11	42.2	12.8	48.1	15.6	86.1	10.0	61.1
CIIR	shore 68	0.119	2.22	0.242	4.08	1.42	24.4	1.92	26.1	2.28	20.0
CSM	shore 70	0.144	3.92	0.494	7.78	3.47	16.7	2.94	20.8	2.97	26.4
AU	shore 94	0.286	4.72								

[a] Ref. 89; P in 10^{-13} cm^3 × cm/(cm^2 × s × Pa).

TABLE 10. PERMEABILITY COEFFICIENTS OF GASES THROUGH VARIOUS COMMERCIAL ELASTOMERS AT 35°C[a]

Elastomer tradename	He			H_2			D_2			O_2			N_2		
	P[b]	D[c]	S[d]	P[b]	D[c]	S[d]	P[b]	D[c]	S[d]	P[b]	D[c]	S[d]	P[b]	D[c]	S[d]
Hypalon® 40	6.6	6.31	0.10	8.25	2.65	0.31	7.65	2.32	0.33	1.78	2.04	0.87	0.473	0.10	0.48
Hypalon® 45	8.63	10.3	0.08	11.7	4.84	0.24	11.2	5.35	0.21	3.15	4.86	0.65	0.960	0.34	0.28
Viton® E60	22.9	8.10	0.28	7.95	1.87	0.42	750	1.79	0.42	1.71	1.39	1.23	0.638	0.06	0.99
Viton® GF	32.9	18.3	0.18	16.4	3.45	0.47	15.7	2.78	0.56	3.15	3.86	0.82	1.60	0.13	1.24
Hydrin® 100 w/filler	1.13	0.73	0.15	1.05	0.23	0.47	1.20	0.18	0.67	0.233	0.03	0.73	0.113	0.008	1.43
Hydrin® 100	4.13	5.26	0.08	6.68	2.92	0.23	6.60	2.93	0.23	0.788	0.17	0.47	0.330	0.09	0.36
Kraton® G1652	34.0	19.9	0.17	51.5	12.3	0.42	48.2	10.1	0.48	20.0	1.92	1.04	7.35	1.18	0.62
Kraton® FG	34.7	22.4	0.15	50.2	11.6	0.43	44.9	9.68	0.46	18.4	1.43	1.29	6.47	0.98	0.66
Kraton® KG VTEOS	33.8	20.5	0.16	52.3	13.3	0.39	47.7	9.93	0.48	19.1	1.81	1.06	7.43	1.14	0.65

[a] Ref. 90.
[b] P in 10^{-13} cm^3 × cm/(cm^2 × s × Pa).
[c] D in 10^{-6} cm^2/s.
[d] S in 10^{-6} cm^3/(cm^3 × Pa).

TABLE 11. PERMEABILITY, DIFFUSION AND SOLUBILITY COEFFICIENTS OF ALKANES THROUGH SANTOPRENE™ (BLEND OF ETHYLENE-PROPYLENE COPOLYMER AND ISOTACTIC POLY(PROPYLENE))[a]

Alkane	T[b]	P[c]	D[d]	S[e]	Temp. range	E_P[f]	E_D	E_S
n-Pentane	25	1.51	6.07	0.25				
n-Hexane	25	1.11	2.88	0.39	25–70	13.86	12.87	0.99
	40	1.48	3.83	0.39				
	55	1.85	4.63	0.40				
n-Heptane	25	1.39	3.22	0.43	25–70	8.64	8.23	0.41
	40	1.67	3.74	0.45				
	55	2.13	4.72	0.45				
	70	2.12	4.82	0.44				
n-Octane	25	1.03	1.83	0.56	25–70	14.10	12.89	1.21
	40	1.38	2.36	0.58				
	55	1.73	2.88	0.60				
	70	2.18	3.64	0.60				

Alkane	T^b	P^c	D^d	S^e	Temp. range	$E_P{}^f$	E_D	E_S
n-Nonane	25	0.82	1.69	0.49	25–70	16.65	15.12	1.53
	40	1.13	2.23	0.51				
	55	1.50	2.87	0.52				
	70	1.99	3.79	0.53				
n-Decane	25	0.67	1.34	0.50	25–70	14.86	12.67	2.19
	40	0.87	1.78	0.49				
	55	1.13	2.10	0.54				
	70	1.47	2.67	0.55				
n-Dodecane	25	0.37	0.78	0.47	25–70	20.80	18.30	2.51
	40	0.52	1.04	0.50				
	55	0.76	1.44	0.53				
	70	1.10	2.05	0.54				
n-Tetradecane	25	0.28	0.62	0.45	25–70	19.48	17.41	2.07
	40	0.34	0.69	0.49				
	55	0.55	1.08	0.51				
	70	0.75	1.49	0.50				
n-Hexadecane	25	0.17	0.34	0.50	25–70	20.04	19.43	0.61
	40	0.27	0.55	0.49				
	55	0.38	0.74	0.51				
	70	0.49	0.97	0.51				
2,2,4-Trimethylpentane	25	0.56	1.66	0.34	25–70	12.67	11.19	1.48
	40	0.76	2.07	0.37				
	55	0.89	2.40	0.37				
	70	1.12	3.05	0.37				
Cyclohexane	25	0.85	0.90	0.94	25–70	17.43	14.70	2.74
	40	1.27	1.27	1.00				
	55	1.82	1.74	1.05				
	70	2.08	1.90	1.09				
1,2,3,4-Tetrahydronaphthalene	25	0.49	0.56	0.88	25–70	17.81	13.69	4.12
	40	0.74	0.80	0.93				
	55	0.92	0.93	0.99				
	70	1.29	1.19	1.08				

[a] Ref. 93.
[b] T and Temp. range in °C.
[c] P in 10^{-6} cm^3 × cm/(cm^2 × s).
[d] D in 10^{-6} cm^2/s.
[e] S in cm^3/cm^3.
[f] E_P, E_D and E_S in kJ/mol.

TABLE 12. PERMEABILITY, DIFFUSION AND SOLUBILITY COEFFICIENTS OF ESTERS THROUGH POLY(EPICHLOROHYDRIN) (ECO)[a]

Alkane	T^b	P^c	D^d	S^e	Temp. range	$E_P{}^f$	E_D	E_S
Methyl acetate	25	0.998	0.712	1.40	25–50	16.25	18.21	– 1.94
	40	1.450	1.069	1.36				
	50	1.640	1.246	1.32				
(Ethyl acetate)	25	0.765	0.561	1.36	25–60	12.48	14.78	– 2.30
	44	0.985	0.779	1.26				
	60	1.304	1.052	1.24				
(*n*-Butyl acetate)	25	0.346	0.295	1.17	25–60	14.34	15.02	– 0.68
	44	0.480	0.418	1.15				
	60	0.636	0.559	1.14				
(Iso-amyl acetate)	25	0.317	0.267	1.19	25–60	15.99	17.34	– 1.35
	44	0.486	0.420	1.16				
	60	0.621	0.554	1.12				
(Methyl salicylate)	25	0.146	0.071	2.06	25–60	31.15	31.15	0.10
	44	0.327	0.155	2.11				
	60	0.546	0.263	2.08				

[a] Ref. 97.
[b] T and Temp. range in °C.
[c] P in 10^{-6} cm^3 × cm/(cm^2 × s).
[d] D in 10^{-6} cm^2/s.
[e] S in cm^3/cm^3.
[f] E_P, E_D and E_S in kJ/mol.

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Refractive Indices of Polymers

James C. Seferis
Polymeric Composites Laboratory, Department of Chemical Engineering, University of Washington, Seattle, WA, USA

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A. INTRODUCTION

The refractive indices of polymers provide fundamental physical property information that can be used in characterization, processing, and usage analyses. In-depth description of refractive indices based on classic electromagnetic theory can be found in basic texts (1,2). The purpose of this monograph is to provide a convenient reference of values and some general remarks in approximating and utilizing refractive indices of polymers.

The refractive index, reported as the velocity of light in a vacuum relative to the velocity in the polymer, depends on the wavelength of light. All values reported in this chapter refer to the sodium spectral line $\lambda = 5893$Å, referred to as n_D in this literature. However, for simplicity, the subscript D is omitted here in the subsequent discussion and tables. In general, it should be kept in mind that for any polymer, the refractive index represents an average property of its aggregate state (3,4). Orientation, conformation, as well as phase changes may all contribute to variations in the index of refraction of a polymer with a given chemical structure. Thus, the refractive index may not be expected to be equal along all axes of the molecule (5). Consequently, the measured refractive index is an average value, with contributions from the refractions of the molecule's different chemical bonds. It can be shown from classic electromagnetic theory that the square of the refractive index (n^2) is the appropriate form to use in molecular descriptions of refractive indices since it is related to the dielectric tensor, having a magnitude as well as a directional description (1,4). However, since $1.3 < n < 1.7$ for most polymers, correlations proposed for n^2 almost always find a simplified version with n (3,4).

B. MOLAR REFRACTION

The molar refraction of a substance, a product of its refractive index, molecular weight, and density, may be assumed to be a fundamental physical property of materials (1). Furthermore, the molar refraction may be treated (as established by Denbigh) as the sum of the bond refractions that make up the molecule (6). These two postulates make possible, the calculation of the refractive indices of polymers almost from first principles (7,8). Two useful relations for the molar refraction, R, are provided here (1): The Lorentz–Lorentz equation

$$R = \frac{n^2 - 1}{n^2 + 2}\frac{M}{\rho} \tag{B1}$$

The Gladstone–Dale equation

$$R = (n - 1)\frac{M}{\rho} \tag{B2}$$

where ρ is the density of the polymer and M its molecular weight. The molar refraction may be assumed to be the sum of the refractions of all the bonds or groups that make up the polymer system, i.e., $R = \sum_i R_i$ (6,7). Chemical group refractivities that can be used in the calculation of refractive index of polymers have been recently summarized by Van Krevelen (8). For example, for a homopolymer whose repeat monomer unit refractivity, R_M, is known, with $R = \mathrm{DP}\, R_M$ (where DP is the degree of polymerization) and $M = \mathrm{DP}\, M_M$ (M_M = molecular weight of the monomer unit), then the refractive index of the polymer by the Gladstone–Dale expression (Eq. B2) becomes

$$\mathrm{DP}\, R_M = (n - 1)\frac{\mathrm{DP}\, M_M}{\rho} \quad \text{or} \quad n = 1 + \frac{M_m}{R_m}\rho \tag{B3}$$

This may be calculated only from a knowledge of the monomer unit molar refraction and molecular weight. The

use of bond or group refractions in the calculation of refractive indices of polymers has been demonstrated to be in good agreement with the measured values for homogeneous, unoriented polymers (8).

C. REFRACTIVE INDICES OF HETEROGENEOUS POLYMERS

For polymeric systems whose phase dimensions are below the wavelength of the incident light, the application of the Maxwell relations is valid and the refractive index of the polymer may be expressed in terms of the dielectric constants of the constituent phases (1). The dielectric constant, k, is equivalent to the square of the refractive index ($k = n^2$), and it can be demonstrated that an upper bound of the refractive index of the polymer may be obtained as the sum of dielectric constants of the constituent phases (4,5):

$$n^2 = \sum_i v_i n_i^2 \qquad \text{(C1)}$$

where n_i and $v_i(\sum v_i = 1)$ are the refractive indices and volume fractions of the constituent phases of the components that make up the polymer. Similarly, the lower bound of a polymer's refractive index may be computed as the sum of the inverse of the dielectric constants of the constituent phases (4):

$$\frac{1}{n^2} = \sum_i \frac{v_i}{n_i^2} \qquad \text{(C2)}$$

For most heterogeneous polymers, however, whose constituent refractive indices differ by less than 0.2, i.e., $(n_i - n_j \leq 0.2)$, the refractive index of the polymer may be computed by the Gladstone–Dale relation, assuming additivity of the refractive indices of the constituent phases (3,4):

$$n = \sum_i v_i n_i \qquad \text{(C3)}$$

The calculation methods described above may be used for multiphase polymers such as blends, block or graft copolymers, composites, and semicrystalline polymers.

D. OPTICAL ANISOTROPY*

Small as well as long polymer molecules exhibit different refractive indices parallel and perpendicular to the molecular chain axis. Thus, all polymers should be viewed as intrinsically anisotropic. The degree of anisotropy exhibited in bulk property behavior will depend on the molecular orientation imposed by deformation during processing or testing. Only in its unoriented state can a polymer be characterized by a single refractive index, since its optical properties will be identical in all directions. Consequently, optical anisotropy is one of the simplest and often used methods of studying orientation in polymers (5). By polarizing light in a specific direction, the refractive index of a polymer can be measured in that direction. Consequently, all three principal refractive indices of a polymer, n_x, n_y, n_z, corresponding to an x, y, and z direction, can be measured. For example, a refractometer fitted with a polarized eye piece has been successfully used to measure refractive indices along the major axes of polymer films (9). The average refractive indices of a polymer may be computed from the refractive indices along the axes of the polymer:

$$n = (n_x + n_y + n_z)/3 \qquad \text{(D1)}$$

For the unoriented (isotropic) condition ($n_x = n_y = n_z$), a single value of the refractive index provides a unique optical description ($n = n_x = n_y = n_z$). For oriented polymers, the difference in refractive indices along two orthogonal directions can be used as the measure of optical anisotropy and, consequently, orientation of the polymer. The difference in refractive indices is defined as the birefringence or double refraction. According to Stein (5), there are three birefringences, Δ_{ij}'s that may be defined for a cartesian coordinate system, with two of them being independent. They are

$$\Delta n_{xy} = n_x - n_y \qquad \text{(D2)}$$

$$\Delta n_{xz} = n_x - n_z \qquad \text{(D3)}$$

$$\Delta n_{yz} = n_y - n_z = \Delta n_{xz} - \Delta n_{xy} \qquad \text{(D4)}$$

For a polymer exhibiting transverse isotropic symmetry, as in the case of uniaxial orientation (i.e., deformation along one axis), a single birefringence is enough to characterize orientation and anisotropy. For example, for a polymer oriented uniaxially along the x direction, $\Delta n_{xy} = \Delta n_{xz}$ and $\Delta n_{yz} = 0$. For a fully oriented polymer, where the molecular chain axis is aligned with the deformation axis (perfect orientation) a limiting value of birefringence is reached, which is defined as the intrinsic birefringence of the polymer (10,11) and denoted as

$$\Delta n_{xz} = n_{xy}^0 f \qquad \text{(D5)}$$

where f is the Hermans orientation function

$$f = \frac{\overline{3\cos^2\theta - 1}}{2} \qquad \text{(D6)}$$

defined on the average angle θ that the molecular chain axis makes with the deformation axis. The Hermans orientation function (D6), $-1/2 \leq f \leq 1$ assumes the value of $-1/2$ when the molecular chain axis is perpendicular to the deformation axis; 0 for random orientation (isotropy); and -1 for perfect alignment of the chains with the deforma-

*See also corresponding table in this Handbook.

tion axis. The use of the refractive index in the calculation of birefringence, rather than the difference of some function of the dielectric constant (n^2 or $1/n^2$), is an approximation to optical anisotropy. Thus, if the birefringence is used as a measure of orientation, as was proposed by Stein, form effects should be considered (5,7,11)

$$\Delta n_{xz} = n_{xy} f + \Delta_{\text{form}} \tag{D7}$$

The importance of form may be estimated from bond polarizabilities for a given polymer (4,7). Thus, to characterize completely the optical properties of a given polymer, its average refractive index as well as the intrinsic and form birefringences must be specified. To date, very few polymers have been optically characterized in such detail. However, as more refined and specific performance is demanded from polymers, this information is forthcoming. In order to demonstrate the usefulness of complete characterization and to summarize the data available till date, an example for semicrystalline polymers is provided, along with a table showing reported values (for a few polymers) of average refractive indices and intrinsic birefringences.

E. APPLICATIONS

Using Eq. (B2), the unoriented refractive index of a semicrystalline polymer may be calculated from a knowledge of its intrinsic crystalline and noncrystalline densities and refractive indices. First, the volume fraction crystallinity, v_{cr}, is calculated from the densities:

$$v_{\text{cr}} = \frac{\rho - \rho_{\text{nc}}}{\rho_{\text{cr}} - \rho_{\text{nc}}} \tag{E1}$$

where ρ is the bulk measured density, and ρ_{cr} and ρ_{nc} are the crystalline and noncrystalline densities. Then the average refractive index is

$$n = v_{\text{cr}} n_{\text{cr}} + (1 - v_{\text{cr}}) n_{\text{nc}} \tag{E2}$$

From Stein's equation of birefringence additivity (neglecting form birefringence) (5,11)

$$\Delta n_{xy} = v_{\text{cr}} \Delta n^0_{xy_{\text{cr}}} f_{\text{cr}} + (1 - v_{\text{cr}}) \Delta n^0_{xy_{\text{nc}}} f_{\text{nc}} \tag{E3}$$

where $\Delta n^0_{xy_{\text{cr}}}$ and $\Delta n^0_{xy_{\text{nc}}}$ are the crystalline and noncrystalline intrinsic birefringences, and f_{cr} and f_{nc} are the corresponding crystalline and noncrystalline Hermans orientation functions.

If the intrinsic properties of a semicrystalline polymer are known, Eq. (E2) can be used to calculate the volume fraction crystallinity by simply measuring the polymer's refractive index, while Eq. (E3) can be used to obtain the value of the noncrystalline orientation function by measuring birefringence and crystalline orientation by an independent technique [e.g., wide angle X-ray (5)]. For a single-phase polymer like polystyrene, the orientation function can be directly calculated from the measured birefringence value and the known intrinsic birefringence:

$$f = \frac{\Delta n_{xy}}{\Delta n^0_{xy}} \tag{E4}$$

Once these quantities are known, it becomes possible to completely characterize and predict the optical anisotropy of a given polymer from its unoriented to its oriented state (3,4).

Table 1 is provided to demonstrate that such basic optical parameters may be obtained from the literature (3,4,9,12–16). The recognition of polymers as anisotropic heterogeneous systems continues to expand and their refractive indices provide useful insight into their process–structure–property interrelations (18–20). It is hoped that continuous investigations in existing as well as new polymers will expand this compilation.

Finally, Table 2 provides average refractive indices of polymers arranged in order of increasing values, while Table 3 provides the same list in alphabetical order. Some additional values from the recent literature (21–23) have been added to the earlier compilation (17) to form the material for the present edition.

TABLE 1. INTRINSIC OPTICAL PROPERTIES OF SELECTED POLYMERS

Polymer	Crystalline density (ρ_{cr})	Noncrystalline density (ρ_{nc})	Phase average refractive indices		Intrinsic birefringence ($\times 10^3$)	
			n_{cr}	n_{nc}	Δn^0_{cr}	Δn^0_{nc}
Poly(propylene)	0.936	0.850	1.519–1.524	1.471	23–30	60–86
Poly(ethylene)	1.000	0.855	1.560–1.565	1.476–1.483	58–66	
Low orientation						120
High orientation						194
Poly(oxyethylene-oxyterephthaloyl)	1.455	1.335	1.639–1.643	1.570–1.577	220–230	220–275
Poly(styrene)	Amorphous	1.06	Amorphous	1.590–1.592	Amorphous	195

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TABLE 2. AVERAGE REFRACTIVE INDICES OF POLYMERS (IN ORDER OF INCREASING *n*)[a]

Polymer	*n*	*T* (°C)
Poly(tetrafluoroethylene-*co*-hexafluoropropylene)	1.338	
Poly(pentadecafluorooctyl acrylate)	1.339	25
Poly(tetrafluoro-3-(heptafluoropropoxy)propyl acrylate)	1.346	25
Poly(tetrafluoro-3-(pentafluoroethoxy)propyl acrylate)	1.348	25
Poly(tetrafluoroethylene)	1.35–1.38	
Poly(undecafluorohexyl acrylate)	1.356	
Poly(nonafluoropentyl acrylate)	1.360	25
Poly(tetrafluoro-3-(trifluoromethoxy)propyl acrylate)	1.360	25
Poly(pentafluorovinyl propionate)	1.364	25
Poly(heptafluorobutyl acrylate)	1.367	25
Poly(trifluorovinyl acetate)	1.375	25
Poly(octafluoropentyl acrylate)	1.380	25
Poly(pentafluoropropyl acrylate)	1.385	25
Poly(2-heptafluorobutoxy)ethyl acrylate)	1.390	25
Poly(2,2,3,4,4,4-hexafluorobutyl acrylate)	1.392	25
Poly(trifluoroethyl acrylate)	1.407	25
Poly(2-(1,1,2,2-tetrafluoroethoxy)ethyl acrylate)	1.412	25
Poly(trifluoroisopropyl methacrylate)	1.4177	20
Poly(2,2,2-trifluoro-1-methylethyl methacrylate)	1.4185	
Poly(2-trifluoroethoxy)ethyl acrylate	1.419	25
Poly(trifluorochloroethylene)	1.42–1.43	
Poly(vinylidene fluoride)	1.42	25
Poly(oxydimethylsilylene) (poly(dimethyl siloxane))	1.43	
Poly(trifluoroethyl methacrylate)	1.437	
Poly(oxypropylene)	1.4495	
Poly(vinyl isobutyl ether)	1.4507	30
Poly(vinyl ethyl ether)	1.4540	30
Poly(oxyethylene)	1.4563	30
Poly(vinyl butyl ether)	1.4563	30
Poly(vinyl pentyl ether)	1.4581	30
Poly(vinyl hexyl ether)	1.4591	30
Poly(4-methyl-1-pentene)	1.459–1.465	
Cellulose acetate butyrate	1.46–1.49	
Poly(4-fluoro-2-trifluoromethylstyrene)	1.46	
Poly(vinyl octyl ether)	1.4613	30
Poly(vinyl-2-ethylhexyl ether)	1.4626	30
Poly(vinyl decyl ether)	1.4628	30
Poly(2-methoxyethyl acrylate)	1.463	25
Poly(butyl acrylate)	1.4631	30
	1.466	20
Poly(*tert*-butyl methacrylate)	1.4638	20
Poly(vinyl dodecyl ether)	1.4640	30
Poly(3-ethoxypropyl acrylate)	1.465	25
Poly(oxy-1-oxopentamethylene)	1.465	50
Poly(vinyl propionate)	1.4665	20
Poly(vinyl acetate)	1.4665	20
Poly(vinyl methyl ether)	1.467	20
Poly(ethyl acrylate)	1.4685	20
Poly(ethylene-*co*-vinyl acetate) (80%–20% vinyl acetate)	1.47–1.50	
Cellulose propionate	1.47–1.49	
Cellulose acetate propionate	1.47	
Benzyl cellulose	1.47–1.58	
Phenol–formaldehyde resins	1.47–1.70	
Cellulose triacetate	1.47–1.48	
Poly(vinyl methyl ether) (isotactic)	1.4700	30
Poly(3-methoxypropyl acrylate)	1.471	25
Poly(2-ethoxyethyl acrylate)	1.471	25
Poly(methyl acrylate)	1.472–1.480	
Poly(isopropyl methacrylate)	1.4728	20
Poly(1-decene)	1.4730	
Poly(propylene) (atactic, density 0.8575 g/cm^3)	1.4735	20
Poly(vinyl *sec*-butyl ether) (isotactic)	1.4740	30
Poly(dodecyl methacrylate)	1.4740	20
Poly(oxyethyleneoxysuccinoyl) (poly(ethylene succinate))	1.4744	25
Poly(tetradecyl methacrylate)	1.4746	30

TABLE 2. *cont'd*

Polymer	*n*	*T* (°C)
Poly(ethylene-*co*-propylene) (EPR-rubber)	1.4748–1.48	
Poly(hexadecyl methacrylate)	1.4750	30
Poly(vinyl formate)	1.4757	20
Poly(2-fluoroethyl methacrylate)	1.4768	20
Poly(isobutyl methacrylate)	1.477	20
Ethyl cellulose	1.479	21
Poly(vinyl acetal)	1.48–1.50	
Cellulose acetate	1.48–1.50	
Cellulose acetate (39.8% acetyl content)	1.4700	25
Cellulose tripropionate	1.48–1.49	
Poly(oxymethylene)	1.48	20
Poly(vinyl butyral)	1.48–1.49	
Poly(*n*-hexyl methacrylate)	1.4813	20
Poly(*n*-butyl methacrylate)	1.483	20–25
Poly(ethylidene dimethacrylate)	1.4831	20
Poly(2-ethoxyethyl methacrylate)	1.4833	20
Poly(oxyethyleneoxymaleoyl) (poly(ethylene maleate))	1.4840	25
Poly(*n*-propyl methacrylate)	1.484	25
Poly(3,3,5-trimethylcyclohexyl methacrylate)	1.485	20
Poly(ethyl methacrylate)	1.485	20–25
Poly(2-nitro-2-methylpropyl methacrylate)	1.4868	20
Poly(triethylcarbinyl methacrylate)	1.4889	20
Poly(1,1-diethylpropyl methacrylate)	1.4889	20
Poly(methyl methacrylate)	1.4893	23
	1.490	20
Poly(2-decyl-1,3-butadiene)	1.4899	20.5
Poly(vinyl alcohol)	1.49–1.53	
	1.5214	20
Poly(ethyl glycolate methacrylate)	1.4903	20
Poly(3-methylcyclohexyl methacrylate)	1.4947	20
Poly(cyclohexyl α-ethoxyacrylate)	1.4969	20
Methyl cellulose (low viscosity)	1.497	25
Poly(4-methylcyclohexyl methacrylate)	1.4975	20
Poly(decamethylene glycol dimethacrylate)	1.4990	
Poly(urethanes)	1.5–1.6	
Poly(1,2-butadiene)	1.5000	20
Poly(vinyl formal)	1.50	
Poly(2-bromo-4-trifluoromethylstyrene)	1.5	25
Cellulose nitrate	1.5–1.514	
Poly(*sec*-butyl α-chloroacrylate)	1.500	25
Poly(2-heptyl-1,3-butadiene)	1.5000	
Poly(ethyl α-chloroacrylate)	1.502	25
Poly(2-isopropyl-1,3-butadiene)	1.5028	30
Poly(2-methylcyclohexyl methacrylate)	1.5028	20
Poly(propylene) (density 0.9075 g/cm^3)	1.5030	20
Poly(isobutene)	1.505–1.51	
Poly(bornyl methacrylate)	1.5059	20
Poly(2-*tert*-butyl-1,3-butadiene)	1.5060	24.6
Poly(ethylene glycol dimethacrylate)	1.5063	20
Poly(cyclohexyl methacrylate)	1.5066	20
Poly(cyclohexanediol-1,4-dimethacrylate)	1.5067	20
Butyl rubber(unvulcanized)	1.508	
Poly(tetrahydrofurfuryl methacrylate)	1.5096	20
Gutta percha (β)	1.509	
Poly(ethylene) ionomer	1.51	
Poly(oxyethylene) (high molecular weight)	1.51–1.54	
Poly(ethylene) (density 0.914 g/cm^3)	1.51	20
(density 0.94–0.945 g/cm^3)	1.52–1.53	20
(density 0.965 g/cm^3)	1.545	20
Poly(1-methylcyclohexyl methacrylate)	1.5111	20
Poly(2-hydroxyethyl methacrylate)	1.5119	20
Poly(vinyl chloroacetate)	1.512	25
Poly(butene) (isotactic)	1.5125	
Poly(vinyl methacrylate)	1.5129	20
Poly(*N*-butyl methacrylamide)	1.5135	20

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TABLE 2. *cont'd*

Polymer	*n*	*T* (°C)
Gutta percha (α)	1.514	50
Terpene resin	1.515	25
Poly(1,3-butadiene)	1.5154	25
Shellac	1.51	1.53
Poly(methyl α-chloroacrylate)	1.517	20
Poly(2-chloroethyl methacrylate)	1.517	20
Poly(2-diethylaminoethyl methacrylate)	1.5174	20
Poly(2-chlorocyclohexyl methacrylate)	1.5179	20
Poly(1,3-butadiene) (35% *cis*; 56% *trans*; 7% 1,2-content)	1.5180	
Natural rubber	1.519–1.52	
Poly(allyl methacrylate)	1.5196	20
Poly(vinyl chloride) + 40% dioctyl phthalate	1.52	
Poly(acrylonitrile)	1.52	
	1.5187	25
Poly(methacrylonitrile)	1.52	
Poly(1,3-butadiene) (high *cis*-type)	1.52	
Poly(butadiene-*co*-acrylonitrile)	1.52	
Poly(methyl isopropenyl ketone)	1.5200	20
Poly(isoprene)	1.521	20
Poly(ester) resin, rigid (ca. 50% styrene)	1.523–1.54	
Poly((*N*-2-methoxyethyl)methacrylamide)	1.5246	20
Poly(2,3-dimethylbutadiene) (methyl rubber)	1.525	
Poly(vinyl chloride-*co*-vinyl acetate) (95/5–90/10)	1.525–1.535	
Poly(acrylic acid)	1.527	25
Poly(1,3-dichloropropyl methacrylate)	1.5270	20
Poly(2-chloro-1-(chloromethyl)ethyl methacrylate)	1.5270	20
Poly(acrolein)	1.529	
Poly(1-vinyl-2-pyrrolidone)	1.53	
Poly(*N*-methylmaleimide-*alt*-isobutene)	1.53	
Hydrochlorinated rubber	1.53–1.55	
Poly(imino(1-oxohexamethylene)) (nylon 6)	1.53	
Poly(iminoadipoyliminohexamethylene) (nylon 6,6)	1.53	
Poly(iminoadipoylimino tetramethylene) (nylon moulding 6,10)	1.53	
oriented fibres	1.515–1.565	
Poly(butadiene-*co*-styrene) (– 30% styrene) block copolymer	1.53	
Poly(cyclohexyl α-chloroacrylate)	1.532	25
Poly(2-chloroethyl α-chloroacrylate)	1.533	25
Poly(butadiene-*co*-styrene) (~ 75/25)	1.535	
Poly(2-aminoethyl methacrylate)	1.537	20
Poly(furfuryl methacrylate)	1.5381	
Proteins	1.539–1.541	
Poly(butylmercaptyl methacrylate)	1.5390	20
Poly(1-phenyl-*n*-amyl methacrylate)	1.5396	20
Poly(*N*-methyl-methacrylamide)	1.5398	20
Cellulose	1.54	
Poly(vinyl chloride)	1.54–1.55	
Urea–formaldehyde resin	1.54–1.56	
Poly(*sec*-butyl α-bromoacrylate)	1.542	25
Poly(cyclohexyl α-bromoacrylate)	1.542	25
Poly(2-bromoethyl methacrylate)	1.5426	20
Poly(dihydroabietic acid)	1.544	
Poly(abietic acid)	1.546	25
Poly(ethylmercaptyl methacrylate)	1.547	20
Poly(*N*-allyl methacrylamide)	1.5476	20
Poly(1-phenylethyl methacrylate)	1.5487	20
Poly(vinylfuran)	1.55	20
Poly(2-vinyltetrahydrofuran)	1.55	20
Poly(vinyl chloride) + 40% tricresyl phosphate	1.55	
Epoxy resins	1.55–1.60	
Poly(*p*-methoxybenzyl methacrylate)	1.552	20
Poly(isopropyl methacrylate)	1.552	
Poly(*p*-isopropylstyrene)	1.554	20
Poly(chloroprene)	1.554–1.558	
Poly(oxyethylene)-α-benzoate-ω-methacrylate)	1.555	20
Poly(*p*,*p*-xylylenyl dimethacrylate)	1.5559	20

TABLE 2. *cont'd*

Polymer	*n*	*T* (°C)
Poly(1-phenylallyl methacrylate)	1.5573	20
Poly(*p*-cyclohexylphenyl methacrylate)	1.5575	20
Poly(2-phenylethyl methacrylate)	1.5592	20
Poly(oxycarbonyloxy-1,4-phenylene-1-propylbutylidene-1,4-phenylene)	1.5602	
Poly(1-(*o*-chlorophenyl)ethyl methacrylate)	1.5624	20
Poly(styrene-*co*-maleic anhydride)	1.564	21
Poly(1-phenylcyclohexyl methacrylate)	1.5645	20
Poly(oxycarbonyloxy-1,4-phenylene-1,3-dimethylbutylidene-1,4-phenylene)	1.5671	
Poly(methyl α-bromoacrylate)	1.5672	20
Poly(benzyl methacrylate)	1.5680	20
Poly(2-(phenylsulfonyl)ethyl methacrylate)	1.5682	
Poly(*m*-cresyl methacrylate)	1.5683	20
Poly(styrene-*co*-acrylonitrile) (– 75/25)	1.57	
Poly(oxycarbonyloxy-1,4-phenyleneisobutylidene-1,4-phenylene)	1.5702	
Poly(*o*-methoxyphenyl methacrylate)	1.5705	20
Poly(phenyl methacrylate)	1.5706	20
Poly(*o*-cresyl methacrylate)	1.5707	20
Poly(diallyl phthalate)	1.572	20
Poly(2,3-dibromopropyl methacrylate)	1.5739	20
Poly(oxycarbonyloxy-1,4-phenylene-1-methyl-butylidene-1,4-phenylene)	1.5745	
Poly(oxy-2,6-dimethylphenylene)	1.575	
Poly(oxyethyleneoxyterephthaloyl) (amorphous) (poly(ethylene terephthalate))	1.5750	20
Poly(vinyl benzoate)	1.5775	20
Poly(oxycarbonyloxy-1,4-phenylenebutylidene-1,4-phenylene)	1.5792	
Poly(1,2-diphenylethyl methacrylate)	1.5816	20
Poly(*o*-chlorobenzyl methacrylate)	1.5823	20
Poly(oxycarbonyloxy-1,4-phenylene-*sec*-butylidene-1,4-phenylene)	1.5827	
Poly(oxypentaerythritoloxyphthaloyl)	1.584	20
Poly(*m*-nitrobenzyl methacrylate)	1.5845	20
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)	1.5850	
Poly(*N*-(2-phenylethyl)methacrylamide)	1.5857	20
Poly(4-methoxy-2-methylstyrene)	1.5868	20
Poly(*o*-methylstyrene)	1.5874	20
Poly(styrene)	1.59–1.592	20
Poly(oxycarbonyloxy-1,4-phenylenecyclohexylidene-1,4-phenylene)	1.5900	20
Poly(*o*-methoxystyrene)	1.5932	20
Poly(diphenylmethyl methacrylate)	1.5933	20
Poly(oxycarbonyloxy-1,4-phenyleneethylidene-1,4-phenylene)	1.5937	
Poly(*p*-bromophenyl methacrylate)	1.5964	20
Poly(*N*-benzyl methacrylamide)	1.5965	20
Poly(*p*-methoxystyrene)	1.5967	20
Hard rubber (32% S)	1.6	
Poly(vinylidene chloride)	1.60–1.63	
Poly(sulfides) (Thiokol)	1.6–1.7	
Poly(*o*-chlorodiphenylmethyl methacrylate)	1.6040	
Poly(oxycarbonyloxy-1,4-(2,6-dichloro)phenylene-isopropylidene-1,4-(2,6-dichloro)phenylene)	1.6056	
Poly(oxycarbonyloxybis(1,4-(3,5-dichlorophenylene)))	1.6056	
Poly(pentachlorophenyl methacrylate)	1.608	20
Poly(*o*-chlorostyrene)	1.6098	20
Poly(phenyl α-bromoacrylate)	1.612	25
Poly(*p*-divinylbenzene)	1.6150	20
Poly(*N*-vinylphthalimide)	1.6200	20
Poly(2,6-dichlorostyrene)	1.6248	20
Poly(β-naphthyl methacrylate)	1.6298	20
Poly(α-naphthyl carbinyl methacrylate)	1.63	
Poly(sulfone)	1.633	
Poly(2-vinylthiophene)	1.6376	20
Poly(α-naphthyl methacrylate)	1.6410	20
Poly(oxycarbonyloxy-1,4-phenylenediphenyl-methylene-1,4-phenylene)	1.6539	
Poly(vinyl phenyl sulfide)	1.6568	20
Butylphenol formaldehyde resin	1.66	
Urea–thiourea–formaldehyde resin	1.660	25
Poly(vinylnaphthalene)	1.6818	20

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TABLE 2. *cont'd*

Polymer	*n*	*T* (°C)
Poly(vinylcarbazole)	1.683	20
Naphthalene–formaldehyde resin	1.696	
Phenol–formaldehyde resin	1.70	
Poly(pentabromophenyl methacrylate)	1.71	

[a]Temperature in °C are listed when available. In general, *n* may be assumed to decrease with increasing temperature. Approximate change may be calculated as $dn/dT = -1 \times 10^{-4}$ to 2×10^{-4}/°C for glassy polymers and $dn/dT = -3 \times 10^{-4}$ to 5×10^{-4}/°C for amorphous unoriented polymers above the glass transition.

TABLE 3. AVERAGE REFRACTIVE INDICES OF POLYMERS (IN ALPHABETICAL ORDER)

Polymer	*n*	*T* (°C)
Benzyl cellulose	1.47–1.58	
Butylphenol formaldehyde resin	1.66	
Butyl rubber(unvulcanized)	1.508	
Cellulose	1.54	
Cellulose acetate	1.48–1.50	
Cellulose acetate (39.8% acetyl content)	1.4700	25
Cellulose acetate butyrate	1.46–1.49	
Cellulose acetate propionate	1.47–1.48	
Cellulose nitrate	1.5–1.514	
Cellulose propionate	1.47–1.49	
Cellulose triacetate	1.47–1.48	
Cellulose tripropionate	1.48–1.49	
Epoxy resins	1.55–1.60	
Ethyl cellulose	1.479	21
Gutta percha (α)	1.514	50
Gutta percha (β)	1.509	
Hard rubber (32% S)	1.6	
Hydrochlorinated rubber	1.53–1.55	
Methyl cellulose (low viscosity)	1.497	25
Naphthalene–formaldehyde resin	1.696	
Natural rubber	1.519–1.52	
Phenol–formaldehyde resin	1.70	
Phenol–formaldehyde resins	1.47–1.70	
Poly(abietic acid)	1.546	25
Poly(acrolein)	1.529	
Poly(acrylic acid)	1.527	25
Poly(acrylonitrile)	1.52	
	1.5187	25
Poly(allyl methacrylate)	1.5196	20
Poly(2-aminoethyl methacrylate)	1.537	20
Poly(*N*-allyl methacrylamide)	1.5476	20
Poly(*N*-benzyl methacrylamide)	1.5965	20
Poly(*n*-butyl methacrylate)	1.483	20–25
Poly(benzyl methacrylate)	1.5680	20
Poly(bornyl methacrylate)	1.5059	20
Poly(2-bromoethyl methacrylate)	1.5426	20
Poly(*p*-bromophenyl methacrylate)	1.5964	20
Poly(2-bromo-4-trifluoromethylstyrene)	1.5	25
Poly(1,2-butadiene)	1.5000	20
Poly(1,3-butadiene)	1.5154	25
Poly(1,3-butadiene) (high *cis*-type)	1.52	
Poly(1,3-butadiene) (35% *cis*; 56% *trans*; 7% 1,2-content)	1.5180	
Poly(butadiene-*co*-acrylonitrile)	1.52	
Poly(butadiene-*co*-styrene) (~75/25)	1.535	
Poly(butadiene-*co*-styrene) (– 30% styrene) block copolymer	1.53	
Poly(butene) (isotactic)	1.5125	
Poly(butyl acrylate)	1.4631	30
	1.466	20
Poly(*sec*-butyl α-bromoacrylate)	1.542	25
Poly(*sec*-butyl α-chloroacrylate)	1.500	25
Poly(2-*tert*-butyl-1,3-butadiene)	1.5060	24.6

TABLE 3. *cont'd*

Polymer	n	T (°C)
Poly(*tert*-butyl methacrylate)	1.4638	20
Poly(butylmercaptyl methacrylate)	1.5390	20
Poly(*N*-butyl methacrylamide)	1.5135	20
Poly(*o*-chlorobenzyl methacrylate)	1.5823	20
Poly(2-chloro-1-(chloromethyl)ethyl methacrylate)	1.5270	20
Poly(2-chlorocyclohexyl methacrylate)	1.5179	20
Poly(*o*-chlorodiphenylmethyl methacrylate)	1.6040	
Poly(2-chloroethyl α-chloroacrylate)	1.533	25
Poly(2-chloroethyl methacrylate)	1.517	20
Poly(1-(*o*-chlorophenyl)ethyl methacrylate)	1.5624	20
Poly(chloroprene)	1.554–1.558	
Poly(*o*-chlorostyrene)	1.6098	20
Poly(*m*-cresyl methacrylate)	1.5683	20
Poly(*o*-cresyl methacrylate)	1.5707	20
Poly(cyclohexanediol-1,4-dimethacrylate)	1.5067	20
Poly(cyclohexyl α-bromoacrylate)	1.542	25
Poly(cyclohexyl α-chloroacrylate)	1.532	25
Poly(cyclohexyl α-ethoxyacrylate)	1.4969	20
Poly(cyclohexyl methacrylate)	1.5066	20
Poly(*p*-cyclohexylphenyl methacrylate)	1.5575	20
Poly(decamethylene glycol dimethacrylate)	1.4990	
Poly(1-decene)	1.4730	
Poly(2-decyl-1,3-butadiene)	1.4899	20.5
Poly(diallyl phthalate)	1.572	20
Poly(2,3-dibromopropyl methacrylate)	1.5739	20
Poly(1,3-dichloropropyl methacrylate)	1.5270	20
Poly(2,6-dichlorostyrene)	1.6248	20
Poly(2-diethylaminoethyl methacrylate)	1.5174	20
Poly(1,1-diethylpropyl methacrylate)	1.4889	20
Poly(dihydroabietic acid)	1.544	
Poly(2,3-dimethylbutadiene) (methyl rubber)	1.525	
Poly(1,2-diphenylethyl methacrylate)	1.5816	20
Poly(diphenylmethyl methacrylate)	1.5933	20
Poly(*p*-divinylbenzene)	1.6150	20
Poly(dodecyl methacrylate)	1.4740	20
Poly(ester) resin, rigid (ca. 50% styrene)	1.523–1.54	
Poly(2-ethoxyethyl acrylate)	1.471	25
Poly(2-ethoxyethyl methacrylate)	1.4833	20
Poly(3-ethoxypropyl acrylate)	1.465	25
Poly(ethyl acrylate)	1.4685	20
Poly(ethyl α-chloroacrylate)	1.502	25
Poly(ethyl glycolate methacrylate)	1.4903	20
Poly(ethyl methacrylate)	1.485	20–25
Poly(ethylene) (density 0.914 g/cm^3)	1.51	20
(density 0.94–0.945 g/cm^3)	1.52–1.53	20
(density 0.965 g/cm^3)	1.545	20
Poly(ethylene) ionomer	1.51	
Poly(ethylene-*co*-propylene) (EPR-rubber)	1.4748–1.48	
Poly(ethylene-*co*-vinyl acetate) (80%–20% vinyl acetate)	1.47–1.50	
Poly(ethylene glycol dimethacrylate)	1.5063	20
Poly(ethylidene dimethacrylate)	1.4831	20
Poly(ethylmercaptyl methacrylate)	1.547	20
Poly(2-fluoroethyl methacrylate)	1.4768	20
Poly(4-fluoro-2-trifluoromethylstyrene)	1.46	
Poly(furfuryl methacrylate)	1.5381	
Poly(2-heptafluorobutoxy)ethyl acrylate)	1.390	25
Poly(heptafluorobutyl acrylate)	1.367	25
Poly(2-heptyl-1,3-butadiene)	1.5000	
Poly(hexadecyl methacrylate)	1.4750	30
Poly(2,2,3,4,4,4-hexafluorobutyl acrylate)	1.392	25
Poly(*n*-hexyl methacrylate)	1.4813	20
Poly(2-hydroxyethyl methacrylate)	1.5119	20
Poly(iminoadipoyliminohexamethylene) (nylon 6,6)	1.53	
Poly(iminoadipoylimino tetramethylene) (nylon moulding 6,10)	1.53	
oriented fibers	1.515–1.565	

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TABLE 3. *cont'd*

Polymer	*n*	*T* (°C)
Poly(imino(1-oxohexamethylene)) (nylon 6)	1.53	
Poly(isobutene)	1.505–1.51	
Poly(isobutyl methacrylate)	1.477	20
Poly(isoprene)	1.521	20
Poly(2-isopropyl-1,3-butadiene)	1.5028	30
Poly(isopropyl methacrylate)	1.4728	20
	1.552	
Poly(*p*-isopropylstyrene)	1.554	20
Poly(methacrylonitrile)	1.52	
Poly(*p*-methoxybenzyl methacrylate)	1.552	20
Poly(2-methoxyethyl acrylate)	1.463	25
Poly((*N*-2-methoxyethyl)methacrylamide)	1.5246	20
Poly(4-methoxy-2-methylstyrene)	1.5868	20
Poly(*o*-methoxyphenyl methacrylate)	1.5705	20
Poly(3-methoxypropyl acrylate)	1.471	25
Poly(*o*-methoxystyrene)	1.5932	20
Poly(*p*-methoxystyrene)	1.5967	20
Poly(methyl acrylate)	1.472–1.480	
Poly(methyl α-bromoacrylate)	1.5672	20
Poly(methyl α-chloroacrylate)	1.517	20
Poly(methyl isopropenyl ketone)	1.5200	20
Poly(methyl methacrylate)	1.4893	23
	1.490	20
Poly(*N*-methyl-methacrylamide)	1.5398	20
Poly(4-methyl-1-pentene)	1.459–1.465	
Poly(1-methylcyclohexyl methacrylate)	1.5111	20
Poly(2-methylcyclohexyl methacrylate)	1.5028	20
Poly(3-methylcyclohexyl methacrylate)	1.4947	20
Poly(4-methylcyclohexyl methacrylate)	1.4975	20
Poly(*N*-methylmaleimide-alt-isobutene)	1.53	
Poly(*o*-methylstyrene)	1.5874	20
Poly(α-naphthyl carbinyl methacrylate)	1.63	
Poly(α-naphthyl methacrylate)	1.6410	20
Poly(β-naphthyl methacrylate)	1.6298	20
Poly(*m*-nitrobenzyl methacrylate)	1.5845	20
Poly(2-nitro-2-methylpropyl methacrylate)	1.4868	20
Poly(nonafluoropentyl acrylate)	1.360	25
Poly(octafluoropentyl acrylate)	1.380	25
Poly(oxycarbonyloxybis(1,4-(3,5-dichlorophenylene))	1.6056	
Poly(oxycarbonyloxy-1,4-(2,6-dichloro)phenylene-isopropylidene-1,4-(2,6-dichloro)phenylene))	1.6056	
Poly(oxycarbonyloxy-1,4-phenylene-1,3-dimethylbutylidene-1,4-phenylene)	1.5671	
Poly(oxycarbonyloxy-1,4-phenylene-1-methyl-butylidene-1,4-phenylene)	1.5745	
Poly(oxycarbonyloxy-1,4-phenylene-1-propylbutylidene-1,4-phenylene)	1.5602	
Poly(oxycarbonyloxy-1,4-phenylene-*sec*-butylidene-1,4-phenylene)	1.5827	
Poly(oxycarbonyloxy-1,4-phenylenebutylidene-1,4-phenylene)	1.5792	
Poly(oxycarbonyloxy-1,4-phenylenecyclohexylidene-1,4-phenylene)	1.5900	20
Poly(oxycarbonyloxy-1,4-phenylenediphenyl-methylene-1,4-phenylene)	1.6539	
Poly(oxycarbonyloxy-1,4-phenyleneethylidene-1,4-phenylene)	1.5937	
Poly(oxycarbonyloxy-1,4-phenyleneisobutylidene-1,4-phenylene)	1.5702	
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)	1.5850	
Poly(oxy-2,6-dimethylphenylene)	1.575	
Poly(oxydimethylsilylene) (poly(dimethyl siloxane))	1.43	
Poly(oxyethylene) (high molecular weight)	1.4563	30
	1.51–1.54	
Poly(oxyethylene)-α-benzoate-ω-methacrylate)	1.555	20
Poly(oxyethyleneoxymaleoyl) (poly(ethylene maleate))	1.4840	25
Poly(oxyethyleneoxysuccinoyl) (poly(ethylene succinate))	1.4744	25
Poly(oxyethyleneoxyterephthaloyl) (amorphous) (poly(ethylene terephthalate))	1.5750	20
Poly(oxymethylene)	1.48	20
Poly(oxy-1-oxopentamethylene)	1.465	50
Poly(oxypentaerythritoloxyphthaloyl)	1.584	20
Poly(oxypropylene)	1.4495	
Poly(pentabromophenyl methacrylate)	1.71	
Poly(pentachlorophenyl methacrylate)	1.608	20
Poly(pentadecafluorooctyl acrylate)	1.339	25

TABLE 3. *cont'd*

Polymer	*n*	*T* (°C)
Poly(pentafluoropropyl acrylate)	1.385	25
Poly(pentafluorovinyl propionate)	1.364	25
Poly(1-phenyl-*n*-amyl methacrylate)	1.5396	20
Poly(phenyl α-bromoacrylate)	1.612	25
Poly(phenyl methacrylate)	1.5706	20
Poly(1-phenylallyl methacrylate)	1.5573	20
Poly(1-phenylcyclohexyl methacrylate)	1.5645	20
Poly(1-phenylethyl methacrylate)	1.5487	20
Poly(2-phenylethyl methacrylate)	1.5592	20
Poly(*N*-(2-phenylethyl)methacrylamide)	1.5857	20
Poly(2-(phenylsulfonyl)ethyl methacrylate)	1.5682	
Poly(*n*-propyl methacrylate)	1.484	25
Poly(propylene) (density 0.9075 g/cm^3)	1.5030	20
Poly(propylene) (atactic, density 0.8575 g/cm^3)	1.4735	20
Poly(styrene)	1.59–1.592	20
Poly(styrene-*co*-acrylonitrile) (– 75/25)	1.57	
Poly(styrene-*co*-maleic anhydride)	1.564	21
Poly(sulfides) (Thiokol)	1.6–1.7	
Poly(sulfone)	1.633	
Poly(tetradecyl methacrylate)	1.4746	30
Poly(tetrafluoro-3-(heptafluoropropoxy)propyl acrylate)	1.346	25
Poly(tetrafluoro-3-(pentafluoroethoxy)propyl acrylate)	1.348	25
Poly(tetrafluoro-3-(trifluoromethoxy)propyl acrylate)	1.360	25
Poly(2-(1,1,2,2-tetrafluoroethoxy)ethyl acrylate)	1.412	25
Poly(tetrafluoroethylene)	1.35(– 1.38)	
Poly(tetrafluoroethylene-*co*-hexafluoropropylene)	1.338	
Poly(tetrahydrofurfuryl methacrylate)	1.5096	20
Poly(triethylcarbinyl methacrylate)	1.4889	20
Poly(2,2,2-trifluoro-1-methylethyl methacrylate)	1.4185	
Poly(trifluorochloroethylene)	1.42–1.43	
Poly(2-trifluoroethoxy)ethyl acrylate)	1.419	25
Poly(trifluoroethyl acrylate)	1.407	25
Poly(trifluoroethyl methacrylate)	1.437	
Poly(trifluoroisopropyl methacrylate)	1.4177	20
Poly(trifluorovinyl acetate)	1.375	25
Poly(3,3,5-trimethylcyclohexyl methacrylate)	1.485	20
Poly(undecafluorohexyl acrylate)	1.356	
Poly(urethanes)	1.5–1.6	
Poly(vinyl acetal)	1.48–1.50	
Poly(vinyl acetate)	1.4665	20
Poly(vinyl alcohol)	1.49–1.53	
	1.5214	20
Poly(vinyl benzoate)	1.5775	20
Poly(vinyl butyl ether)	1.4563	30
Poly(vinyl *sec*-butyl ether) (isotactic)	1.4740	30
Poly(vinyl butyral)	1.48–1.49	
Poly(vinyl chloride)	1.54–1.55	
Poly(vinyl chloride) + 40% dioctyl phthalate	1.52	
Poly(vinyl chloride) + 40% tricresyl phosphate	1.55	
Poly(vinyl chloride-*co*-vinyl acetate) (95/5–90/10)	1.525–1.535	
Poly(vinyl chloroacetate)	1.512	25
Poly(vinyl decyl ether)	1.4628	30
Poly(vinyl dodecyl ether)	1.4640	30
Poly(vinyl ethyl ether)	1.4540	30
Poly(vinyl-2-ethylhexyl ether)	1.4626	30
Poly(vinyl formal)	1.50	
Poly(vinyl formate)	1.4757	20
Poly(vinyl hexyl ether)	1.4591	30
Poly(vinyl isobutyl ether)	1.4507	30
Poly(vinyl methacrylate)	1.5129	20
Poly(vinyl methyl ether)	1.467	20
Poly(vinyl methyl ether) (isotactic)	1.4700	30
Poly(vinyl octyl ether)	1.4613	30
Poly(vinyl pentyl ether)	1.4581	30
Poly(vinyl phenyl sulfide)	1.6568	20

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TABLE 3. *cont'd*

Polymer	*n*	*T* (°C)
Poly(vinyl propionate)	1.4665	20
Poly(vinylcarbazole)	1.683	20
Poly(vinylfuran)	1.55	20
Poly(vinylidene chloride)	1.60–1.63	
Poly(vinylidene fluoride)	1.42	25
Poly(vinylnaphthalene)	1.6818	20
Poly(1-vinyl-2-pyrrolidone)	1.53	
Poly(*N*-vinylphthalimide)	1.6200	20
Poly(2-vinyltetrahydrofuran)	1.55	20
Poly(2-vinylthiophene)	1.6376	20
Proteins	1.539–1.541	
Shellac	1.51–1.53	
Terpene resin	1.515	25
Urea–formaldehyde resin	1.54–1.56	
Urea–thiourea–formaldehyde resin	1.660	25
Poly(*p*,*p*-xylylenyl dimethacrylate)	1.5559	20

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Radiation Resistance of Plastics and Elastomers

Tadao Seguchi, Yosuke Morita
Takasaki Radiation Chemistry Research Establishment, Japan Atomic Energy Research Institute (JAERI), Takasaki, Gunma 370-12, Japan

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A. INTRODUCTION

1. General Comments

The data on radiation resistance have been compiled mainly for practical polymer materials that have been classified into four groups: thermoplastics, elastomers, all aromatic polymers, and composite materials. The values of radiation resistance were determined by the change in mechanical properties. Radiation-induced degradation of polymer materials depends greatly on the irradiation conditions, as indicated in the tables; hence, the reader is advised to use these data with caution, considering all the factors.

2. Criterion for Radiation Resistance

Radiation resistance is characterized by the half-value-dose of significant changes in mechanical properties. For elastomers and thermoplastics, with large ultimate elongation by tensile test, the resistance is characterized by 100% elongation at break. The half-value-dose means the absorbed dose that reduces a property to 50% of its initial value under defined environments. The SI unit gray (Gy; 1 Gy = 1 J/kg = 100 rad) is used, and values in tables are in units of MGy (10^6 Gy) when there is no notation. In cases where the absorbed dose in the experiment was terminated before reaching the criterion, the dose is given with the sign ">".

The properties can be affected differently, therefore more than one relevant property should be considered. In most cases, the properties used to characterize radiation resistance are the elongation at break for elastomers and flexible plastics, and the flexural strength for rigid plastics and composite materials. However, the elongation at break sometimes increases with elastomers deterioration, but in that case, the strength decreases greatly.

3. Factors of Influence and their Consideration in Tables

Radiation resistance depends on polymer formulation as well as on the conditions of radiation exposure, such as the environmental atmosphere, temperature, dose rate, mechanical stress, etc. The most effective factor is the oxidation induced by radiation. Radiation resistance is indicated in two categories, with and without oxidation, together with the irradiation conditions employed.

3.1. Type of Polymer and Formulation The polymer samples reported were generally formulated by mixing with chemical agents, such as of stabilizers and fillers. Elastomers were normally crosslinked. The formulation and/or crosslinking have many variations for a given type of polymer. The formulation is determined by the suppliers based on the application (which may need, improve the mechanical or thermal properties), and the contents are usually not disclosed. Radiation resistance is influenced by formulation and crosslinking. In general, radiation resistance can be increased with inorganic fillers, with good adhesion between the polymer and reinforcing fillers, with

antioxidants, and with aromatic compounds. Organic fillers usually decrease radiation resistance. Some of the aromatic polymers reported may contain fillers of glass or carbon fibers.

The first column of the tables give the polymer name, along with the formulation or cross-linking. The second column gives the form of the test sample: either sheets (formed by heat press) or films (formed by extrusion or inflation), and their thickness (in mm).

3.2. Type of Radiation and Dosimetry The overall radiation effect does not depend on the type of radiation (such as X rays, gamma rays, electron beams, nuclear reactor irradiation, or other accelerated particle radiation), but only on the absorbed dose. There are some uncertainties about the given dose, especially to different types of radiation. In the following tables, the accuracy of the dose is estimated to be ±10% for gamma-rays and ±20% for electron beams or accelerated particles.

3.3. Dose Rate and the Atmosphere In an inert gas atmosphere or under vacuum, the dependence of dose rate on polymeric degradation is negligible at ambient temperature (1). If the other stresses, such as thermal degradation or light exposure, are eliminated during irradiation, the degradation should depend on the accumulated dose. If oxygen is present, the induced oxidation will decrease radiation resistance. The overall oxidation is determined by the rate of oxygen consumption by radiation-induced oxidation in the polymer matrix, and by the rate of oxygen supply into the matrix. The thickness of the polymer oxidation layer (L_{ox}) is a function of radiation dose rate (I), oxygen partial pressure (P_{o_2}) at one atmosphere total pressure, oxygen permeability coefficient (P_c) into the polymer matrix, and oxygen consumption factor (Φ), and is given by the following equation. (Ref. 2,3).

$$L_{ox} = (P_c P_{o_2} / I \Phi)^{1/2} \qquad (1)$$

When the test material is a thick sheet, the oxidation layer occurs only at the surface, and the inside is not oxidized. The oxidation layer increases with decreasing dose rate. For most polymers, the degradation is more progressive with oxidation than without it. The dose rate affects the ratio of oxidation layer to material thickness. The degradation with oxidation can be observed by irradiation of a thin film; here, oxidation proceeds throughout the film. Oxidation throughout a thick film requires irradiation with oxygen under pressure rather than decreasing the dose rate (4). In the following tables, radiation resistance with oxidation implies that oxidation takes place throughout the material.

The other dose-rate dependent degradation, chain-reaction oxidation, has been reported at low dose-rate irradiations over long time periods. We believe that it is difficult to distinguish these chain reactions from thermal oxidation. In the tables, the data for very low dose rate have been excluded.

3.4. Temperature The irradiation temperature is ambient temperature, i.e. about 20–30 °C. The data for low-temperature irradiation is listed for few materials. Several experiments performed at higher irradiation temperatures are also listed. As the resistance depends on irradiation temperature, it is supposed that chemical reactions increase greatly due to the increased molecular motions during irradiation.

3.5. Other Stresses The tables do not consider mechanical stress and deformation during irradiation. These factors can have a large influence on degradation.

B. LIST OF SYMBOLS USED

σ	Tensile strength at break (ultimate strength)
$\sigma_{1/2}$	Half of tensile strength at break
ε	Elongation at break (ultimate elongation)
$\varepsilon_{1/2}$	Half of elongation at break
$\varepsilon_{100\%}$	100% of elongation at break
σ_F	Flexural strength
$\sigma_{F1/2}$	Half of flexural strength
IL	Inter Lamella Shear Strength (ILSS)
$IL_{1/2}$	Half of ILSS
γ	^{60}Co- γ-rays
EB	Electron beams, ( ) energy
n	Neutron, ( ) energy
H^+	Proton, ( ) energy
RT	Room temperature
Vac	Vaccum (including seal after vacuum)
Air	Air atmosphere
He	Helium-gas atmosphere
N_2	Nitrogen-gas atmosphere
O_2	Oxygen gas, ( ) indicates pressure

C. TABLES OF RADIATION RESISTANCE

TABLE 1. THERMOPLASTICS

				Radiation resistance						
		Property		Without oxidation (surface oxidation)			With oxidation			
Polymer	Form	Initial value	Criterions	Dose (MGy)	Irradiation conditions	Refs.	Dose (MGy)	Irradiation condition	Refs.	Remarks
Poly(ethylene)	Sheet, 1 mm	σ : 18 MPa	$\sigma_{1/2}$	>1.5	γ, RT, vac, 5 kGy/h	5	0.25	γ, RT, O_2 (1.0 MPa), 5 kGy/h	5	
low-density (LDPE),		ε : 500%	$\varepsilon_{100\%}$	>1.5			0.4			
non formulated										
low-density (LDPE),	Film, 0.1 mm	σ : 45 MPa	$\sigma_{1/2}$	>2	EB (2 MeV), RT, vac, 2.5 kGy/s or					
non formulted		ε : 800%	$\varepsilon_{100\%}$	2.0	H^+(8 MeV), RT, vac, 0.7 kGy/s	6				
cross-linked (XLPE),	Sheet, 1 mm	σ : 17 MPa	$\sigma_{1/2}$	3	γ, RT, vac, 6 kGy/h	7	1.0	γ, RT, O_2 (0.4 MPa), 6 kGy/h	7	
formulated,		ε : 500%	$\varepsilon_{100\%}$	3			2.6			
cable insulator	Tube, 5 mm ϕ	σ : 20 MPa	$\sigma_{1/2}$	1.0	γ, RT, air, 10 kGy/h	8	0.4	γ, RT, O_2 (1.0 MPa), 2.8 kGy/h or	8	
		ε : 700%	$\varepsilon_{100\%}$	0.8			0.4	air, 50 Gy/h		
UHMW-PE (ultra	Fiber,	σ : 3.7 GPa	$\sigma_{1/2}$				0.1 – 0.2	γ, RT, O_2 (0.03 MPa), 10 kGy/h	9	
high molecular	0.011 mm ϕ									
weight-PE)										
Poly(propylene) (PP),	Sheet, 0.5 mm	σ : 32 MPa	$\sigma_{1/2}$	0.5	γ, RT, vac, 10 kGy/h	10	0.15	γ, RT, O_2 (0.1 MPa), 10 kGy/h	10	
isotactic PP		ε : 210%	$\varepsilon_{100\%}$	0.04						
	Film, 0.1 mm	ε : 1200%	$\varepsilon_{100\%}$	0.02	EB (2 MeV), RT, vac, 2.5 kGy/s or					
					H^+(8 MeV), RT, vac, 0.7 kGy/s	6				
Poly(vinyl chloride)	Sheet, 1.0 mm	σ : 28 MPa	$\sigma_{1/2}$	>3	γ, RT, vac, 6 kGy/h	7	0.3	γ, RT, O_2 (0.4 MPa), 6 kGy/h	7	
(PVC), formulated		ε : 370%	$\varepsilon_{100\%}$	1.7			0.5			
Poly(vinyl chloride)	Tube,	σ : 20 MPa	$\sigma_{1/2}$	>1.4	γ, RT, air, 10 kGy/h	8	0.6	γ, RT, O_2 (1 MPa), 2.8 kGy/h, or		Low dose rate in air has the same
(PVC), cable jacket	OD 18 mm ϕ	ε : 190%	$\varepsilon_{100\%}$	1.0			0.1	air, 50 Gy/h	8	effect as high dose rate in O_2
	1.8 mm t									under pressure
Poly (12-aminolauric	Sheet, 0.5 mm	σ : 80 MPa	$\sigma_{1/2}$	>3	γ, RT, vac, 5 kGy/h	11	0.15	γ, RT, O_2 (0.7 MPa), 1.2 kGy/h	11	
acid), Nylon-12		ε : 430%	$\varepsilon_{100\%}$	2.3			0.18			
Poly (ε-caprolactam),	Sheet, 0.5 mm	σ : 130 MPa	$\sigma_{1/2}$	>3	γ, RT, vac, 5 kGy/h	11	0.06	γ, RT, O_2 (0.7 MPa), 1.2 kGy/h	11	Inner part is not oxidized by
Nylon-6		ε : 400%	$\varepsilon_{100\%}$	>3			0.07			oxygen under pressure
Poly(ethylene-	Film, 0.1 mm	σ : 220 MPa	$\sigma_{1/2}$	2.5	γ, RT, vac, 10 kGy/h	12	1.8	γ, RT, air, 8.5 kGy/h, or		Oxidation proceeds throughout
terephthalate) (PET)		ε : 75%	$\varepsilon_{1/2}$	1.8			1.4	O_2 (2 MPa), 8.5 kGy/h	12	film in air at a relatively high
			$\sigma_{1/2}$	2.5	H^+(8 MeV), RT, vac, 0.7 kGy/s	6				dose rate
Poly(ethylene), 2,6-	Film,	σ : 280 MPa	$\sigma_{1/2}$	42	γ, RT, vac, 10 kGy/h	12	7.8	γ, RT, O_2 (0.6 MPa), 8.5 kGy/h	12	Cross-linking under vacuum
naphthalate (PEN)	0.075 mm	ε : 30%	$\varepsilon_{1/2}$	12			4.5			irradiation
Poly(methylmethacrylate)	Sheet, 3 mm	σ_F: 130 MPa	$\sigma_{F1/2}$	0.15	γ, RT, vac, 10 kGy/h					
(PMMA)			$\sigma_{F1/2}$	1.5	γ, 77 K, N_2, 30 kGy/h	13				
					H^+(30, 45 MeV), RT,	14				
					vac, 30 Gy/s					
Poly(styrene) (PS),	Sheet, 0.5 mm	σ : 60 MPa	$\sigma_{1/2}$	>10	γ, RT, vac, 10 kGy/h	15				
atactic PS			$\sigma_{1/2}$	2	σ, 80°C, vac, 10 kGy/h	15				
Poly(styrene) (PS),	Sheet, 0.5 mm	σ : 60 MPa	$\sigma_{1/2}$	>30	γ, RT, vac, 10 kGy/h	15				
syndiotactic PS			$\sigma_{1/2}$	10–20	γ, 80°C, vac, 10 kGy/h	15				
Poly(tetrafluoroethylene)	Sheet, 0.5 mm	σ : 55 MPa	$\sigma_{1/2}$	0.0035	γ, RT, vac, 10 kGy/h	16	0.0015	γ, RT, air, 10 kGy/h	16	In air, oxidation proceeds
(PTFE)		ε : 400%	$\varepsilon_{100\%}$	0.015			0.002			throughout sheet
			$\varepsilon_{100\%}$	0.1	γ, 77 K, N_2, 30 kGy/h	13				
Cross-linked PTFE	Sheet, 0.5 mm	σ : 25 MPa	$\sigma_{1/2}$	2.0	γ, RT, vac, 10 Gy/h	16	0.45	γ, RT, air, 10 kGy/h	16	In air, oxidation proceeds
(XL-PTFE)		ε : 270%	$\varepsilon_{100\%}$	1.2			0.25			throughout sheet
Poly(vinylidene fluoride)	Sheet, 1 mm		$\sigma_{1/2}$	1.0	γ, RT, air, 10 Gy/h	17	0.6	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	
(PVDF)			$\varepsilon_{100\%}$	0.3			0.2			
	Film, 0.1 mm	σ : 110 MPa	$\sigma_{1/2}$	0.4	H^+(8 MeV), RT, vac,	6				
		ε : 800%	$\varepsilon_{100\%}$	0.6	0.7 kGy/s					
Poly(ethylene-	Film, 0.1 mm	σ : 65 MPa	$\sigma_{1/2}$	>2.5	EB (2 MeV), RT, vac, 2.5 kGy/s or					
tetrafluoro ethylene-		ε : 650%	$\varepsilon_{100\%}$	2.5	H^+ (8 MeV), RT, vac, 0.7 kGy/s	6				
co-polymer) (ETFE),										
Tefzel®										

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TABLE 2. ELASTOMERS

Polymer	Form	Property: Initial value	Property: Criterion	Radiation resistance, Without oxidation (surface oxidation): Dose (MGy)	Irradiation conditions	Refs.	Radiation resistance, With oxidation: Dose (MGy)	Irradiation conditions	Refs.	Remarks
Ethyl acrylate rubber formulated, commercial	Sheet, 1 mm	σ : 11 MPa ε : 270%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	3 1.0	γ, RT, air, 10 kGy/h	17	3 >2	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Oxidation proceeds throughout in O_2 under pressure
Chlorosulphonated polyethylene (Hypalon®) formulated	Sheet, 1 mm	σ : 21 MPa ε : 390%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>3 1.0	γ, RT, air, 10 kGy/h	17	1.2 0.6	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Oxidation proceeds throughout in O_2 under pressure
Chlorosulphonated polyethylene (Hypalon®) cable jacket	Tube, 20 mm ϕ 2 mm t	σ : 12 MPa ε : 520%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>2 1.5	γ, RT, air, 10 kGy/h	8	>2 1.5	γ, RT, air, 50 Gy/h, or O_2 (1.0 MPa), 2.8 kGy/h	8	Oxidation proceeds throughout at very low dose rate or in O_2 under pressure
Ethylene-propylene-copolymer (EPR) formulated, commercial	Sheet, 1 mm	σ : 11 MPa ε : 270%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	3 1.0	γ, RT, air, 10 kGy/h	17	3 >2	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	In O_2 oxidation proceeds throughout sheet
Ethylene-propylene-ter-polymer (EPDM) formulated, commercial	Sheet, 1 mm	σ : 12 MPa ε : 800%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>1.5 >1.5	γ, RT, air, 10 kGy/h	17	>1.5 >1.5	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Oxidation is only on the surface at high dose rate, and proceeds throughout sheet in O_2 under pressure
	Tube, 5 mm ϕ Cable insulator	σ : 8.5 MPa ε : 590%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>10 >4	γ, RT, air, 10 kGy/h	8				
Ethylene-vinylacetate-rubber (EVM or EVA) formulated, commercial	Sheet, 1 mm	σ : 11 MPa ε : 270%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	1.5 >3	γ, RT, air, 10 kGy/h	17	>3 >3	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
	Film, 0.1 mm	σ : 30 MPa ε : 110%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>2.5 2.5	EB (2 MeV), RT, vac, 2.5 kGy/s or H^+(8 MeV), RT, vac, 0.7 kGy/s	6				
Poly(vinylidene fluoride-*co*-hexafluoropropylene) (Viton®) commercial	Sheet, 1 mm	σ : MPa ε : %	$\sigma_{1/2}$ $\varepsilon_{100\%}$	0.7 0.8	γ, RT, air, 10 kGy/h	17	0.3 0.3	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Poly(tetrafluoroethylene-*co*-propylene) (Aflus®) commercial	Sheet, 1 mm	σ : MPa ε : %	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>3 0.5	γ, RT, air, 10 kGy/h	17	0.1 1.5	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Poly-(*cis*-isoprene) (Natural rubber) formulated, commercial	Sheet, 1 mm	σ : 22 MPa ε : 580%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	1.0 2.5	γ, RT, air, 10 kGy/h	17	0.3 0.7	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Poly(butadiene-*co*-acrylonitrile) (Nitrile/butadiene rubber), formulated, commercial	Sheet, 1 mm	σ : 17 MPa ε : 670%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	2.5 1.5	γ, RT, air, 10 kGy/h	17	2.5 3	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Poly(isobutene-*co*-isoprene) (Butyl rubber) formulated, commercial	Sheet, 1 mm	σ : MPa ε : %	$\sigma_{1/2}$ $\varepsilon_{100\%}$	0.06 0.25	γ, RT, air, 10 kGy/h	17	0.06 0.2	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Silicone rubber (Q) di-methylsilicone, commercial	Sheet, 1 mm	σ : MPa ϵ : %	$\sigma_{1/2}$ $\varepsilon_{100\%}$	0.8 0.5	γ, RT, air, 10 kGy/h	17	1.2 0.8	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Silicone rubber di-methyl silicone/phenyl silicone (30 phr), commercial	Sheet, 1 mm	σ : MPa ε : %	$\sigma_{1/2}$ $\varepsilon_{100\%}$	2.5 >3	γ, RT, air, 10 kGy/h	17	2.3 2.3	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Poly(butadiene-*co*-styrene) (styrene-butadiene rubber (SBR), commercial	Sheet, 1 mm	σ : MPa ε : %	$\sigma_{1/2}$ $\varepsilon_{100\%}$	>3 2	γ, RT, air, 10 kGy/h	17	1.2 0.7	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Polyurethane rubber (AU), commercial	Sheet, 1 mm	σ : 19 MPa ε : 420%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	1.4 3.0	γ, RT, air, 10 kGy/h	17	0.4 3	γ, RT, O_2 (0.5 MPa), 5 kGy/h	17	Same as above
Polyurethane–polyester, commercial	Sheet, 1–3 mm	σ : 35–60 MPa ε : 600%	$\sigma_{1/2}$ $\varepsilon_{100\%}$	0.5–1.0 3–5	Reactor, RT, air, 200 kGy/h	18	0.2 >0.5	X-rays, RT, air, 100 kGy/h	18	Same as above

TABLE 3. AROMATIC POLYMERS

Polymer	Form	Property: Initial value	Property: Criterion	Radiation resistance – Without oxidation (surface oxidation): Dose (MGy)	Irradiation conditions	Refs.	Radiation resistance – With oxidation: Dose (MGy)	Irradiation conditions	Refs.	Remarks
Poly(phenyl-amide),	Film, 0.05 mm	σ : 100 MPa	$\sigma_{1/2}$	15	γ, RT, air, 10 kGy/h	19	6	γ, RT, O_2 (0.5 MPa), 5 kGy/h	19	Oxidation of surface in air irradiation
Nomex®		ε : 9%	$\varepsilon_{1/2}$	10			3			
Poly-arylene-ether-nitrile,	Sheet, 2 mm	σ : 82 MPa	$\sigma_{1/2}$	370	Reactor, RT, air, 750 kGy/h	20				Dose in reactor irradiation: 95% γ-rays and 5% neutron; temperature of material is estimated to be heated up to 100 °C or more
BEK®		ε : 21%	$\varepsilon_{1/2}$	200						
(Idemitsu Kosan)		σ_F : 107 MPa	$\sigma_{F/2}$	>370						
Poly(ether-ether-ketone)	Film, 0.125 mm	σ : 135 MPa	$\sigma_{1/2}$	>300	EB (2 MeV), RT, He, 6.4 kGy/s	21	10	γ, RT, O_2 (0.5 MPa), 5 kGy/h	19	
(PEEK)		ε : 210%	$\varepsilon_{1/2}$	100			>10			
amorphous	Film, 0.050 mm	σ : 120 MPa	$\sigma_{1/2}$	>300	γ, RT, N_2, 16 kGy/h	22	20	γ, RT, air, 16 kGy/h	22	Inner part is not oxidized in air at high dose-rate
		ε : 220%	$\varepsilon_{1/2}$	125			8			
Poly(ether-ether-ketone)	Film, 0.125 mm	σ : 190 MPa	$\sigma_{1/2}$	>300	EB (2 MeV), RT, He, 6.4 kGy/s	21	10	γ, RT, O_2 (0.5 MPa), 5 kGy/h	19	
(PEEK)		ε : 190%	$\varepsilon_{1/2}$	85			8			
crystalline	Film, 0.050 mm	σ : 105 MPa		>300	γ, RT, N_2, 16 kGy/h	22	12	γ, RT, air, 16 kGy/h	22	
		ε : 240%		45			5			
Poly(ether-ether-imide),	Film, 0.05 mm	σ : 140 MPa	$\sigma_{1/2}$	165	γ, RT, N_2, 16 kGy/h	22	12	γ, RT, air, 16 kGy/h	22	
ULTEM®		ε : 160%	$\varepsilon_{1/2}$	15			5			
Poly(imide),	Film, 0.125 mm	σ : 240 MPa	$\sigma_{1/2}$	>300	EB (2 MeV), RT, He, 6.4 kGy/s	21	12	γ, RT, O_2 (0.7 MPa), 5 kGy/h	23	
Kapton®		ε : 90%	$\varepsilon_{1/2}$	140			3	γ, RT, O_2 (0.6 MPa), 5 kGy/h	22	
	Film, 0.05 mm	σ : 240 MPa	$\sigma_{1/2}$	>300	γ, RT, N_2, 16 kGy/h	22	7			
		ε : 90–120%	$\varepsilon_{1/2}$	160			3			
Poly(imide),	Film, 0.125 mm	σ : 260 MPa	$\sigma_{1/2}$	>300	EB (2 MeV), RT, He, 6.4 kGy/s	21				
Upilex-R®		ε : 130–100%	$\varepsilon_{1/2}$	60						
	Film, 0.05 mm	σ : 320 MPa	$\sigma_{1/2}$	>300	γ, RT, N_2, 16 kGy/h	22	>20	γ, RT, O_2 (0.7 MPa), 5 kGy/h	19	
		ε : 100%	$\varepsilon_{1/2}$	180			20			
			$\sigma_{1/2}$				36	γ, RT, air, 16 kGy/h	22	Inner part is not oxidized in air irradiation
			$\varepsilon_{1/2}$				30			
Poly(imide),	Film, 0.125 mm	σ : 390 MPa	$\sigma_{1/2}$	>300	EB (2 MeV), RT, He, 6.4 kGy/s	21				
Upilex-S®		ε : 30–50%	$\varepsilon_{1/2}$	>300						
	Film, 0.05 mm	σ : 380 MPa	$\sigma_{1/2}$	>300	γ, RT, N_2, 16 kGy/h	22	60	γ, RT, air, 16 kGy/h	22	Inner part is not oxidized in air irradiation
		ε : 36%	$\varepsilon_{1/2}$	230			40			
Poly(imide),	Film, 0.100 mm	σ : 120 MPa	$\sigma_{1/2}$	>300	EB (2 MeV), RT, He, 6.4 kGy/s	21				
Thermo-plastics,		ε : 110%	$\varepsilon_{1/2}$	70						
Regulus®	Sheet, 2 mm	σ : 78 MPa	$\sigma_{1/2}$	>120	EB (2 MeV), RT, air, 5 kGy/s	24				
		ε : 60%	$\varepsilon_{1/2}$	90						
Poly(ethersulfone),	Film, 0.10 mm	σ : 85 MPa	$\sigma_{1/2}$	>2	EB (2 MeV), RT, vac, 2.5 kGy/s	6				
(PES)		ε : 190%	$\varepsilon_{1/2}$	1						

TABLE 4. ORGANIC COMPOSITE MATERIALS[a]

		Property		Radiation resistance without oxidation (surface oxidation)			
Polymer	Form	Initial value	Criterion	Dose (MGy)	Irradiation conditions	Refs.	Remarks
GFRP(epoxy resin), G-10CR®	Sheet, 2 mm	σ_F : 600 MPa	$\sigma_{F1/2}$	2	γ, RT, N_2, 10 kGy/h	13	σ_F : 1.2 GPa at 77 K
			$\sigma_{F1/2}$	25	γ, 77 K, N_2, 30 kGy/h		
			$\sigma_{F1/2}$	2	H^+ (30, 45 MeV), RT, vac, 5 kGy/h	14	H^+ was irradiated by beam scanning throughout sheet
GFRP(epoxy resin), G-11CR®	Sheet, 2 mm	σ_F : 630 MPa	$\sigma_{F1/2}$	40	γ, RT, air, 10 kGy/h	25	σ_F : 1.2 GPa at 77 K
			$\sigma_{F1/2}$				In air, oxidation is limited only to the surface layer in air at high dose-rate
GFRP(epoxy resin), (TGDDM/DDM), Vf: 40%	Sheet, 2 mm	σ_F : 0.5–.7 GPa	$\sigma_{F1/2}$	>120	EB (2 MeV), RT, air, 5 kGy/s	26	σ_F : 1.2 GPa at 77 K
		IL : 50 MPa	$IL_{1/2}$	70–90			In air, oxidation is limited only to the surface layer in air at high dose-rate
GFRP(epoxy resin), M50J/2500®	Sheet, 2 mm	σ_F : 0.8 GPa	$\sigma_{F1/2}$	>60	EB (2 MeV), RT, air, 5 kGy/s	27	Same as above
		IL : 60 MPa	$IL_{1/2}$	>60			
GFRP(silicon resin)	Sheet, 4–6 mm	σ_F : 1.5 GPa	$\sigma_{F1/2}$	50	Reactor, RT, air, 1–2 MGy/h	28	In air oxidation is limited only to the surface layer in air at high dose-rate
GFRP(polyester), Vf: 40%	Sheet, 4–6 mm	σ_F : 2–3 GPa	$\sigma_{F1/2}$	10–50	Reactor, RT, air, 1–2 MGy/h	28	Same as above
GFRP(Kerimide)	Sheet, 4–6 mm	σ_F : 5 GPa	$\sigma_{F1/2}$	80	Reactor, RT, air, 1–2 MGy/h	28	Same as above
CFRP(epoxy resin), T300/3601, IM-6/R6376®	Sheet, 2 mm	σ_F : 2.0 GPa	$\sigma_{F1/2}$	>120	EB (2 MeV), RT, air, 5 kGy/s	29	Same as above
CFRP(PEEK), T6142/PEEK	Sheet, 2 mm	σ_F : 700 MPa	$\sigma_{F1/2}$	>120	EB (2 MeV), RT, air, 5 kGy/s	30	Same as above
CFRP(polyimide), T800H/PMR-15®	Sheet, 2 mm	σ_F : 1.2 GPa	$\sigma_{F1/2}$	>60	EB (2 MeV), RT, air, 5 kGy/s	27	Same as above
		IL : 80 MPa	$IL_{1/2}$	>60			
AFRP(epoxy resin), Kevlar 49/DGEBA, (FiBRA)®	Fabric rod, 3–20 mm φ	σ : 1.6 GPa	σ : 90%	5	EB (2 MeV), RT, air, 5 kGy/h	31	Same as above
		σ_F : 150 MPa	$\sigma_{F1/2}$	30			
		IL : 53 MPa	$IL_{1/2}$	60			
AFRP(epoxy resin), Kevlar 49/TGDDM/StO, (New FiBRA)®	Fabric rod, 3–20 mm φ	σ : 1.6 GPa	σ : 90%	>1205	EB (2 MeV), RT, air, 5 kGy/h	31	Same as above
		σ_F : 150 MPa	$\sigma_{F1/2}$	>120			
		IL : 45 MPa	$IL_{1/2}$	>120			

[a] GFRP: Glass fiber reinforced plastic; CFRP: Carbon fiber reinforced plastic; ARFP: Aramid fiber reinforced plastic.

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PVT Relationships and Equations of State of Polymers

Junhan Cho
Polymer Science and Engineering Department, Dankook University, Seoul 140-714, South Korea

Isaac C. Sanchez
Chemical Engineering Department, University of Texas at Austin, Austin, TX 78712, USA

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A. INTRODUCTION

Pressure–volume–temperature (*PVT*) behavior of polymeric materials are important both from the practical and scientific viewpoint. On the practical side, a general knowledge of *PVT* properties are often required for processing polymers. On the scientific side, *PVT* properties are often required as input information on molecular models of polymer solutions. Information on molecular packing is also reflected in *PVT* properties. Numerous equations of state (EOS) have been developed to describe polymers. One can divide them into two categories: phenomenological and molecular.

Equations of state in the first category are for the empirical representation of volumetric data. The majority of equations in this group are the so-called isothermal compressibility equations (1–4). The purely empirical, original Tait equation and its modification by Tammon have been almost exclusively used for organics, including polymers (2,3,5,6).

Sanchez et al. re-examined polymer bulk data in a rigorous classical thermodynamic analysis (7,8). A new principle of temperature–pressure (T–P) superposition of compression response was found. Stated briefly, a dimensionless pressure variable is used to superpose compression data as a function of temperature into a universal curve. The governing parameter of compression is the first pressure coefficient $B_1(= \partial B/\partial P)_{P=0}$, of the bulk modulus B. It is related to the asymmetry of the free energy around its minimum, between dilation and compression. For polymers, B_1 is around 10, and universal. A new isothermal equation of state was formulated through a Padé analysis of the pressure dependence of the bulk modulus (8). Both the Tait and the Padé equations describe almost perfectly the isothermal pressure dependence of volume. Both can be used to smoothen experimental *PVT* data.

Equations of state in the second category arise from molecular models and the development of a proper partition function (9). Most earlier works on this group are based on the lattice or quasi-lattice description of a fluid. Three types of models have played a dominant role in the past several decades. These are the cell, hole, and lattice fluid models.

In Prigogine's cell model (10–12), any monomer is considered to be enclosed by the cell of surrounding molecules. The configurational potential is separated into the mean potential (between the center of the cell and surroundings), and the cell potential (generated by the movement of the central monomer within the cell). The cell potential was further simplified to be athermal. The Simha–Somcynsky theory (13) incorporated the lattice imperfection (hole) into the simple cell model by Prigogine et al. Flory et al. (14) borrowed some ideas from the cell model (separation of internal and external degrees of freedom) but used a Tonk's gas-type description for the repulsive part of the intermolecular potential. Unlike the cell model, the molecules are not localized in space, and a van der Waals mean field energy is employed. Meanwhile, the lattice fluid model (15,16) introduces lattice vacancies as pseudo-solvent molecules into the incompressible Flory–Huggins model. In this model, an incompressible polymer solution is converted into a compressible bulk polymer liquid.

All theoretical equations of state suggest a corresponding states behavior of polymer PVT properties that requires three scaling parameters such as characteristic temperature (T^*), pressure (P^*), and volume (V^*).

The derivation of the partition function can in principle be done in continuum space. This approach yields the so called integral equation theory (9). The self consistent integral equations of the interparticle distribution functions are to be determined. For the simplest hard sphere chains, several analytical equations of state were suggested by Chiew (17–22), Wertheim (23–27) and Chapman (28,29). Chiew's equation of state is based on Baxter's solution of the Percus–Yevick integral equation for the adhesive hard sphere (AHS) system. The AHS has a strong, but extremely short ranged attractive interaction at its surface. This peculiar interaction is treated as chemical bonds. Wertheim and Chapmann considered this adhesive attraction as a perturbation to the hard sphere potential in the framework of graph theory. A different and unique work on this subject was performed by Hall and coworkers (30) without recourse to integral equation theory. A particle insertion method was generalized to hard chains in continuum space.

To apply these continuum models to real systems, an energetic contribution to pressure should be added on the basis of a perturbation theory. In the simplest approximation a mean field (van der Waals) energy is added (28,31). The incorporation of the energy term turns these off-lattice models into 3-parameter (V^*, T^*, P^*) corresponding states models.

There are empirical or semiempirical equations of state that can be included partly in the two categories. The Sanchez–Cho (32), and the Hartmann–Haque (33) equations are considered the most important in applications. These two equations of state also suggest a corresponding states behavior.

This article only deals with liquid data (above T_g or T_m). The mathematical expression of the liquid PVT data with either the Padé or the Tait equations are tabulated here for extracting the 3 characteristic parameters (V^*, T^*, P^*) for given corresponding states equations of state.

The characteristic parameters are essential in the application of a given equation of state to real systems. We present, therefore, a compendium of such parameters for the 3-parameter equations of state described above. These parameters have their own physical meaning according to theories at hand. However, these are treated as adjustable parameters in a general nonlinear regression routine to best represent the smoothed experimental values regenerated from the Sanchez–Cho or the Tait equations. We used the volume data over the whole experimental T–P range. All model parameters are determined from the same data sets.

B. ISOTHERMAL COMPRESSIBILITY EQUATIONS

The recently found principle of temperature–pressure (T–P) superposition (7,8) implies that the $\ln(V/V_0)$, is a function of the scaled pressure, P/B_0, as is compression, given below:

$$\ln(V/V_0) = f\left(\frac{P}{B_0}\right) = -\frac{P}{B_0} + \frac{B_1}{2!}\left(\frac{P}{B_0}\right)^2 - \frac{1}{3!}(2B_1^2 - B_0B_2)\left(\frac{P}{B_0}\right)^3 + \cdots \quad \text{(A1)}$$

where V_0 and B_0 are volume and the bulk modulus at zero pressure, respectively. The right hand side of Eq. (A1) is a rigorous power series expression of $\ln(V/V_0)$. The additional contributing numbers $B_i (i \geq 0)$ are the coefficients in the series expansion of the bulk modulus B in pressure:

$$B = B_0 + B_1P + \frac{1}{2}B_2P^2 + \cdots \quad \text{(A2)}$$

A tractable approximation to the infinite series in Eq. (A1) was suggested by Sanchez et al. They utilized the empirical observation that the bulk modulus B in Eq. (A2) is linear in pressure to high pressures. Expecting that the modulus B diverges as $P^{\omega}(\omega < 1)$, a Padé analysis and the successive integration of B yielded the Padé equation (8) given below:

$$\ln(V/V_0) = \frac{\omega}{(1-\omega)B_1}\left[1 - \left(1 + \frac{B_1}{\omega}\frac{P}{B_0}\right)^{1-\omega}\right] \quad \text{(A3)}$$

where the curvature parameter, ω, is defined as

$$\omega = B_1^2/(B_1^2 - B_0B_2) \quad \text{(A4)}$$

A pair of universal values of B_1 and ω ($B_1 = 10.2$, $\omega = 0.9$) is observed to be excellent in correlating the bulk volumetric data of various polymers.

The historically well known Tait equation falls into the general statement of the T–P superposition in Eq. (A1):

$$\ln(V/V_0) = \ln\left[1 - C\ln\left(1 + \frac{1}{C}\frac{P}{B_0}\right)\right] \qquad \text{(A5)}$$

where C is universally 0.0894 (Cutler's constant). Equation (A5) is the modified version, by Tammon, of the original Tait equation, which was empirically formulated for water. One should notice that the product, CB_0, comprises the so-called Tait parameter in the literature. Equations (A3) and (A5) yield an accurate representation (within experimental error) of isothermal, volume–pressure relationships.

The zero pressure volume, V_0, and modulus, B_0, are additionally required to complete Eqs. (A3) and (A5). The compilation of these parameters are shown in Table 1. In this table, the abbreviation of polymer names are used. The explanation of the abbreviated names and experimental T–P range are listed in Table 2. Several types of fitting functions are used for V_0. Typically used are the polynomial and exponential expressions. For the bulk modulus, the exponential dependence on temperature is almost exclusively used. Some other polymer PVT data that are not used to obtain the characteristic parameters can be found in the literature, including blends and liquid crystalline polymers (38,50,55,59–67).

C. EMPIRICAL OR SEMIEMPIRICAL 3-PARAMETER EQUATIONS OF STATE

Equations in this section are in between the compressibility equations and succeeding model equations of state: (a) they are formulated on the basis of phenomenological arguments; (b) they suggest a corresponding behavior or a universal relationship between dimensionless V, T and P. The Sanchez–Cho and the Hartmann–Haque equations of state are considered the most important equations in this category.

Sanchez–Cho (S–C) Equation of State The Sanchez–Cho equation of state (32) was formulated by combining the empirically observed temperature dependence of the zero pressure volume V_0 and modulus B_0 with the isothermal Padé equation, Eq. (A3):

$$\tilde{V} = \frac{1}{(1-\tilde{T})}\exp\left[\frac{\omega}{(1-\omega)B_1}\left\{1 - \left(1 + \frac{B_1\tilde{P}e^{\tilde{b}\tilde{T}}}{\omega}\right)^{1-\omega}\right\}\right] \qquad \text{(A6)}$$

where the required universal numbers are $B_1 = 10.2$, $\omega = 0.9$, and $\tilde{b} = 9$. The dimensionless variables are defined as:

$$\tilde{V} \equiv V/V^*, \tilde{T} \equiv T/T^*, \tilde{P} \equiv P/P^* \qquad \text{(A7)}$$

The V^* and P^* are related to the van der Waals volume and cohesive energy density (32). The Sanchez-Cho equation provides volume as an explicit function of temperature and pressure, as is shown in Eq. (A6). Equation (A6) is to date the most accurate 3-parameter equation of state. The comparison of Eq. (A6) with the empirical Tait or Padé equation over the whole experimental T–P range gives the average deviation in volume less than 0.0004 cm^3/g. The Sanchez–Cho equation is useful in extrapolating data to high pressures and investigating the negative pressure region. The three characteristic parameters for the Sanchez–Cho equation are given in Table 4.

Hartmann–Haque (H–H) Equation of State The Hartmann–Haque equation of state (33) has the following functional form:

$$\tilde{P}\tilde{V} = \tilde{T}^{3/2} - \ln\tilde{V} \qquad \text{(A8)}$$

where the dimensionless variables $\tilde{P}, \tilde{V}, \tilde{T}$ are defined as in Eq. (A7). The P^* is identified as the isothermal bulk modulus extrapolated to zero temperature and pressure. The zero pressure isobar in Eq. (A8) originates in the Simha–Somcynsky hole model (13) in the next section. The three characteristic parameters for the Hartmann–Haque equation are given in Table 5. The average deviation between Eq. (A8) and regenerated bulk PVT data (data smoothed using the Tait Eq.) is 0.0009 cm^3/g or more than a factor of 2 worse than the S–C equation.

D. LATTICE OR QUASI LATTICE MODELS

The most frequently used model equations of state based on the lattice or quasi lattice phase space are visited in this section. These are various cell models of Prigogine et al., the hole model, and the lattice fluid model. The common feature of the models in this section is the separation of pressure into the thermal (P_{th}) and internal (P_i) pressures:

$$\frac{\tilde{P}}{\tilde{T}} = \frac{\tilde{P}_{th}(\tilde{V})}{\tilde{T}} + \frac{\tilde{P}_i(\tilde{V})}{\tilde{T}} \qquad \text{(A9)}$$

where the dimensionless variables are defined as before Eq. (A7). The physical meaning of the characteristic parameters P^*, V^*, T^* vary among the models. But in general, V^* is related to the van der Waals volume, T^* is proportional to monomer–monomer interaction energy, and P^* is related to the cohesive energy density.

Simple Cell Model of Prigogine et al. The cell model by Prigogine et al. (10–12) is an extension of the cell model for small molecules by Lennard–Jones and Devonshire (68) to polymers. Each monomer in the system is considered to be trapped in the cell created by the surroundings. The general cell potential, generated by the surroundings, is simplified to be athermal. This turns the simple cell model into a free volume theory. The mean potential between the centers of different cells are described by the Lennard–Jones 6–12 potential. The dimensionless equation of state has the following form:

$$\frac{\tilde{P}}{\tilde{T}} = \frac{1}{\tilde{V}^{2/3}(\tilde{V}^{1/3} - 2^{-1/6})} - \frac{2}{\tilde{T}}\left(\frac{1.2045}{\tilde{V}^3} - \frac{1.011}{\tilde{V}^5}\right) \quad \text{(A10)}$$

The factor $2^{-1/6}$ originates in the choice of the hexagonal close packing lattice as a cell geometry. The factors 1.2045 and 1.011 correct the effects of higher coordination shells on the internal energy.

Table 6 gives the three characteristic parameters P^*, V^*, T^* for the Prigogine cell model for the polymers in Tables 1 and 2. The average deviation between Eq. (A10) and regenerated *PVT* data is 0.0008 cm^3/g.

Cell Model by Flory, Orwoll, and Vrij (FOV) The cell model by Flory et al. (14) has the simpler mathematical form than the Prigogine cell model:

$$\frac{\tilde{P}}{\tilde{T}} = \frac{1}{\tilde{V}^{2/3}(\tilde{V}^{1/3} - 1)} - \frac{1}{\tilde{T}\tilde{V}^2} \quad \text{(A11)}$$

The Lennard–Jones energy is replaced with a uniform background (van der Waals) energy.

The characteristic parameters P^*, V^*, T^* for the FOV theory are shown in Table 7. The average deviation between Eq. (A11) and regenerated *PVT* data is 0.0022 cm^3/g. It has often been pointed out that the fitting performance of the FOV theory is less accurate, especially when covering a large pressure range. However, we present the parameters for the whole pressure range. This will provide a guidance when one fits the *PVT* data for smaller pressure ranges of interest.

Hole Model by Simha and Somcynsky (S–S) The simple cell model by Prigogine et al. is modified by Simha and Somcynsky (13) to allow for lattice imperfections (holes). The model can be written as the following equation of state:

$$\frac{\tilde{P}}{\tilde{T}} = \frac{(y\tilde{V})^{1/3}}{\tilde{V}[(y\tilde{V})^{1/3} - 2^{-1/6}y]} - \frac{2y}{\tilde{T}\tilde{V}}\left(\frac{1.2045}{(y\tilde{V})^2} - \frac{1.011}{(y\tilde{V})^4}\right) \quad \text{(A12)}$$

where the factor "y" is the fraction of occupied lattice sites and satisfies

$$(s/3c)[1 + \ln(1-y)/y] = -\frac{[(y\tilde{V}^{1/3}/3 - 2^{-1/6}y]}{[(y\tilde{V})^{1/3} - 2^{-1/6}y]} - \frac{y}{6\tilde{T}}\left(\frac{2.409}{(y\tilde{V})^2} - \frac{3.033}{(y\tilde{V})^4}\right) \quad \text{(A13)}$$

The factor $s/3c$ in Eq. (A13) is called the flexibility ratio, which is usually set to 1. Other factors are the same as those in the Prigogine cell model.

In order to calculate volume at given temperatures and pressures, one should solve Eqs. (A12) and (A13) simultaneously. The calculational complexity is a drawback of this model. Simha and Somcynsky suggested the approximate representation of the S–S equation of state:

$$\tilde{V} = 0.9018\exp(23.835\tilde{T}^{3/2}) [1 - 0.089\ln\{1 + 1.0472\tilde{P}\exp(49.22\tilde{T})\}] \quad \text{(A14)}$$

The characteristic parameters P^*, V^*, T^* for the S–S theory are shown in Table 8. The parameters are obtained by fitting the original S–S equation of state in Eq. (A12) with Eq. (A13), rather than fitting Eq. (A14). The average deviation between Eq. (A12) and regenerated *PVT* data is 0.0007 cm^3/g.

Lattice Fluid Model The Lattice Fluid model developed by Sanchez and Lacombe (15,16) introduces vacancies into the classical incompressible Flory–Huggins model. The lattice vacancy is treated as a pseudo particle in the system. The free energy of an incompressible binary polymer solution is then converted to that of the bulk polymer. The equation of state for a polymer is given below:

$$\frac{\tilde{P}}{\tilde{T}} = -\left[\ln\left(1 - \frac{1}{\tilde{V}}\right) + \frac{1}{\tilde{V}}\right] - \frac{1}{\tilde{T}\tilde{V}^2} \quad \text{(A15)}$$

Table 9 gives the three characteristic parameters P^*, V^*, T^* for the lattice fluid (LF) theory. As was with the FOV model, the LF model does not correlate *PVT* data well over large pressure ranges. The average deviation between Eq. (A15) and regenerated bulk *PVT* data is 0.0033 cm^3/g.

E. CONTINUUM MODELS

The widely used models presented in the last section are derived by considering the partition function of a chain system on a lattice or quasi lattice. The lattice or quasi lattice phase space can be further generalized to be a continuum counterpart. This approach yields, in general, the integral equation theory, which focuses on solving the integral equations of the particle-particle distribution functions (9). The system of hard chains has been treated the most, because it is the simplest and provides the possibility of analytical equation of state in some cases.

One approach of this category is to solve the integral equations using the Percus–Yevick closure for the system of adhesive hard sphere (AHS) mixtures (17–22). An adhesive hard sphere is a hard sphere that has attractive sites at surface. The attractive interaction on these attractive sites is infinitely strong and infinitesimally short ranged. The Percus–Yevick closure yields an analytical solution for such systems. The adhesive attraction, which resembles the chemical bonding, is used to build up chains by employing the proper connectivity constraints.

A different approach of this category is to manipulate the graphs in the cluster expansion of the system of hard spheres with multiple attractive sites (23–29). The attractive interaction is the same as that of the AHS system, and is treated as a perturbation to the reference hard

sphere potential. The steric incompatibility is taken into account by Wertheim to approximate the graph expansion for distribution functions. This approach is called the thermodynamic perturbation theory (TPT) (23–27) or the statistically associating fluid theory (SAFT) (28,29).

A unique approach to the hard chain equation of state has been developed by Hall and coworkers (30). Flory's on-lattice particle insertion analysis is generalized to the off-lattice calculation. This theory is called the generalized Flory (GF) model. The enhanced evaluation of the insertion probability is further manipulated to yield the equation of state.

Since the developed equations of state are for athermal chain systems, an energetic contribution to pressure is required in order for these models to be applicable to real systems. The simplest model adds a van der Waals (vdW) term as a perturbation to the reference pressure (28,31):

$$\frac{\tilde{P}}{\tilde{T}} = \left(\frac{\tilde{P}}{\tilde{T}}\right)_0 - \frac{1}{\tilde{T}\tilde{V}^2} \qquad \text{(A16)}$$

where the term with the subscript 0 implies the athermal reference pressure. The dimensionless variables are defined as usual (Eq. (A7)).

The specific mathematical forms of the reference equation of state are as follows:

$$\left(\frac{\tilde{P}}{\tilde{T}}\right)_0 = \frac{3}{2}\frac{1+1/\tilde{V}}{\tilde{V}^2(1-1/\tilde{V})^3} \quad \text{(AHS)} \qquad \text{(A17)}$$

$$\left(\frac{\tilde{P}}{\tilde{T}}\right)_0 = \frac{3}{\tilde{V}^2(1-1/\tilde{V})^3}\left[1-\frac{(1-1/\tilde{V}^2)}{(2+1/\tilde{V})}\right] \quad \text{(TPT or SAFT)} \qquad \text{(A18)}$$

$$\left(\frac{\tilde{P}}{\tilde{T}}\right)_0 = 1.31659\frac{2-1/\tilde{V}}{\tilde{V}^2(1-1/\tilde{V})^3} \quad \text{(GF)} \qquad \text{(A19)}$$

The three characteristic parameters P^*, V^*, T^* for the AHS + vdW equation of state are shown in Table 10. The average deviation between the AHS + vdW equation and regenerated bulk data is 0.0012 cm^3/g. The parameters for other two equations are relatively close to those for the AHS + vdW equation, and are not tabulated here.

F. TABLES

TABLE 1. ZERO PRESSURE VOLUME ($V_0(T)$) AND BULK MODULUS ($B_0(T)$)[a]

Polymer	$V_0(T)$ (cm^3/g)	$B_0(T)$ (MPa)
PDMS	$1.0079\ \exp(9.121\times10^{-4}t)$	$1000.00\ \exp(-5.701\times10^{-3}t)$
PS	$0.9287\ \exp(5.131\times10^{-4}t)$	$2426.17\ \exp(-3.319\times10^{-3}t)$
PoMS	$0.9396\ \exp(5.306\times10^{-4}t)$	$2929.53\ \exp(-4.114\times10^{-3}t)$
PMMA	$0.8254+2.8383\times10^{-4}t+7.792\times10^{-7}t^2$	$3215.88\ \exp(-4.146\times10^{-3}t)$
PnBMA	$0.9341+5.5254\times10^{-4}t+6.5803\times10^{-7}t^2+1.5691\times10^{-10}t^3$	$2535.79\ \exp(-5.344\times10^{-3}t)$
PCHMA	$0.8793+4.0504\times10^{-4}t+7.774\times10^{-7}t^2-7.7534\times10^{-10}t^3$	$3302.01\ \exp(-5.220\times10^{-3}t)$
PEA	$0.8756\ \exp(7.241\times10^{-4}t)$	$2161.07\ \exp(-4.839\times10^{-3}t)$
PEMA	$0.8614\ \exp(7.468\times10^{-4}t)$	$2918.34\ \exp(-5.356\times10^{-3}t)$
PMA	$0.8365\ \exp(6.795\times10^{-4}t)$	$2637.58\ \exp(-4.493\times10^{-3}t)$
PVAc	$0.8250+5.820\times10^{-4}t+2.940\times10^{-7}t^2$	$2\,291.95\ \exp(-4.346\times10^{-3}t)$
LPE	$0.9172\ \exp(7.806\times10^{-4}t)$	$1976.51\ \exp(-4.661\times10^{-3}t)$
BPE	$0.9399\ \exp(7.341\times10^{-4}t)$	$1980.98\ \exp(-4.699\times10^{-3}t)$
LDPE-A	$1.1484\ \exp(6.950\times10^{-4}t)$	$2157.72\ \exp(-4.701\times10^{-3}t)$
LDPE-B	$1.1524\ \exp(6.700\times10^{-4}t)$	$2199.11\ \exp(-4.601\times10^{-3}t)$
LDPE-C	$1.1516\ \exp(6.730\times10^{-4}t)$	$2088.37\ \exp(-4.391\times10^{-3}t)$
PBD	$1.0970\ \exp(6.600\times10^{-4}t)$	$1987.70\ \exp(-3.593\times10^{-3}t)$
PBD8	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
PBD24	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
PBD40	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
PBD50	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
PBD87	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
i-PB	$1.1417\ \exp(6.751\times10^{-4}t)$	$1873.60\ \exp(-4.533\times10^{-3}t)$
PAr	$0.73381\ \exp(1.626\times10^{-5}T^{3/2})$	$3321.03\ \exp(-3.375\times10^{-3}t)$
PCL	$0.9049\ \exp(6.392\times10^{-4}t)$	$2114.09\ \exp(-3.931\times10^{-3}t)$
PC	$0.73565\ \exp(1.859\times10^{-5}T^{3/2})$	$3467.56\ \exp(-4.078\times10^{-3}t)$
BCPC	$0.6737+3.634\times10^{-4}t+2.370\times10^{-7}t^2$	$4064.88\ \exp(-4.921\times10^{-3}t)$
HFPC	$0.6111+4.898\times10^{-4}t+1.730\times10^{-7}t^2$	$2646.53\ \exp(-5.156\times10^{-3}t)$
TMPC	$0.8497+5.073\times10^{-4}t+3.832\times10^{-7}t^2$	$2588.37\ \exp(-4.242\times10^{-3}t)$
PET	$0.6883+5.90\times10^{-4}t$	$4135.35\ \exp(-4.150\times10^{-3}t)$
PIB	$1.0750\ \exp(5.651\times10^{-4}t)$	$2240.49\ \exp(-4.329\times10^{-3}t)$
PI8	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
PI14	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$
PI41	$0.9352+4.9988\times10^{-4}t^2 1.268\times10^{-7}t^2$	$10915.90\ \exp(-5.344\times10^{-3}t)$

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TABLE 1. *cont'd*

Polymer	$V_0(T)$ (cm^3/g)	$B_0(T)$ (MPa)
PI56	$0.9352+4.9988\times10^{-4}t+1.268\times10^{-7}t^2$	$10915.90\exp(-5.344\times10^{-3}t)$
i-PP	$1.1606\exp(6.700\times10^{-4}t)$	$1667.79\exp(-4.177\times10^{-3}t)$
a-PP	$1.1841-1.091\times10^{-4}t+5.286\times10^{-6}t^2$	$1813.20\exp(-6.604\times10^{-3}t)$
Phenoxy	$0.76644\exp(1.921\times10^{-5}T^{3/2})$	$4025.73\exp(-4.378\times10^{-3}t)$
PSO	$0.7644+3.419\times10^{-4}t+3.126\times10^{-7}t^2$	$4092.84\exp(-3.757\times10^{-3}t)$
PEO	$0.8766\exp(7.087\times10^{-4}t)$	$2323.27\exp(-3.947\times10^{-3}t)$
PVME	$0.9585\exp(6.653\times10^{-4}t)$	$2413.87\exp(-4.588\times10^{-3}t)$
PEEK	$0.7158\exp(6.690\times10^{-4}t)$	$4340.04\exp(-4.124\times10^{-3}t)$
PTFE	$0.3200-9.5862\times10^{-4}t$	$4756.15\exp(-9.380\times10^{-3}t)$
PTHF	$1.0043\exp(6.691\times10^{-4}t)$	$1997.76\exp(-4.233\times10^{-3}t)$
PMP	$1.4075-9.905\times10^{-4}t+3.497\times10^{-6}t^2$	$376.7+2.134t-7.0445\times10^{-3}t^2$
PA6	$0.7597\exp(4.701\times10^{-4}t)$	$4213.65\exp(-4.660\times10^{-3}t)$
PA66	$0.7657\exp(6.600\times10^{-4}t)$	$3539.15\exp(-5.040\times10^{-3}t)$
PECH	$0.7216\exp(5.825\times10^{-4}t)$	$2665.55\exp(-4.171\times10^{-3}t)$
PVC	$0.7196+5.581\times10^{-5}t+1.468\times10^{-6}t^2$	$3290.83\exp(-5.321\times10^{-3}t)$
PPO	$0.78075\exp(2.151\times10^{-5}T^{3/2})$	$2548.10\exp(-4.290\times10^{-3}t)$
E/P50	$1.2291+5.799\times10^{-5}t+1.964\times10^{-6}t^2$	$5447.43\exp(-8.103\times10^{-3}t)$
EVA18	$1.02391\exp(2.173\times10^{-5}T^{3/2})$	$2105.15\exp(-4.537\times10^{-3}t)$
EVA25	$1.00416\exp(2.244\times10^{-5}T^{3/2})$	$2062.64\exp(-4.734\times10^{-3}t)$
EVA28	$1.00832\exp(2.241\times10^{-5}T^{3/2})$	$2052.57\exp(-4.457\times10^{-3}t)$
EVA40	$1.06332\exp(2.288\times10^{-5}T^{3/2})$	$2294.18\exp(-4.989\times10^{-3}t)$
SAN3	$0.9233+3.936\times10^{-4}t+5.685\times10^{-7}t^2$	$2682.33\exp(-4.376\times10^{-3}t)$
SAN6	$0.9211+4.370\times10^{-4}t+5.846\times10^{-7}t^2$	$2538.03\exp(-4.286\times10^{-3}t)$
SAN15	$0.9044+4.207\times10^{-4}t+4.077\times10^{-7}t^2$	$2666.67\exp(-3.943\times10^{-3}t)$
SAN18	$0.9016+4.036\times10^{-4}t+4.206\times10^{-7}t^2$	$2689.04\exp(-3.858\times10^{-3}t)$
SAN4	$0.8871+3.406\times10^{-4}t+4.938\times10^{-7}t^2$	$3236.02\exp(-4.431\times10^{-3}t)$
SAN70	$0.8528+3.616\times10^{-4}t+2.634\times10^{-7}t^2$	$3751.68\exp(-3.923\times10^{-3}t)$
SMMA20	$0.9063+3.570\times10^{-4}t+6.532\times10^{-7}t^2$	$2595.08\exp(-4.143\times10^{-3}t)$
SMMA60	$0.8610+3.350\times10^{-4}t+6.98010^{-7}t^2$	$2919.46\exp(-4.611\times10^{-3}t)$

[a] In the mathematical expression of volume, t and T are in °C and K, respectively. See Table 2 for references.

TABLE 2. ABBREVIATIONS OF POLYMER NAMES AND THE EXPERIMENTAL TEMPERATURE–PRESSURE RANGE FOR POLYMER LIQUIDS[a]

Polymer abbreviation	Monomer or source-based Name	T (°C)	P (MPa)	Refs.
PDMS	Dimethyl siloxane	25–70	0–100	34,35,36
PS	Styrene	115–196	0–200	37
PoMS[b]	*o*-Methyl styrene	139–198	0–180	37
PMMA	Methyl methacrylate	114–159	0–200	38
PBMA[b]	*n*-Butyl methacrylate	34–200	0–200	38
PCHMA[b]	Cyclo hexyl methacrylate	123–198	0–200	38
PEA	Ethyl acrylate	37–210	0–196	34
PEMA[b]	Ethyl methacrylate	113–161	0–196	34
PMA	Methyl acrylate	37–220	0–196	34
PVAC	Vinyl acetate	35–100	0–80	39
LPE[b]	Linear polyethylene (PE)	142–200	0–200	38
BPE[b]	Branched PE	125–198	0–200	38
LDPE-A	Low density PE-A	112–225	0–196	40
LDPE-B	Low density PE-B	112–225	0–196	40
LDPE-C	Low density PE-C	112–225	0–196	40
PBD[b]	Butadiene	4–55	0–283.5	41
PBD8[b]	Butadiene with 8% 1,2 content	25–200	0–200	42
PBD24[b]	Butadiene with 24% 1,2 content	25–200	0–200	42
PBD40[b]	Butadiene with 40% 1,2 content	25–200	0–200	42
PBD50[b]	Butadiene with 50% 1,2 content	25–200	0–200	42
PBD87[b]	Butadiene with 87% 1,2 content	25–200	0–200	42

TABLE 2. *cont'd*

Polymer abbrevation	Monomer or source-based Name	T (°C)	P (MPa)	Refs.
PB	1-Butene	133–246	0–196	43
PAr[b]	Arylate	177–310	0–176.5	44
PCL	Caprolactone	100–148	0–200	34
PC	Carbonate (PC)	151–340	0–176.5	44
BCPC[b]	Bisphenol chloral PC	220–280	0–50	45
HFPC[b]	Hexafluoro bisphenol-A PC	220–280	0–50	45
TMPC[b]	Tetramethyl bisphenol-A PC	210–290	0–50	45
PET	Ethylene terephthalate	274–342	0–196	46
PIB	Isobutylene	53–110	0–00	36,47
PI8	Isoprene with 8% 3,4 content	25–200	0–200	42
PI14	Isoprene with 14% 3,4 content	25–200	0–200	42
PI41	Isoprene with 41% 3,4 content	25–200	0–200	42
PI56	Isoprene with 56% 3,4 content	25–200	0–200	42
i-PP	Isotactic polypropylene	170–297	0–196	43
a-PP	Atactic polypropylene	80–120	0–100	34
Phenoxy[b]	Phenoxy	68–300	0–176.5	44
PSO	Sulfone	202–371	0–196	48
PEO	Ethylene oxide	88–224	0–68.5	49
PVME	Vinyl methyl ether	30–198	0–200	34,50
PEEK	Ether ether ketone	346–398	0–200	51
PTFE	Tetrafluoro ethylene	330–372	0–39	52
PTHF[b]	Tetrahydro furane	62–166	0–78.5	49
PMP	4-Methyl-1-pentene	241–319	0–196	53
PA6	Amide 6	236–296	0–196	54

TABLE 2. *cont'd*

Polymer abbrevation	Monomer or source-name	*T* (°C)	*P* (MPa)	Refs.
PA66	Amide 66	246–298	0–196	54
PECH[b]	Epichlorohydrine	60–140	0–200	34
PVC	Vinyl chloride	100–150	0–200	34
PPO	Phenylene oxide	203–320	0–176.5	55
E/P50	Ethylene/propylene 50%	140–250	0–62.5	56
EVA18	Ethylene/vinyl acetate 18%	112–219	0–176.5	57
EVA25	Ethylene/vinyl acetate 25%	94–233	0–176.5	57
EVA28	Ethylene/vinyl acetate 28%	94–235	0–176.5	57
EVA40	Ethylene/vinyl acetate 40%	75–235	0–176.5	57
SAN3	Styrene/acrylonitrile 2.7%	105–266	0–200	45
SAN6	Styrene/acrylonitrile 5.7%	96–267	0–200	45
SAN15	Styrene/acrylonitrile 15.3%	132–262	0–196	45
SAN18	Styrene/acrylonitrile 18.0%	104–255	0–196	45
SAN40	Styrene/acrylonitrile 40%	100–270	0–196	45
SAN70	Styrene/acrylonitrile 70%	100–271	0–196	58
SMMA20[a]	Styrene/methyl methacrylate 20%	110–270	0–196	58
SMMA60[a]	Styrene/methyl methacrylate 60%	110–270	0–200	58

[a] See Abbreviations Table in Part VIII of this Handbook.
[b] Abbreviation may not be recognized by international organization.

TABLE 3. ***PVT* PROPERTIES OF OTHER POLYMERS**[a]

Polymer	*T* (°C)	*P* (MPa)	Note	Refs.
HDPE	140–203	0–196.0		59
LDPE	121–175	0–196.0		59
HMLPE	137–200	0–200.0		38
i-Poly(1-pentene)	140–172	0.1		60
Poly(vinylidene fluoride)	175–240	0.1		61
Poly(methylene oxide)	155–185	18.3–150.9	Figure only	62
Poly(butylene terephthalate)	215–280	20.7–103.4	Figure only	63
Qiana nylon	270–320	20.7–103.4	Figure only	63
Natural rubber vulcanizated with 10–28% sulfur	10–82	0–1013.0		64
Hevea rubber uncrosslinked crosslinked (6% sulfur) crosslinked (11.5% sulfur)	10–85	0–80.0	Simha–Somcynsky parameters only	65
PS/PPO blends	30–350	0–176.5		55
PS/PVME blends	30–198	0–200.0		50
Main chain LCPs			Figure only up	66
Azomethine ether LCP	20–300	0–200.0	to nematic	67

[a] This table lists polymers not mentioned in the earlier tables.

TABLE 4. CHARACTERISTIC PARAMETERS FOR THE SANCHEZ–CHO EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.8071	1375.1	6212.9
PS	0.8165	2277.2	7867.6
PoMS	0.8368	2380.6	7772.1
PMMA	0.7139	2184.2	9873.0
PBMA	0.7963	1855.9	9025.3
PCHMA	0.7710	2195.1	8515.1
PEA	0.7398	1747.4	9131.8
PEMA	0.7332	1771.2	11257.0
PMA	0.7121	1829.0	10623.9
PVAc	0.6918	1696.9	10399.9
LPE	0.9491	1655.0	9943.5
BPE	0.9723	1751.9	8630.7
LDPE-A	0.9852	1865.4	8214.5
LDPE-B	0.9937	1923.8	7983.8
LDPE-C	0.9869	1880.5	8225.3
PBD	0.9115	1633.8	9443.2
PBD8	0.9308	1798.6	9136.3
PBD24	0.9359	1819.0	8708.0
PBD40	0.9357	1842.9	8352.0
PBD50	0.9408	1892.0	7757.3
PBD87	0.9498	1905.6	7241.8
PB	0.9854	1924.1	6891.1
PAr	0.6839	2243.9	11557.3
PCL	0.7671	1849.0	9530.1
PC	0.6871	2070.3	12106.1
BCPC	0.5971	2249.1	9931.3
HFPC	0.5264	1788.2	10173.1
TMPC	0.7261	1908.0	10573.0
PET	0.6199	2022.2	15278.8
PIB	0.9382	2130.2	7045.3
PI 8	0.9453	1921.0	7669.6
PI 14	0.9366	1911.3	8219.9
PI 41	0.9370	1912.7	8112.3
PI 56	0.9330	1854.5	8600.1
i-PP	1.0116	1991.5	6118.1
a-PP	0.9690	1776.2	6202.8
Phenoxy	0.7242	2103.4	12728.1
PSO	0.6655	2232.2	13286.4
PEO	0.7441	1789.1	10805.4
PVME	0.8187	1861.3	9270.5
PEEK	0.6395	2126.5	14335.5
PTFE	0.3638	1400.7	9757.5
PTHF	0.8561	1843.0	8160.2
PMP	1.0089	1885.0	6452.5
PA6	0.7130	3140.3	5718.4
PA66	0.6887	2195.2	8391.9
PECH	0.6269	2068.9	8899.3
PVC	0.6252	2395.4	7551.2
PPO	0.7181	1810.4	11776.9
E/P50	1.0582	2384.7	6421.0
EVA18	0.9585	1878.9	8107.5
EVA25	0.9338	1848.3	7957.5
EVA28	0.9241	1812.5	8622.1
EVA40	0.8864	1856.1	8441.9
SAN3	0.8030	2185.7	7878.5
SAN6	0.7896	2010.7	8896.8
SAN15	0.7860	2170.4	8602.0
SAN18	0.7854	2208.4	8495.6
SAN40	0.7853	2435.2	7772.6
SAN70	0.7616	2546.6	9177.0
SMMA20	0.7789	2105.6	8531.3
SMMA60	0.7408	2099.5	8858.9

TABLE 5. CHARACTERISTIC PARAMETERS FOR THE HARTMANN–HAQUE EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.8795	1106	1837
PS	0.8754	1603	2956

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TABLE 5. *cont'd*

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PoMS	0.8891	1608	3096
PMMA	0.7582	1467	3819
PBMA	0.8552	1309	3268
PCHMA	0.8249	1517	3038
PEA	0.8038	1284	3076
PEMA	0.7976	1298	3654
PMA	0.7712	1334	3680
PVAc	0.7368	1151	3817
LPE	1.0381	1211	2804
BPE	1.0677	1313	2510
LDPE-A	1.0769	1387	2516
LDPE-B	1.0842	1426	2509
LDPE-C	1.0781	1396	2538
PBD	0.9855	1199	3333
PBD8	1.0065	1301	3109
PBD24	1.0118	1317	2989
PBD40	1.0113	1336	2891
PBD50	1.0157	1370	2742
PBD87	1.0264	1387	2557
PB	1.0818	1452	2066
PAr	0.7408	1614	3709
PCL	0.8418	1411	3013
PC	0.7474	1502	3644
BCPC	0.5356	1520	3641
HFPC	0.5758	1306	2920
TMPC	0.8010	1430	2907
PET	0.6802	1484	4071
PIB	0.9935	1422	2976
PI8	1.0199	1389	2733
PI14	1.0098	1375	2925
PI41	1.0103	1377	2889
PI56	1.0076	1339	2990
i-PP	1.1066	1475	1852
a-PP	1.0292	1197	2383
Phenoxy	0.7784	1481	4357
PSO	0.7246	1623	3972
PEO	0.8005	1254	3504
PVME	0.8836	1342	3245
PEEK	0.7044	1568	3668
PTFE	0.3683	900	3251
PTHF	0.9165	1276	2894
PMP	1.1228	1449	1670
PA6	0.7654	2255	2264
PA66	0.7559	1643	2453
PECH	0.6734	1456	3775
PVC	0.6559	1532	3595
PPO	0.7906	1339	3079
E/P50	1.1112	1516	2247
EVA18	1.0443	1380	2521
EVA25	1.0171	1356	2474
EVA28	1.0077	1333	2646
EVA40	0.9604	1339	2716
SAN3	0.8615	1534	2840
SAN6	0.8545	1448	3010
SAN15	0.8495	1564	2957
SAN18	0.8448	1566	3024
SAN40	0.8326	1630	3138
SAN70	0.8140	1776	3578
SMMA20	0.8453	1539	2812
SMMA60	0.8037	1530	2912

TABLE 6. CHARACTERISTIC PARAMETERS FOR THE SIMPLE CELL MODEL EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.9180	3254	388.0
PS	0.9148	5167	599.0
PoMS	0.9302	5214	622.7
PMMA	0.7941	4783	765.0
PBMA	0.8931	4237	683.0
PCHMA	0.8906	4873	630.1
PEA	0.8394	4167	652.7
PEMA	0.8321	4190	772.8
PMA	0.8054	4318	768.3
PVAc	0.7731	3781	755.9
LPE	1.0978	4124	588.1
BPE	1.1179	4309	535.2
LDPE-A	1.1195	4430	549.8
LDPE-B	1.1267	4537	544.6
LDPE-C	1.1210	4461	552.3
PBD	1.0269	3811	681.5
PBD8	1.0488	4171	655.5
PBD24	1.0539	4212	629.9
PBD40	1.0532	4263	608.3
PBD50	1.0573	4357	575.4
PBD87	1.0679	4399	537.9
i-PB	1.1216	4600	460.6
PAr	0.7745	5257	776.0
PCL	0.8758	4478	632.0
PC	0.7835	4969	774.7
BCPC	0.6676	5046	762.1
HFPC	0.6116	4525	620.7
TMPC	0.8473	4875	609.4
PET	0.7193	5070	868.8
PIB	1.0393	4593	580.0
PI8	1.0617	4415	572.1
PI14	1.0516	4382	611.4
PI41	1.0521	4386	604.1
PI56	1.0495	4277	628.0
i-PP	1.1470	4712	425.8
a-PP	1.0758	3884	493.4
Phenoxy	0.8145	4837	903.2
PSO	0.7593	5358	844.5
PEO	0.8447	4226	696.8
PVME	0.9210	4298	677.0
PEEK	0.7465	5418	797.0
PTFE	0.4829	4488	323.9
PTHF	0.9609	4185	576.8
PMP	1.1652	4721	400.0
PA6	0.7956	7048	465.4
PA66	0.7841	5231	550.9
PECH	0.6997	4662	757.7
PVC	0.6855	4938	719.2
PPO	0.8355	4585	668.5
E/P50	1.1653	4982	453.5
EVA18	1.0874	4434	544.5
EVA25	1.0592	4368	537.6
EVA28	1.0509	4319	572.9
EVA4	1.0012	4326	584.9
SAN3	0.8995	4969	603.2
SAN6	0.8950	4761	640.8
SAN15	0.8875	5069	618.8
SAN18	0.8826	5070	630.4
SAN40	0.8696	5273	653.6
SAN70	0.8493	5676	723.1
SMMA20	0.8795	4908	600.7
SMMA60	0.8362	4884	622.9

TABLE 7. CHARACTERISTIC PARAMETERS FOR THE FLORY, ORWOLL, AND VRIJ EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.8264	5184	326.9
PS	0.8277	8118	405.2
PoMS	0.8457	8463	441.5
PMMA	0.7204	7717	568.8
PBMA	0.8087	6794	509.6
PCHMA	0.7772	7700	461.4
PEA	0.7563	6599	511.5
PEMA	0.7503	6703	641.3
PMA	0.7277	6894	599.2
PVAc	0.7090	6449	599.7
LPE	0.9818	6548	537.6
BPE	0.9992	6710	453.1
LDPE-A	0.9963	6774	469.5
LDPE-B	1.0025	6896	456.4
LDPE-C	0.9974	6809	471.0
PBD	0.9173	5521	454.4
PBD8	0.9404	6418	505.5
PBD24	0.9438	6432	480.9
PBD40	0.9419	6453	460.7
PBD50	0.9443	6514	425.0
PBD87	0.9511	6474	395.9
PB	0.9867	6838	403.9
PAr	0.6991	8470	651.2
PCL	0.7830	6754	486.2
PC	0.7070	8039	671.0
BCPC	0.6065	8287	611.0
HFPC	0.5521	7360	542.7
TMPC	0.7720	8156	514.2
PET	0.6452	8215	851.0
PIB	0.9455	7396	396.0
PI8	0.9480	6573	419.3
PI14	0.9415	6622	450.1
PI41	0.9415	6613	444.0
PI56	0.9400	6514	473.7
i-PP	1.0072	7011	397.4
a-PP	0.9755	6351	405.9
Phenoxy	0.7389	7869	713.2
PSO	0.6847	8664	738.2
PEO	0.7719	7147	601.6
PVME	0.8266	6607	512.8
PEEK	0.6642	8667	832.9
PTFE	0.4215	7088	404.9
PTHF	0.8774	7006	459.8
PMP	1.0203	7079	395.0
PA6	0.6896	9182	411.0
PA66	0.6885	7865	558.3
PECH	0.6321	7192	524.6
PVC	0.6210	7752	501.8
PPO	0.7472	7360	650.9
E/P50	1.0650	8377	360.2
EVA18	0.9724	6870	453.6
EVA25	0.9475	6770	444.8
EVA28	0.9416	6759	480.5
EVA40	0.8985	6766	475.5
SAN3	0.8129	7897	453.3
SAN6	0.8087	7622	503.1
SAN15	0.8020	8053	465.0
SAN18	0.7974	7999	461.0
SAN40	0.7869	8369	474.7
SAN70	0.7648	8701	500.9
SMMA20	0.7865	7521	475.8
SMMA60	0.7494	7558	491.3

TABLE 8. CHARACTERISTIC PARAMETERS FOR THE SIMHA-SOMCYNSKY EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.9592	7864	501.4
PS	0.9634	12840	715.9
PoMS	0.9814	13080	746.1
PMMA	0.8369	11940	926.4
PBMA	0.9358	10310	856.0
PCHMA	0.9047	12030	772.2
PEA	0.8773	11040	830.8
PEMA	0.8710	10190	987.0
PMA	0.8431	10460	969.1
PVAc	0.8126	9348	947.4
LPE	1.1406	9793	786.4
BPE	1.1674	10390	692.3
LDPE-A	1.1664	10580	716.2
LDPE-B	1.1734	10860	703.6
LDPE-C	1.1679	10660	718.8
PBD	1.0766	9225	815.0
PBD8	1.0960	10029	827.0
PBD24	1.1013	10122	792.3
PBD40	1.1003	10229	763.7
PBD50	1.1049	10450	716.8
PBD87	1.1149	10502	671.2
PB	1.1666	10920	603.7
PAr	0.8091	12390	1003.0
PCL	0.9173	10870	784.5
PC	0.8156	11830	1020.0
BCPC	0.6975	12190	987.8
HFPC	0.6317	10550	851.0
TMPC	0.8794	11540	819.2
PET	0.7426	11800	1194.0
PIB	1.0940	11360	686.6
PI8	1.1094	10578	711.5
PI14	1.0997	10541	760.1
PI41	1.1000	10547	750.7
PI56	1.0970	10284	786.9
i-PP	1.1884	11060	573.0
a-PP	1.1274	9494	627.7
Phenoxy	0.8529	11730	1139.0
PSO	0.7903	12770	1116.0
PEO	0.8812	10150	914.5
PVME	0.9632	10360	848.1
PEEK	0.7705	12580	1086.0
PTFE	0.4339	8126	658.1
PTHF	1.0087	10280	725.5
PMP	1.2050	11030	545.3
PA6	0.8327	16870	549.9
PA66	0.8195	12640	706.9
PECH	0.7343	11370	913.1
PVC	0.7320	12350	849.5
PPO	0.8602	10580	929.4
E/P50	1.2227	12220	572.0
EVA18	1.1341	10630	705.6
EVA25	1.1040	10440	697.8
EVA28	1.0949	10310	747.2
EVA40	1.0446	10360	753.9
SAN3	0.9416	12070	764.2
SAN6	0.9352	11490	823.8
SAN15	0.9299	12360	779.2
SAN18	0.9255	12380	785.3
SAN40	0.9124	12900	811.8
SAN70	0.8906	13790	874.7
SMMA20	0.9186	11800	764.0
SMMA60	0.8739	11780	791.1

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TABLE 9. CHARACTERISTIC PARAMETERS FOR THE SANCHEZ–LACOMBE EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.9022	466	288.5
PS	0.8929	688	371.5
PoMS	0.9142	725	405.7
PMMA	0.7805	668	516.9
PBMA	0.8789	596	442.1
PCHMA	0.8444	675	410.0
PEA	0.8216	581	450.6
PEMA	0.8189	602	567.5
PMA	0.7908	606	521.9
PVAc	0.7768	582	501.3
LPE	1.0734	596	479.8
BPE	1.0878	601	411.3
LDPE-A	1.0827	603	429.9
LDPE-B	1.0878	610	421.4
LDPE-C	1.0835	606	431.8
PBD	0.9851	462	440.2
PBD8	1.0167	554	456.0
PBD24	1.0194	553	437.1
PBD40	1.0161	552	422.5
PBD50	1.0169	553	394.8
PBD87	1.0224	547	373.6
PB	1.0739	609	377.5
PAr	0.7632	760	568.7
PCL	0.8477	589	453.4
PC	0.7737	728	574.4
BCPC	0.6651	753	513.6
HFPC	0.6077	680	455.4
TMPC	0.8493	752	432.4
PET	0.7102	761	726.1
PIB	1.0213	623	350.4
PI8	1.0196	555	392.3
PI14	1.0141	562	415.6
PI41	1.0139	561	410.7
PI56	1.0141	557	433.1
i-PP	1.0958	633	366.4
a-PP	1.0658	570	354.2
Phenoxy	0.8032	690	607.4
PSO	0.7496	787	635.3
PEO	0.8492	656	492.2
PVME	0.8930	567	463.0
PEEK	0.7310	804	713.7
PTFE	0.4515	630	357.2
PTHF	0.9587	626	385.6
PMP	1.1153	650	355.7
PA6	0.7406	785	422.5
PA66	0.7502	713	513.7
PECH	0.6803	606	482.4
PVC	0.6686	656	469.0
PPO	0.8220	681	554.1
E/P50	1.1652	753	301.4
EVA18	1.0580	612	407.7
EVA25	1.0307	602	397.0
EVA28	1.0259	604	424.1
EVA40	0.9772	600	419.8
SAN3	0.8860	701	391.6
SAN6	0.8841	686	429.7
SAN15	0.8733	712	404.1
SAN18	0.8672	703	400.1
SAN40	0.8556	734	412.1
SAN70	0.8222	726	466.4
SMMA20	0.8520	658	434.7
SMMA60	0.8125	662	446.0

TABLE 10. CHARACTERISTIC PARAMETERS FOR THE AHS + vdW EQUATION OF STATE

Polymer	V^* (cm^3/g)	T^* (K)	P^* (MPa)
PDMS	0.5629	7331	707.2
PS	0.6080	16542	731.7
PoMS	0.6222	17194	731.6
PMMA	0.5264	15173	986.3
PBMA	0.5820	12106	868.5
PCHMA	0.5719	15573	793.6
PEA	0.5294	10289	933.1
PEMA	0.5143	9659	1252.0
PMA	0.5111	10989	1105.2
PVAc	0.4891	9713	1246.9
LPE	0.6471	7955	1136.2
BPE	0.6801	9336	924.9
LDPE-A	0.6995	10596	845.6
LDPE-B	0.7117	11372	802.4
LDPE-C	0.7017	10761	846.0
PBD	0.6793	11913	867.5
PBD8	0.6764	11417	900.7
PBD24	0.6832	11794	843.1
PBD40	0.6865	12248	792.9
PBD50	0.6962	13112	710.5
PBD87	0.7069	13574	642.2
i-PB	0.7029	11078	680.3
PAr	0.4779	12060	1319.1
PCL	0.5249	8788	943.2
PC	0.4691	10088	1439.2
BCPC	0.4016	10381	1248.0
HFPC	0.3627	8598	946.0
TMPC	0.4638	7446	1496.6
PET	0.4041	8344	1984.3
PIB	0.7079	16891	687.8
PI 8	0.7030	13661	689.7
PI 14	0.6936	13326	756.7
PI 41	0.6943	13369	744.3
PI 56	0.6850	12371	817.0
i-P	0.6987	10082	691.1
a-PP	0.6935	10648	672.6
Phenoxy	0.515	212153	1377.3
PSO	0.4541	10866	1582.8
PEO	0.4974	8139	1439.8
PVME	0.5991	12258	900.3
PEEK	0.4164	8666	1801.4
PTFE	0.1807	3156	2185.6
PTHF	0.6026	10303	965.0
PMP	0.6857	8842	718.6
PA6	0.5321	23165	533.4
PA66	0.4818	11705	896.1
PECH	0.4707	15781	820.9
PVC	0.4747	19538	673.1
PPO	0.4664	7365	1538.8
E/P50	0.7592	14530	718.7
EVA18	0.6792	10625	852.7
EVA25	0.6669	10405	831.9
EVA28	0.6589	9791	934.8
EVA40	0.7130	10665	877.9
SAN3	0.5894	14537	737.9
SAN6	0.5662	11971	902.0
SAN15	0.5685	13512	858.1
SAN18	0.5763	14760	816.5
SAN40	0.5911	18577	678.8
SAN70	0.5745	19851	827.2
SMMA20	0.5622	12948	850.6
SMMA60	0.5344	12855	883.0

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SECTION VII

SOLUTION PROPERTIES

Viscosity – Molecular Weight Relationships and Unperturbed Dimensions of Linear Chain Molecules

M. Kurata, Y. Tsunashima
Institute for Chemical Research, Kyoto University, Uji, Kyoto, Japan

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A. INTRODUCTION

1. The Viscosity – Molecular Weight Relationship

The limiting viscosity number $[\eta]$ of a solution – which has long been called the intrinsic viscosity – is defined as

$$[\eta] = \lim_{c \to 0} \frac{\eta - \eta_0}{\eta_0 c} \qquad \text{(A1)}$$

in terms of the solvent viscosity, η_0, the solution viscosity, η, and the solute concentration, c. The concentration, c, is expressed in grams of solute per milliliter of solution or, more frequently, in grams of solute per 100 milliliters of solution, the limiting viscosity number being given in the reciprocal of these units, *i.e.*, in milliliters per gram or in deciliters per gram. Here, following the IUPAC 1952-recommendations (1), we adopt the former unit. The quantity $[\eta]$ of a polymer solution is a measure of the capacity of a polymer molecule to enhance the viscosity, which depends on the size and the shape of the polymer molecule. Within a given series of polymer homologs, $[\eta]$ increases with the molecular weight M; hence it is a measure of M.

Section C gives the limiting viscosity number – molecular weight relationships for polymers, in various solvents and at various temperatures. The table contains the constants of the equation

$$[\eta] = KM^a \qquad \text{(A2)}$$

which is known as the Mark–Houwink–Sakurada equation. It is now well established that for linear, flexible polymers, under special conditions of temperature or solvent, (usually known as the Flory "theta" temperature or solvent, (2)), the above equation becomes

$$[\eta]_\theta = K_\theta M^{0.50} \qquad \text{(A3)}$$

In the tables, the θ sign in parenthesis (next to the temperature data) indicates that the viscosity constants were obtained under the theta condition. Since Eq. (A3) is approximately valid over the whole molecular weight range, K_θ and $a = 0.50$ may be used without modification, outside of the molecular weight range in which they were determined. However, it must be noted that $[\eta]$ is rather sensitive to temperature in the vicinity of θ, especially when M is higher than 5×10^5.

In ordinary good solvents, the constants K and a obtained are valid only within a rather limited range of M (3,4). It is therefore, quite probable that the tabulated relationships are in error outside the indicated range of M (see eighth column in the table). As for the effect of temperature, however, both K and a mostly become insensitive to the temperature when a exceeds about 0.70, and they may be used in a 10-degree range on either side of temperature at which the constants were determined.

The method of determination of the molecular weight and the number of fractionated samples (Fr.) or whole polymer samples (WP) used to determine the $[\eta]$–M relationship are also given in the ninth and the sixth or seventh columns, respectively. The abbreviations used are as follows:

(A) Methods Yielding the Number-Average Molecular Weight (M_n)

CR	cryoscopy
EG	end-group titration
VOS	vapor pressure osmometry
EB	ebullioscopy
OS	osmotic pressure

(B) Methods Yielding the Weight-Average Molecular Weight (M_w)

LS	light scattering
LLS	low-angle laser light scattering
SE	sedimentation equilibrium
SEC, GPC	size exclusion chromatography gel permeation chromatography
SA	approach to the sedimentation equilibrium (Archibald's method)

(C) Empirical or Semi-Empirical Methods

EM	electron microscopy
GPC	gel permeation chromatography
LV	limiting viscosity number – molecular weight relationship
PR	analysis of polymerization rate (yielding M_n)
DV	diffusion and viscosity
MV	melt viscosity – molecular weight relationship
SD	sedimentation and diffusion
SV	sedimentation and viscosity

Thus, for example, the constants tabulated are for the $[\eta]$–M relationships, expressed in terms of M_n or M_w, if the method is specified as OS or LS, respectively; *i.e.*,

$$[\eta] = K_n M_n^a \qquad \text{(A4)}$$

or

$$[\eta] = K_w M_w^a \qquad \text{(A5)}$$

The values of K_n and K_w, especially the former, are greatly influenced by the molecular weight distribution (MWD) of the polymer samples, and caution must be taken in using these relationships.

To illustrate this effect, let us assume that

(i) Equation (A2) is applicable to the molecule i with molecular weight M_i over the whole range of M; *i.e.*,

$$[\eta]_i = KM_i^a \qquad \text{(A6)}$$

(ii) The weight fraction w_i of the molecules i in a given sample can be represented by a continuous exponential function,

$$w_i(M_i) = [y^{h+1}/\Gamma(h+1)]\, M_i^h \exp(-yM_i) \qquad \text{(A7)}$$

$$y = h/M_n = (h+1)/M_w \qquad \text{(A8)}$$

or by the log-normal function,

$$w_i(M_i) = AM_i \exp[-p^2(\ln M_i/M_0)^2] \qquad \text{(A9)}$$

where h, A, p, and M_0 are constants, and Γ represents the gamma function.
Then, since $[\eta] = \sum_i w_i[\eta]_i$, we obtain

$$K_n = K\Gamma(a+h+1)/h^a\Gamma(h+1) \qquad \text{(A10)}$$

$$K_w = K\Gamma(a+h+1)/(h+1)^a\Gamma(h+1) \qquad \text{(A11)}$$

for the exponential MWD, and

$$K_n = K(M_w/M_n)^{0.5a(a+1)} \qquad \text{(A12)}$$

$$K_w = K(M_w/M_n)^{0.5a(a-1)} \qquad \text{(A13)}$$

for the log-normal MWD (5). The values of K_n/K and K_w/K calculated by these equations are shown in Section B. This table may be used for estimating an error due to MWD in the determination of M.

As an example, let us assume that a given polymer sample has the exponential MWD with $M_w/M_n = 2.0$, while an available $[\eta]-M_n$ equation has been obtained for samples with a narrow MWD, *e.g.*, $M_w/M_n = 1.1$. Further, let a be 0.70. Then, to find the correct value of M_n of the given sample from $[\eta]$, we must use Eq. (A4) with $K_n = 1.54K$, instead of the available equation with $K_n = 1.06K$. Use of the latter would lead to an overestimate M_n' which is related to the correct M_n by

$$[\eta] = 1.54KM_n^{0.70} = 1.06KM_n'^{0.70} \qquad \text{(A14)}$$

The error amounts to about 70%, *i.e.*, $M_n' = 1.7M_n$. Thus, application of the viscosity equation written in M_n is to be restricted to within a narrow class of samples, unless an appropriate correction is made. On the other hand, if an $[\eta]-M_w$ equation is available for the same pair of working and reference samples as above, we have

$$[\eta] = 0.951KM_w^{0.70} = 0.991KM_w'^{0.70} \qquad \text{(A15)}$$

instead of Eq. (A14). Hence, the error M_w amounts to only 6% ($M_w' = 0.94M_w$), which will be negligible for more practical purposes.

Based on the above consideration, we classify the heterogeneity of polymers into four classes, A–D, as shown in the last column of the table in Section B, and indicate it in the tenth column of the tables in Section C, as a measure of the heterogeneity of the reference samples used.

It is desirable that readers select their own relationship by inspecting these data on heterogeneity as well as those on the number of samples and the molecular weight range. Generally speaking, a "good" $[\eta]-M$ relationship is one that has been obtained on the basis of M_w for at least four samples of classes A and B (exceptionally C) or on the basis of M_n for those of class A (exceptionally B), whose molecular weights range over at least one half orders of magnitude.

In the "Remarks" column of Section C, we have occasionally indicated by the letter R, a "recommended" relationship for the convenience of readers. In the range of low molecular weight (mostly less than 10^4), the constant a becomes 0.50 irrespective of the solvent. This type of relationship cannot be used, even approximately, at higher molecular weights. This case is noted by the letter L. High conversion polymers are also marked by the letter H, where the $[\eta]-M$ relationships are less reproducible due to chain branching than are ordinary ones. The abbreviations used are as follows:

A	Narrow MWD polymers, or well-fractionated polymers, $M_w/M_n \leq 1.25$
B	Ordinary fractionated polymers, $1.30 \leq M_w/M_n \leq 1.75$
C	Poorly fractionated polymers or most probable MWD polymers, $1.8 \leq M_w/M_n \leq 2.4$
D	Wide MWD polymers, $M_w/M_n \geq 2.5$
H	High conversion polymers, including branches
L	Limited to low-molecular-weight polymers
R	Recommended relationship

In Section C, polymers are arranged according to their structure in subgroups. Within each subgroup, the polymers are, in principle, given in alphabetical order. Within each polymer, the solvents are also arranged in alphabetical order, followed by the mixed solvents.

Chain configurational data are occasionally given in the first column. The data given in parentheses refer to only one set of viscosity constants listed in the same row, while the data given without parentheses refer to a series of sets listed in the same and succeeding rows. Thus, for example, the data "N content, 13.9 wt.%" are effective only for the sixth row of cellulose trinitrate, and the data "95%-*cis*, 1%-*trans*, 4%-1,2" are effective for the fourth to eighth rows of polybutadiene.

The tables in Section C are essentially based on the table published by Kurata and Stockmeyer (3). Data were also taken from tables published by Peterlin (7), Meyerhoff (8), Elias (9), and Krause (10), the last one including a number of unpublished data on acrylic and methacrylic polymers. We are also grateful to these authors. Thanks are also due to J. Brandrup and K. Kamide for their help with this compilation.

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2. Unperturbed Dimensions of Linear Chain Molecules

The mean-square end-to-end distance $\langle r^2 \rangle$ of a linear chain molecule in solution is usually expressed in terms of two basic quantities, the unperturbed mean-square end-to-end distance $\langle r^2 \rangle_0$ and the expansion factor α; *i.e.*,

$$\langle r^2 \rangle = \langle r^2 \rangle_0 \alpha^2 \qquad \text{(A16)}$$

The latter quantity α represents the effect of "long-range interactions" which can be described as an osmotic swelling of the chain by the solvent–polymer interactions, while the unperturbed dimension $\langle r^2 \rangle_0$ represents the effect of "short-range interactions" such as bond angle restrictions and steric hindrances to internal rotation. The steric hindrances are also influenced by the torques exerted on the chain by solvent molecules, but the effect is rather small in many cases (11).

For sufficiently long chain, $\langle r^2 \rangle_0$ becomes proportional to $\sum_i n_i l_i^2$ where n_i is the number of the ith-kind bond of length l_i. The quantity C_∞, defined by

$$C_\infty = \lim_{n \to \infty} \langle r^2 \rangle_0 \Big/ \sum_i n_i l_i^2 \qquad \text{(A17)}$$

is often called the characteristic ratio and it serves as a measure of the effect of short-range interactions.

The freely rotating state is a hypothetical state of the chain in which the bond angle restrictions are retained, but the steric hindrances to internal rotation are released. The mean-square end-to-end distance of the freely rotating chain $\langle r^2 \rangle_{0f}$ can be readily calculated from the given basic structure of the chain. For instance, if the chain consists of only one kind of bond of length l, we obtain

$$\langle r^2 \rangle_{0f} = nl^2[(1 + \cos\theta)/(1 - \cos\theta)] \qquad \text{(A18)}$$

where n is the number of bonds and θ is the supplement of the valence bond angle. For vinyl polymer chains, $l = 0.154$ [nm], $\cos\theta = 1/3$, and $n = M/m = 2M/M_u$; and hence

$$(\langle r^2 \rangle_{0f}/M)^{1/2} = 0.308/M_u^{1/2} = 0.218/m^{1/2}\,[\text{nm}] \qquad \text{(A19)}$$

where M_u is the molecular weight of the repeating unit and m is the average molecular weight per skeletal link. Similar expressions for r_{0f} $(= \langle r^2 \rangle_{0f}^{1/2})$ can be also obtained for more complicated chains. The results are summarized in Section D.

The ratio of $\langle r^2 \rangle_0$ to $\langle r^2 \rangle_{0f}$, then, represents the effect of steric hindrance on the average chain dimensions:

$$\sigma = r_0/r_{0f} = (\langle r^2 \rangle_0 / \langle r^2 \rangle_{0f})^{1/2} \qquad \text{(A20)}$$

The quantity σ is independent of n. Section E gives a list of the unperturbed dimensions of linear chain molecules which were obtained under various conditions of solvent and temperature. The values of $r_0/M^{1/2}$, $r_{0f}/M^{1/2}$, σ and C_∞ are given, together with the experimental values of $S_{0z}/M_w^{1/2}$, a_p, or K_0 from which r_0 was computed. S_{0z} which is the abbreviation of $\langle S^2 \rangle_{0z}^{1/2}$ is the z-average value of the unperturbed radius of gyration, a_p is the persistence length, and K_0 is the viscosity constant corresponding to K_θ in Eq. (A3). The methods used to determine these quantities are also indicated in the tenth column of the tables by using the following abbreviations:

(A) Light scattering

- LT Zimm's plot in a theta solvent yielding $S_{0z}/M_w^{1/2}$. After a heterogeneity correction is made, the tabulated value of $r_0/M^{1/2}$ $(= 6^{1/2} S_{0w}/M_w^{1/2})$ is obtained.
- LD dissymmetry method in a theta solvent. Less reliable for heterogeneous samples than the former method.
- LG Zimm's plot in good solvents yielding $S_z/M_w^{1/2}$. After corrections for the excluded volume effect and heterogeneity are made, the tabulated value of $r_0/M^{1/2}$ is obtained (3,12).

(B) X-ray small-angle scattering

- XS the persistence length a_p is obtained irrespective of the solvent nature. The tabulated values of $r_0/M^{1/2}$ are the asymptotic values for infinitely high molecular weight (13,14).

(C) Limiting viscosity number

- VT viscosity – molecular weight relationship in a theta solvent. Equation (A3) $r_0/M^{1/2}$ is calculated by the Flory and Fox relation, $K_0 = \Phi_0 (r_0/M^{1/2})^3$. The following values of Φ_0 were used:
  - 2.7×10^{23} for well-fractionated polymers (class A in Section C)
  - 2.5×10^{23} for ordinary fractionated polymers (class B)
  - 2.1×10^{23} for poorly fractionated or unfractionated polymers (class C or D)
- VG viscosity – molecular weight relationship in good solvents. K_0 was estimated by using the Kurata–Stockmeyer–Fixman plot (3,4) or other analogous plots (12).
- VWC viscosity analyzed by the wormlike cylinder model.
- VA viscosity in good solvents. The correction of excluded volume effect is made by using the Flory–Krigbaum–Orofino theory of the second virial coefficient A_2 or other analogous theories (12).

(D) Method yielding the temperature dependence of r_0.
- ST stress – temperature coefficient of undiluted or swollen samples.
- VTe viscosity – temperature coefficient of the intrinsic viscosity

The polymers are arranged in Section E in the same order as in Section C. For each polymer, smoothed values of $r_0/M^{1/2}$, σ, and C_∞, which were mostly obtained by VT or VG, are given in the first line, followed by some typical values obtained by more direct methods such as LT or XS. The listed values of $r_0/M^{1/2}$ sometimes scatter appreciably, reflecting the difficulty involved, both experimental and theoretical, in the determination of this quantity. Especially in the case of cellulose chains, the right magnitude of r_0 is yet in controversy (542, 549,3,691,696,688,678,686,12). In recent papers, emphasis has often been put on the effect of temperature or solvent on the unperturbed dimensions. These data are put together at the end of the tabulation for each polymer. Section E is also based on the tables published by Kurata and Stockmeyer (3).

B. EFFECT OF MOLECULAR WEIGHT DISTRIBUTION ON THE VISCOSITY CONSTANT K

	$a=0.5$		$a=0.6$		$a=0.7$		$a=0.8$		$a=0.9$		$a=1.0$		
M_w/M_n	K_n/K	K_w/K	K_n/K	K_w/K	K_n/K	K_w/K	K_n/K	K_w/K	K_n/K	K_w/K	K_n/K	K_w/K	Class
MOLECULAR WEIGHT DISTRIBUTION: EXPONENTIAL TYPE (Eq. (A7))													
30	4.87	0.890	6.91	0.897	9.85	0.911	14.18	0.933	20.56	0.963	30	1	D
15	3.46	0.893	4.57	0.900	6.08	0.914	8.16	0.935	11.02	0.964	15	1	D
10	2.83	0.896	3.59	0.903	4.59	0.917	5.91	0.937	7.67	0.965	10	1	D
5	2.03	0.907	2.40	0.913	2.85	0.925	3.42	0.943	4.12	0.968	5	1	D
3	1.60	0.921	1.79	0.926	2.02	0.936	2.29	0.952	2.62	0.973	3	1	D
2	1.33	0.940	1.43	0.943	1.54	0.951	1.68	0.963	1.83	0.979	2	1	C
1.75	1.25	0.948	1.33	0.951	1.42	0.958	1.51	0.968	1.63	0.982	1.75	1	B
1.50	1.18	0.959	1.23	0.961	1.28	0.967	1.35	0.975	1.42	0.986	1.50	1	B
1.25	1.09	0.975	1.12	0.977	1.15	0.980	1.18	0.985	1.21	0.991	1.25	1	A
1.10	1.04	0.989	1.05	0.989	1.06	0.991	1.07	0.993	1.09	0.996	1.10	1	A
MOLECULAR WEIGHT DISTRIBUTION: NORMAL TYPE (Eq. (A9))													
30	3.58	0.654	5.12	0.665	7.57	0.700	11.58	0.762	18.32	0.858	30	1	D
15	2.76	0.713	3.67	0.723	5.01	0.753	7.03	0.805	10.13	0.885	15	1	D
10	2.37	0.750	3.02	0.759	3.94	0.785	5.25	0.832	7.16	0.902	10	1	D
5	1.83	0.818	2.17	0.824	2.61	0.845	3.19	0.879	3.96	0.930	5	1	D
3	1.51	0.872	1.69	0.877	1.92	0.891	2.21	0.916	2.56	0.952	3	1	D
2	1.30	0.917	1.39	0.920	1.51	0.930	1.65	0.946	1.81	0.969	2	1	C
1.75	1.23	0.932	1.31	0.935	1.40	0.943	1.50	0.956	1.61	0.975	1.75	1	B
1.50	1.16	0.951	1.21	0.953	1.27	0.958	1.34	0.968	1.41	0.982	1.50	1	B
1.25	1.09	0.973	1.11	0.974	1.14	0.977	1.17	0.982	1.21	0.990	1.25	1	A
1.10	1.04	0.988	1.05	0.989	1.06	0.990	1.07	0.992	1.08	0.996	1.10	1	A

C. TABLES OF VISCOSITY – MOLECULAR WEIGHT RELATIONSHIPS, $[\eta] = KM^a$

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	No. of samples W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
1.1. POLY(DIENES)										
Poly(butadiene)										
linear	Dioxane	12.1	139	0.52	4	–	2.1–23.2	LG	B–C	889
	Toluene	35	16.9	0.765	6	–	2.1–23.2	LG	B–C	889
ring	Toluene	35	11.8–10.6	0.765	3	–	3.8–6.1	LG	B–C	889
98%-*cis*, 2%-1,2	Benzene	30 (θ)	33.7	0.715	9	–	5–50	OS	A,R	15
	Isobutyl acetate	20.5	185	0.50	6	–	5–50	OS	A	15
	Toluene	30	30.5	0.725	9	–	5–50	OS	A	15
95%-*cis*, 1%-*trans*, 4%-1,2	Benzene	30	8.5	0.78	4	–	15–50	LS	A	16
	Cyclohexane	30	11.2	0.75	4	–	15–50	LS	A	16
	5-Methyl-2-hexanone	12.6 (θ)	150	0.50	4	–	15–35	LS	B	17

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
	3-Pentanone	10.3 (θ)	152	0.50	4	–	10–25	LS	B	17
	Toluene	30	33.9	0.688	8	–	10–65	OS	A	18
94%-*cis*, 4%-*trans*, 2%-1,2	Benzene	25	41.4	0.70	8	–	9–120	OS	A	19
	Dioxane	20.2 (θ)	205	0.50	8	–	9–120	OS	A	19
92%-*cis*, 3%-*trans*, 5%-1,2	Benzene	32	10	0.77	13	–	10–160	LS	B,R	20
51%-*trans*, 43%-*cis*, 6%-1,2	Toluene	30	39	0.713	6	–	11–25	OS	A	21
57%-*trans*, 36%-*cis*, 7%-1,2	Tetrahydrofuran	30	25.6	0.74	2	–	1–57	LS	A	733
71%-*trans*, 4%-*cis*, 25%-1,2	Cyclohexane	25	12	0.77	8	–	230–880	LS	C	22
79%-*trans*, 21%-*cis*	Cyclohexane	20	36	0.70	12	–	23–130	LS	B,R	23
97%-*trans*, 3%-1,2	Cyclohexane	40	28.2	0.70	7	–	4–17	LS	B	24
	Toluene	30	29.4	0.753	6	–	5–16	OS	A	25
ca. 100%-*cis*	Benzene	32	14.5	0.76	8	–	18–50	LS	A	26
	Heptane/hexane (1/1, v/v)	20	138	0.53	5	–	?	SD	A	27
65%-1,2, 25%-*trans*, 10%-*cis*	Toluene	25	110	0.62	8	–	7–70	OS	B	28
5°C-emulsion, randomly branched	3-Pentanone	24 (θ)	$M^{2/3}[\eta] = 7.15 + 3.47M$		10	–	10–100	OS	C	29
50°C-emulsion, randomly branched	Benzene	5 (θ)	$M^{2/3}[\eta]^{4/3} = 4.61 + 0.3287M$		16		5–124	OS	C	29
Poly(butadiene-*co*-acrylonitrile), Buna-N rubber										
	Acetone	25	50	0.64	5	–	2.5–10	OS	B	28
	Benzene	25	13	0.55	5	–	2.5–10	OS	B	28
	Chloroform	25	54	0.68	5	–	2.5–10	OS	B	28
	Toluene	25	49	0.64	7	–	2.5–40	OS	B	28
Poly(butadiene-*co*-styrene), Buna-S, GR-S, or SBR rubber										
	Benzene	25	52.5	0.66	24	–	1–160	OS		45
		25	54	0.66	8	–	1–165	OS	B	46
	Cyclohexane	30	31.6	0.70	6	–	5–25	OS	A	47
	2-Pentanone	21 (θ)	185	0.50	6	–	5–25	OS	A	47
	Toluene	25	52.5	0.667	25	–	2.5–50	OS	B	28
		30	16.5	0.78	–	9	3–35	OS		48
		30	37.9	0.71	6	–	5–25	OS	A	47
linear fraction	Toluene	30	21.4	0.74	15	–	3–20	OS	A,R	41
branched fraction	Toluene	30	535	0.48	20	–	20–100	OS	B	41
Poly(1-butenylene-*co*-vinylethylene)										
43%-1,2	1,4-Dioxane	15.7 (θ)	173	0.50	6	–	0.88–22	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	32.3	0.72	6	–	0.88–22	LLS, SEC, OS	A	890
Poly(2-*tert*-butylbutadiene)	Benzene	21	4.2	0.80	–	8	6–90	SD	A	30
	Octane	21	4.2	0.80	–	7	6–35	SD	A	30
Poly(chloroprene)										
Neoprene CG	Benzene	25	2.02	0.89	10	–	6–150	OS	B	31
Neoprene GN	Benzene	25	14.6	0.73	16	–	2–96	OS	B	32
Neoprene W	Benzene	25	15.5	0.71	8	–	5–100	OS	B	33
		25	15.5	0.72	9	–	5–80	LS	B,R	34
	Butanone	25 (θ)	113	0.50	7	–	15–300	LS	A	35
	Butyl acetate	25	37.8	0.62	7	–	15–300	LS	A	35
	Carbon tetrachloride	25	22.1	0.69	7	–	15–300	LS	A	35
	Cyclohexane	45.5 (θ)	107	0.50	7	–	15–70	LS	B	34
type, unspecified	Toluene	25	50	0.615	13	–	4–120	OS	B	28
Poly(isoprene)										
natural rubber	Benzene	30	18.5	0.74	–	4	8–28	OS	C	37
	Cyclohexane	27	30	0.70	–	1	ca. 185	LS, SD	C	38
	4-Methyl-2-pentanone	35	60.7	0.57			5–100	LS	B	698
	2-Pentanone	14.5 (θ)	119	0.50	–	4	8–28	OS	C	37
	Toluene	25	50.2	0.667	20	–	7–100	OS	B,R	39
		35	17.4	0.74			5–100	LS	B	698
synthetic *cis*	Hexane	20	68.4	0.58	5	–	5–80	SD	A	40
	Toluene	30	8.51	0.77	5	–	20–100	LS	A	41
85–91%-*cis*	Toluene	30	20.0	0.728	–	12	14–580	LS	A,R	42
		30	15	0.74	–	16	2–15	PR	A	43
	2,2,4-Trimethylpentane	30	22.2	0.683	–	8	23–580	LS	A	42
	Heptane/propanol (78/22, v/v)	30	37	0.63	–	6	43–580	LS	A	42

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
84%-*cis*, 14%-*trans*, 2%-1,2	Benzene	25	13.3	0.78	20	–	2–80	OS	B	44
		25	11.2	0.78	25	–	2–60	OS	B	44
	Dioxane	34 (θ)	145	0.50	30	–	2–50	OS	B	44
71%-*cis*, 22%-*trans*, 7%-3,4	Cyclohexane	35	20.2	0.73	5	–	2–32	OS	A	786
	Dioxane	35	94	0.53	5	–	2–32	OS	A	786
	4-Methyl-2-pentanone	35	76	0.56	5	–	2–32	OS	A	786
	Toluene	35	17.5	0.74	5	–	2–32	OS	A	786
gutta percha	Benzene	25	35.5	0.71	9	–	0.2–5	OS	A,R	19
	Dioxane	47.7 (θ)	191	0.50	9	–	0.2–5	OS	A	19
	Propyl acetate	60 (θ)	232	0.50	–	3	10–20	OS	C	37
synthetic *trans*	Benzene	32	43.7	0.65	24	–	8–140	LS	C	26
synthetic *trans* (98%)	Benzene	30	18.1	0.722			14–77	LS	B	699
	Cyclohexane	30	16.2	0.736	8	–	14–77	LS	B	699
	Hexane	30	13.8	0.711	7	–	14–77	LS	B	699
	Toluene	30	17.6	0.729			14–77	LS	B	699
98% 1,4-*trans*	Benzene	30	18.1	0.722	6	–	14–69	LS	B	887
	Cyclohexane	30	16.2	0.736	8	–	16–130	LS	B	887
	n-Hexane	30	13.8	0.711	7	–	16–105	LS	B	887
	Toluene	30	17.6	0.729	5	–	14–77	LS	B	887
70% *cis*-1,4, 23% *trans*-1,4 7% 3,4	Cyclohexane	25	20.5	0.730	11	–	1.5–342	LS	A	891
76% *cis*-1,4, 19% *trans*-1,4 5% 3,4	Cyclohexane	25	18.0	0.74	5	–	33–724	LS	A	892
star type 70% *cis*-1,4, 23% *trans*-1,4 7% 3,4 (mol. wt. of arm = various)										
3 arm	Cyclohexane	25	12.5	0.757	–	–	–	LS	–	893
4 arm	Cyclohexane	25	11.6	0.753	–	–	–	LS	–	893
8 arm	1,4-Dioxane	34	75.5	0.493	–	–	–	LS	–	893
	Toluene	34	9.47	0.726	–	–	–	LS	–	893
12 arm	1,4-Dioxane	34	53.9	0.501	–	–	–	LS	–	893
	Toluene	34	5.70	0.741	–	–	–	LS	–	893
16 arm	1,4-Dioxane	34	37.4	0.502	–	–	–	LS	–	893
	Toluene	34	3.04	0.764	–	–	–	LS	–	893
trans 1,4	Benzene	30	18.1	0.722	6	–	14–70	LS	B	894
	Cyclohexane	30	16.2	0.736	6	–	14–70	LS	B	894
	Hexane	30	13.8	0.711	6	–	14–70	LS	B	894
	Toluene	30	17.6	0.729	4	–	14–70	LS	B	894
Poly(isoprene)-*block*-poly(styrene), A_k-B_n										
k/n, (50/50, w/w)	Cyclohexane	35	21.8	0.68	5	–	3–54	OS	A	786
	Dioxane	35	32.6	0.63	5	–	3–54	OS	A	786
	4-Methyl-2-pentanone	35	53.1	0.57	5	–	3–54	OS	A	786
	Toluene	35	14.6	0.73	5	–	3–54	OS	A	786
k/n, (25/75, w/w)	Cyclohexane	35	39.3	0.60	6	–	3–48	OS	A	786
	Dioxane	35	24.8	0.65	6	–	3–48	OS	A	786
	4-Methyl-2-pentanone	35	62.8	0.55	6	–	3–48	OS	A	786
	Toluene	35	14.3	0.72	6	–	3–48	OS	A	786
Poly(isopropenylethylene-*co*-1-methyl-1-vinylethylene) 20–25%-1,2,70–75%-3,4										
	2-Octanol	30.5 (θ)	102	0.50	7	–	1.3–27	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	11.6	0.77	7	–	1.3–27	LLS, SEC, OS	A	890
Poly(1-methyl-1-butylene-*co*-isopropenylethylene) 51%-1,4,49%-3,4										
	2-Octanol	41.3	78	0.52	8	–	1.1–14	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	14.6	0.75	8	–	1.1–14	LLS, SEC, OS	A	890
Poly(1,1,2-trichlorobutadiene)	Benzene	25	31.6	0.66	11	–	25–130	LS		36
1.2. POLY(ALKENES), POLY(ACETYLENES)										
Poly(alkene) C_{10}–C_{18}	Toluene	25	12.7	1.04	12	–	2–18	LS	B	86
Poly(alkene) C_{12}–C_{18}	Cetane	38	21	0.61	10	–	4–700	LS	B	87
Poly(1-butene)	2-Octanol	23.6	60.5	0.52	6	–	2.7–55	LLS, SEC	A	896
	Tetrahydrofuran	25	8.24	0.76	6	–	2.7–55	LLS, SEC	A	896
atactic	Anisole	86.2 (θ)	123	0.50	3	–	10–130	LS	C	81
	Benzene	30	22.4	0.72	11	–	0.03–0.5	EG	B,L	82

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	No. of samples W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
	Ethylcyclohexane	70	7.34	0.80	5	–	4–130	LS	C	81
	Phenyl ether	141 (θ)	104	0.50	5	–	2–66	OS	A	700
isotactic	Anisole	89 (θ)	111	0.50	5	–	4–57	OS	B	700
	Decalin	115	9.49	0.73	6	–	4.5–90	LS		83
	Ethylcyclohexane	70	7.34	0.80	4	–	8–94	LS	A	81
	Heptane	35	4.73	0.80	6	–	4.5–90	LS		83
		60	15.0	0.69	6	–	4.5–90	LS		83
	Nonane	80	5.85	0.80	4	–	11–94	LS	A	81
	Phenetole	64.5 (θ)	113	0.50	5	–	4–57	OS	B	700
	Phenyl ether	148 (θ)	103	0.50	5	–	4–57	OS	B	700
	1,2,4,-Trichlorobenzene	135	11.8	0.729				GPC		701
	Cyclohexane/propanol									
	(80/20, v/v)	35	102	0.59	6	–	3–73	LS	B–C	702
	(70/30, v/v)	35	253	0.51	6	–	3–73	LS	B–C	702
	(65/35, v/v)	35	497	0.44	6	–	3–73	LS	B–C	702
Poly(ethylene)										
low pressure	Biphenyl	127.5 (θ)	323	0.50	4	–	2–30	LV	B	58
		130 (θ)	302	0.50	5	–	5.7–27	LS, GPC		703
	1-Chloronaphthalene	125	138	0.58	?	?	?	LS	?	59
		125	18.4	0.78	10	–	5–100	LS		60
		125	43	0.67	10	–	5–100	LS	C,D	61
		129	27.1	0.71	26	–	5–100	LS	D	62
	Decalin	135	67.7	0.67	–	> 10	3–100	LS	D	63
		135	46	0.73	23	–	3–64	LS		64
		135	62	0.70	7	–	2–105	LS	B,R	65,66
		135	58.5	0.725	9	–	0.4–50	OS	B	67,68
		135	62	0.70	7	–	3–120	GPC, LS	B	704
	Decanol	153.3 (θ)	302	0.50	?	–	2–105	LV	B	58
	Diphenyl ether	161.4 (θ)	295	0.50	6	–	2–105	LS	B	65
	Diphenylmethane	142.2 (θ)	315	0.50	?	–	2–105	LV	B	58
	Dodecanol	137.3 (θ)	307	0.50	5	–	2–105	LV	B	58
		138 (θ)	316	0.50	–	8	8–32	LS	F	69
		144.5		0.61	6	–	0.8–59	LS		705
	Octanol	180.1 (θ)	286	0.50	?	–	2–105	LV	B	58
	Tetralin	105	16.2	0.83	4	–	13–57	LS	C	70
		120	23.6	0.78	36	–	5–100	LS		60
		120	32.6	0.77	20	–	0.3–50	LS	B	71
		130	43.5	0.76	6	–	2–30	OS	B	71
		130	51	0.725	9	–	0.4–50	OS	B,R	72
		130	37.8	0.72	–	10	8–17	LS	D	73
	1,2,4-Trichlorobenzene	135	95.4	0.64	4	–	3–45	LS	A	706
		135	51	0.706	19	–	0.8–123	GPC, LS	B	704
		135	51.6	0.691	4	–		GPC		701
	3,5,5-Trimethylhexyl acetate	121		0.55	6	–	1–59	LS		705
	p-Xylene	105	16.5	0.83	4	–	13–50	LS	C	70
		105	17.6	0.83	8	–	1–18	OS	C	74
		105	51	0.725	?	–	0.4–50	LV	B,R	75
	Paraffin wax ($M_n = 390 \pm 10$)									
		150	(42)	(0.65)	9	–	0.04–11	LS	D	76
high pressure	Decalin	70	38.73	0.738	8	–	0.2–3.5	OS	B	77
	p-Xylene	75	135	0.63	–	22	0.2–7.6	OS	D	78
		81	105	0.63	7	–	1–10	OS	D	79
(normal paraffin)	Carbon tetrachloride	20 $[\eta] = -1.14 + 0.104\,M$			–	7	0.024–0.048	CR	A	80
Poly(ethylene-*alt*-tetrafluoroethylene)										
	Diisobutyl adipate	240	2.3	0.71	–	3	54–116	LS	B	898
Poly(ethylene-*co*-isopropylethylene)										
	n-Hexyl acetate	65	171	0.51	6	–	0.92–23	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	71.3	0.64	6	–	0.92–23	LLS, SEC, OS	A	890
Poly(ethylene-*co*-propylene)	Benzene	19.0	201	0.502	6	–	2.8–39	LS	A	897
		21.4	136	0.543	6	–	2.8–39	LS	A	897
	n-Decyl acetate	5.0	162	0.523	6	–	2.8–39	LS	A	897
	n-Heptyl acetate	38.0	156	0.522	6	–	2.8–39	LS	A	897

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
Poly(ethylene-*co*-propylene-*co*-diene), EPDM rubber										
	Cyclohexane	40	53.1	0.75	20	–	3–30	OS	A	41
Poly(isobutene)	Anisole	105 (θ)	91	0.50	–	–	18–188	LV	B	49
	Benzene	24 (θ)	107	0.50	15	–	18–188	LV	B	49
		25	83	0.53	9	–	0.05–126	OS, CR	B,R	50
		30	61	0.56	9	–	0.05–126	OS, CR	B	50
		40	43	0.60	9	–	0.05–126	OS, CR	B	50
		60	26	0.66	9	–	0.05–126	OS, CR	B	50
	Benzene	25	100	0.504	–	9	1.35–148	SEC, LLS	A–B	1010
	Carbon tetrachloride	30	29	0.68	12	–	0.05–126	OS, CR	B	50
	Chloroform	25	71	0.55	12	–	5.7–490	LS	A(?)	899
	Cyclohexane	10	25.6	0.639	–	6	2.6–110	LV	A–B	901
		20	24.2	0.697	–	6	2.6–110	LV	A–B	901
		30	23.3	0.699	–	6	2.6–110	LV	A–B	901
		40	22.9	0.701	–	6	2.6–110	LV	A–B	901
		50	22.4	0.702	–	6	2.6–110	LV	A–B	901
	Cyclohexane	25	40	0.72	6	–	14–34	OS	B	51
		30	27.6	0.69	7	–	4–71	OS	A,R	52
		30	26.5	0.69	12	–	0.05–126	OS, CR	B	50
	Cyclohexane	25	13.5	0.740	–	18	6.4–161	SEC, LLS	A–B	1010
	Decalin	25	22	0.70	6	–	530–1680	LS	A–B	53,54
	Diisobutylene	20	36	0.64	23	–	1–130	OS	A,R	55,52
		25	130	0.50	5	–	0.4–2.5	OS	A,L	56
	n-Heptane	25	15.8	0.697	–	7	0.84–148	SEC, LLS	A–B	1010
	Isooctane	10	38.1	0.624	–	6	2.6–110	LV	A–B	901
		20	36.8	0.626	–	6	2.6–110	LV	A–B	901
		30	36.2	0.627	–	6	2.6–110	LV	A–B	901
		40	34.6	0.631	–	6	2.6–110	LV	A–B	901
		50	33.6	0.633	–	6	2.6–110	LV	A–B	901
	Phenetole	86 (θ)	91	0.50	4	–	5–188	LV	B	49
	Toluene	0	40	0.60	8	–	1–146	LV	B	50
		15	24	0.65	6	–	1–146	LV	B	50
		25	87	0.56	6	–	14–34	OS	B	51
		30	20	0.67	5	–	1–146	LV	B,R	50
		50	20	0.68	6	–	1–146	LV	B	50
		60	13.5	0.71	4	–	11–146	LV	B	50
		90	12.6	0.72	3	–	46–146	LV	B	50
oligomer–polymer	Benzene	25 (θ)	($M_w > 10^5$)	0.50	19	–	0.011–179	LS	A	904
			($M_w < 10^5$)	Not const.						
	Isoamyl isovalerate	25 (θ)	($M_w > 10^5$)	0.50	19	–	0.011–179	LS	A	904
			($M_w < 10^5$)	Not const.						
Poly(isobutene-*co*-isoprene), butyl rubber	Benzene	22.8 (θ)	115	0.50	5	–	15–72	LS	A	787
	Carbon tetrachloride	25	10.7	0.78	6	–	10–30	OS	A	57
	5-Methyl-3-heptanone	55.5 (θ)	109	0.50	5	–	15–72	LS	A	787
	Toluene	25	66	0.60	5	–	15–30	OS	A	57
		30	21.4	0.678	8	–	10–30	OS	A	57
Poly(methylbutylene)	*n*-Hexyl acetate	60.9	169	0.51	8	–	0.84–60	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	42.2	0.68	8	–	0.84–60	LLS, SEC, OS	A	890
Poly(isopropylethylene-*co*-1-methyl-1-ethylethylene)										
	2-Octanol	26.2	92	0.49	7	–	1.5–28	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	10.3	0.75	7	–	1.5–28	LLS, SEC, OS	A	890
Poly(3-methyl-1-butene)	Diisobutylene	20	42	0.63	6	–	1–20	LS	A	85
Poly(1-methylbutylene-*co*-isopropylethylene)										
	2-Octanol	53.3	74	0.52	8	–	1.1–43	LLS, SEC, OS	A	890
	Tetrahydrofuran	30	29.8	0.68	8	–	1.1–43	LLS, SEC, OS	A	890
Poly(4-methyl-1-pentene)	Biphenyl	194.6 (θ)	152	0.50	7	–	6–30	OS	B	707
	Decalin	130	19.5	0.75	5	–	6–30	OS	B	707
	Diphenyl ether	210.0 (θ)	158	0.50	6	–	6–30	OS	B	707
	Diphenylmethane	176.6 (θ)	160	0.50	6	–	6–30	OS	B	707
Poly(1-octene)	Bromobenzene	25	2.90	0.78	5	–	25–400	LS	A	84
	Cyclohexane	30	5.75	0.78	6	–	25–400	LS	A	84
	Phenetole	50.4 (θ)	65.5	0.50	4	–	60–400	LS	A	84

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	No. of samples W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(pentenamer)										
80–85%-*trans*,	Cyclohexane	30	56.9	0.68	5	–	3.6–63	LS	B	788
19–12%-*cis*	Isopentyl acetate	38 (θ)	234	0.50	8	–	3.6–63	LS	B	788
	Toluene	30	52.1	0.69	10	–	3.6–63	LS	B	788
Poly(1-phenyl-1-propyne)	Cyclohexane	36 (θ)	–	0.5–0.8	12	–	1.6–145	LS, SE	A	902
		(wormlike behavior)								
	Toluene	25	–	Not const.	12	–	1.6–145	LS, SE	A	902
		(wormlike behavior)								
Poly(propylene)										
	n-Octyl acetate	27.0	175	0.512	6	–	2.8–39	LS	A	897
	3-Nonanol	5.0	113	0.536	7	–	2.3–42	LS, SEC	A	897
	1-Octanol	77.0	110	0.504	7	–	2.3–42	LS, SEC	A	897
atactic	Benzene	25	27.0	0.71	6	–	6–31	OS	A	88
		30	33.8	0.67	6	–	2–34	OS	A	89
	Biphenyl	129 (θ)	128.3	0.50	3		4–71	LV	B	708
	1-Chloronaphthalene	74 (θ)	182	0.50	3	–	4–33	OS	A	90
	Cyclohexane	25	16.0	0.80	6	–	6–31	OS	A	88
		30	20.9	0.76	6	–	2–34	OS	A	89
	Cyclohexanone	92 (θ)	172	0.50	4	–	1.5–33	OS	A	90
	Decalin	135	15.8	0.77	6	–	2–39	OS	A	91
		135	11.0	0.80	6	–	2–62	LS	A,R	88
		135	54.3	0.65	–	10	2–72	LS	D	92
	Isobutyl acetate	58 (θ)	158.5	0.50	3	–	4–71	LV	B	708
	Isopentyl acetate	34 (θ)	168.5	0.50	6	–	2–34	OS	A	89
	Phenyl ether	145	192	0.47	3	–	3.7–21	OS	A	90
		153 (θ)	120	0.50	3	–	3.7–21	OS	A	90
	Tetralin	130	1.24	0.96	–	–	?	?		93
	Toluene	30	21.8	0.725	7	–	2–34	OS	A	89
isotactic	Biphenyl	125.1 (θ)	152	0.50	4	–	5–42	LV	A	94
		125 (θ)	141.0	0.50	5	–	5–50	OS	B	708
	1-Chloronaphthalene	139	21.5	0.67	11	–	10–170	LS		95
		145	4.9	0.80	9	–	5–63	LS	A,R	96
	Decalin	135	11.0	0.80	6	–	2–62	LS	A,R	88
		135	10.0	0.80	4	–	10–100	LS	A,R	97
	Dibenzyl ether	183.2 (θ)	106	0.50	4	–	5–42	LV	A	94
	Diphenyl ether	142.8 (θ)	137	0.50	4	–	5–42	LV	A	94
		145 (θ)	132	0.50	4	–	3–48	OS	A	90
		153	112	0.54	4	–	3–48	OS	A	90
	Tetralin	135	2.5	1.0	5	–	2–11	OS		98
		135	9.17	0.80	9	–	4–54	OS	A,R	96
		135	19.3	0.74	5	–	5–50	OS	B	708
	p-Xylene	85	96	0.63	12	–	?	OS		99
syndiotactic	Heptane	30	31.2	0.71	5	–	9–45	LS	A	100
head-to-head										
94%-*trans*, 6%-1,2	Cyclohexane	30	493	0.39	5	–	0.2–1.1	VOS, OS	L	709
		30	4.16	0.86	5	–	2.1–4.2	VOS, OS		709
89%-*trans*, 11%-1,2	Cyclohexane	30	295	0.43	5	–	0.3–0.8	VOS, OS	L	709
		30	3.82	0.90	3	–	1.7–3.2	VOS, OS		709
1.3. POLY(ACRYLIC ACID) AND DERIVATIVES										
Poly(acrylamide)	Water	30	6.31	0.80	7	–	2–50	SD	B	101
		30	68	0.66	–	21	1–20	PR	C	102
		30	6.5	0.82	7	–	4–127	OS	B	710
	Aq. NaCl (1 N)	25	19.1	0.71	–	5	49–320	LS	D	905
	Aq. NaCl (0.12 M)	30	5.31	0.79	7	–	15–153	LS	B	972
Poly(*N*-acryloyl-*m*-aminobenzoic acid)										
	N,N-Dimethylacetamide	30	9.1	0.84	8	–	1.3–5.5	VOS, GPC	A–B	908
	N,N-Dimethylformamide	30	8.9	0.83	8	–	1.3–5.5	VOS, GPC	A–B	908
	Dimethyl sulfoxide	30	10.6	0.80	8	–	1.3–5.5	VOS, GPC	A–B	908
Poly(*N*-acryloyl-*o*-aminobenzoic acid)										
	N,N-Dimethylformamide	25	3.74	0.93	7	–	0.7–2.9	VOS, GPC	A–B	909
	Dimethyl sulfoxide	25	3.83	0.92	7	–	0.7–2.9	COS, GPC	A–B	909
	Tetrahydrofuran	25	3.39	0.89	7	–	0.7–2.9	COS, GPC	A–B	909

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
Poly(acrylamide-*co*-*N*,*N*,*N*-trimethyl aminoethyl chloride acrylate)										
70% acrylamide	Aq. NaCl (1 N)	25	10.5	0.73	–	6	45–270	LS	D	905
Poly(acrylic acid)	1,4-Dioxane	30 (θ)	76	0.50	–	4	13–82	OS	B	104
–, sodium salt	Aq. NaOH (2 M)	25	42.2	0.64	12	–	4–50	OS	C	105
	Aq. NaCl									
	(0.012 M)	20	–	0.93	7	–	7–180	LV	B	106
	(1 M)	25	15.47	0.90	12	–	4–50	OS	C	105
Poly(acrylic acid)										
–, sodium salt	Aq. NaCl									
	(0.05 M)	25	7.35	0.88	4	–	9.4–60	LLS, GPC	B–C	906
	(0.1 M)	25	14.6	0.80	4	–	9.4–60	LLS, GPC	B–C	906
	(0.3 M)	25	16.9	0.75	4	–	9.4–60	LLS, GPC	B–C	906
	(0.5 M)	25	18.6	0.72	4	–	9.4–60	LLS, GPC	B–C	906
	(1.0 M)	25	41.5	0.63	4	–	9.4–60	LLS, GPC	B–C	906
	Aq. NaBr									
	(1.5 M)	15	145	0.50	4	–	9.4–60	LLS, GPC	B–C	906
	(1.5 M)	15 (θ)	165	0.50	5	–	6–64	LV	C	107
		15 (θ)	124	0.50	4	–	12–83	LS	C	108
	(0.5 M)	15	52.7	0.628	7	–	1–50	LV	C	109
		25	50.6	0.656	7	–	2–80	LV	C,R	110
	(0.1 M)	15	25.4	0.755	7	–	1–50	LV	C	109
		25	31.2	0.755	7	–	2–80	LV	C	110
	(0.05 M)	15	28.1	0.77	7	–	1–50	LV	C	109
	(0.025 M)	15	16.3	0.84	7	–	1–50	LV	C	109
		25	17.6	0.85	7	–	2–80	LV	C	110
	(0.01 M)	15	13.6	0.89	7	–	1–50	LV	C	109
		25	13.2	0.91	7	–	2–80	LV	C	110
	(0.005 M)	15	(44.2)	0.83	7	–	1–50	LV	C	109
	(0.0025 M)	15	(24.9)	0.89	7	–	1–50	LV	C	109
	Aq. NaSCN	30 (θ)	154	0.50	5	–	6–64	LV	C	107
	(1.12 M)	30 (θ)	121	0.50	4	–	12–83	LS	C	111
Poly(acrylonitrile)	γ-Butyrolactone	20	34.3	0.730	5	–	4–40	LV (LS)	A,R	134
(polymerized at – 30°C)		30	57.2	0.67	6	–	4–30	SA	B	135
(polymerized at 60°C)		30	34.2	0.70	5	–	6–30	SA	B	135
		30	40.0	0.69	–	5	15–53	LS	D	136
		50	28.7	0.740	5	–	4–40	LS	A	134
	Dimethylformamide	20	17.7	0.78	5	–	7–30	LS	B	137
		25	16.6	0.81	5	–	5–27	SD	B	138
		25	24.3	0.75	–	4	3–25	LS	C	139
		25	39.2	0.75	–	16	3–100	OS	C	140
		25	52.0	0.690	7	–	5–52	LS	B,R	711
	(Deionized DMF)	25	15.5	0.80	3	5	3–10	LS, SD	B–C	141
		25	57.4	0.73	–	8	0.3–1.5	EG	L	142
		25	39.6	0.75	–	7	4–30	OS	C	143
		25	44.3	0.70	–	7	2–20	LS	C	143
		25	69.8	0.65	–	21	8–140	LS	C	144
(polymerized at – 30°C)		30	29.6	0.74	7	–	4–30	SA	B	135
(polymerized at 60°C)		30	20.9	0.75	7	–	6–30	SA	B	135
		30	33.5	0.72	–	6	16–48	LS	D	136
		35	27.8	0.76	9	–	3–58	DV	B	145
		35	31.7	0.746	12	–	9–76	LS	A,R	134
		50	30.0	0.752	22	–	4–102	LV	A	134
	Dimethylacetamide	20	30.7	0.761	6	–	2–40	LV	A	134
		35	27.5	0.767	6	–	2–40	LV	A	134
		50	27.4	0.764	6	–	2–40	LV	A	134
	Dimethyl sulfoxide	20	32.1	0.750	9	–	9–40	LV	A	134
		50	28.3	0.758	9	–	9–40	LV	A	134
		140	20.9	0.75	–	6	4–40	LS		146
	Ethylene carbonate	50	29.5	0.718	13	–	7–40	LV	A	134
	Ethylene carbonate/water (85/15, w/w)	25	263	0.49	7	–	5.2–52	LS, OS	A–B	951

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
	Hydroxyacetonitrile	20	40.9	0.697	8	–	4–34	LV	A	134
		50	35.4	0.707	8	–	4–34	LV	A	134
	Aq. HNO_3 (60%)	0	33.9	0.740	6	–	2–40	LV	A	134
		20	30.7	0.747	5	–	4–40	LV	A	134
Poly(benzyl acrylate)	Butanone	35	0.587	0.883	?		?	OS		337
Poly(butyl acrylate)	Acetone	25	6.85	0.75	–	6	5–27	LS	C	112
Poly(*tert*-butyl acrylate)	Acetone	25	4.7	0.75	5	–	7–31	LS	B	712
	Butanone	25	3.2	0.80	5	–	7–31	LS	B	712
	Hexane	24.2 (θ)	49.0	0.50	5	–	7–31	LS	B	712
	Methanol	25	16.0	0.61	5	–	7–31	LS	B	712
	Pentane	25	22.0	0.57	5	–	7–31	LS	B	712
Poly(1,1-dihydroperfluorobutyl acrylate)										
	Benzofluoride	26.6	13	0.56	7	3	20–200	LS	B	113
	Methyl perfluorobutyrate	26.6	12	0.60	7	3	20–200	LS	B	113
Poly(*N*,*N*-dimethylacrylamide)	Methanol	25	17.5	0.68	–	8	5–122	LS	C	103
	Water	25	23.2	0.81	–	6	5–122	LS	C	103
		40	20.0	0.65	–	4	11–122	LS	C	103
Poly(ethyl acrylate)	Acetone	25	51	0.59	7	–	35–450	LS	B,R	114
		30	20.0	0.66	5	–	16–50	OS	B,R	115
	Benzene	30	27.7	0.67	–	7	5–67	OS	C	116
	Butanone	30	2.68	0.80	5	–	48–700	LS	B–C	117
	Chloroform	30	31.4	0.68	–	5	9–54	OS	C	116
	Ethyl acetate	30	26.0	0.66	–	5	9–54	OS	C	116
Poly(2-ferrocenylethyl acrylate)	Benzene	25	4.68	0.70	–	3	1.4–2.7	VOS, GPC	D	713
Poly(ferrocenylmethyl acrylate)	Benzene	25	6.84	0.75	–	8	0.7–2	VOS, GPC	C–D	714
Poly(hexadecyl acrylate)	Methanol	30	48.7	0.55	–	6	6–70	OS	C	116
	Heptane	20	1.74	0.82	6	–	1–10	LS	B	118
Poly(*N*-isopropylacrylamide)	Tetrahydrofuran	27	9.59	0.65	8	–	10–100	OS	A	975
	Water	20 (θ)	145	0.50	8	–	10–100	OS	A	975
Poly(isopropyl acrylate)	Acetone	30	13.0	0.69	6	–	6–30	LS	B	119
	Benzene	25	14.9	0.70	9	–	7–70	OS	B	120
		25	12.4	0.701	20	–	4–100	LS	B,R	121
		30	11.8	0.71	4	–	7–20	LS	B	119
	Bromobenzene	25	11.3	0.704	20	–	4–100	LS	B	121
		60	11.6	0.698	20	–	4–100	LS	B	121
	Chloroform	30	14.1	0.72	5	–	7–30	LS	B	122
isotactic	2,2,3,3-tetrafluoro-propanol	25	19.7	0.697	7	–	10–65	LS	B	121
atactic		25	17.3	0.703	6	–	8–110	LS	B	121
syndiotactic		25	15.9	0.708	6	–	20–110	LS	B	121
isotactic		60	17.9	0.693	4	–	10–65	LS	B	121
atactic and syndiotactic		60	14.7	0.704	6	–	20–110	LS	B	121
Poly(methyl acrylate)	Acetone	20	(7.40)	(0.76)	–	4	7–32	OS		123
		25	5.5	0.77	8	–	28–160	LS	B,R	124
		25	19.8	0.66	9	–	30–250	LS	B	125
		25	5.20	0.77	11	–	4–183	LS	B	715
		30	28.2	0.52	7	–	4–45	OS	B	126
	Benzene	25	2.58	0.85	4	–	20–130	OS		127
		30	4.5	0.78	7	7	7–160	LS		128
		30	3.56	0.798	6	–	25–190	LS	B,R	129
		30	4.59	0.795	6	–	15–140	OS	B	129
		35	12.8	0.71	–	5	5–30	OS	C	130
	Butanone	20	3.5	0.81	13	–	6–240	LS	A–B,R	128
		25	14.1	0.67	4	–	17–68	LS	B	131
		30	3.97	0.772	6	–	25–190	LS	B	129
		35	(34)	(0.61)	–	3	5–47	LV	C	132
	Dimethyl malonate	30	3.51	0.793	4	–	50–190	LS	B	129
	Ethyl acetate	35	11	0.69	–	8	24–148	LS	A	133
	Isopentyl acetate	62.5 (θ)	68	0.50	6	–	20–160	LS	B	129
	2-methylcyclohexanol	56.0 (θ)	68	0.50	4	–	40–105	LS	B	129
	Toluene	30	7.79	0.697	6	–	25–190	LS	B	129
		35	21	0.60	–	7	12–69	LS	A	133

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
	Butanone–2-propanol									
	(42/58, v/v)	20 (θ)	81	0.50	5	–	29–140	LS	B	124
	(1/1, v/v)	27.5 (θ)	54.4	0.50	4	–	14–83	LS	C	108
		30 (θ)	72	0.50	4	–	50–190	LS	B	129
branched	(42/58 v/v)	20 (θ)	290	0.40	6	–	37–250	LS	B	125
Poly(1-methylphenyl acrylate)	Butyl acetate	25	14.7	0.63	8	–	2–110	SD	A	346
Poly(morpholinocarbonylethylene)										
	Dimethylformamide	25	18	0.65	?		?	LS	C	338
	Aqueous NaCl (0.1 M)	20	64	0.68	?		?	LS	C	338
Poly(piperidinocarbonylethylene)	Dimethylformamide	25	32	0.56	?		?	LS	C	338
Poly(propyl acrylate)	Butanone	30	15.0	0.687	4	–	71–181	LS	A	117
1.4. POLY(α-SUBSTITUTED ACRYLIC ACID) AND DERIVATIVES										
Poly(benzyl methacrylate)	Benzene	30	1.03	0.82	–	9	17–120	LS		339
Poly(butyl methacrylate)	Acetone	25	18.4	0.62	5	–	100–600	LS	A	150
	Benzene	30	(4.0)	(0.77)	–	3	8–300	LS		151
	Benzene	25	3.82	0.774	6	–	1270–2070	–	–	912
	Butanone	23	1.56	0.81	10	–	25–260	LS	B	152
		25	9.7	0.68	5	–	11–670	LS	A	150
		30	(1.15)	(0.89)	3	–	67–132	OS	C	153
	Chloroform	20	2.9	0.78	8	–	4–800	LS	B,R	154
		25	4.37	0.80	6	–	8–80	OS		155
	Cyclohexane	25	21.0	0.648	6	–	1230–2450	–	–	912
	Dioxane	25	23.7	0.630	6	–	1330–2070	–	–	912
	Methyl ethyl ketone	25	6.13	0.726	10	–	959–2160	–	–	912
	2-Propanol	21.5 (θ)	29.5	0.50	8	–	30–260	LS	B	152
		21.5 (θ)	38	0.50	9	–	4–800	LS	B,R	154
		23.7 (θ)	36.6	0.50	5	–	40–170	LS	B	156
Poly(*tert*-butyl methacrylate)	Butyl acetate	25	22.0	0.63	6	–	46–870	LS	A	157
anionic	Butanone	25	12.0	0.675	6	–	2.8–107	LLS, SEC	A	917
	Cyclohexane	10.0	62.0	0.499	6	–	2.8–107	LLS, SEC	A	917
	Tetrahydrofuran	30	15.2	0.66	6	–	2.8–107	LLS, SEC	A	917
free radical	Butanone	25	5.91	0.73	4	–	14–155	LLS, SEC	A	917
	Cyclohexane	10.0	46.0	0.505	5	–	6.8–155	LLS, SEC	A	917
	n-Heptane	64.0	62.1	0.476	7	–	3.4–155	LLS, SEC	A	917
	Tetrahydrofuran	30	5.84	0.76	6	–	3.4–155	LLS, SEC	A	917
Poly(2-*tert*-butylphenyl methacrylate)										
	Benzene	25	7.8	0.68	8	–	4–113	LS	B	771
	Butanone	25	9.0	0.64	8	–	4–113	LS	B	771
	Cyclohexane	18.4 (θ)	35.5	0.50	8	–	4–113	LS	B	771
Poly(4-*tert*-butylphenyl methacrylate)										
	Acetone	20	5.75	0.68	15	–	6–350	LS		340
		25	16	0.60	6	–	11–204	LS	B	716
	Bromobenzene	20	4.1	0.71	7	–	15–2500	LS		341
	Carbon tetrachloride	20	4.1	0.71	7	–	20–2500	LS		341
	Chloroform	20	2.4	0.78	15	–	6–300	LS	A–B	342
	Cyclohexane	25	47	0.49	6	–	11–204	LS	B	716
	Tetrahydrofuran	25	9.4	0.68	6	–	7–88	L	B	716
Poly[1-(*N*-carbethoxyphenyl)-methacrylamide]										
	Acetone	Unc.	0.00115	1.35	4	–	26–74	LS		369
	Dimethylformamide	Unc.	This relation not followed		5	–	48–140	LS		369
	Ethyl acetate	Unc.	0.00446	1.25	5	–	26–11	LS		369
Poly(2-chloroethyl methacrylate)	*o*-Dichlorobenzene	35.7 (θ)	47.4	0.50	6	–	3.2–54	LLS, SEC	A–B	914
	Tetrahydrofuran	30	6.83	0.72	6	–	3.2–54	LLS, SEC	A–B	914
Poly(4-chlorophenyl methacrylate)										
	Benzene		9.2	0.66	8	–	10–610	LS	A	343
	Carbon tetrachloride		20.0	0.58	8	–	10–610	LS	A	343
	Dioxane		6.1	0.70	8	–	10–610	LS	A	343
Poly(cyclobutyl methacrylate)	1-Butanol	37.5	49.2	0.494	6	–	4.8–31		A–B	915
Poly(cyclododecyl methacrylate)	Cyclohexane	30	8.84	0.651	7	–	5.1–475		B–C	915
	n-Hexyl acetate	35	35.4	0.494	6	–	5.1–475		B–C	915
	Toluene	30	6.03	0.687	7	–	5.1–475		B–C	915

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples		Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
					Fr.	W.P.				
Poly(cyclohexyl methacrylate)	Benzene	30	8.4	0.69	5	–	80–200	LS		344
		25	3.54	0.77	9	–	10–419	LS	A	717
	Butanol	23 (θ)	33.7	0.50	5	–	57–445	LS	B	345
		22.5 (θ)	45.2	0.50			10–125	LS	A	718
		25	31.8	0.533			10–125	LS	A	718
	Butanone	25	5.79	0.68	6	–	57–560	LS	B	345
		30	7.0	0.66	5	–	80–200	LS		344
	Cyclohexane	25	8.8	0.67	9	–	10–419	LS	A	717
Poly(cyclohexylthiolmethacrylate)										
	Cyclohexane	25	8.65	0.63	8	–	4–60	LS	B	719
	Tetrahydrofuran	35	4.07	0.74	8	–	4–60	LS	B	719
Poly(cyclooctyl methacrylate)	2-Butanol	45	43.2	0.488	7	–	6.6–418		A–C	915
	1,4-Dioxane	30	26.0	0.549	8	–	3.1–418		A–C	915
	Toluene	30	8.70	0.677	8	–	3.1–418		A–C	915
Poly(cyclopentyl methacrylate)	Cyclohexane	36	54.8	0.487	8	–	4.6–358		A–B	915
	1,4-Dioxane	30	10.9	0.659	8	–	2.9–358		A–B	915
	Ethyl acetate	30	19.4	0.588	9	–	2.9–358		A–B	915
	Methyl ethyl ketone	30	13.6	0.631	9	–	2.9–358		A–B	915
	Toluene	30	8.38	0.696	9	–	2.9–358		A–B	915
Poly(2,6-dimethylphenyl methacrylate)										
	Chlorobenzene	25	18.4	0.65	4	–	3.4–33	OS, SEC	A	923
	Tetrahydrofuran	25	33.1	0.59	8	–	3.4–82	OS, SEC	A	923
	Tetrahydrofuran/water	25 (θ)	75.0	0.50	4	–	5.7–33	OS, SEC	A	923
	Toluene	25 (θ)	78.0	0.50	9	–	3.4–82	OS, SEC	A	923
Poly(diphenylmethyl methacrylate)										
	3-Heptanone	45	38.6	0.485	9	–	8.7–575	LLS, SEC	A–B	911
	Toluene	25	3.61	0.712	7	–	42–575	LLS, SEC	A–B	911
Poly(decyl methacrylate)	Ethyl acetate	11 (θ)	34.7	0.50	10	–	2.9–92	LS, OS, SEC	B	913
	Tetrahydrofuran	30	4.56	0.73	10	–	2.9–92	LS, OS, SEC	B	913
Poly(dodecyl methacrylate)	Amyl acetate	31	36.6	0.53	10	–	10–135	LS, OS, SEC	B	913
	Tetrahydrofuran	30	1.05	0.64	10	–	10–135	LS, OS, SEC	B	913
Poly(dodecyl methacrylate)	Butyl acetate	23	8.64	0.64	8	–	26–360	LS	A	158
	Isopropyl acetate	13 (θ)	32.2	0.50	7	–	26–360	LS	A	158
	Pentanol	29.5 (θ)	34.8	0.50	7	–	27–240	LS	A	159
Poly(2-ethylbutyl methacrylate)	Butanone	25	2.21	0.77	8	–	48–332	LS	A	160
	2-Propanol	27.4 (θ)	33.7	0.50	8	–	48–332	LS	A	160
Poly(ethyl methacrylate)	Butanone	23	2.83	0.79	10	–	20–263	LS	A	161
	Ethyl acetate	35	8.6	0.71	–	11	65–1200	LS	C	162
	2-Propanol	36.9 (θ)	47.5	0.50	4	–	22–130	LS	B	156
	Butanone-2-propanol (1/7, v/v)	23 (θ)	47.3	0.50	10	–	20–263	LS	A	161
	Ethyl acetate/ethanol (2/9, v/v)	35	47.6	0.53	6	–	78–500	LS	A	162
	(1/6, v/v)	35 (θ)	56.4	0.50	6	–	60–420	LS	A	162
Poly(2-ferrocenylethyl methacrylate)										
	Benzene		3.12	0.76	–	6	2–9	VOS, GPC	C,D	713
Poly(ferrocenylmethyl methacrylate)										
	Benzene	25	27.8	0.58	–	6	0.6–3.6		C,D	714
Poly(hexadecyl methacrylate)	Benzene	21	5.9	0.71	3	–	130–440	SD	B	163
	Carbon tetrachloride	21	2.37	0.78	5	–	130–440	SD	B	163
	Heptane	21	3.92	0.75	5	–	130–440	SD	B	163
		25	35.1	0.56	9	–	20–110	LS		164
Poly[4-(4-hexadecyloxybenzoyloxy)-phenyl methacrylate]										
	Carbon tetrachloride		33.1	0.5	20	–	10–2000	SD		730
Poly(hexyl methacrylate)	Butanone	23	2.12	0.78	8	–	6–41	LS	A	165
	2-Propanol	32.6 (θ)	43.0	0.50	8	–	6–41	LS	A	165
Poly(2-hydroxyethyl methacrylate)										
	Dimethylformamide	30	10.6	0.70	6	–	4–52	LS	A,B	720
	Dimethyl sulfoxide	30	12.9	0.69	5	–	4–52	LS	A,B	720
	Methanol	30	52.4	0.51	7	–	4–52	LS	A,B	720
Poly[1-(2-hydroxyethyl) pyridiniumbenzene sulfonate methacrylate]										
	Aq. KCL (0.5 M)	25	2.62	0.71	–	14	19–950	LS		721

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly[1(2-hydroxyethyl) trimethylammoniumbenzene sulfonate methacrylate]										
	Aq. KCl (0.5 M)	25	4.04	0.70	–	8	15–400	LS		721
Poly[*N*-(2-hydroxypropyl) methacrylamide]										
	Aqueous KCl (0.1 M)	25	11.0	0.67	12	–	2–500	LS		722
Poly(D,L-isobornyl methacrylate)	1-Octanol	39.6 (θ)	31.7	0.50	6	–	9–120	GPC		723
	Tetrahydrofuran	30	3.68	0.73	6	–	9–120	GPC		723
Poly(isobutyl methacrylate)	Acetone	25	0.199	0.94	6	–	300–1100	LS	C	166
		25	23.4	0.66	6	–	50–116	OS		724
		60	18.2	0.68	6	–	50–116	OS		724
	Acetone	25	8.41	0.66	6	–	1020–3460	–	–	919
	Benzene	25	3.88	0.74	5	–	1020–3460	–	–	919
	Benzene	25	7.03	0.77	6	–	50–116	OS		724
	Butanone	20	5.56	0.73	6	–	300–1100	LS	C	166
		25	8.61	0.70	7	–	300–1100	LS	C	166
		30	7.47	0.71	6	–	300–1100	LS	C	166
		44	2.18	0.79	6	–	300–1100	LS	C	166
	Carbon tetrachloride	25	4.88	0.72	6	–	1020–3460	–	–	919
	1,4-Dioxane	25	6.89	0.68	6	–	1020–3460	–	–	919
	2-Hydroxymethyl-tetrahydrofuran	25	85.8	0.56	6	–	50–116	OS		724
Poly(5-*p*-methyl methacrylate)	Benzene	25	9.6	0.67	6	–	12–230	LS	B	771
	Cyclohexane	25	11.5	0.65	6	–	12–230	LS	B	771
	2-Pentanone	25 (θ)	43.6	0.50	6	–	12–230	LS	B	771
	Tetrahydrofuran	25	11.5	0.65	6	–	12–230	LS	B	771
Poly(methacrolein)	Dimethylformamide	20	2.8	0.97	–	?	0.5–2	OS, CR	?	204
Poly(methacrylic acid)	*N,N*-Dimethylformamide/ 1,4-dioxane (5/7, v/v)	26.9 (θ)	103	0.50	7	–	27.5–101	LS	–	907
	Methanol	26	242	0.51	6	–	4–20	OS	B	147
	Aq. HCl (0.002 M)	30	66	0.50	7	–	10–90	LV	C	148
	Aq. $NaNO_3$ (2 M)	25	44.9	0.65	6	–	8–70	OS	B	149
Poly(methacrylonitrile)	Acetone	20	95.5	0.56	–	4	35–100	OS	C	202
	Dimethylformamide	29.2	306	0.503	–	15	0.6–8	LV	C,H	203
Poly(2-methoxyethyl methacrylate)										
	Butanone	25	7.34	0.71	12	–	4–220	LS	A–B	725
	Tetrahydrofuran	25	7.57	0.71	12	–	4–220	LS	A–B	725
Poly(methyl butacrylate)	Butanol	13 (θ)	57.0	0.50	4	–	6–60	LS	A	168
	Butanone	30	5.43	0.73	10	–	7–430	LS	A	168
Poly(methyl α-chloroacrylate)	Chloroform	30	3.08	0.78	8	–	20–780	LS	D	726
Poly(methyl ethacrylate)	Benzene	30	2.35	0.82	6	–	16–110	LS	A	168
	Butanone	30	4.29	0.75	10	–	4–200	LS	A	168
	2,6-Dimethyl-4-heptanone	11.4 (θ)	67.6	0.50	10	–	4–200	LS	A	168
Poly(methyl methacrylate)										
atactic	Acetone	20	5.5	0.73	7	–	7–700	SD	A–B,R	169
		20	3.90	0.76	7	–	7–700	SD	A–B	169
		25	7.5	0.70	9	–	8–137	LS	B	170
		25	6.76	0.71	10	–	3–700	SD	A–B	171
		25	7.5	0.70	14	–	2–740	LS, SD	A–B	172
		25	5.3	0.73	7	–	2–780	LS	A–B,R	173
		25	9.6	0.69	4	–	180–350	LS	A–B	174
		25	7.5	0.70	4	6	3–98	LS	B–C	175
		25	2.45	0.80	9	–	6–210	OS	B–C	176
		25	6.59	0.71	6	–	5–41	OS	B	177
		30	7.7	0.70	6	–	6–263	LS	A–B	178
		39	6.40	0.72	6	–	5–41	OS	B	177
		46	6.18	0.72	6	–	5–41	OS	B	177
	Acetonitrile	30	39.3	0.50	6	–	10–86	LV	A–B	178
		45 (θ)	48	0.50	6	–	10–260	LV	A–B,R	179
		50	29	0.54	6	–	10–260	LV	A–B	180
		65	9.8	0.64	5	–	10–260	LV	A–B	180
	Benzene	20	8.35	0.73	7	–	7–700	SD	A–B	169
		20	15.1	0.70	7	–	8–90	SD		181
		25	7.24	0.76	10	–	6–100	OS	B	182
		25	5.5	0.76	11	–	2–740	LS	A–B,R	173

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
		25	3.80	0.79	5	–	24–450	LS		183
		25	83	0.52	7	–	0.03–1	EB	A,L	184
		30	5.2	0.76	9	–	6–250	LS	A–B,R	178
		30	6.27	0.76	5	–	4–73	OS	A	185
		30	104	0.50	9	–	0.02–2	OS	A,L	185
		30	195	0.41	5	–	0.3–2	LS	A–B,L	178
		39	6.74	0.75	6	–	5–41	OS	B	177
		53	6.52	0.76	6	–	5–41	OS	B	177
	Butanone	25	6.8	0.72	9	–	8–137	LS	B,R	170
		25	7.1	0.72	7	–	41–330	LS	A–B	174
		25	6.8	0.72	4	6	3–98	LS	B–C	175
		25	9.39	0.68	15	–	16–910	LS	A–B	186
plasma initiated		25	11 ± 2	0.69			1610–3000	LS		727
	Butyl chloride	35.4 (θ)	50.5	0.50	4	–	13–68	SA	A–B	187
	Chloroform	20	9.6	0.78	18	–	1.4–60	OS		188
		20	4.88	0.82	8	–	6–100	OS	B	182
		20	4.85	0.80	9	–	8–200	SD	A–B,R	169
		20	6.0	0.79	12	–	3–780	LS	A–B	173,189
		25	4.8	0.80	9	–	8–137	LS	B	170
		25	3.4	0.83	6	–	40–330	LS	A–B	174
		25	5.81	0.79	6	–	5–41	OS	B	177
living type		30	4.3	0.80	–	8	13–263	LS	A–B	178
		39	5.02	0.80	6	–	5–41	OS	B	177
		53	3.90	0.79	6	–	5–41	OS	B	177
		Unc.	5.1	0.79	13	–	7–400	LS	B	190
	p-Cymene	159.7 (θ)	57.5	0.50	4	–	6.6–171	LV	A–B	191
	1,2-Dichloroethane	25	17.0	0.68	4	6	3–98	LS	B–C	175
		30	5.3	0.77	–	7	6–263	LS	A–B,R	178
	Ethyl acetate	20	21.1	0.64	8	34	6–110	SD		192
	3-Heptanone	33.7 (θ)	63.1	0.50	4	–	6.6–171	LV	A–B	191
	4-Heptanone	33.8 (θ)	48	0.50	5	–	1–172	LS	A–B,R	179
	Methyl isobutyrate	30	9.9	0.67	6	–	19–260	LV	A–B	178
	Methyl methacrylate	20	16.2	0.65	9	–	1.8–160	LS	A	918
		40	11.3	0.68	9	–	1.8–160	LS	A	918
		60	21.2	0.64	9	–	1.8–160	LS	A	918
	Methyl methacrylate	30	6.75	0.72	3	–	13–170	LV	A–B	178
	Nitroethane	25	5.70	0.74	2	6	10–200	LS	C	193
	3-Octane	72 (θ)	50	0.50	3	–	13–260	LV	A–B	179
	Propanol	84.4 (θ)	67.9	0.50	4	–	6.6–171	LV	A–B	191
	Tetrachloroethane	25	12.8	0.73	6	–	5–41	OS	B	177
		53	12.2	0.73	6	–	5–41	OS	B	177
	2,2,3,3-Tetrafluoro-propanol	25	7.2	0.79	7	–	7–95	LV	A	194
	Tetrahydrofuran	25	7.5	0.72				LS	A	732
	Toluene	25	7.1	0.73	7	–	4–330	LS	A–B	174
		25	8.12	0.71	6	–	5–41	OS	B	177
		25	78	0.50	10	–	0.2–7	OS	A,L	195
		30	7.0	0.71	6	–	19–263	LV	A–B	178
		39	7.24	0.72	6	–	5–41	OS	B	177
		53	6.63	0.73	6	–	5–41	OS	B	177
	Butanone/2-propanol									
	(55/45, v/v)	23	47.0	0.55	6	–	40–300	LS	A–B	174
	(50/50, v/v)	25 (θ)	59.2	0.50	7	–	30–280	LS	A–B	196
		25 (θ)	42.8	0.50	5	–	77–490	LS	A–B	186
	Methanol/toluene (9/5, v/v)	26.2 (θ)	55.9	0.50	3	–	60–300	LS	A–B	156
oligomer-polymer										
atactic, f_{racem} = 0.79	Acetonitrile	44.0	–	Not const.	22	–	0.032–283	LS	A	916
	Benzene	30.0	–	Not const.	15	–	0.032–75.8	LS	A	916
	n-Butyl chloride	40.8	–	Not const.	21	–	0.032–283	LS	A	916
isotactic	Acetone	30	23.0	0.63	7	–	5–128	LS	A–B	199
	Acetonitrile	20	130	0.448	5	–	3–19	LV	A	198
		27.6 (θ)	75.5	0.500	5	–	3–19	LV	A	198

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
		35	46	0.546	5	–	3–19	LV	A	198
		50	26.2	0.602	5	–	3–19	LV	A	198
		27.5 (θ)	76.2	0.50	6	–	13–68	LS	B	728
	Benzene	30	5.2	0.76	5	–	5–128	LS	A–B	199
	p-Cymene	152.1 (θ)	56.6	0.50	4	–	7–131	LV	A–B	191
	3-Heptanone	40.0 (θ)	87.0	0.50	4	–	7–131	LV	A–B	191
	Propanol	75.9 (θ)	76.1	0.50	4	–	7–131	LV	A–B	191
	2,2,3,3-Tetrafluoro-propanol	25	7.05	0.78	11	–	2–100	LV	B	194
	Butanone/2-propanol (1/1, v/v)	30.3 (θ)	90.0	0.50	4	–	7–131	LV	A–B	191
5%-iso, 51%-hetero, 43%-syndiotactic	Acetonitrile/chlorobenzene									
	(4.4/95.6, v/v)	25 (θ)	68.3	0.50	4	–	73–232	LS	A	785
	(91.2/8.8, v/v)	25 (θ)	63.5	0.50	4	–	73–232	LS	A	785
Poly(α-methyleneglutaronitrile)	Dimethylformamide	25	31.6	0.65	–	8		LS	H	731
Poly(methyl phenylacrylate), see 1.9 Other Compounds poly(1-methoxycarbonyl-1-phenylethylene)										
Poly(β-naphthyl methacrylate)	Benzene	20	27.2	0.55	6	–	17–262	LS	B	729
	Tetralin	20 (θ)	47.5	0.50	4	–	57–262	LS	B	729
Poly[4-(4-nonyloxy-phenyl methacrylate], Poly(phenylmethacrylic ester of nonyloxybenzoic acid)										
	Carbon tetrachloride		24.3	0.5	20	–	20–220	SD		730
Poly(octadecyl methacrylate)	Tetrahydrofuran	30	2.5	0.75	–	4	20–170	LS	C,H	200
Poly(octyl methacrylate)	Butanol	16.8 (θ)	26.8	0.50	10	–	33–1250	LS	B	201
	Butanone	23	4.47	0.69	10	–	33–1250	LS	B	201
	Butyl acetone	10.5 (θ)	–	0.45	4	–	62–320	LS	C	920
		20	–	0.53	4	–	62–320	LS	C	920
		30	–	0.54	4	–	62–320	LS	C	920
Poly(*N*-phenyl methacrylamide)	Acetone	20	28.2	0.75	8	–	10–320	LS		370
	n-Propyl acetate	36 (θ)	37.1	0.50	11	–	1.5–93	LS, OS, SEC	B	913
	Tetrahydrofuran	30	8.95	0.67	11	–	1.5–93	LS, OS, SEC	B	913
Poly(2-selenolylmethyl methacrylate)										
	Chlorobenzene	25	36.3	0.56	5	–	3.6–21	VOS, SEC	A–B	922
	Tetrahydrofuran	25	18.1	0.65	5	–	3.6–21	VOS, SEC	A–B	922
Poly(stearyl methacrylate)	Tetrahydrofuran	30	9.0	0.67	12	–	1.5–94	LS	B	733,751
Poly(tetrahydrofurfuryl methacrylate)										
	Acetone	30	24.0	0.66	7	–	16–62	OS	B	734
Poly(tetrahydro-4H-pyranyl 2-methacrylate)										
	Isobutanol	30.4 (θ)	31.9	0.50	6	–	4–85	GPC		735
Poly(2-thiophenmethyl methacrylate)										
	Chlorobenzene	25 (θ)	4.35	0.50	6	–	48–59	SEC	A–B	921
	Tetrahydrofuran	25	6.95	0.72	6	–	48–59	SEC	A–B	921
	Thiophen	25	9.00	0.66	6	–	48–59	SEC	A–B	921
Poly(*N*,*N*,*N*-trimethyl aminoethyl chloride acrylate)										
	Aq. NaCl (1 N)	25	2.3	0.82	–	4	85–510	LS	D	905
Poly(tridecyl methacrylate)	Ethyl acetate	27 (θ)	32.2	0.50	10	–	8.2–138	LS, OS, SEC	B	913
	Tetrahydrofuran	30	4.74	0.71	10	–	8.2–138	LS, OS, SEC	B	913
	Tetrahydrofuran	30	2.93	0.76	6	–	4–85	GPC		735
Poly[2-(triphenylmethoxy)ethyl methacrylate]										
	Mesitylene	47 (θ)	30	0.50				LV		736
1.5. POLY(VINYL ETHERS)										
Poly[(hexadecyloxy)ethylene]	Heptane	21	70.8	0.50	6	–	0.5–3	SD	B,L	205
Poly(methoxyethylene)	Benzene	30	76	0.60	13	–	1–45	LS	B	206
	Butanone	30	137	0.56	13	–	1–45	LS	B	206
Poly[(octadecyloxy)ethylene]	Benzene	25	170	0.47	–	7	0.1–1.5	LS	D,H	200
	Tetrahydrofuran	30	224	0.35	–	7	9.4–11	LS	D,H	200
Poly(vinyl methyl ether), see Poly(methoxyethylene)										
1.6. POLY(VINYL ALCOHOL), POLY(VINYL HALIDES)										
Poly(chlorotrifluoroethylene)	2,5-Dichlorobenzo-trifluoride	130	6.15	0.74	7	–	7–51	OS	B	234

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(tetrafluoroethylene-*alt*-ethylene), see also Poly(ethylene-*alt*-tetra-fluoroethylene) in group 1.2										
Poly(vinyl alcohol)	Water	25	20	0.76	6	–	0.6–2.1	OS	B	208
		25	300	0.50	4	–	0.9–17	SD		209
		25	140	0.60	3	–	1–7	SD	B	210
		30	66.6	0.64	8	–	0.6–16	OS	B	212
		30	42.8	0.64	–	14	1–80	LS	C	213
		30	45.3	0.64	–	–	1–80	LS	A,R	213
		30	73.4	0.63	7	–	3–12	LV	B	737
		80	94	0.56	–	5	10–46	LS	B	214
	Phenol/water (85/15, v/v)	30	24.6	0.80	–	21	3–12	LV	B	215
	Water/dimethylsulfoxide									
	(100/0, v/v)	30	74.3	0.63	7	–	DP = 815–2830	VG	C	924
	(90/10, v/v)	30	–	Not clear	5	–	DP = 815–3400	VG	C	924
Poly(vinyl bromide)	Cyclohexanone	25	32.8	0.55	7	–	2–10	LS	B	217
	Tetrahydrofuran	25	15.9	0.64	7	–	2–10	LS	B	217
	Methanol/tetrahydrofuran									
	(17/83, v/v)	20	38.8	0.50	7	–	2–10	LS	B	218
Poly(vinyl chloride)	Benzyl alcohol	155.4 (θ)	156	0.50	9	–	4–35	LS	B	219
	Chlorobenzene	30	71.2	0.59	7	–	3–19	SA	B	220
	Cyclohexanone	20	11.6	0.85	–	6	2–10	OS	C	221
		20	13.7	1.0	7	5	7–13	OS	C,D	222
		20	112.5	0.63	5	3	9–15	OS	D,H	222
		25	12.3	0.83	11	–	2–14	OS		223
		25	24	0.77	13	–	3–14	OS		224
		25	204	0.56	?	–	2–15	OS	C	225
		25	174	0.55	6	–	6–22	LS	C	226
		25	8.5	0.75	5	–	4–20	LS	B	227
		25	13.8	0.78	28	–	1–12	LS	A,B,R	228
		30	16.3	0.77	6	–	3–19	SA	B	220
	Tetrahydrofuran	20	3.63	0.92	20	–	2–17	OS	B	229
		25	15.0	0.77	22	–	1–12	LS	A,B	228
		25	16.3	0.766	23	–	2–30	LS	A,B,R	230
		25	49.8	0.69	5	–	4–40	LS	A–B	231
		30	63.8	0.65	9	–	3–32	LS		232
		30	83.3	0.83	7	–	3–19	SA	B	220
		30	219	0.54	16	–	5–30	LS		233
Poly(vinyl fluoride)	Dimethylformamide	90	6.42	0.80	–	9	14–66	SV	D	235
Poly(vinylidene chloride)	Hexamethylphos-phoramide	25	25.8	0.65	–	7	0.8–12	LS	C	738
	1-Methyl-2-pyrrolidone	25	13.1	0.69	–	7	0.8–12	LS	C	738
	Tetramethylene sulfoxide	25	13.9	0.69	–	7	0.8–12	LS	C	738
Poly(vinylidene fluoride)	*N*,*N*-Dimethylacetamide, *N*,*N*-dimethylformamide, *N*-methylpyrrolidone, *N*,*N*-dimethyl-*N*,*N*-tri-methylene urea	25	45	0.70	–	7	–	LS	–	925

1.7. POLY(VINYL ESTERS)

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(allyl acetate)	Benzene	27	66	0.53	8	–	0.1–0.3	CR		216
Poly(vinyl acetate)	Acetone	6	$[\eta] = 0.104 M^{0.50} + 0.00725 M^{0.90}$		21	–	0.3–150	LS	A	236
		18	24.5	0.67	6	–	4–34	OS	B	237
		20	15.8	0.69	6	–	19–72	LS		238
		25	21.4	0.68	6	–	4–34	OS	B	237
		25	18.8	0.69	?	?	?	LS		239
		25	14.6	0.72	–	6	0.7–1.3	EG	C,L	240
		25	10.8	0.72	10	–	0.9–2.5	EG	B,L	240
		30	17.6	0.68	16	–	2–163	OS	A–B	241
		30	8.6	0.74	8	–	8–66	LS	A–B	242
		30	17.4	0.70	?	–	7–68	OS		243
		30	10.2	0.72	–	8	3–126	LS	C	244
		30	10.1	0.73	11	–	6–150	LS	A	236

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	No. of samples W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
		30	$[\eta] = 0.097 M^{0.50} + 0.00723 M^{0.90}$		22	–	0.3–150	LS	A	236
		46	13.8	0.71	6	–	4–34	OS	A	236
	Acetonitrile	25	16.2	0.71	–	–	24–215	LS	B	246
		30	41.5	0.62	4	–	97–153	LS	A–B	247
	Benzene	30	22	0.65	5	–	34–102	LS	A–B	248
		30	56.3	0.62	24	–	3–86	OS	B	249
		30	56.3	0.62	12	–	7–54	LS	B	250
		35	21.6	0.675	14	–	5–40	LS	A–B	251
	Butanone	25	13.4	0.71	6	–	25–346	LS	A	252
		25	42	0.62	15	–	2–120	SD,LS	A,B	253
		30	10.7	0.71	–	13	3–120	LS	C	244
	Chlorobenzene	25	110	0.50	9	–	0.15–7	OS	A	195
		25	94.4	0.56	6	–	4–34	OS	A	236
		53	53.7	0.60	6	–	4–34	OS	A	236
		67	28.9	0.65	6	–	4–34	OS	A	236
	Chloroform	20	15.8	0.74	?	?	7–68	OS		243
		25	20.3	0.72	5	–	4–34	OS	A	236
		53	14.7	0.74	5	–	4–34	OS	A	236
	Dioxane	25	11.4	0.74	5	–	4–34	OS	B	237
		53, 60	10.2	0.75	5	–	4–34	OS	B	237
	Ethanol	56.9 (θ)	90	0.50	5	–	4–150	OS, LS	A	236
	Ethyl formate	30	32	0.65	4	–	16–154	LS	A–B	247
	3-Heptanone	26.8 (θ)	82.0	0.50	5	–	4–150	OS, LS	A	236
		29 (θ)	92.9	0.50	18	–	5–83	LS	A–B	255
	Methanol	6 (θ)	101	0.50		–	0.3–150	OS, LS, VOS		236,245
		25	38.0	0.59	5	–	4–22	OS	B	237
		30	31.4	0.60	–	13	3–120	LS	C	244
		53	36.6	0.59	5	–	4–22	OS	B	237
	6-Methyl-3-heptanone	66 (θ)	82.0	0.50	9	–	14–83	LS	A–B	255
		66 (θ)	78.0	0.50	3	–	9–150	OS, LS	A	236
	4-Methyl-2-pentanone	30	44.9	0.60	5	–	12–69	LS		247
	Tetrahydrofuran	25	16	0.70	11	–	5–50	GPC	B,C	739
		35	15.6	0.708	9	–	1.7–117	GPC	B	740
	Toluene	25	108	0.53	4	–	4–15	OS	B	237
		67	156	0.49	4	–	4–15	OS	B	237
	1,2,4-Trichlorobenzene	35	33.0	0.623			5–40	LS		251
	Heptane/3-methyl-2-butanone (27.3/72.7, v/v)	25	92	0.50	6	–	25–287	LS	C	244
Poly(vinyl benzoate)	Xylene	32.5 (θ)	62.0	0.50	5	–	10–24	OS	B	334
Poly(vinyl butyrate)	Benzene	30	11.15	0.735	–	4	3–15	OS	C	256
Poly(vinyl caproate)	Benzene	30	15.47	0.689	–	4	3–126	OS	C	256
Poly(vinyl 4-chlorobenzoate)	Water	30	64.0	0.64	7	–	6–35	LV	B	336
	Butanol/butanone (47/53, v/v)	60 (θ)	73	0.50	7	–	6–35	LV	B	336
Poly(vinyl formate)	Acetone	30	29.3	0.63	–	9	3–41	LV	C	257
	Acetonitrile	30	14.1	0.717	–	9	3–41	LV	C	257
	Dioxane	30	20.7	0.68	–	8	3–41	LV	C	257
	Methyl acetate	30	37.6	0.61	–	7	3–24	LV	C	257
	Methyl formate	30	14.1	0.722	–	7	3–24	LV	C	257
Poly(vinyl isobutyrate)	Benzene	30	11.05	0.711	–	4	5–20	OS	C	256
Poly(vinyl isocaproate)	Benzene	30	51.0	0.575	–	4	3–17	OS	C	256
Poly(vinyl pivalate)	Acetone	25	2.88	0.77	4	–	40–217	LS	C	258
	Butanone–methanol (0.897 g/ml)	20	53	0.50	2	–	222–344	LS	C	258
Poly(vinyl sulfate)	Aq. NaCl (0.5 M)	20	0.55	1.06	6	–	1–6	LV	C	261

1.8. POLY(STYRENE) AND DERIVATIVES

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	No. of samples W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(4-acetoxystyrene)	Butyl acetate	26.8 (θ)	52.0	0.50	13	–	15–219	LS	A–B	937
	Dioxane	25	16.7	0.65	22	–	0.91–352	LS	A–B	937
	Isopropyl acetate	19.7 (θ)	52.0	0.50	13	–	15–219	LS	A–B	937
	Tetrahydrofuran	25	17.5	0.64	20	–	0.91–352	LS	A–B	937

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples		Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
					Fr.	W.P.				
Poly(4-bromostyrene)	Benzene	20 (θ)	95.5	0.53	10	–	3–30	OS	B	347
		26.3 (θ)	50.0	0.50	5	–	84–250	LS	A,R	348
	Chlorobenzene	30	7.43	0.69	5	–	59–400	LS	A	348
	Toluene	30	18.2	0.57	5	–	63–400	LS	A	349
Poly(*p-tert*-butylstyrene)	Benzene	35	7.1	0.74	4	–	1.8–640	LS	A	741
	Benzene	35	6.58	0.739	7	–	1.3–174	LLS, SEC, OS	A	934
	Cyclohexane	25	8.52	0.717	10	–	1.3–240	LLS, SEC, OS	A	934
	Cyclohexane	35	9.9	0.71	4	–	1.8–640	LS	A	741
	1-Hexanol	65.0	64.7	0.480	6	–	16–240	LLS, SEC, OS	A	934
	Cyclohexane	35.0	11.1	0.694	7	–	2.7–45.5	OS, LLS	A	938
	1,4-Dioxane	25.0	21.4	0.604	4	–	9.3–45.5	OS, LLS	A	938
		38.0	14.3	0.644	4	–	9.3–45.5	OS, LLS	A	938
	1-Nitropropane	31.0	60.0	0.489	7	–	2.7–45.5	OS, LLS	A	938
	1-Nitropropane	31 (θ)	61	0.49	4	–	1.8–640	LS	A	741
	3-Nonanol	10.9	66.5	0.490	6	–	16–240	LLS, SEC, OS	A	934
	2-Octanol	32.7	60.8	0.492	6	–	16–240	LLS, SEC, OS	A	934
	2-Octanol	32.7	61.0	0.489	7	–	2.7–45.5	OS, LLS	A	938
	Tetrahydrofuran	30.0	10.4	0.70	7	–	2.7–45.5	OS, LLS	A	938
Poly(2-chlorostyrene)	Butanone	24.5 (θ)	46.8	0.50	7	–	20–80	LS	A,R	742
		25 (θ)	46.0	0.50	5	–	20–100	LS	A,B	743
	Toluene	25	11.5	0.66	6	–	14–101	LS	A,B	743
		30	14.3	0.65	10	–	23–143	LS	A	350
Poly(4-chlorostyrene)	Benzene	30	30.6	0.56	–	8	10–200	LS	C	351
		26.7	29.3	0.56	5	–	34–180	LV	B	744
	Benzene–methanol (4.5/1, v/v)	41.6 (θ)	56.8	0.50	5	–	34–180	LV	B	744
	Butanone	25	29	0.59	7	–	3–140	LS	B,R	352
		30	3.52	0.75	6	–	17–270	OS	B	353
	Chlorobenzene	30	2.19	0.80	6	–	17–270	OS	B	353
	Chloroform	30	14.8	0.65	–	8	10–200	LS	C	351
	Dioxane	30	17.6	0.62	–	8	10–200	LS	C	351
	Ethylbenzene	30	21.8	0.60	6	–	10–180	LS	B	745
	Toluene	20	24.1	0.605	–	7	2–40	LS	B	354
		25	13.2	0.645	–	7	1–244	LS	B	355
		30	13.0	0.64	6	–	3–140	LS	B,R	352
		30	11.8	0.65	7	–	21–140	LS	A	349
		30	5.37	0.71	7	–	17–270	OS	B	353
Poly(4-cyclohexylstyrene)	Heptane	30	32.3	0.54	6	–	4–30	OS	A–B	266
	Toluene	30	10.6	0.69	7	–	2–30	OS	A–B	266
Poly(2,5-dichlorostyrene)	Toluene	21	12.6	0.69	9	–	7–66	LS		356
	Ethanol/ethyl acetate (1/15, w/w)	30.5 (θ)	35.5	0.50	8	–	50–130	LS		357
Poly(3,4-dichlorostyrene)	Chlorobenzene	30	4.39	0.72	7	–	8–51	OS	A	358
	o-Dichlorobenzene	30	4.11	0.73	7	–	8–51	OS	A	358
	Butanol/butyl acetate (1/13, w/w)	32.9 (θ)		0.50	8	–	40–540	LS		359
Poly(2,4-dimethylstyrene)	Benzene	20	3.8	0.79	6	–	3–22	LS	B,C	746
	Butyl acetate	20	10.2	0.68	8	–	3–22	LS	B,C	746
	Cyclohexane	20	14.8	0.65	7	–	3–22	LS	B,C	746
	Toluene	30	9.52	0.70	–	9	5–120	LS	C	333
Poly(1,4-divinylbenzene)	*trans*-Decalin	25.0 (θ)	286	0.32	7	–	0.7–180	LS, SE	Branching	895
Poly(3-fluorostyrene)	Benzene	25	15.3	0.69						747
	Butanone	25	13.8	0.70						747
	Carbon tetrachloride	25	65.6	0.53			0.5–8	LS	C	747
	Chloroform	25	12.8	0.70	–	8	1–15	LS	C	747
Poly(4-fluorostyrene)	Benzene	25	40.8	0.58						747
	Butanone	25	11.1	0.73						747
	Carbon tetrachloride	25	82.8	0.50						747
	Chloroform	25	16.1	0.69	–	8	0.2–13	LS	C	747
Poly(4-hydroxystyrene)	Dioxane	25	20.3	0.66	11	–	3.8–583	LS	–	940
	Ethyl propionate	25	63.7	0.52	11	–	3.8–583	LS	–	940
	Isobutyl acetate	25	59.4	0.53	11	–	3.8–583	LS	–	940
	Tetrahydrofuran	25	37.2	0.60	10	–	3.8–583	LS	–	940
	1-Chloro-*n*-hexane	5.7	91.6	0.468	9	–	5.9–90.3	LS, SEC, OS	A	888

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(4-iodostyrene)	Dioxane	20	33	0.51	10	6	10–118	LV	B-C	360
Poly((*p*-isopropyl-α-methylstyrene)										
	Tetrahydrofuran	25	45	0.55	8	–	1–63	LS	A-D	748
Poly(*p*-isopropylstyrene)	Toluene	25	12.3	0.69	–	5	14–75	LS	B,C	265
Poly(*o*-methoxystyrene)	Butanone	30	18.6	0.59	5	–	13–35	LS	A–B	362
	Toluene	30	6.40	0.71	5	–	13–35	LS	A–B	362
	Methanol/toluene (25/75, v/v)	30 (θ)	57.5	0.50	4	–	15–30	LS	A–B	362
Poly(*p*-methoxystyrene)	Butanone	30	3.75	0.73	5	–	13–75	LS	A–B	362
		35	8.6	0.68	6	–	1–100	LS	B	352
	Chlorocyclohexane	25	17.7	0.63	16	–	22–220	LS	A	363
	Pentyl acetate	25	55	0.52	16	–	22–220	LS	A	363
	Toluene	25	10.5	0.70	16	–	22–220	LS	A	363
		30	5.28	0.73	5	–	13–75	LS	B	362
		30	18.0	0.62	6	–	1–100	LS	B	352
	Methanol/toluene (28.1/71.9, v/v)	30 (θ)	62.1	0.50	5	–	7–180	LS	B	362
Poly(α-methylstyrene) anionic, (ca. 50%-hetero, ca. 40%-syndio)										
	Benzene	30	10.3	0.72	–	9	4–170	LS	A	319
		30	9.15	0.726	–	6	37.5–685	LS	A	873
	Cyclohexane	34.5 (θ)	73	0.50	–	10	4–750	LS, OS	A	320
		37 (θ)	78	0.50	–	9	9–400	LS	A	321
		38 (θ)	76	0.50	–	6	2–66	LS	A	322
		38.6 (θ)	76.0	0.50	–	9	4–170	LS	A	323
		39	71.3	0.51	–	9	3–140	LS	A	324
	trans-Decalin	9.5 (θ)	67	0.50	–	9	8–750	LS, OS	A	320
	Toluene	25	7.06	0.744	–	9	8–750	LS, OS	A	320
		25	7.81	0.73	–	6	3–60	SD	A	325
		30	10.8	0.71	–	13	2–66	LS	A	322,326
cationic	Benzene	30	24.9	0.647	4	–	14–91	OS	B	327
(10%-hetero, 90%-syndio)	Cyclohexane	32.5 (θ)	66.0	0.50	5	–	2–370	LS	B	328
(19%-hetero, 80%-syndio)		33.3 (θ)	72.7	0.50	8	–	2–18	LS	B	328
	Toluene	30 (θ)	2.2	0.80	6	–	1–100	LS	B	329
	Benzene/methanol (79.4/20.6, v/v)	30	76.8	0.50	4	–	14–91	OS	B	327
		10.0	71.8	0.491	9	–	5.9–90.3	LLS, SEC, OS	A	888
	1-Chloro-*n*-heptane	20.0	94.9	0.459	9	–	5.9–90.3	LLS, SEC, OS	A	888
		27.0	79.6	0.477	9	–	5.9–90.3	LLS, SEC, OS	A	888
	1-Chloro-*n*-octane	43.0	94.8	0.461	9	–	5.9–90.3	LLS, SEC, OS	A	888
		53.0	65.1	0.497	9	–	5.9–90.3	LLS, SEC, OS	A	888
		80.0	74.6	0.484	9	–	5.9–90.3	LLS, SEC, OS	A	888
	n-Hexyl acetate	85.0	86.4	0.474	9	–	5.9–90.3	LLS, SEC, OS	A	888
	Cyclohexane	34.5	74.0	0.493	11	–	2.01–90.3	LLS, SEC, OS	A	888
	trans-Decalin	10.0	83.0	0.480	11	–	2.01–90.3	LLS, SEC, OS	A	888
	n-Butyl chloride	35.5	40.0	0.56	16	–	0.2–130	OS, GPC	B	927
	Carbon tetrachloride	45	19.4	0.67	16	–	0.2–130	OS, GPC	B	927
	Chloroform	25	13.3	0.70	16	–	0.2–130	OS, GPC	B	927
	Tetrahydrofuran	25	11.1	0.69	16	–	0.2–130	OS, GPC	B	927
	Toluene	25	10.1	0.71	16	–	0.2–130	OS, GPC	B	927
	n-Butyl chloride	5	33.6	0.570	8	–	6.0–107	LLS, LS	A	935
		25	27.0	0.590	15	–	5.4–354	LLS, LS	A	935
		50	26.5	0.594	8	–	6.0–107	LLS, LS	A	935
Poly(*m*-methylstyrene)	Benzene	30	7.36	0.76	9	–	8–115	OS	A	330
	Cyclohexane	30	11.76	0.70	7	–	15–83	OS	A	330
	Ethyl acetate	30	17.42	0.64	7	–	15–83	OS	A	330
Poly(*p*-methylstyrene)	Diethyl succinate	16.4 (θ)	70	0.50	6	–	16–200	LS	A	331
	Toluene	30	8.86	0.74	9	–	19–180	LS	A	331
Poly(methylstyrene), position of substituent, unspecified										
	Cyclohexane	20	22	0.68	6	–	11–133	SV	A	332
Poly[(2,3,4,5,6-pentafluorostyrene)]										
	4-Methyl-2-pentanone	20	4.37	0.736	–	21	10–260	OS	C	364
Poly(styrene)	Benzene	20	6.3	0.78	18	–	1–300	SD	A	270
atactic		20	12.3	0.72	7	–	0.6–520	SD	A,R	271

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
		25	22.7	0.72	–	7	0.2–0.8	CR	C,L	272
		25	41.7	0.60	9	–	0.1–1	CR	B,L	272
		25	34.0	0.65	11	–	0.04–0.8	EG	A,L	273
		25	9.52	0.744	6	–	3–61	OS	A	274
		25	9.18	0.743	6	–	3–70	LS	A	275
		25	11.3	0.73	10	–	7–180	OS	A	276
		34	9.8	0.737	10	–	8–80	DV	A	277
	Butanone	25	39	0.58	16	–	1–180	LS	A,R	278
		25	30.5	0.60	5	–	7–150	OS	A	276
		25	19.5	0.635	7	–	12–280	LS	A	279
		30	23	0.62	7	–	40–370	LS	B	280
		34	28.9	0.60	10	–	8–80	DV	A	281,282
		35	17.1	0.64	13	–	4–640	LS	A	752
	Butyl chloride	40.8	15.1	0.659	5	–	29–106	LS	B	283
	n-Butyl chloride	25	17.4	0.662 ($M_w > 3.7 \times 10^4$)	8	–	0.97–67.5	LLS, SEC	A	933
		50	16.2	0.665 ($M_w > 3.7 \times 10^4$)	8	–	0.97–67.5	LLS, SEC	A	933
	Carbon tetrachloride	10	12.6	0.717	–	6	1.8–180	LV	A–B	901
		20	12.0	0.720	–	6	1.8–180	LV	A–B	901
		30	11.4	0.724	–	6	1.8–180	LV	A–B	901
		40	11.2	0.725	–	6	1.8–180	LV	A–B	901
		50	11.0	0.726	–	6	1.8–180	LV	A–B	901
	Chlorobenzene	25.7	7.4	0.749	4	–	62–424	LS	B	283
	Chloroform	25	7.16	0.76	8	–	12–280	LS	A	279
		25	11.2	0.73	5	–	7–150	OS	A	276
		30	4.9	0.794	4	–	19–373	OS	B	284
	Cyclohexane	28	108.0	0.479	7	–	0.6–69	OS	A	285
		34 (θ)	82	0.50	15	–	1–70	LV	A	274
		34 (θ)	90.2	0.503	9	–	0.6–69	OS	A	285
		34.5 (θ)	84.6	0.50	8	–	14–200	LS	A,R	286
		35 (θ)	80	0.50	3	–	8–42	LS	A	287
		35 (θ)	70	0.50	8	–	3–200	SD	B	288
		35 (θ)	76	0.50	10	–	4–137	LS	B	283
		40	41.6	0.554	10	–	4–137	LS	B	283
		45	34.7	0.575	10	–	4–137	LS	B	283
		50	26.9	0.599	10	–	4–137	LS	B	283
		50	36.4	0.584	7	–	4–52	LS	A	289
	cis-Decalin	25	40	0.574	8	–	4.8–2360	LS	A	936
	Decalin (100%-*trans*)	20	149	0.44	7	–	14–200	LS	A	290
		23	98	0.48	7	–	14–200	LS	A	290
		23.8 (θ)	–	0.50	–	–		LS	A	290
		25	67	0.52	7	–	14–200	LS	A	290
		30	61	0.53	6	–	14–200	LS	A	290
		60	22	0.63	4	–	14–200	LS	A	290
	Decalin (73%-*trans*)	18 (θ)	77	0.50	4	–	14–140	LS	A	290
		30	36	0.58	4	–	14–140	LS	A	290
		40	37	0.58	4	–	14–140	LS	A	290
		60	22	0.64	4	–	14–140	LS	A	290
		100	15.7	0.67	6	–	14–200	LS	A	290
	Dichloroethane	25	21.0	0.66	7	–	1–180	LS	A	278
		35	14.3	0.69	11	–	10–500	LS	A	689
	1,2-Dichloroethane	35	14.3	0.69	11	–	9–540	LS	A	752
	Diethyl malonate	34.2 (θ)	71.8	0.50	3	–	39–400	LV	B	291
	Diethyl oxalate	55.8 (θ)	73.0	0.50	3	–	39–400	LV	B	291
	Dimethylformamide	35	31.8	0.603	5	–	0.4–87	LS	A	754
	Dioxane	34	15.0	0.694	10	–	8–80	DV	A	282
	Ethyl acetate/cyclohexane (100/0–10/90)	–	18.2–43.8	0.54–0.67	5	–	11–96	–	A	939
		10	11.0	0.733	–	6	1.8–180	LV	A–B	901
		25	9.32	0.738	–	6	1.8–180	LV	A–B	901
		40	9.07	0.739	–	6	1.8–180	LV	A–B	901
		55	8.79	0.742	–	6	1.8–180	LV	A–B	901
		65	8.90	0.740	–	6	1.8–180	LV	A–B	901

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
	Ethylbenzene	25	17.6	0.68	5	–	7–150	OS	A	276
	Ethylcyclohexane	70 (θ)	75	0.50	2	–	36–127	LV	B	292
	Methylcyclohexane	70 (θ)	76	0.50	?	?	?	?		293
		70.5 (θ)	69.6	0.50	3	–	39–400	LV	B	291
	4-Methyl-2-pentanone	35	61.9	0.53			5–100	LS	B	698
	Tetrahydrofuran	25	11.0	0.725	–	7	1–100	GPC	A	749
		25	14	0.70				LS	C	756
	Toluene	20	4.16	0.788	10	–	4–137	LS	B	283
		25	7.5	0.75	8	–	12–280	LS	A	279
		25	8.48	0.748	7	–	4–52	LS	A	289
		25	10.5	0.73	6	–	16–100	LS	A,R	294
		25	17	0.69	9	–	1–160	LS	A	278
		25	7.54	0.783	?	?	5–80	OS		295
		25	13.4	0.71	5	–	7–150	OS	A	276
		25	44	0.65	–	9	0.5–4.5	OS		296
		25	(a increases with M)		10	–	0.08–3.7	CR	L	297
		25	100	0.50	8	–	0.05–0.5	CR	A,R,L	298
		30	9.2	0.72	9	–	4–146	LS	A	299
		30	12.0	0.71	8	–	40–370	LS	B	280
		30	11.0	0.725	7	–	8–85	OS	A–B	300
		34	9.7	0.733	10	–	8–80	DV	A	282
		35	12.6	0.71	16	–	3–650	LS	A	752
		35	12.9	0.71			5–100	LS	B	698
	Trichloro benzene	135	1.75	0.67						697
	Benzene/methanol (74/26, v/v)	34 (θ)	89	0.50	10	–	8–80	DV	A	277
	Butanone/methanol									
	(97.5/2.5, v/v)	25	22.4	0.62	8	–	12–280	LS	A	279
	(95.9/5.0, v/v)	25	26.3	0.60	8	–	12–280	LS	A	279
	(92.5/7.5, v/v)	25	35.7	0.57	8	–	12–280	LS	A	279
	(89/11, v/v)	25 (θ)	73	0.50	8	–	12–280	LS	A	279
	Butanone/2-propanol									
	(6/1, v/v)	23 (θ)	73	0.50	9	–	4–146	LS	A	299
	(82.6/17.4, v/v)	34 (θ)	71.8	0.50	10	–	8–80	DV	A	282
	Chloroform/methanol									
	(90/10, v/v)	25	7.7	0.75	8	–	12–280	LS	A	279,278
	(80/20, v/v)	25	12	0.68	8	–	12–280	LS	A	279,278
	(75/25, v/v)	25	46	0.54	8	–	12–280	LS	A	279,278
	(74.7/24.3, v/v)	25 (θ)	73	0.50	8	–	12–280	LS	A	279,278
	Dioxane/methanol									
	(65.1/34.9, v/v)	34 (θ)	72.6	0.50	10	–	8–80	DV	A	282
	Toluene/methanol									
	(90/10, v/v)	25	10.4	0.715	8	–	12–280	LS	A	279
	(80/20, v/v)	25	26	0.612	8	–	12–280	LS	A	279
	(76.9/24.8, v/v)	25	92	0.50	12	–	0.07–3.5	DV	A,L	298,297
	(75.2/24.8, v/v)	34 (θ)	88	0.50	10	–	8–80	DV	A	282
atactic, anionic	Benzene	25	100	0.50	–	7	0.04–1	VOS, EB	A,L	301
		25	7.8	0.75	17	–	40–6000	LS	A,R	750
		30	8.5	0.75	–	12	2.5–150	VOS	A	301
		30	11.5	0.73	–	5	25–300	LS	A	302
		30	9.50	0.74	–	6	31–500	LS	A	649
	Cyclohexane	34 (θ)	74.5	0.50	–	?	?	LS	B	304
		34.5 (θ)	85	0.50	–	12	0.04–150	LS	A,R	301,303
		34.5 (θ)	88	0.50	–	9	31–970	LS	A	649
		34.5 (θ)	88	0.50	17	–	1–6000	LS	A	750
		34.6 (θ)	91	0.50	–	4	25–300	LS	A	302
		35 (θ)	86	0.50	–	7	2–50	LS	A	305
	Cyclohexene	25	16.3	0.68	–	3	20–107	LS	A	306
	Decalin (66%-*cis*)	12.2 (θ)	80	0.50	–	6	2–50	LS	A	303
	Decalin (99%-*trans*)	20.4 (θ)	81	0.50	–	8	31–760	LS	A	649
	Dichloroethane	30	8.38	0.74	–	5	25–300	LS	A	302
	Dioctyl phthalate	22.0 (θ)	80	0.50	–	4	40–160	LS	A	303
	Tetrahydrofuran	25	13.63	0.714	13	–	2–4000	LS, OS, SD	A,R	753

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples		Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
					Fr.	W.P.				
	Thiophenol	25	14.6	0.70	6	–	42–842	LS	A	778
	Toluene	20	10.69	0.724	20	–	3–4000	LS, OS, SD	A,R	753
		20	11.2	0.72	–	6	3–24	SD		307
		25	9.77	0.73	–	12	1–104	SD	A,R	308
		25	34.5	0.62	–	25	0.4–230	SD	B	309
		30	8.81	0.75	–	5	25–300	LS	A	302
		30.3	10.4	0.73	–	15	2.6–50	OS, LS	A	310
isotactic	Benzene	30	9.5	0.77	6	–	4–75	OS		311
		30	10.6	0.735	7	–	4–37	OS	A–B,R	312
	Chloroform	30	25.9	0.734	3	–	9–32	OS	C-D	284
	o-Dichlorobenzene	25	17.9	0.677	5	–	2–100	LV	C	313
	Toluene	30	11.0	0.725	7	–	3–37	OS	A–B	312
		30	9.3	0.72	5	–	15–71	LS	A–B,R	314
branched, random type	Butanone	25	(a decreases with M)		5	–	30–200	LS	B-C	315
	Cyclohexane	35 (θ)	(a decreases with M)		9	–	8–300	LS	A	316
	Toluene	30	(a decreases with M)		9	–	8–300	LS	A	316
head-to-head	Tetrahydrofuran	25	53	0.61	8	–		LS	C	756
		35 (not θ)	–	0.465	12	–	0.69–43.6	GPC	B	926
		40	–	0.5	3	–	16.1–43.6	GPC	B	926
		35	–	0.67	12	–	0.69–43.6	GPC	B	926
	Cyclohexane	34.5	53	0.50	8	–	3–27	LLS, GPC	A–B	928
		35	–	0.52	10	–	4.4–27.6	LS	A–B	930
	Tetrahydrofuran	30	12.0	0.68	8	–	3–27	LLS, GPC	A–B	928
		25	–	–	–	–	?–18	LS	A–B	930
	Toluene	25	6.38	0.734	8	–	3–27	LLS, GPC	A–B	928
ring	Cyclohexane	40.0	55.6	0.50	10	–	0.7–44	LS		755
	Toluene	35.0	12.4	0.67	10	–	0.7–44	LS		755
star type										
three branches	Benzene	25	5.7	0.76	5	–	3–96	OS, GPC	A	757
	Cyclohexane	35	36	0.55	5	–	3–96	OS, GPC	A	757
four branches	Cyclohexane	35 (θ)	63.1	0.50	9	–	5–140	OS, LS	A	758
		50	26.5	0.58	9	–	5–140	OS, LS	A	758
	Toluene	35	7.4	0.73	9	–	5–140	OS, LS	A	758
regular H-shaped	Cyclohexane	35 (θ)	66.5	0.50	6	–	11–170	LS	A	759
	Toluene	35	74.7	0.73	6	–	11–170	LS	A	759
star type 3 arm	Cyclohexane	16.6–30.1 (θ) (depend on M_w)	–	–	–	–	–	LS	–	931
	Toluene	35	–	Not const.	–	–	–	LS	–	931
star type 15 arm	Cyclohexane	34.5 (not θ)	30	0.5	4	–	86–302	LS, OS, GPC	A–B	941
20 arm	Cyclohexane	34.5 (not θ)	24	0.5	3	–	26–148	LS, OS, GPC	A–B	941
star type, anionic	Cyclohexane	34 (θ)	$g' = 0.94$ (3 branches)*							304
			$g' = 0.82$ (4 branches)*							304
	Decalin	15	$g' = 0.48$ (9 branches)*							318
	Toluene	25	$g' = 0.90$ (3 branches)*							304
		34	$g' = 0.84$ (4 branches)*							304
Poly(styrenesulfonic acid)	Aq. HCl (0.52 M)	25	(0.344)	(1.0)	3	–	18–46	LV		365
	Aq. NaCl (0.52 M)	25	(0.312)	(1.0)	3	–	18–46	LV		365
–, sodium salt	Aq. NaCl									
	(4.17 M)	25 (θ)	20.4	0.50	4	–	49–228	LS	B	366
	(0.5 M)	25	18.6	0.64	6	–	39–234	LS	B,R	366
	(0.1 M)	25	17.8	0.68	6	–	39–234	LS	B	366
	(0.05 M)	25	13.9	0.72	6	–	39–234	LS	B	366
	(0.02 M)	25	10.1	0.78	6	–	39–234	LS	B	366
	(0.01 M)	25	2.8	0.89	5	–	39–234	LS	B	366
	(0.05 M)	25	2.3	0.93	5	–	49–234	LS	B	366
Aq. KCl	(3.1 M)	25	20.4	0.50	4	–	49–234	LS	B	366

[a] $g' = [\eta]$ of branched molecules/$[\eta]$ of linear molecules with same mol. wt.

1.9. OTHER COMPOUNDS

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(2-acrylamino-2-methylpropanesulfonamide)										
	Water	25	12.3	0.757	10	–	85–122	OS, LS	B	1011
	Water/1,4-dioxane (81.5/18.5, v/v)	25 (θ)	172	0.50	10	–	85–122	OS, LS	B	1011

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
Poly(allylammonium chloride)	Aqueous NaCl (0.05 M)	25	2.40	0.975	9	–	4.1–18	LS	–	900
	(0.2 M)	25	7.18	0.815	7	–	2.8–18	LS	–	900
	(0.5 M)	25	7.19	0.794	6	–	2.8–18	LS	–	900
	(1.0 M)	25	13.9	0.714	9	–	4.1–18	LS	–	900
Poly[(biphenyl-4-yl)-ethylene]	Benzene	20	21.4	0.619	5	–	7–170	LS	B	264
		30	29.5	0.59	6	–	1–110	LV	B	264
		75	27.7	0.589	5	–	7–170	LS	B	264
Poly(*tert*-butyl crotonate)	Butyl chloride	25	7.7	0.82	–	11	0.2–32	OS, GPC	A	760
	Toluene	25	7.7	0.82	10	–	0.6–35	OS, GPC	A	760
Poly(carbanilinoxyethylene), (Poly(vinyl carbanilate))	Dioxane	20	13.7	0.68	11	–	6–200	LS	A	335
	Dioxane/methanol (28/72, v/v)	20 (θ)	64.5	0.51	5	–	6–200	LS	A	335
Poly(dibutyl itaconate)	Toluene	25	5.70	0.70	8	–	20–105	LS	B	762
Poly(dicyclohexyl itaconate)	Tetrahydrofuran	25	23.3	0.58	5	–	5–56	OS	B	761
	Toluene	25	13.1	0.623	10	–	5–56	OS	B	761
Poly(didecyl itaconate)	Toluene	25	8.01	0.64	11	–	13–82	LS	B	762
Poly(diethyl fumarate)	Benzene	30	1.62	0.87	10	–	?–20	OS, GPC	A–B	1009
Poly(didodecyl itaconate)	Toluene	25	11.7	0.59	–	–	–	LS	–	945
Poly(diethyl itaconate)	Toluene	25	1.48	0.80	–	8	5–61	LS	B	762
Poly[di(ethylcyclohexyl) itaconate]	Toluene	25	2.62	0.73			16–170	LS	B	763
Poly(dihexadecyl itaconate)	Toluene	25	11.4	0.60	–	–	–	LS	–	945
Poly(dihexyl itaconate)	Toluene	25	3.71	0.72	–	8	12–122	LS	B	762
Poly(diicosayl itaconate)	Toluene	25	14.3	0.56	–	–	–	LS	–	945
Poly(diisopropyl fumarate)	Benzene	30	0.753	0.98	11	–	4.7–30	OS, GPC	A–B	1009
		(Wormlike behavior)								
Poly(dimethyl itaconate)	Benzene	25	5.15	0.68	–	8	4–120	LS	B	762
Poly[di(methylcyclohexyl) itaconate]	Toluene	25	2.02	0.76			13–102	LS	B	763
Poly(dioctyl itaconate)	Toluene	25	3.67	0.71	–	8	11–163	LS		762
Poly(diphenylmethylene)	Benzene		218	0.328	?		1–90	?		267
Poly(diphenyl itaconate)	Toluene	25	4.47	0.69	9	–	5.7–57	LS	–	943
Poly(dioctadecyl itaconate)	Toluene	25	13.1	0.59	–	–	–	LS	–	945
Poly(dipropyl itaconate)	Toluene	25	1.62	0.78	–	6	13–109	LS		762
Poly[di(propylcyclohexyl itaconate]	Pentyl acetate	25	14.0	0.56			16–91	LS	B	763
	Toluene	25	2.23	0.73			16–91	LS	B	763
Poly(ditetradecyl itaconate)	Toluene	25	9.91	0.61	–	–	–	LS	–	945
Poly(diundecyl itaconate)	Toluene	25	10.01	0.61	–	4	9–250	LS		762
Poly(1-methoxycarbonyl-1-phenylethylene)	Benzene	30	35.6	0.566	8	–	6–40	LS	A	361
	Chloroform	30	12.7	0.661	8	–	6–40	LS	A	361
	Ethylbenzene	15 (θ)	51.4	0.507	8	–	6–40	LS	A	361
Poly(monodecyl itaconate)	Tetrahydrofuran	25	–	Not const.	11	–	3.3–72.4	LS, SEC	A	1006
		(Wormlike behavior)								
Poly(monododecyl itaconate)	Tetrahydrofuran	25	11.2	0.65	9	–	1.7–233	LS, SEC	A	949
		(Wormlike behavior)								
Poly[bis(phenylethyl) itaconate]	Toluene	25	5.26	0.66	8	–	9.0–45	LS	–	943
Poly[bis(phenyl-*n*-propyl) itaconate]	Toluene	25	5.97	0.65	12	–	6.5–52	LS	–	943
Poly(9-vinyladenine)	Aq. NaCl (0.1 M)/ $NaAs(CH_3)_2$(0.1 M); pH7	26	241	0.35	3	–	9–51	OS		830
		40	29.2	0.53	3	–	9–51	OS		830
Poly(1-vinyl-3-benzylimidazolium chloride)	Aq. NaCl (0.2 M)	25	5.89	0.74	4	–	18–130	LS	B	813
	Methanol/$N(CH_3)_4$ Br(0.01 M)	25	13.4	0.63	5	–	18–160	LS	B	813
Poly(4-vinylbenzyl trimethylammonium chloride)	Aq. NaCl (0.5 M)	25	19.6	0.67	4	–	1–21	OS, GPC		764
	(0.1 M)	25	18.6	0.70	4	–	1–21	OS, GPC		764
	(0.01 M)	25	7.87	0.85	4	–	1–21	OS, GPC		764
	(0.002 M)	25	5.77	0.88	4	–	1–21	OS, GPC		764

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(vinylcarbazole)	Benzene	25	30.5	0.58	11	–	0.7–45	LS	A	367
	Bromobenzene	25	5.14	0.76	7	–	7–49	GPC	A–B	765
	Chlorobenzene	30	5.23	0.755	6	–	7–57	GPC	A–B	766
		45	4.44	0.776	6	–	7–57	GPC	A–B	766
	Chloroform	25	5.93	0.74	7	–	7–49	GPC	A–B	765
		25	13.6	0.67	8	–	3–45	LS	A	367
	Cyclohexanone	25	20.0	0.61	9	–	2–45	LS	A	367
	1,2-Dichlorobenzene	25	11.0	0.68	7	–	4–44	GPC	A–B	767
	1,3-Dichlorobenzene	25	5.6	0.75	6	–	7–49	GPC	A–B	767
	Nitrobenzene	25	9.25	0.69	6	–	7–49	GPC	A–B	765
		30	7.19	0.716	6	–	7–57	GPC	A–B	766
		45	6.03	0.739	6	–	7–57	GPC	A–B	766
	Tetrachloroethane	25	12.9	0.68	9	–	2–45	LS	A	367
	Tetrahydrofuran	25	14.4	0.65	10	–	1–45	LS	A	367
	Toluene	37 (θ)	76.2	0.50	7	–	4–107	OS	A	368
Poly(*N*-vinyl-3,6-dibromo carbazole)										
	p-Chloro-*m*-cresol	112.9 (θ)	30.2	0.50	7	–	4.8–125	–	–	942
	o-Chlorophenol	60.0 (θ)	27.5	0.50	8	–	4.8–125	–	–	942
Poly(1-vinylimidazole)	Aq. NaCl (0.1 M)	25	122	0.51	5	–	9–90	LS	B	813
	(5.0 M)	25 (θ)	121	0.50	8	–	5–90	LS	B	813
	Aq. NaSCN (0.1 M)	25 (θ)	105	0.50	5	–	9–90	LS	B	813
	Methanol/N$(CH_3)_4$ Br(0.01 M)	25	48.5	0.63	6	–	9–130	LS	B	813
protonated	Aq. HCl (0.1 M)/ NaCl (1 M)	25 (θ)	169	0.50	5	–	9–90	LS	B	813
Poly(5-vinyl-2-methylpyridine)	Butanone	25	13.9	0.65	5	–	13–88	LS	A	375
		25	19	0.64	15	–	6–100	LS	A	376
	Dimethylformamide	25	13.0	0.76	6	–	4–40	OS	A–B	377
	Methanol	25	18.0	0.83	8	–	4–40	OS	A–B	377
		25	18.6	0.70	9	–	7–80	LS	A	376
		25	8.0	0.76	9	–	13–88	LS	A	375
Poly(1-vinylnaphthalene)	Benzene	20	2.20	0.82	4	–	4–17	LS	B	264
		75	1.03	0.88	4	–	4–17	LS	B	264
Poly(2-vinylnaphthalene)	Benzene	17	1.7	0.80	11	–	10–100	LS		268
		20	6.90	0.719	6	–	6–68	LS	B	264
		75	8.69	0.695	6	–	6–69	LS	B	264
	Decalin/toluene (13/10, w/w)	30.2 (θ)		0.50	8	–	10–100	LS		269
Poly(3-vinylpyrene)	Chloroform	25 (θ)	51.0	0.500	9	–	3–50	LS	A	768
	1,2-Dichlorobenzene	25	11.7	0.655	9	–	3–50	LS	A	768
	Tetrahydrofuran	25	31.8	0.547	9	–	3–50	LS	A	768
Poly(2-vinylpyridine)	Benzene	25	6.6	0.72	3	–	3–11	LS		769
		25	17.0	0.64	14	–	3–93	LS	B,C	371
	Benzene	10	151	0.445	5	–	9.4–196	LS, OS	A	944
	Benzene	10	149	0.43	5	–	9.4–196	LS, OS	A	952
		11.4 (θ)	81	0.50	5	–	9.4–196	LS, OS	A	952
		12	56.0	0.53	5	–	9.4–196	LS, OS	A	952
		15	31.8	0.59	5	–	9.4–196	LS, OS	A	952
	Butanone	25	97.2	0.47	14	–	3–93	LS	B,C	207
	Dimethylformamide	25	14.7	0.67	14	–	3–93	LS	B,C	371
	Dioxane	25	30.9	0.58	14	–	3–93	LS	B,C	371
	Methanol	25	11.3	0.73	14	–	3–93	LS	B,C	371
	Methyl ethyl ketone	25	93.3	0.480	5	–	9.4–196	LS, OS	A	944
	Pyridine	25	9.84	0.727	5	–	9.4–196	LS, OS	A	944
	2-Propanol	25	18.4	0.67	5	–	9.4–196	LS, OS	A	952
	Pyridine	25	9.9	0.73	4	–	9.4–196	LS, OS	A	952
	Pyridine	25	13.8	0.69	14	–	3–93	LS	B,C	207
	Ethanol/water (92/8, w/w)	25	12.2	0.73	14	–	3–93	LS	B,C	371
Poly(2-vinylpyridine 1-oxide)	Benzyl alcohol	25	9.35	0.73	14	–	1.3–34	LS	A–B	946
	1-Butanol	25	7.78	0.72	14	–	1.3–34	LS	A–B	946
	Chloroform	25	15.8	0.64	14	–	1.3–34	LS	A–B	946
	Methanol	25	7.55	0.72	14	–	1.3–34	LS	A–B	946

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
	1-Propanol	25	10.3	0.70	14	–	1.3–34	LS	A–B	946
	2-Propanol	25	12.0	0.68	14	–	1.3–34	LS	A–B	946
Poly(4-vinylpyridine)	Ethanol	25	(1.51)	(0.52)	–	3	1–4	SD	C	372
		25	25.0	0.68	8	–	10–185	LS	A–B	373
	Water	25	22.0	0.687	8	–	10–185	LS	A–B	373
	Butanone/2-propanol	25	38.0	0.57	7	–	7–224	LS	B	374
	Ethanol/water	25	12.0	0.73	7	–	7–224	LS	B	374
	(92/8, w/w)									
Poly(vinylpyrrolidone)	Chloroform	25	19.4	0.64	4	2	2–23	LS	B	378
	Methanol	30	23	0.65	–	6	2–23	LS	B	378
	Water	20	64	0.58	3	–	1–9	SD	B	379
		25	67.6	0.55	15	–	0.7–10	LS	B,R	378
		25	4.1	0.85	–	5	1–4	SD	C,D	211
		30	14	0.70	9	–	1–20	SD	B	381
		30	39.3	0.59	6	–	8–110	OS	A,R	383
	Acetone/water	25 (θ)	75.0	0.50	–	3	1.2–108	LS	B	384
	(66.8/33.2, v/v)									
	Aq. Na_2SO_4	25 (θ)	58.0	0.500	5	–	9–46	OS	B	770
	(0.55 M)									
Poly(1-vinyl-2-pyrrolidone)										
high *M*	Aq. sodium acetate	25	8.86	0.74			4–220	–	–	948
	(0.1 M)			(Mixed)						
low *M*	Aq. sodium acetate	25	64	0.53			0.2–4	–	–	948
	(0.1 M)			(Mixed)						
Poly(vinylsulfonic acid)	Aq. KBr (0.347 M)	5.7 (θ)	68.8	0.50	5	–	4–39	LS	B	259
		15	30.8	0.61	5	–	8–39	LS	B	259
		30	24.5	0.75	5	–	8–39	LS	B	259
		50	26.6	0.76	5	–	8–39	LS	B	259
	Aq. KCl	5.5 (θ)	68.2	0.50	5	–	4–39	LS	B	259
	(0.349 M)	25	16.7	0.79	5	–	4–39	LS	B	259
	(0.650 M)	26.0 (θ)	79.5	0.50	5	–	4–39	LS	B	259
	(1.001 M)	44.5 (θ)	80.3	0.50	5	–	4–39	LS	B	259
	Aq. NaBr	– 0.6 (θ)	95.5	0.50	5	–	4–39	LS	B	259
	(0.346 M)	10	26.8	0.73	5	–	8–39	LS	B	259
		20	25.1	0.76	5	–	8–39	LS	B	259
		30	22.0	0.79	5	–	8–39	LS	B	259
	(1.008 M)	40.1 (θ)	94.5	0.50	5	–	4–39	LS	B	259
	Aq. NaCl									
	(1.003 M)	32.4 (θ)	96.1	0.50	5	–	4–39	LS	B	259
	(0.5 M)	20	21.5	0.65	–	6	0.3–3	SD	C	260
Poly(vinyltrimethylsilane)	Cyclohexane	25	8.2	0.71	5	–	59–213	LS	B	610

1.10. COPOLYMERS

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(acrylonitrile-*co*-butadiene), see also Poly(butadiene-*co*-acrylonitrile) in group 1.1										
(18/82, w/w, random)	Toluene	25	251	0.50	7	–	0.06–1.26	OS	A	590
(26/74, w/w, random)	Toluene	25	260	0.50	5	–	0.15–0.40	OS	A	590
Poly(acrylonitrile-*co*-glycidyl methacrylate)										
	Dimethylformamide	30	175	0.65	?	?	?	?		591
Poly(acrylonitrile-*co*-methyl acrylate)										
	Dimethylformamide	20	17.9	0.79	6	–	2–21	LS	B	592
Poly(acrylonitrile-*stat*-methyl acrylate), (91.5/8.5, w/w)										
	Dimethylformamide	25	21.3	0.743	11	–	2–53	LS		772
	Ethylene carbonate/water	25 (θ)	152	0.502	8	–				772
	(82.5/17.5, w/w)									
Poly(acrylonitrile-*co*-styrene)										
(38.3/61.7, mol/mol,)	Butanone	30	36	0.62	16	–	15–120	LS	B	593
	Tetrahydrofuran	25	21.5	0.68	4	–	10–78	LS	B	594
azeotropic										
(62.6/37.4, mol/mol, random)	Butanone	30	53	0.61	11	–	19–56	LS	B	595
	Dimethylformamide	30	12	0.77	11	–	19–56	LS	B	595
Poly(acrylonitrile-*stat*-styrene)										
(27.4/72.6, mol/mol)	Dimethylformamide	30	12.0	0.74	6	–	14–58	LS	B	773

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
(38.5/61.5, mol/mol)	Dimethylformamide	30	16.2	0.73	6	–	22–106	LS	B	773
(47.5/52.5, mol/mol)	Dimethylformamide	30	17.2	0.73	6	–	14–78	LS	B	773
Poly(acrylonitrile-*alt*-styrene) (1/1, mol/mol)										
	Butanone	30	24.3	0.67	10	–	5–100	LS	B	774
	Dimethylformamide	30	7.63	0.76	9	–	8–100	LS	B	774
	Butanone/methanol (63.6/36.4, v/v)	30 (θ)	140	0.50	10	–	5–100	LS	B	774
Poly(acrylonitrile-*co*-vinylidene chloride) 58 wt.% AN										
	γ-Butyrolactone	25	112	0.576	8	–	4.2–50	LS	–	961
	Dimethylacetamide	25	99.9	0.603	8	–	4.2–50	LS	–	961
	Dimethylformamide	25	102	0.591	8	–	4.2–50	LS	–	961
	N-methyl-2-pyrrolidone	25	114	0.595	8	–	4.2–50	LS	–	961
	70 wt.% HNO_3	25	142	0.521	8	–	4.2–50	LS	–	961
Poly(*p*-aminobenzoic acid-*stat*-6-aminohexanoic acid) (1/1, mol/mol)										
	Dichloroacetic acid	30	23.7	1.13	4	–	12–60	LS		775
	Trifluoroacetic acid	30	132.5	0.99	4	–	12–60	LS		775
Poly(butadiene-*co*-methacrylamide) (90/10, w/w, random)										
	Toluene	25	437	0.50	5	–	0.09–0.11	OS	A	590
Poly(butadiene-*co*-2-methyl-5-vinylpyridine)										
	Toluene	25	309	0.50	5	–	0.08–1.04	OS	A	590
Poly(butadiene-*co*-styrene), see also Poly(butadiene-*co*-styrene) in group 1.1 (84/16 mol/mol, random)										
	Benzene	25	39.4	0.70	4	–	2–51	OS	A	596
	Dibutyl phthalate	56	472	0.40	6	–	2–51	OS	A	596
	2-Pentanone	23.8 (θ)	167	0.50	5	–	7–51	OS	A	596
Poly(butyl itaconate-*co*-dibutyl itaconate), (40/60, mol/mol, random)										
	Acetone	25	575	0.32	6	–	9–70	LS	B	597
	Methanol	25	354	0.32	7	–	11–110	LS	B	597
	m-Xylene	25	1040	0.21	7	–	11–110	LS	B	597
Poly(butyl methacrylate-*alt*-styrene)										
	Butanone	25	5.3	0.76	10	–	32–320	LS	B	776
Poly(butyl methacrylate-*stat*-styrene) (1/1, mol/mol)										
	Butanone	25	4.9	0.77	10	–	15–208	LS	B	776
		35	5.98	0.75	8	–	22–56	LS	B	777
	Cyclohexane	35	7.88	0.70	6	–	34–50	LS	B	777
Poly(*tert*-butylphenyl methacrylate)-*stat*-vinylpyrrolidone)										
(33.7/66.3, mol/mol)	Benzene	25	118	0.53	5	–	33–96	OS	C	779
	Chloroform	25	105	0.57	5	–	33–96	OS	C	779
(60.4/39.6, mol/mol)	Benzene	25	130	0.55	4	–		OS	C	779
	Chloroform	25	247	0.51	4	–		OS	C	779
Poly(*p*-*tert*-butylstyrene)-*block*-poly(dimethyl-siloxane)-*block*-poly(*p*-*tert*-butylstyrene) 28 wt.% PBS										
	Methyl ethyl ketone	10	252	0.39	4	–	12–129	OS, GPC	C–D	957
		15	58.9	0.50	4	–	12–129	OS, GPC	C–D	957
		20	40.5	0.54	4	–	12–129	OS, GPC	C–D	957
		31	19.3	0.61	4	–	12–129	OS, GPC	C–D	957
		38	10.7	0.66	4	–	12–129	OS, GPC	C–D	957
	Benzene	35	15.4	0.66	4	–	9.3–128	OS, LS	B	960
	Methyl ethyl ketone	15 (θ)	58.9	0.50	4	–	9.3–128	OS, LS	B	960
		20	40.5	0.54	4	–	9.3–128	OS, LS	B	960
		31	19.3	0.61	4	–	9.3–128	OS, LS	B	960
Poly(*p*-chlorostyrene-*stat*-methylmethacrylate), (52/48, mol/mol)										
	Benzene	27	7.94	0.72	9	–	15–120	LS	C	598
	Benzene/hexane (60/40, v/v)	22.3 (θ)	64	0.50	8	–	15–120	LS	C	598
Poly(4-chlorostyrene)-*block*-poly(styrene)-*block*-poly(4-chlorostyrene), A_k–B_n–A_k										
$2k/n$, (33/67, mol/mol)	Carbon tetrachloride	40	6.24	0.76	–	5	14–61	OS	A	780
	Cumene	40	5.88	0.76	–	5	14–61	OS	A	780
$2k/n$, (50/50, mol/mol)	Carbon tetrachloride	40	6.63	0.74	–	10	19–74	OS	A	780
	Cumene	40	5.76	0.75	–	10	19–74	OS	A	780
Poly(diethyl fumarate-*co*-isobutene)										
50/50, mol/mol	Benzene/petrol ether	20	340	0.44	4	–	1–14	SD	C	599
Poly(diethyl fumarate-*co*-vinylcarbazole)										
	Benzene	25	14.6	0.67	6	–	2–13	LS	B	789

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	No. of samples W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(*p*-diethylphosphonomethylstyrene-*co*-styrene), (1/4, mol/mol, random)										
	Benzene	20	1.95	0.90	5	–	15–50	SV	B	
	Tetrachloroethane	20	0.0836	1.18	11	–	9–51	SV	B	
Poly(dimethyl itaconate-*co*-styrene)										
(75/25, w/w)	Toluene	25	6.6	0.68	6	–	6–22	LS	A	683
(67/33, w/w)		25	9.0	0.67	6	–	4–19	LS	A	683
(59/41, w/w)		25	9.7	0.67	8	–	5–38	LS	A	683
(49/51, w/w)		25	11.7	0.67	7	–	6–24	LS	A	683
(29.5/70.5, w/w)		25	12.8	0.67	8	–	7–36	LS	A	683
(27/73, w/w)		25	10.9	0.69	8	–	6–40	LS	A	683
(0/100, w/w)		25	11.45	0.712	12	–	3–58	LS	A	683
Poly(dimethyl siloxane-*co*-diphenylsiloxane)										
(54/45, mol/mol)	Benzene	25	40.7	0.60	5	–	7–57	OS	A	596
	Dimethyl phthalate	82.5	512	0.31	5	–	11–57	OS	A	596
	Ethanol/toluene (37/63, w/w)	29.5 (θ)	78	0.50	5	–	7–35	OS	A	596
(66/34, mol/mol)	Benzene	25	15.6	0.68	4	–	3.7–100	LS	A	596
	Hexane	36 (θ)	141	0.44	4	–	3.7–100	LS	A	596
	Benzene/2-propanol (44/56, w/w)	42 (θ)	74	0.50	4	–	3.7–100	LS	A	596
Poly(divinylstyrene-*co*-styrene), see also Poly(styrene), branched, random type, in group 1.8.										
	Benzene	25	37.2	0.70	5	–	5–80	SD		602
	Octane	21	162	0.50	6	–	5–80	SD		602
Poly(ethyl acrylate-*stat*-methyl methacrylate), (80/20, mol/mol)										
	Acetone	25	62	0.57	10	–	65–800	LS	B	114
Poly(ethyl methacrylate-*alt*-styrene)										
	Butanone	25	9.3	0.72	9	–	19–470	LS	B	776
Poly(ethyl methacrylate-*stat*-styrene)										
(1/1, mol/mol)	Butanone	25	12.0	0.70	10	–	3–185	LS	B	776
Poly(ethylene-*co*-α-methyl-styrene), $[(ET)_m(MS)_n]_p$										
$m/n = 3/4$	Cyclohexane	30	92	0.56	5	–	0.7–6	SA	B	604
	Dioxane	30	76	0.58	5	–	0.7–6	SA	B	604
	Toluene	30	32	0.68	5	–	0.7–6	SA	B	604
	Butanone/cyclohexane (60/40, v/v)	30 (θ)	135	0.50	5	–	0.7–6	SA	B	604
$m/n = 5/4$	Cyclohexane	30	65	0.60	5	–	0.8–7	SA	B	604
	Dioxane	30	89	0.56	5	–	0.8–7	SA	B	604
	Toluene	30	37	0.66	5	–	0.8–7	SA	B	604
	Butanone/cyclohexane (75/25, v/v)	30 (θ)	140	0.50	5	–	0.8–7	SA	B	604
$m/n = 5/7$	Cyclohexane	30 (θ)	112	0.50	4	–	1.5–7	SA	B	604
	Dioxane	30	123	0.49	4	–	1.5–7	SA	B	604
	Toluene	30	56	0.58	4	–	1.5–7	SA	B	604
Poly(hexadecyl methacrylate-*co*-methyl methacrylate)										
(25/75, mol/mol, random)	Heptane	25	85.0	0.38	8	–	4–47	LS	A	605
	Propyl acetate	25	17.1	0.62	8	–	4–47	LS	A	605
(38/62, mol/mol, random)	Chloroform	25	36.3	0.57	8	–	16–195	LS	A	605
	Heptane	25	6.9	0.65	8	–	4–47	LS	A	605
	Propyl acetate	25	53.6	0.50	8	–	4–47	LS	A	605
(50/50, mol/mol, random)	Chloroform	25	53	0.54	8	–	10–154	LS	A	605
	Heptane	25	32.0	0.52	8	–	4–47	LS	A	605
	Propyl acetate	25	91.3	0.43	8	–	4–47	LS	A	605
Poly(1-hexene-*co*-sulfur dioxide), see Poly[sulfonyl(butylethylene) in group 3.10.										
Poly(isobutene-*co*-isoprene), see group 1.2.										
Poly(isoprene)-*block*-poly(styrene), see group 1.1.										
Poly(maleic acid-*alt*-styrene)										
DN[b] = 9.5	Aq. NaCl (0.02 M)	25	395	0.59	7	–	29–130	LV	B	842
0.50		25	37.3	0.67	7	–	29–130	LV	B	842
0.20		25	0.51	0.87	7	–	29–130	LV	B	842
0.10		25	0.01	0.98	7	–	29–130	LV	B	842
Poly(methacrylic acid-*co*-methyl)methacrylate) (7.4/92.6, w/w)										
	Acetone	20	3.4	0.74	9	–	26–105	LS		607

[b] DN–Degree of neutralization

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
Poly(4-methoxystyrene-*stat*-styrene)										
(24.4/75.6, mol/mol)	Toluene	25	7.0	0.75	9	–	4–42	OS	B	781
(26.4/73.6, mol/mol)	Butanone	25,50	40	0.585	8	–	7–80	LV	B	782
	Toluene	25	18.6	0.68	8	–	7–80	LV	B	782
(46.2/53.8, mol/mol)	Toluene	25	7.3	0.755	13	–	3.5–70	OS	B	781
(53.0/47.0, mol/mol)	Butanone	25 (θ)	100	0.49	7	–	7–80	LV	B	782
	Toluene	25	37	0.615	7	–	7–80	LV	B	782
(74.0/26.0, mol/mol)	Toluene	25	8.2	0.755	9	–	5–35	OS	B	781
(75.6/34.4, mol/mol)	*tert*-Butylbenzene	25 (θ)	83	0.49	6	–	7–80	LV	B	782
	Toluene	25	16.9	0.673	7	–	7–80	LV	B	782
Poly(methyl acrylate-*stat*-methylmethacrylate)										
(17/83, w/w)	Butanone	25	11.7	0.70	4	–	56–208	LS	B	131
(29/71, w/w)		25	11.1	0.63	4	–	37–137	LS	B	131
(67/33, w/w)		25	36.6	0.60	4	–	71–187	LS	B	131
Poly(methyl acrylate-*co*-styrene)										
(22/78, mol/mol, random)	Benzene	30	8.93	0.744	16	–	2.6–80	LS	A	129
	Butanone	30	21.1	0.640	12	–	2.6–80	LS	A	129
	2-Methylcyclohexanol	43.5 (θ)	77	0.50	8	–	2.6–80	LS	A	129
(33/67, mol/mol, random)	Benzene	30	7.18	0.759	9	–	6.6–36	LS	A	129
	Butanone	30	11.4	0.696	4	–	6.6–36	LS	A	129
	2-Methylcyclohexanol	35.0 (θ)	76	0.50	7	–	6.6–36	LS	A	129
(47/53, mol/mol, random)	Butanone	30	10.7	0.724	9	–	6.7–24.4	OS	A	129
(50/50, mol/mol, random)	Ethyl acetate	35	41.6	0.57	9	–	18–116	LS	A	133
(59/41, mol/mol, random)	Benzene	30	6.15	0.780	6	–	7–40	LS	A	129
	Butanone	30	11.3	0.703	4	–	12–40	LS	A	129
	2-Methylcyclohexanol	36.6 (θ)	76	0.50	6	–	7–40	LS	A	129
(76/24, mol/mol, random)	Benzene	30	7.42	0.766	6	–	7.2–28	LS	A	129
	Butanone	30	9.16	0.728	5	–	8.9–28	LS	A	129
	2-Methylcyclohexanol	29.4 (θ)	75	0.50	5	–	6.5–24	LS	A	129
Poly(methyl methacrylate-*co*-*p*-isopropylstyrene), 2/3, mol/mol, *graft*										
	Butanone	25	0.021	1.11	–	6	31–65	LS		611
Poly(methyl methacrylate-*co*-2-methyl-5-vinylpyridine) (85/15, mol/mol, random)										
	Acetic acid	25	170	0.51	3	–	37–150	LV	B	612
Poly(methyl methacrylate-*co*-styrene)										
(10/90, mol/mol, random)	1-Chlorobutane	40.8	16.6	0.609	5	–	20–82	LS	B	613
(30/70, mol/mol, random)	1-Chlorobutane	30	17.6	0.67	9	–	5–55	LS	B	614
	Cyclohexanol	64.0 (θ)	71.6	0.51	4	–	5–55	LS	B	614
	Toluene	30	8.32	0.75	10	–	5–55	LS	B	614
(44/56, mol/mol, random)	1-Chlorobutane	30	24.9	0.63	10	–	5–81	LS	B	614
	Cyclohexanol	64.0 (θ)	70.0	0.51	4	–	10–81	LS	B	614
	Toluene	30	13.2	0.71	11	–	4.8–81	LS	B	614
(50/50, mol/mol, random)	Butanone	25	15.4	0.675	11	–	5–227	LS	B	615
(52/48, mol/mol, random)	1-Chlorobutane	40.8	49.0	0.575	5	–	18–115	LS	B	613
(71/29, mol/mol, random)	1-Chlorobutane	30	24.9	0.63	10	–	4.8–81	LS	B	614
	Cyclohexanol	68.0 (θ)	97.3	0.47	5	–	15–106	LS	B	614
	Toluene	30	11.4	0.70	8	–	7–106	LS	B	614
(94/6, mol/mol, random)	1-Chlorobutane	40.8	27.6	0.617	5	–	20–100	LS	B	613
nearly equimolar, three blocks (MSM)	Cyclohexanol	81.0 (θ)	$\lim_{M_w \to 0} [\eta]_\theta / M^{1/2} = 63$		–	7	3.4–147	LS	B	616
PS% 86.1–90.4, *graft* (S on M; $M_{PS} = 0.7–1.0 \times 10^4$)										
	Benzene	25	$[\eta] = 0.00918 M_{PS}^{0.743} g^{0.77}$				83–121	LV		617
	Butanone	25	$[\eta] = 0.0390 M_{PS}^{0.58} g^{0.59}$				53–285	LV		617
graft	Bromoform	–	56	0.6	6	–	180–320	LV		618
Poly(methyl methacrylate)-*block*-poly(styrene), A_k–B_n, k/n, (54/46, w/w)										
	Butanone	30	9.4	0.69	6	–	5.8–93	LS	A	783
	1-Chlorobutane	30	22.4	0.60	6	–	5.8–93	LS	A	783
	Toluene	30	7.3	0.73	6	–	5.8–93	LS	A	783
Poly(2-methyl-1-pentene-*co*-sulfur dioxide), see Poly[sulfonyl(1-methyl-1-propylethylene)], group 3.10.										
Poly(α-methylstyrene-*co*-styrene)										
	Benzene	20	14.4	0.69	5	–	18–80	SV	A	332
Poly(1-octadecane-*alt*-maleic acid)										
	Ethyl acetate	25	55	0.48	6	–	2.4–9.9	LS	–	956

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TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly(octyl methacrylate-*alt*-styrene)										
	Butanone	25	7.4	0.72	11	–	12–450	LS	B	776
Poly(octyl methacrylate-*stat*-styrene), (1/1, mol/mol)										
	Butanone	25	7.8	0.71	10	–	10–198	LS	B	776
Poly(styrene)-*block*-poly(butadiene)-*block*-poly(styrene) 50 wt.%-PS										
	Toluene	30	71.3	0.62	7	–	5.7–140	OS, LS	A–B	958
Poly(styrene)-*block*-poly(4-chloro-styrene)-*block*-poly(styrene), B_n–A_k–B_n										
$k/2n$, (33/67, mol/mol)	Carbon tetrachloride	40	6.10	0.77	–	4	20–82	OS	A	780
	Cumene	40	3.99	0.79	–	4	20–82	OS	A	780
$k/2n$, (50/50, mol/mol)	Butanone	30	8.14	0.72	–	8	31–89	OS	A	780
	Carbon tetrachloride	40	5.58	0.76	–	8	31–89	OS	A	780
	Cumene	40	6.84	0.74	–	8	31–89	OS	A	780
	Toluene	30	4.62	0.79	–	8	31–89	OS	A	780
$k/2n$, (66/34, mol/mol)	Carbon tetrachloride	40	5.94	0.74	–	4	15–54	OS	A	780
	Cumene	40	5.21	0.75	–	4	15–54	OS	A	780
Poly(styrene-*co*-sulfur dioxide), see Poly[sulfonyl(phenylethylene)], group 3.10.										
Poly(styrene)-*graft*-poly(methyl methacrylate), MMA content, 13 wt.%										
	Bromoform		(16.5)	(0.58)	5	–	17–196	SD	A	784
Poly(styrene)-*block*-poly(dimethylsiloxane) 12-62% PS										
	Methyl ethyl ketone	25	Various	Various	Various	–	Various	OS, GPC	B-C	955
Poly(styrene-*co*-monoethyl maleate)										
	Acetone	26.4 (θ)	51.1	0.50	9	–	20–180	LS	A	317
	Dioxane	25	11.2	0.702	9	–	20–180	LS	A	317
	Tetrahydrofuran	25	7.50	0.695	9	–	20–180	LS	A	317
–, sodium salt	Aq. NaCl									
	(0.005 M)	25	5.8	0.87	4	–	40–130	LS	A	317
	(0.01 M)	25	5.5	0.85	5	–	40–180	LS	A	317
	(0.03 M)	25	6.3	0.80	5	–	40–180	LS	A	317
	(0.05 M)	25	11	0.73	5	–	40–180	LS	A	317
	(0.075 M)	25	10	0.71	5	–	40–180	LS	A	317
	(0.15 M)	25	15	0.65	5	–	40–180	LS	A	317
	(0.3 M)	25	21	0.60	5	–	40–180	LS	A	317
	(0.6 M)	25	55	0.50	5	–	40–180	LS	A	317
Poly(styrene)-*block*-poly(2-vinylpyridine) 50 wt.%-PS										
	Benzene	10	35.2	0.605	4	–	6.5–153	LS, OS	A	944
	Methyl ethyl ketone	25	31.9	0.587	4	–	6.5–153	LS, OS	A	944
	Pyridine	25	9.02	0.734	4	–	6.5–153	LS, OS	A	944

TABLE 2. MAIN-CHAIN CARBOCYCLIC POLYMERS

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M (× 10⁴)	Method	Remarks	Refs.
Poly(acenaphthenylene)	Benzene	25	30.04	0.594	11	–	2–100	OS	B	262
		25	2.82	0.74	4	–	4–100	LS	A,B	263
	Ethylene chloride	25	20.0	0.54	6	–	6–125	LS	A,B	263
	Dioxane	25	11.5	0.61	7	–	6–145	LS	A,B	263
	Methylene chloride	25	6.92	0.66	5	–	6–145	LS	A,B	263
	Toluene	25	6.76	0.66	17	–	3–175	LS	A,B	263
Poly(4,7-dimethylindene)	Benzene	25	3.5	0.77	9	–	5.8–140	LS	C,D	811
Poly(6-methylindene)	Benzene	25	34	0.60	13	–	30–1320	LS	C,D	811

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TABLE 3. MAIN-CHAIN HETEROATOM POLYMERS

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
3.1. POLY(OXIDES), POLY(ETHERS)										
Poly(butene oxide), see Poly[oxy(ethylethylene)]										
Poly(ethylene oxide), see Poly(oxyethylene)										
Poly[oxy(*tert*-butyl-ethylene)]	Benzene	25	39.7	0.686	9	–	8–520	LS	A–B	385
isotactic	Xylene	80	1.48	0.56	8	–	67–640	LS		790
Poly(1,2-cyclohexylene)	Toluene	35	3.5	0.83	22	–	2–50	OS	B	472
Poly(oxydecamethylene)	Benzene	35	195	0.53	7	–	0.1–0.9	SE	B	386
	Chloroform	30	172	0.56	9	–	0.05–0.9	SE	B	386
Poly(2,6-dichlorophenylene oxide)										
from 2,4,6-trichlorophenol	Toluene	37	150	0.327	–	6(?)	1.6–25	LS	Branching	964
from 4-bromo-2,6-dichlorophenol	Toluene	37	207	0.320	–	6(?)	1.6–25	LS	Branching	964
Poly(oxy-2,6-dimethyl-1,4-phenylene)										
	Benzene	25	26.0	0.69	8	–	3–17	LS	B	473
	Carbon tetrachloride	25	75.5	0.585	5	–	7–17	LS	B	473
	Chlorobenzene	25	37.8	0.66	7	–	2–42	LS	B	474
		90	51.4	0.63	7	–	3–18	LS	B	473
	Chloroform	25	48.3	0.64	8	–	2–42	LS	B	474
	Toluene	25	28.5	0.68	15	–	2–42	LS	B	474
Poly(dioxolane), see Poly(oxymethyleneoxyethylene)										
Poly[2,2′-(*p*,*p*-oxydi-*p*-phenylene)6,6′-oxybis(4-phenylquinoline)]										
	Chloroform	25	250	0.57	9	–	7.6–32.5	LLS, SEC	B	962
Poly(oxy-2,6-diphenyl-1,4-phenylene)										
	Benzene	50	19.72	0.638	–	10	1–110	LS	A	792
	Chlorobenzene	25	13.9	0.68	–	10	4–145	LS	C	473
		90	15.5	0.67	–	10	4–145	LS	C	473
	Chloroform	25	32.1	0.609	–	15	1–110	LS	A	792
	Toluene	25	21.4	0.635	–	10	4–145	LS	C	473
Poly(oxyethylene)	Acetone	25	32	0.67	5	–	7–100	LV	A,R	387
		25	156	0.50	7	–	0.02–0.3	EG	A,L	388
	Benzene	20	48	0.68	12	–	0.01–1.9	EG	A	389
		25	39.7	0.686	9	–	8–520	LS	A,R	385
		25	129	0.50	12	–	0.02–0.8	EG	A,L	388
	Carbon tetrachloride	20	69	0.61	9	–	0.02–1.1	EG	A	389
		25	62	0.64	5	–	7–100	LV	A	387
	Chloroform	25	206	0.50	6	–	0.02–0.15	EG	A,L	388
	Cyclohexane	20	$[\eta] = 0.5 + 0.035 M^{0.64}$		11	–	0.006–1.1	EG	A	389
	Diethylene glycol diethyl ether	50	140	0.51	5	–	7–100	LV	A	387
	Dimethylformamide	25	$[\eta] = 2.0 + 0.024 M^{0.73}$		10	–	0.1–3	LS, SD	A	390
	Dioxane	20	$[\eta] = 0.75 + 0.035 M^{0.71}$		13	–	0.006–1.1	EG	A	389
		25	138	0.50	7	–	0.02–0.15	EG	A,L	388
	Methanol	20	$[\eta] = 2.0 + 0.033 M^{0.72}$		12	–	0.006–1.9	EG	A	389
		25	85.2	0.57	?		?	LS, SD	A	391
	4-Methylpentan-2-one	50	120	0.52	5	–	7–100	LV	A	387
	Toluene	35	14.5	0.70	–	4	0.04–0.4	EG	C,L	392
	Water	20	$[\eta] = 2.0 + 0.016 M^{0.76}$		11	–	0.006–1.1	EG	A	391
		25	156	0.50	5	–	0.019–0.1	EG	A,L	393
		30	12.5	0.78	–	6	2–500	LS, SD	C	394
		35	6.4	0.82	–	5	3–700	LV	C,R	395
		35	16.6	0.82	–	4	0.04–0.4	EG	C,L	392
		45	6.9	0.81	–	5	3–700	LV	C	395
	Water	3	60.2	0.67	–	6	0.31–3.0	GPC	A–B	963
		5	61.7	0.66	–	6	0.31–3.0	GPC	A–B	963
		10	56.8	0.67	–	6	0.31–3.0	GPC	A–B	963
		15	50.5	0.68	–	6	0.31–3.0	GPC	A–B	963
		25	49.9	0.67	–	6	0.31–3.0	GPC	A–B	963
		35	48.8	0.66	–	6	0.31–3.0	GPC	A–B	963
		55	77.7	0.61	–	6	0.31–3.0	GPC	A–B	963
		75	76.3	0.57	–	6	0.31–3.0	GPC	A–B	963
		85	118	0.54	–	6	0.31–3.0	GPC	A–B	963

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M (× 10^{-4})	Method(s)	Remarks	Refs.
	Aq. KOH (0.96 M)	25	144	0.53	–	6	0.31–3.0	GPC	A–B	963
	(1.10 M)	25	165	0.51	–	6	0.31–3.0	GPC	A–B	963
	(1.24 M)	25	185	0.50	–	6	0.31–3.0	GPC	A–B	963
	(1.48 M)	25	309	0.43	–	6	0.31–3.0	GPC	A–B	963
	Aq. K_2SO_4	35 (θ)	130	0.50	–	5	3–700	LV	C	395
	(0.45 M)	35	280	0.45	–	5	7–100	LV	A	387
	Aq. $MgSO_4$ (0.39 M)	45 (θ)	100	0.50	–	5	3–700	LV	C	395
Poly[oxy(ethylethylene)]	Benzene	25	15.9	0.75	10	–	5–120	LS	B–C	396
		30	3.39	0.84	9	–	20–210	LS	B	397
	Butanol	25	19.6	0.69	10	–	5–120	LS	B–C	396
	Butanone	30	4.08	0.79	9	–	20–210	LS	B	397
	Hexane	25	14.3	0.73	10	–	5–120	LS	B–C	396
	2-Propanol	30 (θ)	86.5	0.50	9	–	20–210	LS	B	397
		30 (θ)	111	0.50	9	–	5–120	LS	B–C	396
Poly[oxy(hexamethylene)]	Benzene	25	86.9	0.62	1	8	0.01–1.5	SE, CR	C	398
	Dioxane	25	131	0.55	1	10	0.01–1.5	SE, CR	C	398
Poly(oxymethylene)	Dimethylformamide	130	22.4	0.71	7	–	0.15–1.5	EG	B	399
		140	18.1	0.73	7	–	0.15–1.5	EG	B	399
	Hexafluoroacetone-	25	46.0	0.74	7	–	0.15–1.5	EG	B	399
	sesquihydrate (1/1.7, mol/mol, with triethylamine 1%, v/v)	25	87	0.69	–	5	2–16	LS	C	402
	Phenol/tetrachloroethane									
	(1/3, w/w)	90	27.5	0.80	–	18	0.8–10	EG	C,D	400
	(1/3, v/v)	90	5.22	0.93	?		?	OS		403
Poly(oxymethyleneoxyethylene)	Chlorobenzene	25	200	0.50	4	14	9–100	LS	D	404
	p-Chlorophenol	60	41.3	0.724	–	3	7–13	LS	C	405
	1H,1H,5H-octafluoro-pentanol-1	110	13.35	0.810	–	3	7–13	LS	C	405
	Tetrahydrofuran	25	17	0.73	4	–	3–11	OS		791
Poly[oxy(phenylethylene)]	Benzene	30	92.2	0.758	10	–	1.4–81	LS	B,C	385
	Toluene	25	67.9	0.766	10	–	1.4–81	LS	B,C	385
Poly(oxy-1,4-phenylene-oxy-1,4-phenylene-carbonyl-1,4-phenylene), (PEEK)										
	p-Chlorophenol/ o-dichloro-benzene (60/40, w/w)	35	58.6	0.702	7	–	0.86–8	LS	B	993
	Methanesulfonic acid	30	22.6	0.818	8	–	0.46–8	LS	B	993
Poly(oxypropylene)	Acetone	25	75.5	0.56	5	–	0.1–0.4	LS	A	406
	Benzene	20	11.1	0.79	5	–	0.07–0.33	SE	A	407
		25	11.2	0.77	3	–	3–70	LS	A–B	408
		25	14	0.8	?		?	?		409
isotactic		25	38.5	0.73	–	8	0.5–92	LV	C	410
		25	41.3	0.64	11	–	1–8	LS	A	411
		25	41.5	0.65	5	–	0.05–0.4	LS	A	406
	Hexane	46	19.7	0.67	6	10	3.4–367	LS	A–B	408
	Methanol	20	40.6	0.64	6	–	0.05–0.33	SE	A	407
		25	76.9	0.55	10	–	1–7	LS		411
	Tetrahydrofuran	20	55.0	0.62	6	–	0.05–0.33	SE	A	407
	Toluene	20	20.8	0.72	5	–	0.07–0.33	SE	A	407
		25	12.9	0.75	3	–	3–70	LS	A–B	408
	Toluene/2,2,4-trimethyl-pentane (5/7, v/v)	39.5 (θ)	107.5	0.50	7	–	1–7	LS	A	411
oligomer	Acetone	20	75.5	0.56	5	–	0.1–0.4		L	793
	Benzene	20	41.5	0.65	5	–	0.04–0.4		L	793
Poly(oxytetramethylene)	Benzene	30	131	0.60	–	12	2.6–113	LS	A	412
	Ethyl acetate	30	42.2	0.65	–	12	2.6–113	LS	A	412
	Toluene	28	25.1	0.78	10	–	3–12	OS	A–B	413
	Ethyl acetate/hexane (22.7/77.3, w/w)	31.8 (θ)	206	0.49	–	11	2.6–113	LS	A	412
Poly(oxytrimethylene)	Acetone	30	76.0	0.59	–	7	2.8–20	LS	A	414
	Benzene	30	21.9	0.78	–	15	2.8–30	LS	A	414
	Carbon tetrachloride	30	26.7	0.75	–	11	2.8–25	LS	A	414

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(phenyl ether-*alt*-phenyl ketone), (PEK)										
	Sulfuric acid (96.4%)	?	56	0.73	–	6	1.2–5	LS, SEC	C–D	1008
Poly(propylene oxide), see Poly(oxypropylene)										
Poly(tetrahydrofuran), see Poly(oxytetramethylene)										
3.2. POLY(ESTERS), POLY(CARBONATES)										
Poly(butylene isophthalate)	Chloroform	?	3.3	0.92	6	–	1.4–3.7	VOS, EG	–	966
Poly(butylene adipate-*co*-butylene isophthalate)										
(100 mol% BADP)	Chloroform	30	73.1	0.69	6	–	0.67–1.45	VOS	C	967
(80 mol% BADP)	Chloroform	30	47.4	0.73	4	–	0.92–1.9	VOS	C	967
(50 mol% BADP)	Chloroform	30	26.7	0.78	4	–	0.80–1.8	VOS	C	967
(20 mol% BADP)	Chloroform	30	11.2	0.80	4	–	0.88–2.3	VOS	C	967
Bisphenol A poly(carbonates), see Poly[oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene]										
Poly(*N*-decanoyldehydroalanine methyl ester)										
	Tetrahydrofuran	25	26.3	0.63	6	–	10–254	LLS	–	968
Poly(ethylene terephthalate), see Poly(oxyethyleneoxyterephthaloyl)										
Poly(D-β-hydroxybutyrate), see Poly(D-oxy-1-oxo-3-methyl-trimethylene)										
Poly(4,4′-isopropylidene-diphenyl carbonate)-*block*-poly(styrene)										
26 wt.%-PS	Chloroform	25	31.1	0.74	9	–	6–17	OS, LS	A	959
	Diethyl carbonate	25	228	0.54	9	–	6–17	OS, LS	A	959
	1,4-Dioxane	25	60.8	0.68	9	–	6–17	OS, LS	A	959
	Methylene chloride	25	21.2	0.77	9	–	6–17	OS, LS	A	959
	Tetrahydrofuran	25	136	0.57	9	–	6–17	OS, LS	A	959
48 wt.%-PS	Chloroform	25	65.1	0.71	8	–	3–11	OS, LS	A	959
	Diethyl carbonate	25	378	0.53	8	–	3–11	OS, LS	A	959
	1,4-Dioxane	25	80.5	0.68	8	–	3–11	OS, LS	A	959
	Methylene chloride	25	28.6	0.79	8	–	3–11	OS, LS	A	959
	Tetrahydrofuran	25	352	0.54	8	–	3–11	OS, LS	A	959
50 wt.%-PS	Chloroform	25	62.7	0.71	6	–	6–27	OS, LS	A	959
	Diethyl carbonate	25	316	0.55	6	–	6–27	OS, LS	A	959
	1,4-Dioxane	25	79.8	0.68	6	–	6–27	OS, LS	A	959
	Methylene chloride	25	20.4	0.81	6	–	6–27	OS, LS	A	959
	Tetrahydrofuran	25	243	0.56	6	–	6–27	OS, LS	A	959
73 wt.%-PS	Chloroform	25	52.2	0.74	9	–	6–17	OS, LS	A	959
	Diethyl carbonate	25	347	0.55	9	–	6–17	OS, LS	A	959
	1,4-Dioxane	25	117	0.67	9	–	6–17	OS, LS	A	959
	Methylene chloride	25	31.5	0.80	9	–	6–17	OS, LS	A	959
	Tetrahydrofuran	25	143	0.65	9	–	6–17	OS, LS	A	959
Poly(D,L-β-methyl-β-propiolactone), see Poly(D,L-β-methyl-β-propiolactone), see Poly(D,L-oxy-1-oxo-3-methyl-trimethylene)										
Poly(oxyadipoyloxydecamethylene)										
	Chlorobenzene	25	11.7	0.84	–	7	0.3–3	LV	C	415
	Diethyl succinate	79	5.8	0.86	–	12	1–3	LV	C	415
Poly(oxybutynedioyl-	Benzene	20	151	0.55	?	–	0.1–0.5	OS	B	416
oxyhexamethylene)	Chloroform	20	91	0.61	?	–	0.1–0.5	OS	A	416
Poly[oxycarbonyl(bicyclo-[2,2,2]octan-2,5-dion)carbonyloxyhexamethylene]										
	Chloroform	20	–	–	–	4	1.4–3.9	OS	C	475
Poly[oxycarbonyloxy-1,4-phenyleneisopropylidene1,4-phenylene]										
	Butyl benzyl ether	170 (θ)	210	0.50	8	–	4–31	LS	B	476
	Chloroform	20	277	0.50			1.5–6	LS		477
		25	12.0	0.82	8	–	1–7	LS	A	478
		25	30.1	0.74	12	–	0.4–47	LS	A,R	796
	Dichloromethane	25	29.9	0.74	12	–	0.4–47	LS	A	796
	Dioxane/cyclohexane (68/32)	25 (θ)	2.5–2.8	Various	9	–	–	SEC	B	965
	Ethylene chloride	25	20.4	0.76	8	–	1–7	LS	A	478
	Methylene chloride	25	11.1	0.82	6	–	1–27	SD	B	479
		25	11.9	0.80	12	–	1–76	LS	B,R	476
		25	38.9	0.70	8	–	1–7	LS	A	478
	Tetrachloroethane	25	13.4	0.82	8	–	1–7	LS	A	478
	Tetrahydrofuran	25	38.9	0.70	8	–	1–7	LS	A	478
		25	39.9	0.70	–	6	1–27	SD	C,R	479
		25	37.8	0.71	12	–	0.4–47	LS	A	796

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M (× 10⁻⁴)	Method(s)	Remarks	Refs.
	Tetrahydrofuran	Room temp.	31.4	0.70	9	–	–	SEC	B	965
	Cyclohexane/dioxane (36.1/63.9, w/w)	25	210	0.50	4	–	30–75	LS	B	476
Poly(oxy-1,4-cyclohexyleneoxysebacoyl)										
cis	Chloroform	20	27.8	0.78	–	5	2.1–4.6	OS	C	480
trans	Chloroform	20	18.3	0.86	–	9	1.1–3.7	OS	C	480
Poly[oxy-1,10-di-oxoperfluorodecamethyleneoxydecamethylene)										
	Chloroform	25	15.5	0.70	7	–	0.8–8	LS		795
	s-Tetrachloroethane	25 (θ)	88	0.50	7	–	0.8–8	LS		795
Poly(oxyethyleneoxycarbonyl-1,4-phenyleneoxyethyleneoxy-1,4-phenylenecarbonyl)										
	o-Chlorophenol	35	145	0.59	9	–	1.3–11	OS		801
	Phenol–tetrachloroethane (1/2, w/w)	35	112	0.63	9	–	1.3–11	OS		801
Poly(oxyethyleneoxyterephthaloyl)										
	o-Chlorophenol	25	17	0.83	–	7	0.8–2.0	EG	C	481
		25	19	0.81	6	–	1.5–3.8	EG	B	482
		25	30	0.77	–	34	1.1–2.9	EG	C	483
		25	42.5	0.69	7	–	2–15	SD	S	484
		25	65.6	0.73	–	5	1.2–2.5	OS	C	485
		55	26	0.77	6	–	1.5–3.8	EG	B	482
	m-Cresol	25	0.77	0.95	–	5	0.04–1.2	EG	A,L	486
	Dichloroacetic acid	45	400	0.50	7	–	1.5–3.8	EG	B	482
	Tetrachloroethane	50	13.8	0.87	–	6	0.04–0.1	EG	A,L	487
	Trifluoroacetic acid	25	140	0.64	7	–	1.5–3.8	EG	B	482
		30	43.3	0.68	–	9	2.5–12	LS	C	488
		35	130	0.66	7	–	1.5–3.8	EG	B	482
		55	105	0.69	6	–	1.5–3.8	EG	B	482
	Dichloroethane/phenol (6/4, v/v)		9.2	0.8				EG		489
	Phenol/tetrachloroethane	25	140	0.64	6	–	1.5–3.8	EG	B	482
	(40/60, w/w)	35	125	0.65	6	–	1.5–3.8	EG	B	482
	(3/5, v/v)	30	22.9	0.73	–	9	2.5–12	LS	C	488
	(50/50, v/v)	20	75.5	0.685	–	38	0.3–3	EG	C	490
		25	21	0.82	–	9	0.5–3	EG	C	491
		25	12.7	0.86						492
	Phenol/tetrachlorophenol	25	46.8	0.68				LS		493
	Phenol/trichlorophenol (10/7, v/v)	29.8	28.0	0.775	–	4	0.1–0.4	EG	C	494
		30	630	0.47	–	8	1.1–4	OS	C	495
Poly(oxyfumaroyloxyhexamethylene)										
	Chloroform	20	27.1	0.80	5	–	2–4.3	OS	B	417
Poly[oxy(hexahydro-3,6-endomethylenephthaloyl)-oxyhexamethylene]										
cis	Benzene	20	4.64	0.86	13	–	2.3–7.5	OS	B	496
	Chloroform	20	9.33	0.83	13	–	2.3–7.5	OS	B	496
trans	Benzene	20	17.4	0.75	10	–	3.3–11	OS	B	496
	Chloroform	20	17.9	0.77	11	–	3.3–15	OS	B	496
Poly[oxy(hexahydroterephthaloyl)oxyoctamethylene]										
cis	Chloroform	20	22.9	0.79	6	–	3.3–5.5	OS	B	480
trans	Chloroform	20	18.9	0.84	6	–	2.4–4.4	OS	B	480
Poly(oxyhexamethyleneoxy-2,9-dibutylsebacoyl)										
	Benzene	20	37.4	0.74	?	–	0.9–2.4	OS	B	418
Poly(oxyhexamethyleneoxysebacoyl)										
	Benzene	20	62.7	0.69	9	–	0.6–1.8	OS	B	418
	Chloroform	20	72.5	0.70	9	–	2–10	OS	B	419
Poly(oxymaleoyloxyhexamethylene)										
	Benzene	20	76.3	0.60	7	–	1.3–6.6	OS	B	417
	Chloroform	20	36.2	0.73	7	–	1.3–6.6	OS	B	417
	Tetrahydrofuran	20	43.7	0.66	7	–	1.3–6.6	OS	B	417
Poly(oxy-1-oxo-dimethyltrimethylene)										
	Trifluoroacetic acid	20	24.2	0.74	11	–	5–54	GPC	B, C	800
Poly(oxy-1-oxohexamethylene)	Benzene	25	72	0.63	6	–	3.4–12	LS	A	808
		30	9.94	0.82	9	–	1.4–15	SV	B	447

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
	Dimethylformamide	30	19.1	0.73	9	–	1.4–15	SV	B	447
	Dioxane	25	90	0.61	6	–	3.4–12	LS	A	808
	Ethyl acetate	25	180	0.52	6	–	3.4–12	LS	A	808
Poly(oxy-1-oxo-3-methyl-	Chloroform	30	7.7	0.82	–	5	2–78	SD	C, D	660
trimethylene)	2,2,2-Trifluoroethanol	30	25.1	0.74	–	6	2–101	LS	C, D	661
D-	Chloroform	30	11.8	0.78	9	–	11–164	LS	B, C	797
D,L-	Ethylene dichloride	30	9.18	0.78	9	–	11–164	LS	B, C	797
	Trifluoroethanol	25	12.5	0.80	9	–	11–164	LS	B, C	797
	Butyl chloride	13 (θ)	100	0.50	4	–	2–15	LS	A	798
	Chloroform	30	16.6	0.76	5	–	2–15	LS	A	798
	1-Chloronaphthalene	40	39.6	0.62	4	–	2–15	LS	A	798
	Ethylene dichloride	30	16.8	0.74	6	–	2–15	LS	A	798
	Trifluoroethanol	25	22.2	0.76	8	–	2–15	LS	A	798
		30	17.5	0.78	8	–	2–15	LS	A	798
Poly(oxysebacoyloxyhexadecamethylene)										
	Chloroform	20	74.7	0.70	4	–	2–10	OS	B	419
Poly(oxysuccinyloxyhexamethylene)										
	Benzene	20	43.3	0.70	22	–	1.5–5	OS	B	417
	Chloroform	20	24.4	0.79	18	–	1.5–5	OS	B	417
	Tetrahydrofuran	20	44.3	0.69	13	–	1.5–5	OS	B	417
Poly[oxytetra(ethyleneoxy)carbonyl(1-methylethyleneoxy)thio(2-methylethylene(carbonyl]										
	Chloroform	?	34.7	0.714	–	?	< 1.5	EG	?	421
Poly[oxy-(1,1,3-trimethyl-3-phenylindan-5,4′-dicarbonyl)oxy-1,4-phenyleneisopropylidene-1,4-phenylene]										
	Tetrahydrofuran	25	30.5	0.691	7	–	2.6–30	LS	A	794
Poly(oxyundecanoyl)	Chloroform	20	21.4	0.60	7	–	3–49	OS	B	419
		25	36.3	0.82	–	6	0.5–1.3	EG	C	420
Poly(phenylhydroquinone-*co*-terephthalic acid)										
	o-Dichlorobenzene/*p*-chlorophenol (1/1, w/w)									
		25	30	0.869	5	–	5.0–16	LS	–	969
			(Wormlike behavior)							
Poly(β-propiolactone)	Chloroform	30	28.2	0.71	13	–	0.68–86	LS	B–D	991
	1,4-Dioxane	30	17	0.71	–	–	0.68–86	LS	B–D	991
	2,2,2,-Trifluoroethanol	30	17.2	0.78	13	–	0.68–86	LS	B–D	991

3.3. POLY(AMIDES) (FOR COPOLY(AMIDES), see 3.10 COPOLYMERS)

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly[(butylimino)carbonyl], [Poly(butyl isocyanate)]										
	Benzene	20	1.10	1.11	–	7	1.8–21	SD	A,R	441
	Carbon tetrachloride	–	31.6	1.2	9	–	1–30	SD	B	823
		22	7.81×10^{-5}	2.0	8	–	2.5–14	OS, LS	A	825
	Tetrachloromethane	20			–	2	6.6–16	SD	D	442
	Tetrahydrofuran	20	0.457	1.18	–	7	1.8–21	SD	A	441
		40	–	1.8–2.0	4	–	< 10	SE		821
		40	–	0.26–0.37	4	–	> 100	SE		821
Poly[(chlorohexylimino)-carbonyl], [Poly(chlorohexyl isocyanate)]										
	Carbon tetrachloride	21	0.22	1.21	10	–	1.4–31	SD	B,C	826
Poly(*trans*-2,5-dimethylpiperazo-1,3-phthaloyl)										
	m-Cresol	25	–	0.75	9	–	6–237	LS		828
	Trifluoroethanol	25	–	0.75	10	–	3–237	LS		828
Poly[(hexyliminocarbonyl], [Poly(hexyl isocyanate)]										
	Carbon tetrachloride	25	0.0152	1.10	10	–	3.8–43	LS	A	822
	Chloroform	25	0.0499	0.97	10	–	3.8–43	LS	A	822
	Hexane	25	1.0	1.2	8	–	6.8–39	LS	A	824
		25	88	0.77	8	–	$> 10^6$	LS	A	824
		25	5.4	0.97	6	–	9.1–230	LS	A, B	827
	Tetrahydrofuran	25	0.0220	1.06	10	–	3.8–43	LS	A	822
	Toluene	25	0.0248	1.05	11	–	3.8–43	LS	A	822
Poly(hexyl isocyanate)	Butyl chloride	25	(Wormlike behavior)		31	–	0.44–724	LS, SE	A	970
	Dichloromethane	20	–	Not const.	13	–	0.44–91	LS, OS, SE, LV	A	984
			(Wormlike behavior)							
	Toluene	10	–	Not const.	13	–	0.44–91	LS, OS, SE, LV	A	984
			(Wormlike behavior)							
		25	–	Not const.	13	–	0.44–91	LS, OS, SE, LV	A	984
			(Wormlike behavior)							

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M (× 10^{-4})	Method(s)	Remarks	Refs.
		40	– (Wormlike behavior)	Not const	13	–	0.44–91	LS, OS, SE, LV	A	984
Poly(iminoadipoyliminohexamethylene), (Nylon 66)										
	o-Chlorophenol	25	168	0.62	–	2	1.4–5	LS, EG	C	443
	m-Cresol	25	240	0.61	–	2	1.4–5	LS, G	C	443
		25	$[\eta] = 0.5 + 0.0353 M^{0.792}$		13	–	0.015–5	LS,EG	B	444
	Dichloroacetic acid	25	$[\eta] = 0.5 + 0.352 M^{0.551}$		13	–	0.015–5	LS,EG	B	444
	2,2,3,3-Tetrafluoropropanol/CF_3COONa (0.1 M)	25	114	0.66	–	2	1.4–5	LV	C	443
	Aq. HCOOH (90%, v/v)	25	35.3	0.786	3	11	0.6–6.5	LS, EG	C	443
		25	110	0.72	–	20	0.5–2.5	EG	C	446
		25	$[\eta] = 2.5 + 0.0132 M^{0.873}$		13	–	0.015–5	LS,EG	B	444
	Aq. HCOOH (90% vol)/HCOONa (0.1 M)	25	32.8	0.74	–	19	1–5	EG	C,R	445
		25	87.7	0.65	–	2	1.4–5	LS, EG	C	443
		25	$[\eta] = 1.0 + 0.0516 M^{0.687}$		6	–	0.015–5	LS,EG	B, R	444
	Aq. HCOOH (90%, v/v)/KCl (2.3 M)	25 (θ)	227	0.50	–	2	1.4–5	LS, EG	C	443
		25 (θ)	253	0.50	7	–	0.015–5	LS, EG	B-C	444
	Aq. H_2SO_4 (95%, v/v)	25	$[\eta] = 2.5 + 0.0249 M^{0.832}$		12	–	0.015–5	LS,EG	B	444
	(96%, v/v)	25	115	0.67	–	2	1.4–5	LV	C	443
Poly(iminocarbonyl-1,4-phenylene), Poly(*p*-benzamide)										
	Sulfuric acid (96%)	20	1.6	1.7	–	10	0.7–2.3	DV		807
Poly(imino-4,6-carboxyisophthaloylimino-1,4-phenylene)										
	Dimethylformamide	30	252	0.56	–	14	0.9–2.5	LS		802
Poly(iminohexamethyleneiminosebacoyl), (Nylon 6-10)										
	m-Cresol	25	13.5	0.96	–	5	0.8–2.4	SD	B	454
Poly(iminohexamethyleneiminoterephthaloyloxyhexamethyleneoxyterephthaloyl)										
	Phenol/tetrachloroethane (1/1, w/w)	25	36.4	0.75	–	8	1.6–7.4	GPC	D	806
Poly(iminohexamethyleneiminothiocarbonylhexamethylenethiocarbonyl)										
	Dimethylformamide/LiCl (5%)	20	22.8	0.76	12	–	0.7–4.8	EG		805
Poly(iminohexamethyleneiminothiocarbonyltetramethylenethiocarbonyl)										
	Dimethylformamide/LiCl (5%)	20	99.1	0.65	12	–	0.8–2.2	EG		805
Poly[imino(1-oxododecamethylene)], (Nylon 12)										
	m-Cresol	25	81	0.74	38	–	0.3–13	LS	B,R	803
		25	46.3	0.75	16	5	1–13	LS	B	812
	Sulfuric acid (96%)	25	69.4	0.64	15	5	1–13	LS	B	812
Poly[imino(1-oxohexamethylene)], (Nylon 6)										
	m-Cresol	25	320	0.62	6	–	0.05–0.5	EG	B	448
	Trifluoroethanol	– 20	53.3	0.74	5	–	1.3–10	LS	B	450
		25	53.6	0.75	5	–	1.3–10	LS	B	450
		50	58.2	0.73	5	–	1.3–10	LS	B	450
	Aq. HCOOH (85%)	– 10	26.8	0.82	6	–	0.7–12	LS	B	450
		0	24.8	0.82	6	–	0.7–12	LS	B	450
		10	23.4	0.82	6	–	0.7–12	LS	B	450
		20	75	0.70			0.45–1.6	EG		451
		25	22.6	0.82	11	–	0.7–12	LS	B,R	450
	Aq. HCOOH (65%)	25	229	0.50	5	–	0.7–12	LS	B	450
	Aq. H_2SO_4 (40%)	25	59.2	0.69			0.3–1.3	EG		452
ring oligomer	*m*-Cresol	25	2100	0.22	–	4	0.02–0.06	VOS	A	449
	Ethylene chlorohydrin	25	870	0.27	–	3	0.03–0.06	VOS	A	449
Monochain, polymerized with stearic acid										
	Conc. H_2SO_4	25	63	0.76	–	7	0.2–1.4	EG	B	453
Dichain, polymerized with sebacic acid										
	Conc. H_2SO_4	25	42	0.79	–	14	0.2–2.3	EG	B	453

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Tetrachain, polymerized with a tetrabasic acid										
	Conc. H_2SO_4	25	55	0.74	–	11	0.2–1.9	EG	B	453
Octachain, polymerized with a octabasic acid										
	Conc. H_2SO_4	25	13.5	0.86	–	5	0.4–2.6	EG	B	453
Poly(iminoterephthaloylhydrazocarbonyl-1,4-phenylene), [Poly(terephthaloyl-*p*-aminobenzhydrazide)]										
	Dimethyl sulfoxide	25	–	1.3–0.9	15	–	0.2–5.8	LS	B	809
		25	1.05	0.795	–	8	1.2–65	LS	B	810
Poly(iminoterephthaloylimino-1,4-phenylenefluoren-9-ylidene-1,4-phenylene)										
	Dimethylformamide	25	110	0.66	7	–	1.5–7.8	LS	B	503
Poly(iminoterephthaloylimino-1,4-phenylene-phthalidylidene-1,4-phenylene)										
	Dimethylformamide	25	277	0.59	8	–	1.4–6.9	LS	B	503
Poly[iminoterephthaloylimino(trimethylhexamethylene)], 2,4,4-/2,2,4-trimethyl (1/1, mol/mol)										
	Dimethylformamide	25	27.4	0.71	17	–	1.2–28	LS, SA	B	804
Poly(isophthaloyl-*trans*-2,5-dimethylpiperazine)										
	N-methyl-2-pyrrolidone	25	–	Not const	18	–	0.26–237	LS, SE	A	971
			(Wormlike behavior)							
Poly[(octylimino)carbonyl], [Poly(octyl isocyanate)]										
	Carbon tetrachloride	22	2.02×10^{-5}	2.0	4	–	5.9–20.0	OS, LS	A	825
Poly(1,4-phenyleneterephthalamide), (Kevlar)										
	96% Sulfuric acid	30	1.09	1.25	–	3	1.6–3.8	LS	–	973
Poly(terephthalamide-*p*-benzohydrazide)										
	Dimethyl sulfoxide	25	(Wormlike behavior)		6	–	0.94–5.8	LS, SE	A	974

3.4. POLY(AMINO ACIDS)

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(β-benzyl-L-aspartate), see Poly(iminocarbonyl-L-benzyloxycarbonylethylidene)										
Poly(γ-benzyl-L-glutamate), see Poly(iminocarbonyl-L-benzyloxycarbonylpropylidene)										
Poly[(benzylimino)carbonylethylene], (Poly(*N*-benzyl-β-alanine))										
	Dichloroacetic acid	25	120	0.525	–	6	0.15–1.8	EG	B,L	455
Poly(iminocarbonyl-L-benzyloxycarbonylethylidene), (Poly(β-benzyl-L-aspartate))										
	m-Cresol	15	–	1.15	5	–	0.8–24	LS	B	456
		70	–	0.74	5	–	0.8–24	LS	B	456
	Hexamethylphosphoramide	25	–	0.80	4	–	2–24	LS	B	456
	Chloroform/dichloroacetic acid (98/2, v/v)	25	–	1.30	5	–	0.8–24	LS	B	456
Poly(iminocarbonyl-L-benzyloxycarbonylpropylidene),										
	Dichloroacetic acid	25	2.78	0.87	–	6	2–34	LS	C	457
		25	8.8	0.77	8	–	6–	LS	B	814
(Poly(γ-benzyl-L-glutamate))	Dimethylformamide	25	0.0056	1.45	8	–	6–	LS	B	814
		25	0.00029	1.70	–	5	7–34	LS	C	457
	Dichloroacetic acid/heptane									
	(55/45, v/v)	21	116	0.53	–	4	1.5–10	LS	C	458
	(90/10, v/v)	21	25.4	0.68	–	4	1.5–10	LS	C	458
D,L-glutamate	Dichloroacetic acid	25	2.85	0.85	–	6	1.5–10	LS	C	459
	Dimethylformamide	25	37.7	0.55	–	6	1.5–10	LS	C	459
Poly(iminocarbonyl-L-hydroxycarbonylpropylidene), [Poly(α-L-glutamic acid)]										
	Sodium phosphate buffer (1.01 M, pH, 6.8)	25.5	1.55	0.96	5	–	4–15	LS	C	815
Poly[iminocarbonyl-L-(*N*-hydroxy-ethylcarbamoylpropylidene)], {Poly[N^5-(2-hydroxyethyl)-L-glutamine]}										
	Sodium phosphate buffer (0.05 M, pH, 7.4)	25	26.2	0.65	6	–	0.8–15	SE	C	816
	Water	30	–	0.55	4	–	1.7–7.2	OS	C	817
Poly[iminocarbonyl-L-(*N*-hydroxypropylcarbamoylpropylidene)], (Poly(N^5-(3-hydroxypropyl)-L-glutamine))										
	Methanol	25	–	1.6	4	–	20–40	LS	B	460
	Water	25	–	0.6–1.0	5	–	2–33	LS	B	460
Poly(iminocarbonyl-L-methoxycarbonylpropylidene), [Poly(γ-methyl-L-glutamate)]										
	m-Cresol	25		>1			3–21	OS	C	463
	Dichloroacetic acid	25	29	0.74	–	6	3–21	OS	C	463
D,L-glutamate	*m*-Cresol	25	11	0.78	–	6	3.2–8.2	OS	C	464
	Dichloroacetic acid	25	5.9	0.85	–	6	3.2–8.2	OS	C	464
Poly(iminocarbonyl-L-methoxyethylideneiminocarbonyl-L-hydroxyethylideneiminocarbonylmethylene), [Poly(Asp(OCH_3)-Ser(H)-Gly)]										
	Dichloroacetic acid	30	868	0.367	–	9	0.25–1.1	SA	B,C	467

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M (× 10^{-4})	Method(s)	Remarks	Refs.
Poly(iminocarbonyl-L-methylthiopropylidene), [Poly(L-methionine)] acid (1/1, mol)										
	Dichloroacetic acid		3.0	0.87	–	5	3–50	LS	B	820
	Dichloroacetic acid/trifluoroacetic	36	0.62	–	4	3–50	LS	B	820	
Poly(iminocarbonyl-L-p-nitrobenzyloxycarbonylpropylidene), [Poly(γ-p-nitrobenzyl-L-glutamate)]										
	Dichloroacetic acid	25	11.5	0.72	–	10	1–5	LS	B	608
	Dimethylformamide	25	0.0170	1.36	–	10	1–5	LS	B	608
Poly(iminocarbonyl-phenylethylidene), [Poly(phenylalanine))]										
L-	Chloroform	25	0.00346	1.48	–	11	2.2–14	LS	B	465
D,L	Chloroform/dichloro-acetic acid (2/3, v/v)	21	118	0.55				LS	B	466
Poly(γ-hydroxy-L-proline)	Water	30	92	0.68	3	–	1.6–3.5	GPC	A	818
Poly(α,ε-L-lysine)	Dimethylformamide/ LiCl (1%)	20	2500	0			0.05–23		A	819
Poly[(methylimino)carbonylmethylene], (Poly[sarcosine)]										
	Water	20	56	0.88	–	5	0.7–1.6	EG	C	468
Poly(1-proline), see Poly[(L-1,2-pyrrolidindiyl)carbonyl] in group 3.9.										
3.5. POLY(UREAS), POLY(URETHANES), POLY(IMINES)										
Poly(ethylene imine), see also Poly(iminoethylene)										
	Methanol	25	10.4	0.95	8	–	0.24–2.8	LS	–	976
Poly(iminoethylene)	Water	25	$[\eta]=2.14\,P^{0.35}$ P: number of N atoms		4	–	$P=4$–13	CR	D	470
Poly(oxytetramethyleneoxycarbonylimino-2,4-tolyleneiminocarbonyl)										
	Dimethylformamide	30	54	0.74	–	5	0.35–1.6	LS	C	497
Poly[oxytetramethyleneoxycarbonylimino-(6-pentyloxy-1,3-phenylene)-iminocarbonyl]										
	Dimethylformamide	20	8.1	0.86	–	5	0.9–4.3	SV	C	498
Poly(oxytetramethyleneoxycarbonylimino-[6-(αH,ωH,ωH-perfluoroalkylene)oxy-1,3-phenylene]-iminocarbonyl)										
number of F atoms										
4	Acetone	20	7.1	0.81	–	5	0.5–4	SV	C	498
8	Acetone	20	4.3	0.785	–	5	2–16	SV	C	498
12	Acetone	20	13.5	0.67	–	5	1.7–28	SV	C	498
16	Acetone	20	25.6	0.615	–	5	0.9–9	SV	C	498
Poly(terephthalic acid-4-aminobenzohydrazide)										
	Dimethyl sulfoxide	25	(Wormlike behavior)		11	–	0.38–26	LS	–	977
Poly(urethane)with methylene *bis*(4-phenyl isocyanate), tetramethylene glycol and ethylenediamine										
	Dimethylacetamide	25	101	0.59	8	–	3.2–35	LS	–	978
Poly(ureyleneheptamethylene)	Dichloroacetic acid	46	338	0.505	–	10	0.3–2.4	LS	C	471
	Sulfuric acid (90%)	25	50.0	0.714	–	14	0.13–2.4	LS	C	471
		46	223	0.506	–	7	0.06–2.4	LS	C	471
	(96%)	25	37.5	0.757	–	5	0.4–2.4	LS	C	471
	(98%)	46	240	0.53	–	7	0.2–2.4	LS	C	471
3.6. POLY(SULFIDES)										
Poly(thiopropylene)	Benzene	20	3.3	0.86	7	–	3.8–20.4	LS	B	436
		30	5.0	0.78	–	10	3.6–73	LS		839
Poly(trimethylene sulfide)	Chloroform	25	31.0	0.76	6	–	1–4.7	OS	B	979
3.7. POLY(PHOSPHATES)										
Lithium–potassium copoly(phosphate)										
Li/K (9/1, mol/mol)	Aq. NaBr (0.035 N)		0.073	1.17	–	6	0.4–1	EG	–	980
(8/2, mol/mol)	Aq. NaBr (0.035 N)		0.63	0.93	–	6	0.4–1	EG	–	980
(7/3, mol/mol)	Aq. NaBr (0.035 N)		7.3	0.89	–	6	0.4–1	EG	–	980
(6/4, mol/mol)	Aq. NaBr (0.035 N)		27	0.75	–	5	0.4–1	EG	–	980
(5/5, mol/mol)	Aq. NaBr (0.035 N)		25	0.74	–	6	0.4–1	EG	–	980
Poly[oxy(hydroxyphosphinylidene)]										
	Aq. NaBr (0.35 M)	25	6.5	0.69	–	16	1–125	LS	C	422
	(0.415 M)	25 (θ)	49.4	0.50	–	9	1–125	LS	C	422
sodium salt	Aq. NaBr (0.035 M)	25.5	69	0.61	–	5	0.09–1	EG	C	423

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(phosphoric acid), see Poly[oxy(hydroxyphosphinylidene)]										
Sodium–potassium copoly(phosphate)										
Na/K (9/1, mol/mol)	Aq. NaBr (0.035 N)		3.6	0.93	–	4	0.4–0.8	EG	–	980
(8/2, mol/mol)	Aq. NaBr (0.035 N)		11	0.81	–	4	0.4–0.8	EG	–	980
(7/3, mol/mol)	Aq. NaBr (0.035 N)		12	0.80	–	4	0.4–0.8	EG	–	980
(6/4, mol/mol)	Aq. NaBr (0.035 N)		57	0.60	–	4	0.4–0.8	EG	–	980
(5/5, mol/mol)	Aq. NaBr (0.035 N)		73	0.57	–	4	0.4–0.8	EG	–	980
(4/6, mol/mol)	Aq. NaBr (0.035 N)		150	0.50	–	4	0.4–0.8	EG	–	980
3.8. POLY(SILOXANES), POLY(SILSESQUIOXANES)										
Poly(dimethyl siloxane), see Poly[oxy(dimethylsilylene)]										
Poly[(1-isobutyl-3-phenylsilsesquioxane)]										
	Benzene	21	1.4	0.90	?	–	1.2–15	SD	?	619
		21	110	0.54	?	–	20–230	SD	?	619
	Butyl acetate	24	Same as above two data							619
Poly(3-methylbutenesilsesquioxane)										
	Benzene	21	5.4	0.88	5	–	9–60	SD	B	603
		21	1.6	0.90	?	–	0.35–74	SD	B	619
	Butyl acetate	24	5.4	0.88	13	–	9–60	SD	B	603
Poly(methylphenylsiloxane)	Cyclohexane	25	27.3	0.60	4	–	12–46	LS	C	983
		50	15.6	0.65	4	–	12–46	LS	C	983
	Methylcyclohexane	20	30.6	0.58	4	–	12–46	LS	C	983
	Tetrahydrofuran	25	16.5	0.69	4	–	12–46	LS	C	983
Poly[oxy(dimethylsilylene)]	Benzene	20	12	0.68	4	–	5.5–12	LV	A–B	424
	Bromobenzene	78.7 (θ)	76	0.50	3	–	8–106	LS	A	425
	Bromocyclohexane	28 (θ)	78	0.50	5	–	10–92	SD	A	426
		28 (θ)	79.5	0.50	6	–	4–90	LS	A	838
		29.0 (θ)	74	0.50	5	–	3.3–106	LS	A,R	425
	Bromocyclohexane	37 (θ)	78	0.5	7	–	4.5–32	LS	–	982
	Bromocyclohexane/ phenetole (6/7, v/v)	36.3 (θ)	75.5	0.50	4	–	4.5–106	LS	A	425
	Butanone	20	64	0.525	6	–	4–90	LS	A	838
		20 (θ)	81	0.50	5	–	5–66	OS	A	427
		30	48	0.55	8	–	5–66	OS	A	427
	$C_8F_{18}/C_2Cl_4F_2$ (33.17/66.83, w/w), low cohesive energy density mixture	22.5 (θ)	106	0.50	4	–	55–120	LS	A–B	424
	Chlorobenzene/dimethyl phthalate (45/6, v/v)	57.5 (θ)	76	0.50	3	–	8–106	LS	A	425
	Cyclohexane	35	10.2	0.735	8	–	1.7–90	LS	A	838
	Ethyl iodide	2.1 (θ)	70	0.50	2	–	34–106	LS	A	425
	Phenetole	83 (θ)	79	0.50	–	2	5–66	OS	A	427
		89.5 (θ)	73	0.50	4	–	4.5–106	LS	A,R	425
	Toluene	20	20.0	0.66	–	?	0.3–20	OS, LS	C	428
		25	2.43	0.84	–	7	1.9–13	LS	C	429
		25	8.28	0.72	5	–	10–92	SD	A	426
		25	21.5	0.65	–	?	2–130	OS		430
		25	75	0.50	5	–	0.2–1.0	OS		56
	Toluene	25	13.6	0.69	13	–	0.26–63	OS, LS	B	981
	Toluene	25	18.7	0.66	18	–	0.2–30	LS, SA	B	837
		35	12.5	0.703	8	–	1.7–90	LS	A	838
star type, 3 branches	Toluene	20	23.9	0.64	10	–	4–35	LS	A	431
star type, 4 branches	Toluene	20	64.5	0.54	10	–	0.8–25	LS	A	431
Poly[oxy(dimethylsilylene)1,4-phenylenedimethylsilylene]										
	Toluene	25	11.2	0.75	6	–	7–40	LS	B	499
Poly[oxy(dipropylsilylene)]	2-Pentanone	76 (θ)	87.1	0.50	4	–	2.5–27	OS	A	433
	Toluene	10 (θ)	109	0.50	6	–	2.5–30	OS	A	433
		25	43.5	0.58	15	–	1.7–43	OS	A	433
Poly[oxy(methylsilylene)]										
Me/Si = 1.5	Chlorobenzene	20 (θ)	326	0.21	12	–	0.1–500	LS		432
Me/Si = 1.8	Chlorobenzene/dimethyl phthalate (90.7/9.3, w/w)	20 (θ)	240	0.28	3	–	5–100	LS		432

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	No. of samples WP	Mol. wt. range M (× 10⁻⁴)	Method(s)	Remarks	Refs.
Poly[oxy(methylphenylsilylene)]	Cyclohexane	25	5.52	0.72	13	–	6–124	LS	A	434
	Diisobutylamine	30.4 (θ)	51.5	0.50	9	–	6–124	LS	A	434
	Toluene	25	3.90	0.78	20	–	6–124	LS	A	434
Poly[oxy(γ-trifluoropropylmethylsilylene)]										
	Cyclohexyl acetate	25.0 (θ)	41.0	0.50	12	–	12–451	LS	A	435
	Ethyl acetate	25	5.92	0.70	9	–	20–451	LS	A	435
	Methyl hexanoate	72.8 (θ)	44.5	0.50	7	–	44–451	LS	A	435
Poly(phenylsilsesquioxane)	Benzene	–	–	0.92	–	–		LS		500
		21	0.77	0.90	7	–	1.7–6.1	SD	B	501
		21	2.38	0.85	14	–	0.4–88	SD	B	502
		21	0.13	1.10	8	–	3.7–15	SD	B,L	501,603
		21	7.6	0.70	5	–	10–31	SD	B	603
		25	Not linear					LS		843
	Bromoform	21	0.13	1.09	8	–	3.7–15	SD	B	501
		21	2.38	0.85	12	–	3.6–88	SD	B	502
	Benzene/bromoform	21 (θ)	2.38	0.85	5	–	14–71	SD	B	502
	(60/40, w/w)	21 (θ)	220	0.50	?	–	60–340	SD	?	619
cis-syndiotactic	1,2-Dichloroethane	50.5 (θ)	2.12	0.87	4	–	5–30	OS		601
3.9. POLY(HETEROCYCLICS)										
Poly(2,6-benzothiazole)	Methanesulfonic acid	30.0	12.6	1.0	6	–	0.36–11	LLS	–	989
Poly(benzobisthiazole-2,6-diyl-1,4-phenylene)										
	Methanesulfonic acid	25	0.014		1.8		1.5–3.7	LS		833
Poly[2,5-benzoxazole)	Methanesulfonic acid	30.0	10.9	1.02	4	–	0.49–11	LLS	–	989
Poly[bis(*m*-chlorophenoxy)phosphazene]										
	Chloroform	25	–	0.67	10	–	59–668	LS		836
Poly[6,6′-bis(3-phenylquinoxaline)-2,2′-diyl-1,4-phenylene)]										
	m-Cresol	40	86	0.63	–	8	1–35	LS		845
Poly[(1,3-dihydro-3-oxoisobenzofuran-1-ylidene)-1,4-phenyleneiminoterephthaloylimino-1,4-phenylene]										
	Dimethylformamide	25	277	0.59	7	–	1.4–5.5	LS	B	503
Poly[(1,3-dihydro-3-oxo-2-phenylisoindole-1-ylidene)-1,4-phenyleneoxyterephthaloyloxy-1,4-phenylene]										
	Tetrachloroethane	20	41.0	0.684	10	–	0.9–3	LS	B	514
	Tetrahydrofuran	20	259	0.488	5	–	1–3	LS	B	514
Poly[(5,7-dihydro-1,3,5,7-tetraoxobenzo[1,2-c:4,5-c′]-dipyrrole-2,6(1H,3H)diyl)-1,4-phenylene-(1,3-dihydro-3-oxoisobenzofuran-1-ylidene)-1,4-phenylene]										
	Dimethylformamide	20	328	0.516	26	–	0.4–17	LS	B	515
Poly(3,3′-dimethylthietane)	Tetrahydrofuran	25	11.0	0.79	7	–	3.8–12.9	OS	B	986
Poly(1-isobutyl-2,5-oxopyrrolidine-3,4-diyl)										
	Butyl acetate	21	22	0.65	13	–	19–340	SD	A	512
Poly[2-methoxy-4,6-di(*p,p*′-isopropylidene diphenyloxy)-*s*-triazine]										
	Chloroform	30	16.8	0.74	6	–	9–55.2	OS, LS	B–C	985
	1,2-Dichloroethane	30	21.6	0.71	4	–	14–55.2	OS, LS	B–C	985
	1,2-Dichloroethane/ *n*-butanol (80/15, v/v)	30	27.9	0.68	4	–	14–55.2	OS, LS	B–C	985
Poly(methylene-*N,N*′-dimethylpiperidinium chloride)										
	Aq. NaCl (0.1 M)	20	39.8	0.660	5	–	8–195	LS	A	829
	(0.4 M)	20	13.9	0.542	5	–	8–195	LS	A	829
Poly[*N*-(*n*-octadecyl)maleimide]	Benzene	25	5.38	0.74	17	–	1.2–33	OS, VOS, GPC	B	987
	1-Chloronaphthalene	25	2.89	0.77	7	–	1.5–12	OS, VOS, GPC	B	987
	o-Dichlorobenzene	25	4.03	0.75	7	–	1.8–12	OS, VOS, GPC	B	987
	Tetrahydrofuran	25	9.61	0.67	15	–	1.3–33	OS, VOS, GPC	B	987
	Toluene	25	6.04	0.70	8	–	1.2–17	OS, VOS, GPC	B	987
	1-Decanol	39.4 (θ)	18.3	0.50	6	–	2–19	LV	B	988
	1-Hexanol	79.0 (θ)	37.0	0.50	6	–	1.4–9	LV	B	988
	1-Octanol	53.7 (θ)	23.5	0.50	6	–	1.1–12	LV	B	988
Poly(*N,N*′-(*p*-phenylene)-3,3′,4,4′-biphenyltetracarboxylic acid diamine]										
	N-methylpyrrolidinone	25	9.5	0.90	–	4	0.59–7.5	LLS, SEC	–	990
	Dimethyl sulfoxide	25	38	0.77	–	6	0.58–5.6	LLS, SEC	–	990
Poly(4-phenylquinoline-2,6-diyloxy-4-phenylguinoline-2,6-diyl-1,4-phenyleneoxy-1,4-phenylene)										
	Chloroform	25	90	0.66	3	–	4–8	OS		832
Poly[(4-phenyl-1,2,4-triazol-3,5-diyl)-1,3(or 1,4)-phenylene]										
	Phenol/water (90/10, w/w)	–	845	0.56	–	5	1.3–2.7	OS	–	516
Poly[(L-1,2-pyrrolidindiyl)-carbonyl]										
	Water, acetic acid	25	No simple relation		–	5	1–5	OS	C	507

TABLE 3. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	WP	Mol. wt. range M ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Poly(quinoline-2,4-diyl-1,4-phenyleneoxy-1,4-phenylene-quinoline-4,2-diyl-1,4-phenyleneoxy-1,4-phenylene)										
	Chloroform	20	550	0.44	3	–	3–8	OS		831
Poly(1-*p*-tolyl-2,5-oxopyrrolidine-3,4-diyl)										
	Dimethylformamide	21	15.5	0.7	6	–	4–56	SD	B	513
3.10. COPOLYMERS (MALEIC ANHYDRIDE, SULFONES)										
Poly[3,9-bis(ethylidone-2,4,8,10-tetraoxaspiro(5,5)undecane)-*ran*-(*trans*-cyclohexane-dimethanol)/(1,6-hexanediol)]										
trans-CDM/1,6-ND (100/0)	Tetrahydrofuran	30	49.2	0.57	?	?	?	LLS	–	954
(70/30)	Tetrahydrofuran	30	22	0.65	?	?	?	LLS	–	954
(50/50)	Tetrahydrofuran	30	17.2	0.68	?	?	?	LLS	–	954
(29/71)	Tetrahydrofuran	30	11.9	0.74	?	?	?	LLS	–	954
(0/100)	Tetrahydrofuran	30	3.78	0.81	?	?	?	LLS	–	954
Poly[(tetrahydro-2,5-dioxo-3,4-furandiyl)(1-isobutyloxyethylene)]										
	Acetone	30	124.7	0.506	5	–	21–111	LS	B	504
	Butanone	30	119.4	0.512	5	–	21–111	LS	B	504
	Tetrahydrofuran	30	75.6	0.552	5	–	21–111	LS	B	504
Poly[(tetrahydro-2,5-dioxo-3,4-furandiyl)(1-methoxycarbonyl-1-methylethylene)]										
	Acetone	30	12.4	0.69	6	–	20–71	LS	B	505
	Dimethylsulfoxide	30	7.5	0.77	6	–	20–71	LS	B	505
	Dioxane	30	26.1	0.64	6	–	20–71	LS	B	505
	Tetrahydrofuran	30	13.4	0.69	6	–	20–71	LS	B	505
Poly[(tetrahydro-2,5-dioxo-3,4-furandiyl)(1-phenylethylene)]										
	Acetone	30	8.69	0.74	6	–	13–75	OS	A	506
	Tetrahydrofuran	30	5.07	0.81	6	–	13–75	OS	A	506
Poly[sulfonyl(bicycloheptene)]	Chloroform	25	1.58	0.79	4	–	27–227	LS	D	840
	Cyclohexane	25	3.05	0.73	4	–	27–227	LS	D	840
Poly[sulfonyl(butylethylene)]	Acetone	20	5.9	0.74	7	–	5–60	LS, SD	B	437
	Benzene	25	8.9	0.70	5	–	9–107	OS	A,R	438
	Chloroform	25	5.8	0.75	6	–	7–54	OS	A,R	439
	Dioxane	25	6.2	0.76	5	–	9–107	OS	A	438
	Hexylchloride	13 (θ)	33	0.55	5	–	10–60	LS, SD	B	437
	Butanone/2-propanol (29.8/70.2, v/v)	8 (θ)	53	0.50	6	–	7–54	OS	A	439
	(37/63, v/v)	24 (θ)	53	0.50	6	–	7–54	OS	A	439
	Dioxane/hexane (40/60, v/v)	20 (θ)	65	0.50	7	–	9–107	OS	A	438
Poly[sulfonyl(1-methyl-1-propylethylene)]										
	Chloroform	20	5.9	0.81	6	–	4–50	OS	A	439
	Butanone/2-propanol (39.5/60.5, v/v)	22.5 (θ)	91	0.50	6	–	4–50	OS	A	439
	Butanone/hexane (35.4/64.6, v/v)	11.5 (θ)	91	0.50	6	–	4–50	OS	A	439
Poly[sulfonyl(phenyleneoxyphenylene)]										
	Dimethylformamide	25	33	0.64	6	–	3–25	LS	C	841
Poly[sulfonyl(phenylethylene)]	Tetrahydrofuran	30	3.89	0.78	5	–	15–40	OS	A	440
3.11. OTHER COMPOUNDS										
Poly(di-*n*-hexylsilane)	Tetrahydrofuran	25	17.0	0.672	7	–	18–960	LS	B–D	995
Poly(oxy-1,4-phenylene-oxy-1,4-phenylene-*N*-phenylimine-1,4-phenylene)										
	Tetrahydrofuran	25	63.4	0.617	8	–	0.58–10	LS	B	993
Poly[oxythiocarbonyloxy-1,4-phenylene(methyl)phenylmethylene-1,4-phenylene]										
	Chloroform	25	71.0	0.60	5	–	1.5–14.2	OS, SEC	C	992
	Dichloromethane	25	141	0.55	5	–	1.5–14.2	OS, SEC	C	992
	1,4-Dioxane	25	153	0.50	5	–	1.5–14.2	OS, SEC	C	992
	Tetrahydrofuran	25	61.7	0.61	5	–	1.5–14.2	OS, SEC	C	992
Poly[*trans*-bis(tributylphosphine)platinum-1,4-butadiynediyl]										
	Heptane	25	Wormlike	Cylinder						834
	Tetrahydrofuran	25	6.5×10^{-7}	1.7	5	–	4–10	GPC	B	835
Poly[*trans*-bis(tributylphosphine)platinum-1,4-phenylenediethynylene]										
	Tetrahydrofuran	25	2.0×10^{-6}	1.7				GPC	B	835
Poly(hexamethylenedimethylammonium bromide)										
	Aq. KBr (0.4 M)	25	62.2	0.58	5	–	1.3–5	LS	C	844
Poly(hexamethylenedimethylammonium chloride)										
	Aq. KCl (0.4 M)	25	1.02	1.00	4	–	1.3–3	LS	C	844

TABLE 4. CELLULOSE AND DERIVATIVES, POLY(SACCHARIDES) (See also table "Properties of Cellulose Materials")

Polymer	Solvent	Temp. (°C)	K (× 10^3) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10^{-4})	Method(s)	Remarks	Refs.
(Acetoxypropyl) cellulose	Dimethyl phthalate	25	–	0.88	6	–	2.2–43	SEC, LLS	A–C	1001
		105	–	0.75	5	–	7.6–43	SEC, LLS	A–C	1001
		150	–	0.57	6	–	2.2–43	SEC, LLS	A–C	1001
			(Wormlike behavior)							
Amylose	Dimethyl sulfoxide	20	3.97	0.82	–	14	2–217	LS	C	517
		25	1.25	0.87	9	–	22–310	LS	B	518
		25	15.1	0.70			8–180	LS	B	519
		25	30.6	0.64	6	–	27–220	LS	B	520
	Ethylenediamine	25	15.5	0.70	6	–	31–310	LS	B	518
	Formamide	20	22.6	0.67	–	12	2–157	LS	C	517
		25	30.5	0.62	14	–	8–180	LS	B	519
	Water	20	13.2	0.68	–	12	36–217	LS	C	517
	Acetone/dimethyl sulfoxide (43.5/56.5, v/v)	20 (θ)	83.1	0.51	–	10	2–157	LS	C	517
	Aq. KCl (0.33 M)	22.5	33.9	0.59	5	–	16–230	LS	B	521
		25 (θ)	112	0.50	5	–	16–230	LS	B	522
		25 (θ)	115	0.50	6	–	27–220	LS	B	520
	(0.50 M)	25 (θ)	61.1	0.50					B	523
	Aq. KOH (0.15 M)	25	8.36	0.77	?	–	8–180	LS	B	519
	(0.2 M)	25	6.92	0.78	5	–	16–229	LS	B	522
	(0.5 M)	25	8.50	0.76	6	–	27–220	LS	B	520
	(1 M)	25	1.18	0.89	5	–	31–310	LS	B	518
	Aq. NaOH (0.5 M)	20	3.65	0.85	–	16	2–217	LS	C	517
Amylose triacetate	Chloroform	30	1.06	0.92	12	–	12–480	LS	B	524
		30	4.90	0.85	4	–	21–102	LS	A	525
		50	5.20	0.83	4	–	21–102	LS	A	525
	Methyl acetate	25	5.60	0.80	–	3	7–19	SD	D	526
	Nitromethane	22.5	8.50	0.73	12	–	14–310	LS	B	519,527
		25	3.58	0.78	6	–	4–100	LS	B,C	846
		30	2.18	0.82	6	–	4–100	LS	B,C	846
		30	9.93	0.76	4	–	21–102	LS	A	525
		50	8.71	0.76	4	–	21–102	LS	A	525
	Chloroform/cyclohexane									
	(80/20, v/v)	30	4.64	0.85	4	–	21–102	LS	A	525
	(50/50, v/v)	30	7.41	0.79	4	–	21–102	LS	A	525
	Methanol/nitromethane									
	(70.7/29.3, v/v)	30 (θ)	98.4	0.51	4	–	21–102	LS	A	525
	(50/50, v/v)	30	6.49	0.75	4	–	21–102	LS	A	525
	(25/75, v/v)	30	10.23	0.76	4	–	21–102	LS	A	525
	Nitromethane/propanol									
	(43.3/56.7, v/v)	25 (θ)	91.6	0.50	12	–	14–310	LS	B	519
	(50/50, v/v)	25	17.0	0.66	12	–	14–310	LS	B	519
Amylose tributyrate	Butanone	25	3.39	0.77	7	–	7–160	LS	B	847
	Carbon tetrachloride	25	3.46	0.79	7	–	7–160	LS	B	847
	Ethyl acetate	25	5.59	0.74	7	–	7–160	LS	B	847
	Tetrahydrofuran	25	1.66	0.86	7	–	7–160	LS	B	847
Amylose tricarbanilate	Acetone	20	0.814	0.90	–	26	4–490	LS	B	528
	Dioxane	20	0.906	0.92	–	25	4–360	LS	B	528
	Dioxane	–	(Wormlike behavior)		7	–	21–290	LS	A	997
	Pyridine	20	0.589	0.92	–	20	4–360	LS	B	528
		25	2.00	0.83	11	–	30–244	LS	B	848,849
Amylose tricarbethoxymethylcarbamate	Acetone	20	27.6	0.63	13	–	9–380	LV	B	529
Amylose tripropionate	Ethyl acetate	25	31.3	0.58	8	–	1–61	OS, GPC	B	850
	Tetrahydrofuran	25	24.8	0.61	6	–	1–61	OS, GPC	B	850
Amylose, carboxymethyl	Aq. NaCl									
–, sodium salt	(0.35 M)	37.5	25.2	0.64				LS	A	609
	(0.5 M, pH 8)	35	209	0.53	6	–	5–21	OS	B	530
	(0.78 M; 0.02% NaN_3)	35	37.1	0.61	6	–	7–29	LS	B	531
Amylose, diethylaminoethyl										
–, hydrochloride	Aq. NaCl (0.78 M; 0.02% NaN_3)	35	82.8	0.55	5	–	4–23	LS	B	531
Arginic acid, sodium salt	Aq. NaCl (0.2 M)	25	7.97	1.0	–	7	5–19	OS	C	532

TABLE 4. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
Cellulose, see also table "Properties of Cellulose Materials"										
	Cadoxen	25	33.8	0.77	5	–	20–100	SD	C,R	533
		25	38.5	0.76	4	–	1.0–3.4	SE, LS	B–C,R	534
	Cuprammonium	20	105	0.66	9	–	2–25	OS	C	535
		25	8.5	0.81	–	5	8–96	OS	C	536
	Cupriethylene	25	13.3	0.905	32	–	1–54	OS	B-C	537
	N,N-Dimethylactamide/ 9% LiCl	30	0.128	1.19	9	–	12.5–70	LLS	–	1000
Cellulose acetate	*N,N*-Dimethylacetamide	25	191	0.60	10	–	4–15	LS	B	851
DS[a] 0.49	Dimethyl sulfoxide	25	171	0.61	10	–	4–15	LS	B	851
	Formamide	25	20.9	0.60	10	–	4–15	LS	B	851
	Water	25	20.9	0.60	10	–	4–15	LS	B	851
DS[a] 1.75	*N,N*-Dimethylacetamide	25	95.8	0.65	7	–	3–14	LS	B	852
Cellulose acetate butyrate	Acetic acid	25	14.6	0.83	–	5	1–21	OS	B–C	538
	Acetone	25	13.7	0.85	–	11	1–21	OS	B–C	538
	Ethyl acetate	30	11.3	0.83	6	–	3–14	LS		853
	Nitromethane	30	16.5	0.78	6	–	3–14	LS		853
Cellulose diacetate	Acetone	25	133	0.616	9	–	6–27	LS	A	854
Ac. acid content, 55.5 wt.%	Dimethylacetamide	25	39.5	0.738	5	–	6–19	LS	A	855
	N,N-Dimethylactamide	30	11.0 (Wormlike behavior)	0.848	6	–	3.58–17.0	SE	A–B	1007
	Tetrahydrofuran	25	51.3	0.688	6	–	7–30	LS	A	854
	Trifluoroacetic acid	25	52.7	0.696	5	–	6–19	LS	A	855
Cellulose nitrate	Tetrahydrofuran	25	–	0.80–0.84	–	9	2.6–27	LLS, OS	D	1004
Cellulose triacetate	Acetone	20	2.38	1.0	5	–	2–14	SD	B	539
		25	14.9	0.82	8	–	2–39	OS	A(?)	540
		25	8.97	0.90	14	–	1–18	OS	B,R	541
		25	33.0	0.760	9	–	2–30	OS	C	535
		25	28.9	0.725	9	–	8–69	LS	A	855
	Chloroform	20	2.2	0.95	13	–	1–13	LS	A	856
		25	45.4	0.649	7	–	8–69	LS	A	855
		30	14.4	0.800	6	–	10–18	LS	A	857
		30	4.5	0.9	5	–	3–18	LV	C	542
	o-Cresol	30	6.15	0.9	5	–	3–18	LV	C	542
	Dichloromethane	20	24.7	0.704	7	–	6–69	LS	A	855
	Dimethylacetamide	25	26.4	0.750	10	–	6–69	LS	A	855
	Tetrachloroethane	25	39.3	0.662	10	–	6–69	LS	A	855
	Trifluoroacetic acid	25	39.6	0.706	8	–	6–69	LS	A	855
	Acetone/water (80/20, v/v)	20	2.65	1.0	9	–	2–11	SD	B	539
		25	21.0	0.803		–	2–30	OS	C	535
	Ethanol/methylene chloride (20/80, v/v)	13.9	0.834		–	2	–30	OS	C	5315
Cellulose tributyrate	Butanone	30	4.3	0.87	7	–	6–32	LS	B,R	543
		30	18.2	0.80	7	–	8–32	OS	C–D	544,2
	Tributyrin	0	5.3	0.87	4	–	6–32	LS	B	543
		25	5.6	0.85	4	–	6–32	LS	B	543
		50	6.1	0.82	4	–	6–32	LS	B	543
		70	6.2	0.80	4	–	6–32	LS	B	543
	Dodecane/tetralin (75/25, v/v)	130 (θ)	82	0.50	3	–	11–21	OS	C–D	544,2
Cellulose tricarbanilate	Acetone	0	1.10	0.93	6	–	31–220	LS	B–C	545
		20	4.66	0.84	–	16	7–270	LS	B	528
		25	1.43	0.91	6	–	31–220	LS	B–C,R	545
		35	1.31	0.90	6	–	31–220	LS	B–C	545
	Acetone	25	– (Wormlike behavior)	Not const.	9	–	22–770	LS, GPC	B–C	996
	Anisole	94 (θ)	130	0.50	4	–	31–220	LS	B–C	546
	Butanone	15	2.02	0.89	–	10	21–110	LS	D	858
		30	3.42	0.84	–	10	21–110	LS	D	858
	Cyclohexanol	73 (θ)	156	0.51	–	5	21–110	LS	D	858
	Cyclohexanone	25	1.91	0.86	5	–	31–220	LS	B–C	545
		35	2.02	0.85	5	–	31–220	LS	B–C	545

TABLE 4. *cont'd*

Polymer	Solvent	Temp. (°C)	K ($\times 10^3$) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range ($\times 10^{-4}$)	Method(s)	Remarks	Refs.
	Dioxane	20	4.20	0.88	–	15	7–270	LS	B	528
		25	0.813	0.97	5	–	31–220	LS	B–C	545
		35	0.865	0.96	5	–	31–220	LS	B–C	545
		50	0.849	0.95	4	15	31–94	LS	B–C	545
		15	0.89	0.97	–	10	21–110	LS	D	858
		21		0.95	11	–	1–11	SD	B	859
		30	1.04	0.95	–	10	21–110	LS	D	858
		70	2.57	0.86	–	10	21–110	LS	D	858
	Pyridine	20	3.46	0.86	–	12	7–270	LS	B	528
	Tetrahydrofuran	25	–	Not const.	12	–	2.7–370	LS, GPC	B–C	996
			(Wormlike behavior)							
Cellulose trihexanoate	Dimethylformamide	41 (θ)	245	0.50	7		6–130	LS	C–D	547
	Dioxane	35	125	0.57	7		4–130	LS	C–D	547
Cellulose trinitrate	Acetone	20	2.80	1.00	13		1–250	SD	B	548
		25	1.69	1.00	11	–	8–265	LS	B–C	549
		25	1.66	0.86	6	–	68–250	LS	C	550
		25	10.8	0.89	4	–	4–32	LS	C–D	551
(N content, 12.9 wt.%)		25	5.70	0.90	4	–	15–200	LS	A,R	552
(N content, 13.9 wt.%)		25	6.93	0.91	6	–	8–400	LS	A,R	552
		25	7.00	0.933	9	–	5–50	OS	B–C	535
		25	11.0	0.91	33	–	3–100	OS	B–C	537
		25	23.5	0.78	6	–	7–26	OS	B–C	553
	Butyl acetate	25	5.68	0.969	9	–	5–50	OS	B–C	535
	Butyl formate	25	23	0.81	6	–	7–26	OS	B–C	553
	Cyclohexanone	25	2.24	0.810	6	–	7–22	OS	B–C	554
	Ethyl acetate	25	3.8	1.03	33	–	3–100	OS	B–C	537
		25	8.3	0.90	6	–	7–26	OS	B–C	553
		25	1.66	0.86	7	–	68–250	LS	C	550
		30	2.50	1.01	6	–	4–57	LS	B–C	555
	Ethyl butyrate	25	3.64	1.0	?	–	5–50	OS	B–C	556
	Ethyl formate	25	30	0.79	6	–	7–26	OS	B–C	553
	Ethyl lactate	25	12.2	0.92	10	–	3–65	OS	B–C	537
	2-Heptanone	25	5.0	0.93	6	–	7–26	OS	B–C	553
	Methyl acetate	25	18.3	0.835	6	–	7–22	OS	B–C	554
	Nitrobenzene	25	6.1	0.945	6	–	7–22	OS	B–C	554
	Pentyl acetate	25	1.1	1.04	6	–	7–26	OS	B–C	553
Cellulose trioctanoate	Dimethylformamide	140 (θ)	113	0.50	3	–	10–32	OS	B–C	544
	γ-Phenylpropanol	48 (θ)	129	0.50	3	–	8–32	OS	B–C	544
	Toluene	30	17.3	0.70	6	–	8–35	OS	B–C	544
(Cyanoethyl)(hydroxypropyl) cellulose	Tetrahydrofuran	25	1.14	0.99	8	–	5.4–27	LLS, SEC	C–D	1002
			(Wormlike behavior)							
Ethyl cellulose	Acetone	20	1.51	1.05	5	–	1.1–8	SD	A	557
	Benzene	20	1.34	1.07	5	–	1.1–8	SD	A	557
		25	29.2	0.81	6	–	4–14	OS	B–C	558
		60	35.8	0.78	6	–	4–14	OS	B–C	558
	Butanone	25	18.2	0.84	6	–	4–14	OS	B–C	558
		60	26.7	0.79	6	–	4–14	OS	B–C	558
	Butyl acetate	25	14.0	0.87	6	–	4–14	OS	B–C	558
		60	18.1	0.83	6	–	4–14	OS	B–C	558
	Chloroform	25	11.8	0.89	6	–	4–14	OS	B–C	558
		46	9.3	0.90	6	–	4–14	OS	B–C	558
	Ethyl acetate	25	10.7	0.89	6	–	4–14	OS	B–C	558
		60	14.0	0.85	6	–	4–14	OS	B–C	558
	Methanol	25	52.3	0.65	6	–	10–41	LS	B–C	559
	Nitroethane	25	4.2	0.96	6	–	4–14	OS	B–C	558
		60	22.6	0.79	6	–	4–14	OS	B–C	558
Ethyl hydroxyethyl cellulose	Water	25	37	0.80	4	–	5–18	SD, LS	B	560
Hydroxyethyl cellulose	Cadoxen	25	17.4	0.79	4	–	8–61	LS	B	561
	Water	25	9.53	0.87	5	–	8–63	LS	B	561
DS[a] 0.88	Aq. HCl (4 M)	25	$[\eta] = 1.2\ DP_w^{0.87}$ (DP_w; weight-average degree of polymerization)						B	562
Methyl cellulose										
DS[a] 1.74	Water	25	316	0.55	–	5	12–57	LS	C–D	563
	Aq. HCl (4 M)	25	$[\eta] = 1.6\ DP_w^{0.86}$					LS	B	562

TABLE 4. *cont'd*

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	W.P.	Mol. wt. range (× 10⁻⁴)	Method(s)	Remarks	Refs.
Sodium carboxymethylcellulose	Aq. NaOH									
	(0.78 M)/NaN_3(0.1 M)	35	37	0.61	6	–	7–30	OS, LS	B	531
DS[a] 0.2–1.0	Cadoxen	25	33.4	0.73	–	5	5–106	LS	C	564
DS[a] 0.96	Aq. HCl (4 M)	25	$[\eta]=0.97\ DP_w^{0.83}$						B	562
DS[a] 0.62–0.74	Aq. NaCl (0.001 M)									
		25	0.100	1.40	8	–	4.5–35	SD	C–D	565
	(0.01 M)	25	0.646	1.20	3	–	4.5–35	SD	C–D	565
	(0.1 M)	25	12.3	0.91	8	–	4.5–35	SD	C–D	565
DS[a] 1.06	(0.005 M)	25	7.2	0.95	4	–	14–106	LS	C–D	566
	(0.01 M)	25	8.1	0.92	4	–	14–106	LS	C–D	566
	(0.05 M)	25	19	0.82	4	–	14–106	LS	C–D	566
	(0.2 M)	25	43	0.74	4	–	14–106	LS	C–D	566
Sodium cellulose xanthate	Aq. NaOH (1 M)	0	$[\eta]=1.67\ DP_w^{0.82}+0.62\ DS_{2,3}-0.20\ DS_6 DP_w^{0.94}$						C	567
			DS_i, Degree of substitution at the $i(=2, 3$ or $6)$ positions in glucose unit							
Dextran										
linear fraction	Formamide	25	165	0.49	5	–	0.2–3.2	OS	C	568
	Water	25	97.8	0.50	10	–	2–10	LS	C,R	569
		25	49.3	0.60	10	–	0.04–4.5	EA	C	570
		50	39.3	0.61	6	–	0.2–3.2	OS	C	568
branched fraction	Methanol/water (40.5/59.5, v/v)	34 (θ)	10.3	0.25	–	6	7–51	LS	C	860
	Water	25	–	0.20	9	–	80	LS	C	569
		32.7			6	–				571
Guaran triacetate	Acetonitrile	25	2.62	0.87	4	–	7–85	LS	A	572
		25	311	0.52	5	–	206–534	LS	B	572
Hyaluronic acid	Aq. HCl (0.1 M)	25	27.9	0.763	5	–	7–103	LS	A	573
	Aq. NaCl (0.2 M)	25	22.8	0.816	8	–	7–103	LS	A	573
	(0.5 M)	25	31.8	0.777	5	–	11–103	LS	A	573
Pullulan	Water	25	22.1	0.66	9	–	11–236	LS	A	998
		25	–	0.65	8	–	0.53–102	SE	A	1003
Salep glucomannan triacetate	Nitroethane	30	This relation not followed		11	–	0.06–0.4	LS	A–B	574
Shizophyllan (β-1,3-D-glucan)	Dimethyl sulfoxide	25	–	0.69	6	–	3–190	SE, LS	A	852,863
	Aq. NaOH	25	–	1.8	4	–	10–25	LS	A	863
		25	–	1.1	3	–	300–570	LS	A	863
Xanthan	Cadoxen	25	–	0.87			3–15	LS		865
		25		0.70			20–360	LS		865
	Aq. NaCl (0.1 M)	25	0.17	1.14	5	–	30–700	LS		866
		25	Double strand helix				3–360	LS		865

[a] DS: Degree of substitution.

TABLE 5. MISCELLANEOUS

Polymer	Solvent	Temp. (°C)	K (× 10³) (ml/g)	a	No. of samples Fr.	WP	M (× 10⁻⁴)	Mol. wt. range Method	Remarks	Ref.
Imogolite	Aqueous acetic acid/ 0.02 wt.% NaN_3	30	$[\eta]=9.35\times10^{-10}\ M^2/\ln M$	(sonic wave)	6 –		59–208	LS	A	1005

D. CALCULATED UNPERTURBED DIMENSIONS OF FREELY ROTATING CHAINS

Chain type	$r_{of}/M^{1/2}$ (nm mol$^{1/2}$/g$^{1/2}$)		Refs.
Poly(methylene) chain	$0.308/M_u^{1/2}$	$0.218/m^{1/2}$	2
Amylosic chain	$0.426/M_u^{1/2}$	$0.191/m^{1/2}$	518
Cellulosic chain	$0.790/M_u^{1/2}$	$0.353/m^{1/2}$	620
Gutta-percha (*trans* polydiene)	$0.580/M_u^{1/2}$	$0.290/m^{1/2}$	620,621
Natural rubber (*cis* polydiene)	$0.383/M_u^{1/2}$	$0.201/m^{1/2}$	620
Poly(peptide)	$0.383/M_u^{1/2}$	$0.221/m^{1/2}$	620

E. UNPERTURBED DIMENSIONS OF LINEAR POLYMER MOLECULES

TABLE 6. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Solvent	Temp. (°C)	$s_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
6.1. POLY(DIENES)										
Poly(butadiene)										
100%-*cis*	Dioxane	20.2	–	205	920	547	1.68	5.15	VT	19
98%-*cis*, 2%-1,2	Isobutyl acetate	20.5	–	185	880	547	1.61	4.75	VT	15
95%-*cis*, 4%-1,2	2-Pentanone	59.7	–	157	835	546	1.53	4.3	VT	17
	3-Pentanone	10.3	–	152	825	546	1.51	4.2	VT	17
92%-*cis*, 5%-1,2	Benzene	32	–	150 ± 20	820 ± 40	545	1.50 ± 0.08	4.15	VG	3(20)
71%-*trans*, 25%-1,2	Cyclohexane	25	–	300 ± 40	1030 ± 50	702	1.45 ± 0.08	7.3	VG	3(22)
79%-*trans*, 21%-1,2	Cyclohexane	20	–	280 ± 25	1010 ± 30	742	1.36 ± 0.05	6.9	VG	3(23)
97%-*trans*, 3%-1,2	Cyclohexane	40	–	200 ± 30	935 ± 40	768	1.22 ± 0.07	5.4	VG	24
100%-*cis*	Various solvents	50					1.63	4.9	VT	622
	Undiluted	50–90	$d \ln r_0^2/dT = 0.4 \times 10^{-3}$ (deg^{-1})						ST	622
100%-*trans*	Decalin	55					1.23	5.8	VA	623
	Undiluted		$d \ln r_0^2/dT = -0.6 \times 10^{-3}$ (deg^{-1})						ST	623
1,4-*trans*	Oligomeric									
	1,4-Poly(butadiene)	25.0–105.8	$d \ln r_0^2/dT = -0.10 \times 10^{-3}$ (deg^{-1})						VG	888
linear	Dioxane	12.1	–	155	–	–	–	6.15	VG	889
	Toluene	35	–	150	–	–	–	–	VG	889
Poly(1-butenylene-*co*-vinylethylene) 43%-1,2										
	1,4-Dioxane	15.7	–	173	–	–	–	6.0	VT	890
Poly(chloroprene) 85%-*trans*	Benzene	25	–	115 ± 20	750 ± 80	535	1.40 ± 0.15	5.6	VG	3(32,33)
	Butanone	25	–	113	750	535	1.40	5.6	VT	35
	Cyclohexane	45.5	–	107	755	535	1.41	5.65	VT	34
	Butanone	25	313	–	750	535	1.40	5.6	LT	624
Poly(2,3-dimethylbutadiene) 85%-*trans*-1,4, 3%-1,2										
	Cyclohexane/*n*-propanol	25	–	226	–	–	–	8.59 ± 0.14	VG,VT	883
Poly(isoprene) 100%-*cis*	Benzene; 2-pentanone	~20	–	130 ± 20	810 ± 45	485	1.67 ± 0.09	5.0	VT,VG	3,37
	Diisopropyl ether	22	0.76	–	847	485	1.74	5.5	XS	625
	2-Pentanone	14.5		119				4.7	VT	626
	Undiluted	– 10 to 70	$d \ln r_0^2/dT = 0.41 \times 10^{-3}$ (deg^{-1})						ST	626
		30–70	$d \ln r_0^2/dT = 0.56 \times 10^{-3}$ (deg^{-1})						ST,VT	627
100%-*trans*	Propyl acetate	60	–	232	970	703	1.38	7.2	VT	37
	Dioxane	47.7		191	910	703	1.30	6.35	VT	19
	Undiluted	~60	$d \ln r_0^2/dT = -0.27 \times 10^{-3}$ (deg^{-1})						ST	623
trans-1,4	Benzene, cyclohexane,									
	Toluene	30	–	198	884	–	1.26	5.99	VG	894
	Hexane	30	–	135	778	–	1.11	4.64	VG	894
71%-*cis*, 22%-*trans*, 7%-3,4	Cyclohexane; dioxane; 4-methyl-2-pentanone; toluene	35	–	126	766	–	–	–	VG	786
Poly(isopropenylethylene-*co*-1-methyl-1-vinylethylene) 20–25%-1,2,70–75%-3,4										
	2-Octanol	30.5	–	102	–	–	–	7.9	VT	890
Poly[isoprene-*block*-poly(styrene)], A_k–B_n										
k/*n*, (75/25, w/w)	4-Methyl-2-pentanone; toluene	30	–	128	782	–	–	–	VG	867
k/*n*, (50/50, w/w)	Cyclohexane; dioxane; 4-methyl-2-pentanone; toluene	35	–	110	741	–	–	–	VG	786
	Butanone	44	–	116	757	–	–	–	VT	867
	Cyclohexane	46	–	116	756	–	–	–	VG	867
	4-Methyl-2-pentanone	30	–	124	773	–	–	–	VG	867
	Toluene	30	–	115	754	–	–	–	VG	867
k/*n*, (25/75, w/w)	Cyclohexane; dioxane; 4-methyl-2-pentanone; toluene	35	–	97	711	–	–	–	VG	786
Poly(methylbutylene) 43%-1,2	*n*-Hexyl acetate	60.9	–	189	–	–	–	6.2	VG	890
Poly(1-methyl-1-butylene-*co*-isopropenylethylene) 51%-1,4,49%-3,4										
	2-Octanol	41.3	–	96	–	–	–	5.3	VG	890

* References in parentheses include data used for the calculations of end to end distance in Ref. 3.

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
6.2. POLY(ALKENES), POLY(ACETYLENES)										
Poly(1-butene)	2-Octanol	23.6	–	74	–	–	–	5.3	VG	896
	Tetrahydrofuran	25	–	74	–	–	–	5.3	VG	896
atactic	Anisole; ethylcyclo-hexane	~70	–	123 ± 10	775 ± 25	427	1.82 ± 0.05	6.6	VT,VG	3(81)
	Nonane	35	590 ± 50	–	1180 ± 70	427	2.76 ± 0.20	15.1	LT	81
	Phenyl ether	141	–	104	747	–	–	–	VT	700
	Undiluted	140–200	$d \ln r_0^2/dT = (0.5 \pm 0.04) \times 10^{-3}$ (deg^{-1})						ST	633
isotactic	Anisole	89	–	111	763	–	–	–	VT	700
	Nonane	80	510 ± 50	–	1290 ± 90	427	3.00 ± 0.20	18.0	LT	81
	Phenetole	64.5	–	113	767	–	–	–	VT	700
	Phenyl ether	148	–	103	744	–	–	–	VT	700
	Undiluted	140–200	$d \ln r_0^2/dT = (0.09 \pm 0.07) \times 10^{-3}$ (deg^{-1})						ST	634
		160	$d \ln r_0^2/dT = -0.1 \times 10^{-3}$ (deg^{-1})						ST	634
Poly(ethylene)	1-Chloronaphthalene; tetralin; *p*-Xylene	~100	–	230	950 ± 40	582	1.63 ± 0.08	5.3	VG	3(61,67, 74)
	Decalin	140	–	–	1070	582	1.84	6.8	VA	65
	Bis-2-ethylhexyl adipate	145	–	225	940 ± 40	582	1.61	5.2	VT	630
		145	690 ± 100	–	1320 ± 150	582	2.27 ± 0.26	10.3	LT	630
	Biphenyl	127.5	–	323	1085	582	1.87	7.0	VT	58
	Dodecanol	137.3	–	307	1070	582	1.84	6.8	VT	58
		138	–	316 ± 7	1080	582	1.86	6.9	VT	69
	Diphenylmethane	142.2	–	315	1080	582	1.86	6.9	VT	58
	Decanol	153.3	–	302	1065	582	1.83	7.6	VT	65
	Diphenyl ether	161.4	–	295	1060	582	1.79	6.4	VT	58
	Octanol	180.1	–	286	1040	582	1.79	6.4	VT	58
	Biphenyl	127.5	–	330	1095	582	1.88	7.1	VT	631
	Diphenylmethane	142.2	–	322	1085	582	1.87	7.0	VT	631
	Diphenyl ether	163.9	–	309	1070	582	1.84	6.8	VT	631
	Undiluted; diluted with triacontane; dotriacontane	140–190	$d \ln r_0^2/dT = -(1.15 \pm 0.1) \times 10^{-3}$ (deg^{-1})						ST	629
	Hexadecane	140	$d \ln r_0^2/dT = -1.2 \times 10^{-3}$ (deg^{-1})						VA	632
low pressure	Biphenyl	130	–	302	1130	–	–	–	VT	703
	Decalin	120	–	360	1200	–	–	–	VG	703
	1,2,4-Trichlorobenzene	135	–	360	1200	–	–	–	VG	703
Poly(ethylene-*co*-isopropylethylene)	*n*-Hexyl acetate	65	–	188	–	–	–	6.3	VG	890
Poly(ethylene-*co*-propylene)	Benzene	19.0	–	206	938	–	–	6.85	VG	897
		21.4	–	203	933	–	–	6.78	VG	897
	n-Decyl acetate	5.0	–	203	933	–	–	6.78	VG	897
	n-Heptyl acetate	38.0	–	194	919	–	–	6.57	VG	897
	n-Octyl acetate	27.0	–	198	925	–	–	6.66	VG	897
Poly(isobutene)	Anisole	105	–	91 ± 5	700 ± 20	412	1.70 ± 0.05	5.8	VT	49
	Benzene	24	–	107 ± 5	740 ± 20	412	1.80 ± 0.05	6.5	VT	49
	Benzene	25	–	105	749	–	–	6.7	VG	1010
	Phenetole	86	–	91 ± 5	700 ± 20	412	1.70 ± 0.05	5.8	VT	49
	Heptane/propanol (80/20, v/v)	25	390	166	780	412	1.9	7.2	LT	628
	Undiluted; diluted with hexadecane	60	$d \ln r_0^2/dT = -(0.1 \pm 0.05) \times 10^{-3}$ (deg^{-1})						ST	629
Poly(isopropylethylene-*co*-1-methyl-1-ethylethylene)	2-Octanol	26.2	–	83	–	–	–	7.2	VG	890
Poly(1-methylbutylene-*co*-isopropylethylene)	2-Octanol	53.3	–	91	–	–	–	5.0	VG	890
Poly(1-octene)	Bromobenzene	25	–	50	570 ± 50	291	1.96 ± 0.15	7.7	VG	84
	Cyclohexane	30	–	100	710 ± 60	291	2.44 ± 0.20	11.9	VG	84
	Phenetole	50.4	–	65	625 ± 30	291	2.14 ± 0.10	9.1	VT	84
Poly(pentenamer) 80–85%-*trans*, 19–12%-*cis*	Isopentyl acetate	38	–	234	991	–	1.26	–	VT	788

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(1-pentene)										
atactic	Undiluted	40–140	$d\ln r_0^2/dT = (0.53 \pm 0.05) \times 10^{-3}$ (deg^{-1})						ST	633
isotactic	2-Pentanol	62.4	–	121	790	368	2.14	9.2	VT	633
	Undiluted	80–140	$d\ln r_0^2/dT = (0.34 \pm 0.04) \times 10^{-3}$ (deg^{-1})						ST	633
		~90	$d\ln r_0^2/dT = -0.3 \times 10^{-3}$ (deg^{-1})						ST	634
		~60	$d\ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(propylene)										
	3-Nonanol	5.0	–	158	857	–	–	6.6	VG	897
	1-Octanol	77.0	–	115	773	–	–	5.4	VG	897
atactic	Isoamyl acetate; benzene; cyclohexane; toluene	30	–	156 ± 15	835 ± 25	475	1.76 ± 0.05	6.2	VT,VG	3(88,89)
	Decalin	135	–	125 ± 20	755 ± 35	475	1.63 ± 0.08	5.3	VG	3(88,91)
	1-Chloronaphthalene	74	–	182	880	475	1.85	6.85	VT	90
	Cyclohexanone	92	–	172	870	475	1.83	6.7	VT	90
	Diphenyl ether	153	–	120	765	475	1.61	5.2	VT	90
	Diphenyl	129	–	128.3	820	–	–	–	VT	708
	Isoamyl acetate	34	–	168.5	900	–	–	–	VT	708
	Isobutyl acetate	58	–	158.5	880	–	–	–	VT	708
	Phenyl ether	146	–	125.6	820	–	–	–	VT	708
	Above 4 solvents	–	$d\ln r_0^2/dT = 1.8 \times 10^{-3}$ (deg^{-1})			–	–	–	VT	708
isotactic	1-Chloronaphthalene; decalin; tetralin	~140	–	120 ± 20	765 ± 40	475	1.61 ± 0.08	5.2	VG	3(88,96)
	Diphenyl ether	145	–	132	790	475	1.66	5.5	VT	90
		145	–	94	710	475	1.49	4.45	VT	630
		145	370 ± 30	–	685 ± 30	475	1.44 ± 0.07	4.15	LT	630
	Biphenyl	125.1	–	152	809	475	1.70	5.8	VT	94
	Diphenyl ether	142.8	–	137	782	475	1.62	5.25	VT	94
	Dibenzyl ether	183.2	–	106	718	475	1.51	4.55	VT	94
	Diphenyl	125	–	141.0	850	–	–	–	VT	708
	Phenyl ether	143	–	130.4	830	–	–	–	VT	708
	Above 2 solvents	–	$d\ln r_0^2/dT = 3 \times 10^{-3}$ (deg^{-1})			–	–	–	VT	708
syndiotactic	Heptane	30	–	164	830	475	1.75	6.1	VG	100
	Isoamyl acetate	45	–	172	843	475	1.77	6.25	VT	100
head-to-head										
94%-*trans*, 6%-1,2	Cyclohexane	30	–	80	674	–	1.42	4.0	VG	709
89%-*trans*, 11%-1,2	Cyclohexane	30	–	70	646	–	1.36	3.7	VG	709
Poly(vinylethylene)										
atactic	2-Octanol	32.8	–	120	–	–	–	7.0	VT	896
6.3. POLY(ACRYLIC ACID) AND DERIVATIVES										
Poly(acrylamide)	Water	30	–	260 ± 40	100 ± 50	367	2.72 ± 0.10	14.8	VG	3(101)
		30	–	–	862	–	2.36	11.14	VG	710
Poly(acrylic acid)	1,4-Dioxane	30	–	76	665	363	1.83	6.7	VT	104
50% neutralization	Aq. NaCl C_s = 0.02 mol/l	30	–	95	692	–	–	–	VG	868
	0.10 mol/l	30	–	121	750	–	–	–	VG	868
	0.50 mol/l	30	–	114	735	–	–	–	VG	868
100%-neutralization	Aq. NaCl, C_s = 0.02 mol/l	30	–	112	730	–	–	–	VG	868
	0.10 mol/l	30	–	121	750	–	–	–	VG	868
	0.50 mol/l	30	–	133	774	–	–	–	VG	868
	1.50 mol/l	30	–	120	750	–	–	–	VG	868
–, sodium salt	Aq. NaBr (1.5 M)	15	–	124	756	318	2.38	11.3	VT	108,109
		15	–	–	1030	318	3.24	21	LD	108
	Aq. NaSCN (1.25 M)	30	–	121	752	318	2.36	11.1	VT	111
Poly(acrylonitrile)	Dimethylformamide	25	–	210 ± 15	930 ± 20	422	2.20 ± 0.05	9.7	VG	3(138,139)
(polymd. at − 30°C)	γ-Butyrolactone;	30	–	250	970	422	2.30	10.6	VG	135
	dimethyl formamide	30	–	250	900	422	2.13	9.1	VG	135
(polymd. at 60°C)										
	Ethylene carbonate/water (85/15, w/w)	25	–	–	950	–	2.25	10.1	Various	951
	Dimethylformamide/ [illegible]	25	–	–	1060	–	2.51	12.6	Various	951

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
	55 wt.% HNO_3	25	–	–	1060	–	2.51	12.6	Various	951
	67 wt.% HNO_3	25	–	–	1290	–	3.06	18.5	Various	951
Poly(*N*-acryloyl-*m*-aminobenzoic acid)										
	N,N-dimethylacetamide, *N,N*-dimethylformamide, Dimethyl sulfoxide	30	–	85	670	223	3.0	18.1	VG	908
Poly(*N*-acryloyl-*o*-aminobenzoic acid)										
	N,N-dimethylformamide, Dimethyl sulfoxide, Tetrahydrofran	25	–	85	660	223	2.96	18.3	VG	909
Poly(butyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
		76	$d \ln r_0^2/dT = 0$ (deg^{-1})						ST	634
Poly(*sec*-butyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(*tert*-butyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
	Acetone; butanone; methanol; pentane	25	–	47 ± 1	607 ± 3	–	2.2 ~ 2.3	–	VG	712
Poly(*N,N'*-dimethylacrylamide)	Methanol; water	25	–	78 ± 15	670 ± 40	309	2.17 ± 0.14	9.15	VG	3(103)
Poly(dodecyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = 1.0 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(ethyl acrylate)	Acetone; methanol	30	–	90 ± 10	720 ± 30	308	2.34 ± 0.10	10.9	VG	3(115,116)
	Acetone	25	–	–	856	308	2.78	15.4	VG	114
	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
		76	$d \ln r_0^2/dT = -0.4 \times 10^{-3}$ (deg^{-1})						ST	634
Poly(hexyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.3 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(isopentyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(isopropyl acrylate)	Benzene	25	–	–	540 ± 25	287	1.88 ± 0.08	7.1	VA	120
	Bromobenzene	60	–	–	540 ± 25	287	1.88 ± 0.08	7.1	VA	120
	2,2,3,3-Tetrafluoro-propanol	25	–	92	700 ± 30	287	2.42 ± 0.10	11.7	VG	121
	Undiluted	60	$d \ln r_0^2/dT = -0.3 \times 10^{-3}$ (deg^{-1})						ST	635
isotactic	Bromobenzene	60	–	–	630 ± 30	287	2.20 ± 0.10	9.7	VA	120
syndiotactic	Bromobenzene	60	–	–	546 ± 35	287	1.90 ± 0.12	7.2	VA	120
Poly(methyl acrylate)	Various solvents	30	–	81 ± 10	680 ± 30	332	2.05 ± 0.10	8.4	VG	3(123,132)
	Isopentyl acetate	62.5	–	68	650	332	1.96	7.7	VT	129
	2-Methylcyclohexanol	56.0	–	68	650	332	1.96	7.7	VT	129
	Butanone/2-propanol									
	(42/58, v/v)	20	–	81	680	332	2.05	8.4	VT	124
	(50/50, v/v)	30	–	72	665	332	2.00	8.0	VT	129
		27.5	–	–	720	332	2.17	9.4	LD	108
	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(octyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(morpholinocarbonylethylene)										
	Dimethylformamide	25	–	70 ± 10	630 ± 40	260	2.42 ± 0.15	11.7	VG	3(338)
Poly(piperidinocarbonylethylene)										
	Dimethylformamide	25	–	58 ± 10	600 ± 40	261	2.30 ± 0.15	10.6	VG	3(338)
Poly(propyl acrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.3 \times 10^{-3}$ (deg^{-1})						ST	635
6.4. POLY(α-SUBSTITUTED ACRYLIC ACID) AND DERIVATIVES										
Poly(butyl methacrylate)	Butanone; 2-propanol	23	–	34 ± 5	510 ± 20	258	1.98 ± 0.10	7.85	VT,VG	3(152) (154,156)
	Dimethylformamide	23.6	309	–	659	–	–	–	LT	910
	2-Propanol	23	–	–	530	258	2.06	8.5	LD	152
	Undiluted	60	$d \ln r_0^2/dT = 2.5 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(*sec*-butyl methacrylate)	Undiluted	60	$d \ln r_0^2/dT = -0.2 \times 10^{-3}$ (deg^{-1})						ST	635
Poly(*tert*-butyl methacrylate)	Butyl acetate	25	–	–	894	258	3.45	23.8	VA	157
anionic	Cyclohexane	10.0	–	60.8	–	–	–	11.8	VG	917
free radical	Cyclohexane	10.0	–	48.9	–	–	–	10.2	VG	917
	n-Heptane	64.0	–	48.6	–	–	–	10.2	VG	917
	Butanone, cyclohexane, *n*-Heptane, Tetrahydrofuran	25–64	$d \ln r_0^2/dT = 0$ (deg^{-1})			–	–	–	VTe	917
Poly(*tert*-butylphenyl methacrylate)										
	Acetone	20	–	35 ± 5	515 ± 20	208	2.48 ± 0.10		VG	3(340)

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(2-*tert*-butylphenyl methacrylate)										
	Benzene; butanone	25	–	35	550	–	2.6	–	VG	771
	Cyclohexane	18.4	–	35	550	–	2.6	–	VG	771
Poly(4-*tert*-butylphenyl methacrylate)										
	Acetone; cyclohexane; tetrahydrofuran	25	–	45	565	–	–	–	VG	716
Poly(2-chloroethyl methacrylate)	*o*-Dichlorobenzene	35.7	–	47.5	–	–	–	10.5	VT	914
Poly(cyclobutyl methacrylate)	1-Butanol	37.5	–	47.7	–	–	–	10.0	VG	915
Poly(cyclohexyl methacrylate)	Butanol	23	–	34	510	237	2.15	9.25	VT	345
	Benzene; butanol; butanone; cyclohexane; dioxane	25	–	45	590	240	2.5	–	VG	717
Poly(cyclododecyl methacrylate)	Cyclohexane,toluene	30	–	33.0	–	–	–	14.2	VG	915
	Butanol	22.5	224	45.2	549	236	2.33	–	VT	718
	n-Hexyl acetate	35	–	33.0	–	–	–	14.2	VG	915
		21–27	228	–	558	236	2.37	–	LG	718
Poly(cyclohexyl thiolmethacrylate)										
	Cyclohexane	25	–	30.0	490	230	2.13	–	VG	719
	Tetrahydrofuran	35	–	30.0	490	230	2.13	–	VG	719
Poly(cyclooctyl methacrylate)	2-Butanol	45	–	37.7	–	–	–	12.1	VG	915
	1,4-Dioxane, toluene	30	–	37.7	–	–	–	12.1	VG	915
Poly(cyclopentyl methacrylate)	Cyclohexane	36	–	47.8	–	–	–	11.2	VG	915
	1,4-Dioxane,ethyl acetate, methyl ethyl ketone, Toluene	30	–	47.8	–	–	–	11.2	VG	915
Poly(decahydro-β-naphthyl methacrylate)										
	–	–	–	43	600	210	2.9	–	–	717
Poly(decyl methacrylate)	Ethyl acetate	11	–	35.7	–	–	–	13.0	VT	913
Poly(2,6-dimethylphenyl methacrylate)										
	Chlorobenzene, tetrahydrofuran	25	–	77	675	223	3.02	18.3	VG	923
	Tetrahydrofuran/water, toluene	25	–	77	675	223	3.02	18.3	VT	923
Poly(diphenylmethyl methacrylate)										
	3-Heptanone	45	–	33.1	510	–	–	14.0	VG	911
Poly(dodecyl methacrylate)	Isopropyl acetate	13	–	32.2	490	193	2.54	12.9	VT	158
	Pentanol	29.5	–	34.8	500	193	2.59	13.4	VT	159
		29.5	222	–	500	193	2.59	13.4	LD	159
	Undiluted	60	$d\ln r_0^2/dT = 2.6 \times 10^{-3}$ (deg⁻¹)						ST	635
Poly(docosyl methacrylate)	Amyl acetate, tetrahydrofuran	31,30	–	37.9	–	–	–	23.6	VG	913
Poly(2-ethylbutyl methacrylate)	Butanone; 2-propanol	25	–	36 ± 5	510 ± 30	236	2.16 ± 0.13	9.3	VG,VT	3(160)
	2-Propanol	27.4	–	33.7	500	236	2.12	8.95	VT	160
Poly(ethyl methacrylate)	Butanone	23	–	49.3	565 ± 15	288	1.96 ± 0.05	7.7	VG	3(161)
	2-Propanol	36.5	–	47.5	575	288	2.00	8.0	VT	156
	Butanone/2-propanol (1/7, v/v)	23	–	47.3	560	288	1.94	7.55	VT	161
		23	–	–	560	288	1.94	7.55	LD	161
Poly(hexadecyl methacrylate)	Heptane	21	–	60	620	175	3.54	25.1	VG	163
Poly(hexyl methacrylate)	Butanone	30	–	41 ± 4	530 ± 20	236	2.25 ± 0.08	10.1	VT,VG	3(165)
	2-Propanol	32.6	–	43	540	236	2.29	10.5	VT	165
		32.6	–	–	580	236	2.46	12.1	LD	165
	Undiluted	60	$d\ln r_0^2/dT = 2.2 \times 10^{-3}$ (deg⁻¹)						ST	635
Poly[*N*-(2-hydroxypropyl) methacrylamide]										
	Aq. NaCl (10%); water	50	–	52	590	–	–	–	VG	722
	Ethanol	10	–	52	590	–	–	–	VG	722
	Dimethylformamide	25	–	52	590	–	–	–	VG	722
Poly(isobutyl methacrylate)	2-Hydroxymethyl-tetrahydrofuran	19.5	–	26.5	501	–	–	–	VT	724
	Acetone	25	–	89.8	290	–	–	–	VG	919
	Benzene	25	–	113	313	–	–	–	VG	919

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TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
	Carbon tetrachloride	25	–	105	305	–	–	–	VG	919
	1,4-Dioxane	25	–	98.4	299	–	–	–	VG	919
Poly(isopentyl methacrylate)	Undiluted	60	$d\ln r_0^2/dT = 1.4 \times 10^{-3}$ (deg⁻¹)						ST	635
Poly(isopropyl methacrylate)	Undiluted	60	$d\ln r_0^2/dT = 2.5 \times 10^{-3}$ (deg⁻¹)						ST	635
Poly(5-*p*-menthyl methacrylate)	Benzene; cyclohexane; 2-pentanone; tetrahydrofuran	25	–	44.0	630	–	3.1	–	VT,VG	771
Poly(methacrylic acid)	Aq. NaCl	25	–	200	900	334	2.7	14.6	VG	110
	N,N-Dimethylformamide/ 1,4-Dioxane(5/7, v/v)	26.9 (θ)	284	103	–	–	2.13	–	LT,VT	907
Poly(methyl butacrylate)	Butanol	13	–	57	590	258	2.28	10.4	VT	168
Poly(methyl ethacrylate)	2,6-Dimethyl-4-heptanone	11.4	–	67.6	620	288	2.15	9.25	VT	168
Poly((methyl methacrylate) atactic	Various solvents	25	–	70 ± 20	640 ± 60	308	2.08 ± 0.20	8.65	VT,VG	3(170, 173, 174,181, 193,196)
	Acetonitrile	45	–	49 ± 5	555 ± 15	308	1.80 ± 0.05	6.5	VT	179
	Butyl chloride	35.4	219	–	537	308	1.74	6.05	LT	636
		40.8	292 ± 6	–	620 ± 15	308	2.01 ± 0.05	8.1	LT	283
	Benzene, toluene	21	0.72 ± 0.05	–	653 ± 25	308	2.12 ± 0.08	9.0	XS	637
	Benzene; chloroform; etc. (various)	Various	–	46 ± 9	–	–	–	–	VG	869
	2-Methyl-4-pentanone	−42	–	36.0	500	308	1.62	5.25	VT	636
	Methyl isovaleriate	−37	–	41.5	525	308	1.70	5.8	VT	636
	Butyl acetate	−20	–	40.6	520	308	1.69	5.7	VT	636
	Butanone/2-propanol (58.2/41.8, v/v)	4.0	–	47.2	550	308	1.78	6.35	VT	636
	(55/45, v/v)	12.8	–	49.8	560	308	1.82	6.65	VT	636
	(50/50, v/v)	22.8	–	50.4	610	308	1.98	7.85	VT	636
	(46.8/53.2, v/v)	28.5	–	50.8	610	308	1.99	7.95	VT	636
	Butyl chloride	35.4	–	52.6	620	308	2.00	8.0	VT	636
	4-Heptanone	40.4	–	53.2	620	308	2.01	8.1	VT	636
	Isoamyl acetate	57.5	–	53.5	620	308	2.01	8.1	VT	636
	4-Heptanone	33	–	47 ± 4	550 ± 15	308	1.78 ± 0.05	6.35	VT	179
	3-Octanone	72	–	50 ± 3	560 ± 10	308	1.82 ± 0.03	6.65	VT	179
	Undiluted	168	$d\ln r_0^2/dT = 0.1 \times 10^{-3}$ (deg⁻¹)						ST	634
isotactic	Acetonitrile	27.6	–	75.5	670	308	2.17	9.4	VT	198
		27.5	273	76.2	669	–	–	–	VT	728
	Butanone/2-propanol (50/50, v/v)	30.3	–	90	715	308	2.32	10.8	VT	191
	3-Heptanone	40	–	87	710	308	2.30	10.6	VT	191
	Propanol	75.9	–	76.1	680	308	2.21	9.75	VT	191
	p-Cymene	152.1	–	56.6	610	308	1.98	7.85	VT	191
Poly(methyl methacrylate)-*block*-poly(α-methylstyrene)-*block*-poly(methylmethacrylate)										
0.0 wt.% PMS	Chloroform, toluene, tetrahydrofuran, carbon tetrachloride	25, 45	660	–	–	--	–	2.08	VA	927
6.7 wt.% PMS	*ibid.*	25,45	600–690	–	–	–	–	1.98–2.28	VA	927
8.3 wt.% PMS	*ibid.*	25,45	670–770	–	–	–	–	2.24–2.54	VA	927
21.0 wt.% PMS	*ibid.*	25,45	630–720	–	–	–	–	2.17–2.45	VA	927
31.8 wt.% PMS	*ibid.*	25,45	680–780	–	–	–	–	2.27–2.82	VA	927
78.1 wt.% PMS	*ibid.*	25,45	710–810	–	–	–	–	2.48–2.80	VA	927
100 wt.% PMS	*ibid.*	25,45	653	–	–	–	–	2.30	VA	927
Poly(methyl-phenylacrylate), (see group 1.7 Poly(methoxycarbonyl-1-phenylethylene)										
Poly(β-naphthyl methacrylate)	Benzene	Various	–	47.2	574	–	–	–	VG	729
	Tetralin	Various	–	47.5	575	–	–	–	VG	729
	Toluene	Various	–	39.0	538	–	–	–	VG	729
		–	–	54	660	210	3.1	–	–	717
Poly(octadecyl methacrylate)	Butyl acetone	10.5,20,30	–	–	–	–	–	14.5	VG	920
Poly(octyl methacrylate)	Butanol; butanone	20	–	30 ± 5	480 ± 20	219	2.19 ± 0.09	9.6	VT, VG	3(201)
	Butanol	16.8	–	–	500	219	2.28	10.4	LD	201
	Undiluted	60	$d\ln r_0^2/dT = 2.2 \times 10^{-3}$ (deg⁻¹)						ST	635

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10^4) or a_p (nm)	K_0 (×10^3) (ml/g)	$r_0/M^{1/2}$ ×10^4 (nm)	$r_{0f}/M^{1/2}$ (×10^4) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(*N*-phenylmethacrylamide)	Acetone	20	–	38 ± 9	520 ± 40	242	2.15 ± 0.16	9.25	VG	3(370)
Poly(phenyl methacrylate)	Acetone; benzene; butanone; dioxane	25	–	57	670	240	2.8	–	VG	717
Poly(2-selenolylmethyl methacrylate)										
	Chlorobenzene	25	–	56	580	204	2.84	–	VG	922
	Tetrahydrofuran	25	–	65	607	204	2.98	18.0	VG	922
Poly(stearyl methacrylate)	*n*-Propyl acetate	36	–	38.2	–	–	–	20.4	VT	913
Poly(tetrahydrofurfuryl)methacrylate)										
	2-Hydroxymethyl-tetrahydrofuran	31.2	–	34.9	573	–	–	–	VT	734
Poly(2-thiophenmethyl methacrylate)										
	Chlorobenzene	25	–	45.0	594	228	2.45	10.8	VT	921
	Tetrahydrofuran, thiophene	25	–	45.0	594	228	2.45	10.8	VG	921
Poly(tridecyl methacrylate)	Ethyl acetate	27	–	33.3	–	–	–	14.7	VT	913
Poly[2-(triphenylmethoxy)ethyl methacrylate]										
	Mesitylene	47	–	30	487	–	–	18–19	VT	736

6.5. POLY(VINYL ETHERS), POLY(VINYL ALCOHOL), POLY(VINYL ESTERS), POLY(VINYL HALIDES)

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10^4) or a_p (nm)	K_0 (×10^3) (ml/g)	$r_0/M^{1/2}$ ×10^4 (nm)	$r_{0f}/M^{1/2}$ (×10^4) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(chlorotrifluoroethylene)	2,5-Dichlorobenzo-trifluoride	130	–	52 ± 3	580 ± 15	286	2.03 ± 0.07	8.25	VG	3(234)
Poly(methoxyethylene)	Benzene; butanone	30	–	195 ± 30	900 ± 50	404	2.23 ± 0.13	9.95	VG	3(206)
Poly(tetrafluoroethylene)	Mixed digomers of poly-(chlorotrifluoroethylene)	340	330 ± 50	In this poor solvent				7 ± 2	LT	885,886
	Perfluorokerosene	300	–	~300	1070	308	~3.5	~24	VG	690
Poly(vinyl acetate)	Various solvents	25	–	93 ± 10	705 ± 10	332	2.12 ± 0.09	9.0	VT, VG	3(242, 244, 252,255)
	3-Heptanone	29	0.95 ± 0.05	–	790 ± 20	332	2.38 ± 0.07	11.3	XS	641
	Heptane/3-methyl-2-butanone (26.8/73.2, v/v)	25	318 ± 10	–	745 ± 20	332	2.24 ± 0.07	10.0	LT	252
	Methanol	6	–	101	720	332	2.17	9.4	VT	236
	3-Heptanone	26.8	–	82.0	670	332	2.02	8.15	VT	236
	Ethanol	56.9	–	90	690	332	2.08	8.65	VT	236
	6-Methyl-3-heptanone	66	–	78	660	332	1.99	7.9	VT	236
	Tetrahydrofuran	35	–	116 ± 9	774 ± 20	–	–	–	VG	740
Poly(vinyl alcohol)	Water	30	–	222 ± 25	950 ± 40	464	2.04 ± 0.10	8.3	VG	3(208,210, 212)
	Undiluted	50	$d\ln r_0^2/dT = 0.0$ (deg^{-1})						ST	638
		90	$d\ln r_0^2/dT = 0.5 \times 10^{-3}$ (deg^{-1})						ST	639
Poly(vinyl benzoate)	Xylene	32.5	–	62 ± 8	620 ± 25	252	2.46 ± 0.10	12.1	VT	334
Poly(vinyl bromide)	Cyclohexane; tetrahydro-furan; methanol/THF (17/83, v/v)	20	–	40 ± 5	540 ± 20	298	1.82 ± 0.07	6.6	VT, VG	3(217, 218)
	1-Methylnaphthalene	~20	1.09	–	763	298	2.56	13.1	XS	640
Poly(vinyl butyrate)	Benzene	30	–	80 ± 10	670 ± 35	288	2.32 ± 0.12		VG	3(256)
Poly(vinyl chloride)	Cyclohexanone; tetrahydrofuran	~25	–	100 ± 30	393		1.83 ± 0.15	6.7	VG	3(221,223, 224,229)
	Benzyl alcohol	155.4	–	156	820	393	2.08	8.65	VT	219
	Tetrahydrofuran	25	–	103	717	390	1.84	–	VG	879
Poly(vinyl 4-chlorobenzoate)	Butanol/butanone (47/53, v/v)	60	–	73	665	228	2.92	17.1	VT	336
Poly(vinyl fluoride)	Dimethylformamide	90	–	128	787	457	1.72	5.9	VG	235
Poly(vinyl hexanoate)	Benzene	30	–	91 ± 10	700 ± 30	258	2.71 ± 0.12		VG	3(256)
Poly(vinyl isobutyrate)	Benzene	30	–	80 ± 10	670 ± 35	288	2.32 ± 0.12		VG	3(256)
Poly(vinyl methyl ether), see Poly(methoxyethylene)										
Poly(vinyl pivalate)	Butanone/methanol (0.897 g/ml)	20	–	53 ± 5	580 ± 20	253	2.29 ± 0.08		VT	258
Poly(vinylidene chloride)	1-Methyl-2-pyrrolidone; Tetramethylene sulfoxide	25	–	60 ± 10	620 ± 30	–	–	8 ± 1	VG	738

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(vinylidene fluoride)	*N,N*-dimethylacetamide, *N,N*-dimethylformamide, *N*-methylpyrrolidone, *N,N*-dimethy-*N,N*-trimethylene urea	25	330	–	–	–	–	8.9	LV	925
6.6. POLY(STYRENE) AND DERIVATIVES										
Poly(4-acetoxystyrene)	Butyl acetate,	26.8								
	Isopropyl acetate,	19.7	–	54	593	–	2.37	11.2	VT	937
	Dioxane, tetrahydrofuran	25	–	54	593	–	2.37	11.2	VG	937
Poly(4-bromostyrene)	Benzene	26.3	–	50	570	228	2.50	12.5	VT	348
		30	–	28.5	–	–	2.05	–	VG	870
	Chloroform	30	–	46.0	–	–	2.41	–	VG	870
	Dimethylformamide	30	–	44.0	–	–	2.37	–	VG	870
	Dioxane	30	–	30.0	–	–	2.09	–	VG	870
	Toluene	30	–	45	564	228	2.48	12.3	VG	349
		30	237	–	554	228	2.43	11.8	LG	349
Poly(*p-tert*-butylstyrene)	Benzene; cyclohexane	35	–	62	612	–	–	–	VG	741
	1-Nitropropane	31	255	61 ± 5	610 ± 15	–	–	13.4 ± 0.7	VT	741
		31	286	–	–	–	–	–	LT	741
	Benzene	35	–	58.2	–	–	–	–	VG	934
	Cyclohexane	25	–	57.7	–	–	–	–	VG	934
	1-Hexanol	65.0	–	51.1	–	–	–	11.9	VG	934
	3-Nonanol	10.9	–	59.5	–	–	–	13.1	VG	934
	2-Octanol	32.7	–	55.7	–	–	–	12.6	VG	934
	1-Nitropropane	31.0								
	2-Octanol	32.7	–	54.2	–	–	–	12.3	VG	938
Poly(2-chlorostyrene)	Butanone	24.5	237	46.8	580	–	2.22	–	VT	742
		24.5	236	–	580	–	2.22	–	LT	742
Poly(4-chlorostyrene)	Butanone; chlorobenzene; toluene	30	–	50 ± 5	560 ± 20	261	2.15 ± 0.07	9.25	VG	3(352,355), 353
	Benzene; benzene/methanol (5.5/1, v/v)	26.7	–	59	590	–	2.25	–	VG	744
	Toluene	30	–	58	615	261	2.36	11.1	VG	349
		30	272	–	615	261	2.36	11.1	LG	349
Poly(4-cyclohexylstyrene)	Heptane; toluene	30	–	53 ± 3	570 ± 20	226	2.52 ± 0.07	12.7	VG	266
	Toluene	60	–	51 ± 3	560 ± 20	226	2.48 ± 0.07	12.2	VG	266
Poly(2,5-dichlorostyrene)	Ethanol/ethyl acetate (1/15, w/w)	30.5	–	35.5	510	234	2.18	9.5	VT	3(357)
Poly3,4-dichlorostyrene)	Butanol/butyl acetate (1/13, w/w)	32.9	–	71	640	234	2.7	14.6	VT	359
	Chlorobenzene; *o*-dichlorobenzene	30	–	38 ± 5	510 ± 20	234	2.18 ± 0.08	9.5	VG	358
Poly(2,4-dimethylstyrene)	Cyclohexane; 1,2-dichloroethane; dioxane	20	–	59–60	635–640	–	–	VG	746	
	n-Decane; *n*-heptane	50	–	48–49	595–600	–	–	–	VG	746
	p-Dichlorobenzene	60	–	48.5	595	–	–	–	VG	746
	Toluene	30	–	60 ± 5	630 ± 15	268	2.35 ± 0.07	11.0	VG	333
Poly(4-hydroxystyrene)	Dioxane	25	–	82.7	–	–	2.38	11.3	VG	940
	Ethyl propionate	25	–	90.0	–	–	2.45	12.0	VG	940
	Isobutyl acetate	25	–	90.0	–	–	2.45	12.0	VG	940
	Tetrahydrofuran	25	–	83.7	–	–	2.39	11.4	VG	940
Poly(*o*-methoxystyrene)	Methanol/toluene (25/75, v/v)	30	–	57.5	600	266	2.26	10.2	VT	362
Poly(*p*-methoxystyrene)	Amyl acetate	75.0	–	69	635 ± 15	–	2.40 ± 0.06	–	VT	871
	Amyl acetate; cyclohexane; toluene	23.4	–	71	640	–	–	–	VG	363
	Butanone; chlorocyclohexane; toluene	20, 50, 75	–	66–73	–	–	–	–	VG	782
	Methanol/toluene (28.1/71.9, v/v)	30	–	62.1	630	266	2.37	11.2	VT	362

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
	4-Methyl-2-pentanone	23.4	–	64	620 ± 15	–	2.33 ± 0.07	–	VT	871
	2-Methyl-2-phenylpropane	52.2	–	74	650 ± 20	–	2.45 ± 0.06	–	VT	871
	Toluene	25	–	74	650 ± 20	–	2.45 ± 0.06	–	VT	871
Poly(methyl methacrylate)-*block*-poly(α-methylstyrene)-*block*-poly(methyl methacrylate), see also group 1.4										
Poly(α-methylstyrene)	1-Chloro-*n*-hexane	5.7	–	66.0	–	–	–	10.4	VG	888
		10.0	–	65.2	–	–	–	10.3	VG	888
	1-Chloro-*n*-heptane	20.0	–	62.5	–	–	–	10.0	VG	888
		27.0	–	62.7	–	–	–	10.0	VG	888
	1-Chloro-*n*-octane	43.0	–	63.8	–	–	–	10.1	VG	888
		53.0	–	63.1	–	–	–	10.1	VG	888
		80.0	–	63.8	–	–	–	10.1	VG	888
	n-Hexyl acetate	85.0	–	66.5	–	–	–	10.4	VG	888
	Cyclohexane	34.5	–	68.9	–	–	–	10.7	VG	888
	trans-Decalin	10.0	–	68.0	–	–	–	10.6	VG	888
anionic (atactic)	Benzene; cyclohexane	~30	–	76 ± 5	650 ± 15	284	2.29 ± 0.05	10.5	VT, VG	319,323
	trans-Decalin	9.5	–	67 ± 2	625 ± 5	284	2.20 ± 0.02	9.7	VT	320
	Cyclohexane	~38	–	76 ± 2	650 ± 10	284	2.29 ± 0.03	10.5	VT	320,321 322,323
ca. 50%-hetero, ca. 40%-syndio		34.5	290	–	710	–	–	–	LT	872
		34.5	–	73	645	–	–	–	VT	872
		34.9	263	–	645	–	–	–	LT	873
		34.9	–	74.2	650	–	–	–	VT	873
	trans-Decalin (100%)	9.5	283	–	690	–	–	–	LT	872
		9.5	–	67	630	–	–	–	VT	872
		9.6	250	–	615	–	–	–	LT	873
		9.6	–	62.5	615	–	–	–	VT	873
cationic (syndiotactic)	Toluene; benzene/methanol (79.4/20.6, v/v)	30	–	74 ± 10	670 ± 25	284	2.36 ± 0.10	11.1	VT, VG	3(329, 327)
	Cyclohexane	~33	–	69 ± 3	655 ± 10	284	2.31 ± 0.03	10.7	VT	328
Poly(*m*-methylstyrene)	Benzene; cyclohexane; ethyl acetate	30	–	84.0	664	284	2.34	11.0	VG	330
		40	–	86.8	671	284	2.37	11.2	VG	330
		50	–	89.7	678	284	2.39	11.4	VG	330
Poly(*p*-methylstyrene)	Butanone; cyclohexane; toluene	30	–	68 ± 5	620 ± 15	284	2.18 ± 0.05	9.5	VG	651,331
	Diethyl succinate	16.4	–	70	655	284	2.31	10.7	VT	331
		16.4	291	–	680	284	2.39	11.4	LT	331
Poly(styrene)										
atactic	Various solvents	~30	–	82 ± 5	670 ± 15	302	2.22 ± 0.05	9.85	VT, VG	3(274, 277, 279,282 286,299, 301,304)
	n-Butyl chloride	25, 50	–	77	–	–	–	–	VG	933
	Cyclohexane	34.5	297 ± 3	–	–	–	–	–	LT	875
	trans-Decalin	16–80	–	81.4	–	–	–	–	Monte Carlo, G	876
	Ethylcyclohexane; methylcyclohexane	~70	–	75 ± 5	650 ± 15	302	2.15 ± 0.05	9.25		3(292,293)
	Cyclohexane	34	282 ± 5	–	690 ± 10	302	2.28 ± 0.04	10.4	LT	643
		35	306	–	730	302	2.42	11.7	LT	278
		35	300	–	670	302	2.22	9.85	LT	644
		35	0.92 ± 0.03	–	705 ± 15	302	2.33 ± 0.05	10.9	XS	645
	Benzene; toluene	25	0.91 ± 0.02	–	700 ± 15	302	2.32 ± 0.04	10.8	XS	645
	Benzene/ethanol (71.5/28.5, v/v)	25	296	–	645	302	2.14	9.15	LT	628
	Butanone/2-propanol (87/13, v/v)	67	317	–	757	302	2.50	12.5	LT	278
	1-Chloroundecane	32.8	–	–	775	302	2.56	13.1	VA	646
	Cyclohexane	34.8	–	–	768	302	2.54	12.9	VA	646
	Dimethyl malonate	35.9	–	–	762	302	2.52	12.7	VA	646

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
	73%-*trans*-Decalin	18	–	77	655	302	2.17	9.4	VT	290
	100%-*trans*-Decalin	24	–	82	670	302	2.22	9.85	VT	290
	Butyl formate	–9	–	77.4	655	302	2.17	9.4	VT	647
	Hexyl-*m*-xylol	12.5	–	77.0	655	302	2.17	9.4	VT	647
	Decalin	29.5	–	77.9	655	302	2.17	9.4	VT	647
	Diethyl malonate	31	–	70.5	635	302	2.10	8.8	VT	647
	Cyclohexane	34	–	79.5	660	302	2.18	9.5	VT	647
	Diethyl oxalate	51.5	–	72.2	640	302	2.12	9.0	VT	647
	Methylcyclohexane	68	–	78.0	655	302	2.17	9.4	VT	647
	Cyclohexanol	83.5	–	50.8	575	302	1.90	7.2	VT	647
	1-Chlorodecane	6.6	–	78.0	655	302	2.17	9.4	VT	648
	1-Chloroundecane	32.8	–	78.7	660	302	2.18	9.5	VT	648
	1-Chlorododecane	58.6	–	80.7	665	302	2.20	9.7	VT	648
	Cyclohexane/methylcyclohexane									
	(1/0, v/v)	34.5	–	77.9	655	302	2.17	9.4	VT	291
	(2/1, v/v)	43.0	–	77.6	655	302	2.17	9.4	VT	291
	(1/1, v/v)	48.0	–	74.8	650	302	2.15	9.25	VT	291
	(1/2, v/v)	54.0	–	73.0	645	302	2.14	9.15	VT	291
	(0/1, v/v)	70.5	–	69.6	635	302	2.10	8.8	VT	291
	Diethyl malonate	34.2	–	71.8	640	302	2.12	9.0	VT	291
	Diethyl oxalate	55.8	–	73.0	645	302	2.14	9.15	VT	291
	Undiluted	150	$d\ln r_0^2/dT = 0.4 \times 10^{-3}$ (deg^{-1})						ST	634
atactic, anionic	Benzene/isopropyl alcohol									
	(64/36, v/v)	25.5	312	–	764	–	–	–	LT	874
		25.5	–	107	–	–	–	–	VT	874
	Cyclohexane	34.5	288	–	706	–	–	–	LV	877
		34.5	–	89.7	–	–	–	–	VT	877
		34.5	280	–	685	–	–	–	LT	878
		~34.5	–	88 ± 3	685 ± 10	302	2.27 ± 0.03	10.3	VT	301,302, 303,305,649
	Decalin; dioctyl phthalate	12–22	–	80 ± 1	665 ± 5	302	2.20 ± 0.02	9.7	VT	303,649
isotactic	Benzene; toluene	30	–	90 ± 10	695 ± 25	302	2.30 ± 0.08	10.5	VG	3(311,312, 314)
	Chlorobenzene	25.3	–	176	890	302	2.94	17.3	VG	650
head-to-head	Tetrahydrofuran	25	–	135	805	–	–	–	VG	756
head-to-tail	Tetrahydrofuran	25	–	78	660	–	–	–	VG	756
star type										
four branches	Cyclohexane	35	–	63.1	661	–	–	–	VT	758
		34.5	280	–	685	–	–	–	LT	878
six branches	Cyclohexane	34.5	190	–	465	–	–	–	LT	878
star type 12.3 arm	Cyclohexane	34.6	$<S^2>_{0z}/<S^2>_{0z,\text{lin}} = 0.276$		–	–	–	–	LT	929
16.8 arm	Cyclohexane	34.6	$<S^2>_{0z}/<S^2>_{0z,\text{lin}} = 0.228$		–	–	–	–	LT	929
regular H-shaped	Cyclohexane	35	–	66.5	–	–	–	–	VT	759
		35	235	–	–	–	–	–	LT	759
Poly(styrene-*p*-sulfonic acid) –, sodium salt	Aq. NaCl (4.17 M)	25	–	20.4	425	214	1.98	7.85	VT	366
6.7. OTHER COMPOUNDS										
Poly(2-acrylamino-2-methyl-propanesulfonamide)										
	Water/1,4-dioxane (81.5/18.5, v/v)	25	–	172	880	–	4.0	32	VT	1011
Poly[(biphenyl-4-yl)ethylene]	Benzene	30	–	63.0	605	230	2.63	13.8	VG	264
		20–75	$d\ln r_0^2/dT = (0.23 \pm 0.01) \times 10^{-3}$ (deg^{-1})						VG	264
Poly(carbanilinoxyethylene)	Dioxane/methanol (28/72, v/v)	20	–	75	680	241	2.82	15.9	VT	335
Poly[1-(9-carbazyl)-2,3-(diethoxycarbonyl)-butane-1,4-diyl]										
	Benzene	25	–	54 ± 2	573	228	2.51	–	VG	789
Poly(dibutyl itaconate)	Toluene	25	–	35.4	508	198	2.60	–	VG	762
Poly(dicyclohexyl itaconate)	Tetrahydrofuran; toluene	25	–	44 ± 2	–	–	2.99	–	VG	761
Poly(didecyl itaconate)	Toluene	25	–	33.8	503	152	3.30	–	VG	762

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(didodecyl itaconate)	Toluene	25	–	33.6	–	–	3.6	25	VG	945
Poly(diethyl itaconate)	Toluene	25	–	22.3	447	226	1.98	–	VG	762
Poly(diethylcyclohexyl itaconate)	Toluene	25	–	27.5	–	–	2.83	–	VG	763
Poly(dihexadecyl itaconate)	Toluene	25	–	33.5	–	–	3.9	30	VG	945
Poly(dihexyl itaconate)	Toluene	25	–	34.8	528	179	2.90	–	VG	762
Poly(diicosayl itaconate)	Toluene	25	–	26.7	–	–	3.9	31	VG	945
Poly(dimethyl itaconate)	Benzene	25	–	30.2	494	245	2.02	–	VG	762
Poly(dimethylcyclohexyl itaconate)										
	Toluene	25	–	27.5	–	–	2.83	–	VG	763
Poly(dioctadecyl itaconate)	Toluene	25	–	30.7	–	–	4.0	31	VG	945
Poly(diphenyl itaconate)	Toluene	25	–	28.4	–	–	2.69	14.6	VG	943
Poly(dipropyl itaconate)	Toluene	25	–	27.3	478	211	2.27	–	VG	762
Poly(dipropylcyclohexyl itaconate)										
	Amyl acetate	25	–	27.0	–	–	2.93	–	VG	763
	Toluene	25	–	24.8	–	–	2.84	–	VG	763
Poly(ditetradecyl itaconate)	Toluene	25	–	33.6	–	–	3.7	27	VG	945
Poly(diundecyl itaconate)	Toluene	25	–	33.9	514	147	3.50	–	VG	762
Poly(1-methoxycarbonyl-1-phenylethylene)										
	Benzene; chloroform	30	–	54 ± 1	585 ± 5	242	2.42 ± 0.02	11.7	VG	361
	Ethylbenzene	15	–	54 ± 1	585 ± 5	242	2.42 ± 0.02	11.7	VT	361
Poly[bis(phenylethyl)itaconate]	Toluene	25	–	28.1	–	–	2.78	14.8	VG	943
Poly[bis(phenyl-*n*-propyl)itaconate]										
	Toluene	25	–	29.7	–	–	2.91	15.6	VG	943
Poly(*N*-vinyl-3,6-dibromo carbazole)										
	p-Chloro-*m*-cresol	112.9	–	30.2	470	–	2.89	16.7	VT	942
	o-Chlorophenol	60.0	–	27.5	481	–	2.96	17.5	VT	942
Poly(vinylcarbazole)	Benzene; chloroform; tetrachloroethane; tetrahydrofuran	25	–	68 ± 2	619	222	2.82	15.9	VG	367
	Bromobenzene; chloroform; nitrobenzene	25	–	59.2	590	222	2.66	–	VG	765
	Chlorobenzene; nitrobenzene	30–45	–	56.8	583	–	–	–	VG	766
	1,2-Dichlorobenzene	25	–	58.5	589	–	–	–	VG	767
	1,2-Dichloroethane	25	–	59.6	592	–	–	–	VG	767
	Toluene	37	–	76.2 ± 5	633	222	2.85	16.2	VT	368
Poly(1-vinylimidazole)	Aq. NaCl (0.1 M); (5 M); aqueous NaSCN (0.1 M)	25	–	116 ± 10	774 ± 22	–	–	12–15	VT	813
protonated	Acetate (0.1 M)	25	–	414	1180	–	–	15–28	VT	813
	Acetate (0.1 M)/NaCl (1 M)	25	–	183	900	–	–	15–28	VT	813
	Aq. HCl (0.1 M)/ NaCl (1 M)	25	–	169	880	–	–	15–28	VT	813
	Propionate (0.1 M)	25	–	392	1160	–	–	15–28	VT	813
Poly(1-vinyl-3-benzyl-imidazoliumchloride)										
	Aq. NaCl (0.01 M); (0.02 M); (0.05 M); acetate (0.1 M); aqueous NaH_2PO_4 (0.1 M)	25	–	63	–	–	–	18	VG	813
Poly(1-vinylnaphthalene)	Benzene	30	–	24.2	435	248	1.76	6.2	VG	264
		75	–	–	405	248	1.63	5.3	VG	264
		20–75	$d \ln r_0^2/dT = -(1.87 \pm 0.04) \times 10^{-3}$ (deg^{-1})						VG	264
Poly(2-vinylnaphthalene)	Benzene	30	–	64.7	610	248	2.45	12.0	VG	264
		65	–	–	595	248	2.40	11.5	VG	264
		20–75	$d \ln r_0^2/dT = -(0.83 \pm 0.03) \times 10^{-3}$ (deg^{-1})						VG	264
	Decalin/toluene (13/10, w/w)	30.2	–	–	–	248	ca. 3.1	ca. 19.2	VT	269
Poly(3-vinylpyrene)	Chloroform; 1,2-dichlorobenzene; tetrahydrofuran	25	–	52.0	577	–	2.84	–	VG	768

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TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
Poly(2-vinylpyridine)	Various solvents	25	–	82 ± 10	660 ± 30	300	2.20 ± 0.10	9.7	VG	371
	Benzene	15	–	72	635	300	2.12	9.0	VG	652
		25	–	71	633	300	2.11	8.9	VG	652
		30	–	59	595	300	1.98	7.85	VG	652
		40	–	52	570	300	1.90	7.2	VG	652
		50	–	57	590	300	1.96	7.65	VG	652
		60	–	62	605	300	2.02	8.15	VG	652
	Benzene; chloroform; etc. (various)	Various	–	72 ± 11	660 ± 30	–	–	–	VG	869
	Chloroform	0	–	88	690	300	2.24	10.0	VG	652
		25	–	87.5	689	300	2.24	10.0	VG	652
	Benzene, 2-propanol, pyridine	10–15 25	–	81	–	300	2.3	–	VT,VG	952
Poly(2-vinylpyridine 1-oxide)	Benzyl alcohol, 1-butanol, chloroform, methanol, 1-propanol, 2-propanol	25	–	55	576	278	2.07	8.6	VG	946
Poly(4-vinylpyridine)	Ethanol; water	25	–	94 ± 10	710 ± 30	300	2.37 ± 0.10	11.2	VG	3(373,374)
Poly(5-vinyl-2-methylpyridine)	Butanone; methanol	25	–	69 ± 5	652 ± 15	282	2.31 ± 0.05	10.6	VG	375
	Butyl acetate	21.8	–	83	675	282	2.39	11.4	VT	381
	4-Methyl-2-pentanone	37.4	–	83	675	282	2.39	11.4	VT	381
	Pentyl acetate	48.2	–	80	665	282	2.36	11.1	VT	381
Poly(vinylpyrrolidone)	Water	~25	–	100 ± 15	720 ± 40	292	2.48 ± 0.12	12.3	VG	3(380,382)
	Acetone/water (66.8/33.2, v/v)	25	–	75	650	292	2.22	9.85	VT	384
	Butanone/2-propanol (94/4, v/v)	25	–	61	630	292	2.16	9.3	VT	653
	Aq. Na_2SO_4 (0.55 M); 2-propanol	25	–	58.0	650	290	2.24	–	VT,VG	770
	Chloroform	25	–	30.0	520	290	1.79	–	VG	770
	Chloroform/acetone (40/60, v/v)	25	–	66.0	680	290	2.34	–	VG	770
	Water; water/acetone (80/20, v/v)	25	–	23.0	480	290	1.66	–	VG	770
	Water/acetone (33.2/66.8, v/v)	25	–	74.0	710	290	2.45	–	VT	770
Poly(1-vinyl-2-pyrrolidone)	Methanol/3-heptanone, ethanol/3-heptanone, propyl alcohol/ 3-heptanone	25	–	61	–	–	–	–	VG	947
Poly(vinyl sulfate)	Aq. NaCl (0.5 M)	20	–	25 ± 15	460 ± 80	278	1.65 ± 0.30	5.45	VG	3(261)
Poly(vinylsulfonic acid)	Aq. KBr (0.349 M)	5.7	–	68.8	650(788)†	296	2.19(2.66)†	9.6	VT	259,642
	Aq. KCl (0.349 M)	5.5	–	68.2	650(786)†	296	2.19(2.66)†	9.6	VT	259,642
	(0.650 M)	26.0	–	79.5	685(830)†	296	2.31(2.80)†	10.6	VT	259,642
	(1.001 M)	44.5	–	80.3	690(832)†	296	2.33(2.81)†	10.8	VT	259,642
	Aq. NaBr (0.347 M)	−0.6	–	95.5	730(882)†	296	2.46(2.98)†	12.1	VT	259,642
	Aq. NaCl (1.003 M)	32.4	–	96.1	730(880)†	296	2.46(2.97)†	12.1	VT	259,642
	Aq. NaBr (1.008 M)	40.1	–	94.5	725(875)†	296	2.45(2.96)†	12.0	VT	259,642
6.8. COPOLYMERS										
Poly(acrylonitrile-*stat*-α-methylstyrene) ca. (46/54, mol/mol)										
	Tetrahydrofuran	–	409	–	–	–	–	–	LG	878
Poly(acrylonitrile-*co*-styrene)										
(38.3/61.7, mol/mol) azeotropic	Butanone	30	–	124	770	335	2.30 ± 0.05	10.6	VG	593,595
(62.6/37.4, mol/mol, random)	Butanone; dimethylformamide	30	–	170	840	362	2.32	10.8	VG	595
(38.5/61.5, mol/mol) azeotropic	Butanone	–	354	–	–	–	–	–	LG	878
	Tetrahydrofuran	–	390	–	–	–	–	–	LG	878

† The values of $r_0/M^{1/2}$ and σ given in parentheses were obtained by using $\Phi_0 = 1.39 \times 10^{23}$, while for the others $\Phi_0 = 2.5 \times 10^{23}$ was used.

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
(1/1, mol/mol, alternating)	Butanone; dichloroethane; dimethylformamide	30	–	139	785	–	2.25	–	VG	774
	Butanone/methanol (63.6/36.4, v/v)	30	–	140	785	–	2.25	–	VT	774
Poly(acrylonitrile-*co*-vinylidene chloride) 58 wt.%-AN	γ-Butyrolactone	25	–	–	940	–	2.46	13.2	Various	961
	Dimethylacetamide	25	–	–	980	–	2.57	14.4	Various	961
	Dimethylformamide	25	–	–	950	–	2.49	13.5	Various	961
	N-Methyl-2-pyrrolidone	25	–	–	1000	–	2.62	15.0	Various	961
	70 wt.% HNO_3	25	–	–	860	–	2.31	10.8	Various	961
Poly(butadiene-*stat*-styrene) (84/16, mol/mol)										
	2-Pentanone	23.8	–	23.8	460				VT	596
Poly(butyl itaconate-*stat*-dibutyl) itaconate) (40.5/59.5, mol/mol)										
	Acetone	25	–	83			3.2		VG	682
	Methanol/*m*-xylene									
	(100/0, v/v)	25	–	51			2.7		VG	682
	(80/20, v/v)	25	–	62			2.8		VG	682
	(65/35, v/v)	25	–	78			3.1		VG	682
	(50/50, v/v)	25	–	98			3.4		VG	682
	(30/70, v/v)	25	–	101			3.4		VG	682
	(10/90, v/v)	25	–	82			3.2		VG	682
	(0/100, v/v)	25	–	42			2.5		VG	682
Poly(*p*-chlorostyrene-*stat*-methyl methacrylate) (51.6/48.4, mol/mol)										
	Benzene/hexane (960/40, v/v)	22.3	–	64	660				VT	598
poly(dimethyl itaconate-*co*-styrene)										
(100/0, w/w)	Benzene	25	–	30.4	495	245	2.02		VT	683
(75/25, w/w)	Toluene	25	–	35.4	508	260	1.96		VT	683
(67/33, w/w)		25	–	40.3	544	266	2.04		VT	683
(59/41, w/w)		25	–	45.7	553	270	2.05		VT	683
(49/51, w/w)		25	–	55.3	590	278	2.12		VT	683
(29.5/70.5, w/w)		25	–	63.4	617	287	2.15		VT	683
(27/73, w/w)		25	–	63.7	618	288	2.15		VT	683
(0/100, w/w)		25	–	78.0	661	302	2.17		VT	683
Poly(ethyl acrylate-*stat*-methyl methacrylate) (80/20, mol/mol)										
	Acetone	25	–	–	823	308	2.67		VG	114
Poly(ethylene-*co*-α-methyl-styrene), $[(ET)_m(MS)_n]_p$										
$m/n = 3/4$	Butanone/cyclohexane (60/40, v/v)	30	–	135	820	345	2.38		VT	604
$m/n = 5/4$	Butanone/cyclohexane (75/25, v/v)	30	–	140	830	373	2.22		VT	604
$m/n = 5/7$	Cyclohexane	30	–	112	770	343	2.24		VT	604
Poly(4-methoxystyrene-*stat*-styrene)										
(24.4/75.6, mol/mol)	Toluene	25	–	81	–	–	–	–	VG	781
(26.4/73.6, mol/mol)	Butanone; chlorocyclohexane; toluene	25, 50, 75	–	95–100	–	–	–	–	VG	782
(46.2/53.8, mol/mol)	Toluene	25	–	109	–	–	–	–	VG	781
(53.0/47.0, mol/mol)	Butanone; chlorocyclohexane; toluene	25, 50, 75	–	86–109	–	–	–	–	VG	782
(74.0/26.0, mol/mol)	Toluene	25	–	98	–	–	–	–	VG	781
(75.6/24.4, mol/mol)	Butanone; chlorocyclohexane; toluene	25, 50, 75	–	75–83	–	–	–	–	VG	782
Poly(methyl acrylate-*stat*-styrene)										
(50/50, mol/mol)	Ethyl acetate	35	–	104 ± 2	1010 ± 20	314	3.22		VG	133
(22/78, mol/mol)	Various solvents	~30	–	75	650				VT,VG	129
(33–76, mol/mol)		~30	–	76	650				VT	129
(47/53, mol/mol)		~30	–	77	655				VG	129
(59/41, mol/mol)		~30	–	76	650				VT,VG	129
(76/24, mol/mol)		~30	–	75	650				VT	129
Poly(methyl methacrylate-*co*-styrene)										
(100/0, mol/mol, random)	1-Chlorobutane	40.8	–	50	583	308	1.89		VT	613
(94/6, mol/mol, random)		40.8	–	59	616	308	2.00		VG	613
(58/42, mol/mol, random)		40.8	–	95	728	305	2.39		VG	613

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.*
(10/90, mol/mol, random)		40.8	–	89	707	302	2.34		VG	613
(0/100, mol/mol, random)		40.8	–	80	685	302	2.27		VG	613
(71/29, mol/mol, random)	Various solvents	~30	–	66 ± 2	625 ± 95		2.05		VG,VT	614
(44/56, mol/mol, random)	Various solvents	~30	–	75 ± 2	655 ± 95		2.15		VG,VT	614
(30/70, mol/mol, random)	Various solvents	~30	–	77 ± 2	660 ± 95		2.17		VG,VT	614
three blocks (MSM) nearly equimolar	Cyclohexanol	81	–	63	617	305	2.04		VT	616
Poly(styrene)-*block*-poly(butadiene)-*block*-poly(styrene) 50 wt.%-PS										
	Toluene	30	–	–	970–986	–	–	–	VG	958
Poly(styrene-*stat*-vinylpyrrolidone)										
(87/13, w/w)	Butanone	25	–	96					VT	684
	Butanone/2-propanol (75/25, v/v)	25	–	76					VT	684
(13/87, w/w)	Butanone/2-propanol (97/3, v/v)	25	341	75					LT,VT	684
Poly(styrene-*co*-monomethyl maleate)										
	Acetone	26.4	–	51.1	575	285	2.02	8.15	VT	317
	Aq. NaCl (0.6 M)	25	–	55	585	285	2.05	8.4	VT	317
Poly(trifluoronitrosomethane-*co*-tetrafluoroethylene)										
		35	–	38	510 ± 25	304	1.68 ± 0.08		VT	3(685)
Poly(vinylchloride-*stat*-diphenylpropene)										
	Tetrahydrofuran	25	–	127	768	320	2.40	–	VG	8792
(77.3/22.7, mol/mol)	Tetrahydrofuran	25	–	123	761	290	2.62	–	VG	879
(62/38, mol/mol)	Tetrahydrofuran	25	–	100	707	250	2.82	–	VG	879
(33/67, mol/mol)	Tetrahydrofuran	25	–	70	630	233	2.70	–	VG	879
(11/89, mol/mol)	Tetrahydrofuran	25	–	62	605	230	2.63	–	VG	879
(4/96, mol/mol)	Tetrahydrofuran	25	–	56	585	224	2.61	–	VG	879
(0/100, mol/mol)	Tetrahydrofuran	25	–	50	563	221	2.55	–	VG	879

TABLE 7. MAIN-CHAIN CARBOCYCLIC POLYMERS

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	Method	Ref.
Poly(1,2-acenaphthenylene)									
trans	Various solvents	25	–	36 ± 3	520 ± 20	354	1.47 ± 0.05	VG	263

TABLE 8. MAIN-CHAIN HETEROATOM POLYMERS

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
8.1. POLY(OXIDES), POLY(ETHERS)										
Poly(butene oxide), see Poly[oxy(ethylethylene)]										
Poly(ethylene oxide), see Poly(oxyethylene)										
Poly[oxy(*tert*-butylethylene)]	Benzene	25	–	230	930	377*	2.47	13.6	VG	385
isotactic	Xylene	80	–	–	1040	–	–	15.9	VG	790
Poly(oxy-1,2-cyclohexylene)	Toluene	35	–	53	592	359	1.65		VG	472
Poly(oxydecamethylene)	Benzene; chloroform	~30	–	240	960	570	1.68	7.5	VG	386
Poly[oxy(2,6-dimethyl-1,4-phenylene)]										
	Chlorobenzene; toluene	25	–	166 ± 5	833 ± 10	715	1.16 ± 0.02	2.7	VG	474
	Benzene; carbon tetrachloride	25	–	175 ± 8	850 ± 10	715	1.13 ± 0.02	2.6	VG	473

TABLE 8. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times10^4$) or a_p (nm)	K_0 ($\times10^3$) (ml/g)	$r_0/M^{1/2}$ $\times10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
Poly[oxy(2,6-diphenyl-1,4-phenylene)]										
	Chlorobenzene; toluene	25	–	80 ± 5	660 ± 20	500	1.32 ± 0.04	3.5	VG	473
Poly(oxyethylene)	Various solvents	~20	–	110 ± 10	750 ± 30	541	1.38 ± 0.06	3.8	VG	3(389,390)
	Aq. K_2SO_4 (0.45 M); aq. $MgSO_4$ (0.39 M)	~40	–	115 ± 15	775 ± 30	541	1.43 ± 0.06	4.1	VT	395,655
	Benzene	25	–	129	790	541	1.46	4.25	VG	656,388
	Acetone	25	–	170	840	541	1.55	4.8	VG	387
	Various poor solvents	50	–	170	840	541	1.55	4.8	VG	387
	Undiluted	60	$d\ln r_0^2/dT = (0.23 \pm 0.02) \times 10^{-3}$ (deg^{-1})						ST	655
	Water	25	–	175	888	566	1.57	–	VG	963
		3–85	–	201–156	–	–	–	–	VG	963
	Aq. KOH (1.24 M)	25	–	177	888	566	1.57	–	VG	963
	(0.96–1.48 M)	25	–	183–180	–	–	–	–	VG	963
Poly[oxy(ethylethylene)]	Benzene; butanone; 2-propanol	30	–	87	700	423	1.66 ± 0.05	5.5	VG,VT	397
	2-Propanol	30	–	110	730	427	1.71	5.85	VT	396
Poly(oxyhexamethylene)	Benzene; dioxane	25	–	185	910	565*	1.61	5.15	VG	398
Poly(oxymethylene)	Hexafluoroacetone sesquihydrate (1/1.7, mol/mol)	25	–	430 ± 40	1200 ± 80	522	2.3 ± 0.2	10.5	VG	402
Poly[oxy(2-methyl-6-phenyl-1,4-phenylene)]										
	Dioxane/methyl-cyclohexane (1/1, v/v)	25	–	110 ± 5	790 ± 20	580	1.36 ± 0.04	3.7	VT	673
Poly[oxy(phenylethylene)]	Toluene	25	–	75	640	344*	1.85	6.85	VG	385
Poly(oxypropylene)	Benzene; methanol	25	–	115 ± 10	750 ± 25	472	1.59 ± 0.05	5.05	VG	3(411)
	Toluene/2,2-trimethylpentane (5/7, v/v)	39.5	–	107.5	735	472	1.56	4.85	VT	411
	2,2,4-Trimethylpentane	50	375	–	800	494*	1.62	5.75	LT	654
Poly(oxytetramethylene)	Diethyl malonate	33.5	–	243	945	556	1.70	5.8	VT	658
	Ethyl acetate	30	–	180 ± 20	860 ± 30	556	1.55 ± 0.05	4.8	VG	412
	Ethyl acetate/hexane (22.7/77.3, w/w)	30.4	–	267	975	556	1.75	6.1	VT	658
		31.8	–	210	900 ± 20	556	1.62 ± 0.03	5.25	VT	412
	2-Propanol	44.6	–	231	930	556	1.67	5.6	VT	658
	Undiluted	60	$d\ln r_0^2/dT = -1.33 \times 10^{-3}$ (deg^{-1})						ST	659
Poly(oxytrimethylene)	Acetone; benzene; carbontetrachloride	30	–	126	795	550	1.45	4.2	VG	414
Poly(propyleneoxide), see Poly(oxypropylene)										
Poly(tetrahydrofuran), see Poly(oxytetramethylene)										

8.2. POLY(ESTERS), POLY(CARBONATES)

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times10^4$) or a_p (nm)	K_0 ($\times10^3$) (ml/g)	$r_0/M^{1/2}$ $\times10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
Poly(butylene adipate-*co*-butylene isophthalate)										
(100 mol% BADP)	Chloroform	30	–	247	950	–	–	–	VG	967
(80 mol% BADP)	Chloroform	30	–	225	923	–	–	–	VG	967
(50 mol% BADP)	Chloroform	30	–	160	823	–	–	–	VG	967
(20 mol% BADP)	Chloroform	30	–	99	700	–	–	–	VG	967
Bisphenol A poly(carbonate), see Poly(oxycarbonyl-1,4-phenyleneisopropylidene-1,4-phenylene)										
	Poly(ethylene terephthalate), see Poly(oxyethyleneoxyterephthaloyl)									
	Chlorobenzene	25	–	100 ± 10	720 ± 25	540	1.33 ± 0.05	3.55	VT	3(415)
Poly(β-hydroxybutyrate)	Chloroform/*n*-heptane, (50.2/49.8, v/v)	25	–	157	860	–	–	–	VT,LT	950
	2,2,2-Trifluoroethanol/ water (52.6/47.4, v/v)	25	–	149	840	–	–	–	VT,LT	950
	2,2,2-Trifluoroethanol	25	380–390	145–160	830–960	–	–	–	VG,LG	950
Poly(4,4′-isopropylidenediphenyl carbonate)-*block*-poly(styrene)										
26 wt.%-PS	Chloroform, diethyl carbonate, 1,4-dioxane, methylene chloride, tetrahydrofuran	25	–	–	910–1040	–	–	–	VG	959

* These values of r_{0f} of poly(epoxide) chains were calculated by $0.377/M_u^{1/2}$ [nm.mol$^{1/2}$/gram$^{1/2}$], while those given without asterisk were calculated by $0.360/M_u^{1/2}$. The former is due to Allen et al. (Ref. 695). The latter is based on the assumption that all valence angles of skeleton are tetrahedral.

TABLE 8. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
48 wt.%-PS	*ibid.*	25			1000–1200	–	–	–	VG	959
50 wt.%-PS	*ibid.*	25			1040–1200	–	–	–	VG	959
73 wt.%-PS	*ibid.*	25			1120–1270	–	–	–	VG	959
Poly(oxybutynedioyloxyhexamethylene)										
	Benzene; chloroform	20	–	180 ± 20	870 ± 30	627	1.39 ± 0.05	3.9	VG	3(416)
Poly[oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene]										
	Methylene chloride; tetrahydrofuran	25	–	180 ± 20	880 ± 20	796	1.10 ± 0.05		VG	3(479)
	Butyl benzyl ether	170	–	210	940	796	1.18		VT	476
	Cyclohexane/dioxane (36.1/63.9, w/w)	25	–	210	940	796	1.18		VT	476
	Chloroform; tetrahydrofuran	25	–	150 ± 13	840	796	1.05		VG	478
	Hexane/tetrachloroethane (54/46, v/v)	30	–	230	930	796	1.16		VT	694
	Various	25	–	210 ± 17	920 ± 50	–	1.35	–	VG	880
Poly(oxy-1,4-cyclohexyleneoxysebacoyl)										
cis	Chloroform	20	–	140 ± 20	800 ± 30	495	1.62 ± 0.05		VG	3(480)
trans	Chloroform	20	–	160 ± 20	840 ± 30	633	1.33 ± 0.05		VG	3(480)
Poly(oxyethyleneoxyterephthaloyl)										
	Phenol/tetrachloroethane (1/1, v/v)	25	–	160 ± 15	840 ± 25	687	1.22 ± 0.03	3.15	VG	3(491)
	o-Chlorophenol	25	–	210	910	687	1.33	3.7	VG	484
	Trifluoroacetic acid	30	–	242	975	687	1.42	4.25	VG	488
Poly(oxyfumaroyloxyhexamethylene)										
	Chloroform	20–50	–	180 ± 20	870 ± 30	592	1.47 ± 0.05	4.3	VG	3(417)
Poly[oxy(hexahydroterephthaloyl)oxyoctamethylene]										
cis	Chloroform	20	–	140 ± 20	800 ± 30	495	1.62 ± 0.05		VG	3(480)
trans	Chloroform	20	–	160 ± 20	840 ± 30	633	1.33 ± 0.05		VG	3(480)
Poly(oxyhexamethyleneoxy-2,9-dibutylsebacoyl)										
	Benzene	20	–	155 ± 25	835 ± 70	457	1.82 ± 0.15	6.6		3(418)
Poly(oxyhexamethyleneoxysebacoyl)										
	Benzene; chloroform	20	–	215 ± 60	910 ± 100	540	1.70 ± 0.17	5.8		3(418,419)
Poly[oxyisophthaloyloxy-1,4-phenylene (fluoren-9-yildene)-1,4-phenylene]										
	Tetrachloroethane; tetrahydrofuran	20	–	210	902				VG	674
Poly(oxymaleoyloxyhexamethylene)										
	Benzene; chloroform; tetrahydrofuran	20–50	–	135 ± 15	790 ± 30	510	1.55 ± 0.05	4.8	VG	3(417)
Poly(oxy-1-oxo-dimethyltrimethylene)										
	Trifluoroacetic acid	20	–	238	950	–	–	–	VG	800
Poly(oxy-1-oxo-hexamethylene)	Benzene; dioxane; ethyl acetate	25	–	–	–	–	–	5.9 ± 0.3	VG	808
		–	–	–	–	–	–	5.6	–	881
Poly(oxy-1-oxo-3-methyltrimethylene), D,L										
	Chloroform; ethylene dichloride	30	–	133	875	–	–	–	VG	799
	Trifluoroethanol	25	–	133	875	–	–	–	VG	799
Poly(oxyperfluorosebacoyloxydecamethylene)										
	Chloroform; *s*-tetrachloroethane	25	–	–	–	–	–	6.3 ± 0.5	VG, VT	795
Poly(oxysebacoyloxyhexadecamethylene)										
	Chloroform	20	–	270 ± 40	100 ± 50	555	1.80 ± 0.10	6.5	VG	3(419)
Poly(oxysuccinyloxyhexamethylene)										
	Benzene; chloroform; tetrahydrofuran	20–60	–	165 ± 30	850 ± 60	522	1.62 ± 0.14	5.25	VG	3(417)
Poly[oxy-(1,1,3-trimethyl-3-phenylindan-5,4′-dicarbonyl)–oxy-1,4-phenyleneisopropylidene-1,4-phenylene]										
	Tetrahydrofuran	25	–	156 ± 2	850 ± 10	–	–	–	VG	794,882
Poly(oxyundecanoyl)	Chloroform	20	–	185 ± 60	880 ± 100	550	1.60 ± 0.16	5.1	VG	3(419,420)
Poly(β-propiolactone)	Chloroform, 1,4-dioxane, 2,2,2,-trifluoroethanol	30	–	146	–	–	–	–	VG	991

TABLE 8. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
8.3. POLY(AMIDES)										
Poly(iminoadipoyliminohexamethylene), (Nylon 66)										
	Aq. HCOOH (90%, v/v)	25	–	190 ± 20	890 ± 40	545	1.63 ± 0.08	5.3	VG	3(445,446)
	Aqueous HCOOH (90%, v/v) KCl (2.3 M)	25	–	253	1010	545	1.85	6.85	VT	444
		25	–	192	935	545	1.72	5.93	VT	668,669
Poly(iminohexamethyleneiminoterephthaloyloxyhexamethyleneoxyterephthaloyl)										
	Phenol/tetrachloroethane (1/1, w/w)	25	–	250	1000	–	–	4.76	VG	806
Poly(iminohexamethyleneiminothiocarbonylhexamethylenethiocarbonyl)										
	Dimethylformamide/ LiCl (5%)	20	–	142	–	–	–	–	VG	805
Poly(iminohexamethyleneiminothiocarbonyltetramethylenethiocarbonyl)										
	Dimethylformamide/ LiCl (5%)	20	–	279	–	–	–	–	VG	805
Poly[imino(1-oxododecamethylene)], (Nylon 12)										
	m-Cresol	25	–	266	–	–	–	6.77	VG	803
		25	–	238	970	–	6.29	–	VG	812
	Sulfuric acid (96%)	25	–	222	949	–	6.01	–	VG	812
Poly[imino(1-oxohexamethylene)], (Nylon 6)										
	Sulfuric acid	25	–	190 ± 10	890 ± 20	545	1.63 ± 0.04	5.3	VG	3(453)
	Aq. HCOOH (65–85%)	25	–	229	970	545	1.78	6.35	VT,VG	450
Poly[iminoterephthaloylimino-1,4-phenylene(fluoren-9-ylidene)-1,4-phenylene]										
	Dimethylformamide	25	–	409	~1200				VG	503
Poly[iminoterephthaloylimino(trimethylhexamethylene)], 2,4,4-/2,2,4-trimethyl (1/1, mol/mol)										
	Aniline	142	–	148	850	640	1.33	–	VG	804
	Dimethylformamide	25	–	174	–	–	–	–	VG	804
	Pyrroline	62	–	151	850	640	1.33	–	VG	804
Poly(isophthaloyl-*trans*-2,5-dimethylpiperazine)										
	N-methyl-2-pyrrolidone	25	355	–	–	–	–	–	VG	971
8.4. POLY(AMINO ACIDS)										
Poly(β-benzyl-L-aspartate), see Poly(iminocarbonyl-L-benzyloxycarbonylethylidene)										
Poly(γ-benzylglutamate), see Poly(iminocarbonyl-benzyloxycarbonylpropylidene)										
Poly(iminocarbonyl-L-benzyloxycarbonylethylidene)										
	m-Cresol	100	–	–	600	268	2.24 ± 0.1	9.6	VA	670
Poly(iminocarbonyl-benzyloxycarbonylpropylidene)										
L	Dichloroacetic acid	25	–	58 ± 5	600 ± 20	259	2.32 ± 0.08	10.3	VG	3(457)
		25	–				2.14	8.8	VA	670(457)
D,L	Dichloroacetic acid; dimethylformamide	25	–	58 ± 5	600 ± 20	259	2.32 ± 0.08	10.3	VG	3(459)
Poly(iminocarbonyl-L-carboxypropylidene), [Poly(L-glutamic acid)]										
	Phosphate buffer (Na^+, 0.3 M; pH 7.85)	17	–	–	720	337	2.14 ± 0.1	8.8	VA	670
Poly(iminocarbonyl-L-hydrocarbonylpropylidene), [Poly(α-L-glutamic acid)]										
	Sodium phosphate buffer (pH, ca. 7)	25.5	–	98.4	775	–	–	–	VG	815
Poly(iminocarbonyl-L-(*N*-hydroxyethylcarbamoylpropylidene)], {Poly[N^5-(2-hydroxyethyl)-L-glutamine]}										
	Water	30	–	–	–	–	–	10 ± 1	Complex	817
Poly(γ-hydroxy-L-proline)	Water	30	–	–	–	–	–	15.8	VA	818
Poly[(methylimino)carbonylmethylene], [Poly(sarcosine)]										
	Water	20	–	50 ± 20	570 ± 90	455	1.25 ± 0.20	3.0	VG	3(468)
8.5. POLY(URETHANES)										
Poly(oxytetramethyleneoxycarbonylimino-2,4-tolyleneiminocarbonyl)										
	Dimethylformamide	30	–	–	1030	515	2.0		VG	497
8.6. POLY(SULFIDES)										
Poly(thiopropylene)	Benzene	20	–	60	600				VG	436
Poly(trimethylene sulfide)	Chloroform	25	–	150	783	–	–	4.0	VG	979

TABLE 8. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ ($\times 10^4$nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
8.7. POLY(PHOSPHATES)										
Poly[oxy(hydroxyphosphinylidene)]										
	Aq. NaBr (0.35–0.415 M)	25	–	50 ± 3	560 ± 20	370	1.51 ± 0.04	6.6	VT,VG	3(422)
	Aq. LiBr									662
	Aq. CsCl (0.96 M)	30	–				3.93	7.1	LT	663
	Aq. LiCl (2.9 M)	30	–				2.25		LT	663
	Aq. NaCl (0.96 M)	30	–				2.79		LT	663
8.8. POLY(SILOXANES), POLY(SILSESQUIOXANES), POLY(SILMETHYLENES)										
Poly(dimethyl siloxane), see Poly[oxy(dimethylsilylene)]										
Poly(dimethylsilmethylene)	Heptane/propanol (68.8/31.2, v/v)	25	540	–	988	450	2.2	–	LT	671
Poly(dimethylsiltrimethylene)	Heptane	25	–	–	1200	480	2.5	–	LG	671
Poly(diphenylsiltrimethylene)	Cyclohexanol/toluene (63.5/36.5, v/v)	25	580	–	1160	322	3.6	–	LT	671
Poly[oxy(dimethylsilylene)]	Butanone, toluene	~25	–	80 ± 5	670 ± 20	482	1.39 ± 0.05	6.25	VT,VG	3(427, 428) 664
	Various theta solvents	2–90	266 ± 10	–	612 ± 13	482	1.27 ± 0.03	5.2	LT	425
	$C_8F_{18}/C_2Cl_4F_2$ (33/67, w/w)	22.5	–	106	740	482	1.54	7.6	VT	424
	Ethyl iodide	2	–	70	640	482	1.33	5.7	VT	425
	Bromocyclohexane	29	–	74	655	482	1.36	6.0	VT	425
		28	–	79.5	[655]	–	–	–	VT	838
		28	294 ± 14	–	–	–	–	–	LT	838
	Bromocyclohexane	37	–	78	685	–	–	–	VT	982
	Bromocyclohexane/ phenetole (6/7, v/v)	36	–	75	660	482	1.37	6.1	VT	425
	Chlorobenzene/dimethyl phthalate (45/6, v/v)	57.5	–	76	660	482	1.37	6.1	VT	425
	Bromobenzene	78.5	–	76	660	482	1.37	6.1	VT	425
	Phenetole	89.5	–	73	650	482	1.35	5.9	VT	425
	Toluene	25	–	75	670	–	–	–	VG	981
		30	–	78	678	–	–	–	VG	953
	Undiluted	40–100	$d\ln r_0^2/dT = -(0.78 \pm 0.06) \times 10^{-3}$ (deg^{-1})						ST	665
	Diluted with liquid silicon	30–105	$d\ln r_0^2/dT = -(0.71 \pm 0.13) \times 10^{-3}$ (deg^{-1})						VT	665
Poly[oxy(dipropylsilylene)]	2-Pentanone	76	–	87.1	703	372	1.89	12.0	VT	433
	Toluene	10	–	109	759	372	2.04	14.0	VT	433
Poly[oxy(methylphenylsilylene)]	Diisobutylamine	30.4	–	51.5	575	363	1.58	8.35	VT	434
	Cyclohexane	25	–	71.5	–	–	–	10.8	VG	983
		50	–	71.5	–	–	–	10.8	VG	983
	Methylcyclohexane	20	–	65.0	–	–	–	10.2	VG	983
	Tetrahydrofuran	25	–	96.0	–	–	–	13.4	VG	983
Poly[oxy(γ-trifluoropropylmethylsilylene)]										
	Cyclohexyl acetate	25.0	–	41.0	550(648)*	341	1.61(1.90)*	6.3	VT	435
	Methyl hexanoate	72.8	–	44.5	565(667)*	341	1.66(1.96)*	6.65	VT	435
Poly(phenylsilsesquioxane)	1,2-Dichloroethane	50.5	–	–	1160	–	–		VT	675
8.9. POLY(HETEROCYCLICS)										
Poly(3,3′-dimethylthietane)	Tetrahydrofuran	25	–	120	744	–	–	–	VG	986
Poly[2-methoxy-4,6-di(*p,p*′-isopropylidene diphenyloxy)-*s*-triazine]										
	Chloroform, 1,2-dichloroethane, 1,2-dichloroethane/*n*-butanol (80/15, v/v)	30	–	16.5–17.5	850–863	778	1.1	–	VG	985
Poly[*N*-(*n*-octadecyl)maleimide]	Benzene	25	–	28	–	–	–	16.6	VG	987
	1-Chloronaphthalene	25	–	27	–	–	–	16.2	VG	987
	o-Dichlorobenzene	25	–	25	–	–	–	15.4	VG	987

* The values of $r_0/M^{1/2}$ and σ given in parentheses were obtained by using $\Phi_0 = 1.39 \times 10^{23}$, while for the others $\Phi_0 = 2.5 \times 10^{23}$ was used.

TABLE 8. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
	Tetrahydrofuran	25	–	37	–	–	–	20.0	VG	987
	Toluene	25	–	24	–	–	–	15.0	VG	987
	1-Decanol	39.4	–	18.3	–	–	–	11.7	VT	988
	1-Hexanol	79.0	–	37.0	–	–	–	18.8	VT	988
	1-Octanol	53.7	–	23.5	–	–	–	13.8	VT	988
Poly[6,6′-bis(3-phenylquinoxaline)-2,2′-diyl-1,4-phenylene]										
	m-Cresol	40	–	213	1000	–	–	–	VG	849
Poly[(1,3-dihydro-3-oxo-isobenzofuran-1-ylidene)-1,4-phenyleneoxyisophthaloyloxy-1,4-phenylene]										
	Tetrachloroethane; tetrahydrofuran	20	–	195	880	–	–		VG	674
Poly[(1,3-dihydro-3-oxo-isobenzofuran-1-ylidene)-1,4-phenyleneiminoterephthaloylimino-1,4-phenylene]										
	Dimethylformamide	25	–	558	~1500				VG	503
Poly[(D,L-1,2-pyrrolidindiyl)carbonyl]										
	Water	25	–	ca. 25	ca. 570	390	ca. 1.5		VT	3(507)
Poly(1-isobutyl-2,5-dioxopyrrolidin-3,4-diyl)										
	Butyl acetate	21	–	132	790	–	–		VG	512
Poly(1-*p*-tolyl-2,5-dioxopyrrolidin-3,4-diyl)										
	Dimethylformamide	21	–	75	670	–	–		VG	513
8.10. COPOLYMERS (MALEIC ANHYDRIDE, SULFONES, SILOXANES)										
8.10.1. MALEIC ANHYDRIDE COMPOLYMERS										
Poly[3,9-bis(ethylidone-2,4,8,10-tetraoxaspiro(5,5)undecane)-*ran*-*trans*-cyclohexane-dimethanol)/(1,6-hexanediol)]										
trans-CDM/1,6-ND (100/0)	Tetrahydrofuran	30	–	87.0	–	–	–	–	LS	954
(70/30)	Tetrahydrofuran	30	–	67.0	–	–	–	–	LS	954
(50/50)	Tetrahydrofuran	30	–	61.5	–	–	–	–	LS	954
(29/71)	Tetrahydrofuran	30	–	50.0	–	–	–	–	LS	954
(0/100)	Tetrahydrofuran	30	–	30.0	–	–	–	–	LS	954
Poly[(tetrahydro-2,5-dioxo-3,4-furandiyl)-1-phenylethylene]										
	Tetrahydrofuran	30	–	82.6	732	383	1.91		VG	506
8.10.2. SULFONES										
Poly(sulfonylbicycloheptene)	Chloroform	25, 40	–	29.0	488	–	–	4.2	VG	840
	Cyclohexane	25	–	29.0	488	–	–	4.2	VG	840
Poly[sulfonyl(butylethylene)]	Hexyl chloride	13	–	67 ± 2	625 ± 10	350	1.79 ± 0.02		VT	666
		13	296 ± 9	–	725 ± 22	350	2.07 ± 0.07		LT	666
	Benzene/cyclohexane (43/57, v/v)	25	–	66 ± 2	642 ± 7	350	1.84 ± 0.02		VG	348
	Butanone/2-propanol (30–37/70, v/v)	8–24	–	53	580	350	1.66		VT	439
	Dioxane/hexane (40/60, v/v)	20	–	65 ± 2	638 ± 7	350	1.83 ± 0.02		VT	438
Poly[sulfonyl(1-methyl-1-propylethylene)]										
	Butanone/hexane (35.4/64.6, v/v)	11.5	–	91	700				VT	439
Poly(sulfonyl-*p*-phenoxyphenylene)										
	Dimethylformamide	25	–	106	753 ± 20	771	0.98 ± 0.10	–	VG	841
Poly[sulfonyl(phenylethylene)]	Tetrahydrofuran	30	–	57.4	649	425	1.53		VG	440,667
8.10.3. SILOXANES										
Poly(*p*-*tert*-butylstyrene)-*block*-polydimethylsiloxane)-*block*-poly(*p*-*tert*-butylstyrene) 28 wt.% PBS										
	Methyl ethyl ketone	15	–	58.9	620	–	–	–	VT	957
	Benzene	35	–	68	650	–	–	–	VG	960
	Methyl ethyl ketone	15	–	59	620	–	–	–	VT	960
		20	–	62	630	–	–	–	VG	960
		31	–	62	630	–	–	–	VG	960
Poly(dimethyl siloxane-*co*-diphenyl siloxane)										
(95/5, mol/mol)	Bromobenzene	9	–	100	742	–	1.56		VT	596
(66/34, mol/mol)	Benzene/2-propanol (44/56, w/w)	42	–	74	670	–	1.70		VT	596

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TABLE 8. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
(55/45, mol/mol)	Dimethylphthalate	82.5	–	78	675	–	1.81		VT	596
	Ethanol/toluene (37/63, w/w)	29.5	–	78	675	–	1.81		VT	596
Poly(styrene)-*block*-poly(dimethyl siloxane) 68% PS										
	Butanone	30	–	81	687		–	–	VG	953
	Decalin	30	–	80	687	–	–	–	VG	953
	Toluene	30	–	82	687	–	–	–	VG	953
Poly(styrene)-*block*-poly(dimethyl siloxane)-*block*-poly(styrene) 68% PS										
	Toluene	30	–	80	687	–	–	–	VG	953
8.11. OTHER COMPOUNDS										
Poly(2-acrylamino-2-methylpropanesulfonic acid)										
cesium salt	Aq. CsCl (1 N)	25	–	16	–	–	–	11	VG	864
sodium salt	Aq. CsCl (1 N)	25	–	32	–	–	–	12	VG	864
	Aq. NaCl	25	–	30	–	–	–	12	VG	864
tetrabutylammonium salt	Aq. NaCl (0.1 N; 1 N; 5 N)	25	–	10	–	–	–	11	VG	864
	Organic solvents	25	–	23	–	–	–	19	VG	864
	Tetrabutylammonium bromide (0.5 N)	25	–	30	–	–	–	23	VG	864
Poly(dihexoxyphosphazene)	Tetrahydrofuran	25	–	30.8	–	–	–	$C_n = 13.2$	VG	994
Poly(*di-n*-hexylsilane)	Tetrahydrofuran	25	–	–	740	–	–	19	VG	995
Poly(hexamethylenedimethylammonium bromide)										
	Aq. KBr (0.4 M)	25	–	117.4	825	–	–	–	VG	844
Poly[oxythiocarbonyloxy-1,4-phenylene(methyl)phenylmethylene-1,4-phenylene]										
	Chloroform	25	–	190	913	–	–	5.26	VG	992
	Dichloromethane	25	–	225	965	–	–	5.89	VG	992
	1,4-Dioxane	25	–	175	888	–	–	4.98	VG	992
	Tetrahydrofuran	25	–	165	871	–	–	4.79	VG	992

TABLE 9. CELLULOSE AND DERIVATIVES, POLY(SACCHARIDES)

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
Amylose	Dimethyl sulfoxide; ethylene diamine	25	–	56 ± 12	600 ± 50	335	1.79 ± 0.15		VG	3(518)
	Various solvents	25	–	–	700	335	2.08		VT,VG	517
	Aq. KCl (0.33 M); dimethyl sulfoxide	25	–	110 ± 5	750 ± 25	335	2.24 ± 0.08		VT,VG	3(520)
	Aq. KCl (0.5 M)	25	–	61	625	335	1.87		VT	523
	Aq. KOH (0.15 M)	25	–	164					VG	519
	Aq. KCl (0.33 M)	25	–	–	–	–	–	5.2[a]	VT	530
	Nitromethane	22.5	–	–	920	335	2.75		LG	527
	Water/dimethyl sulfoxide (40/60, v/v)	25	–	–	–	–	–	4.1	VA,LG	884
	Water	24	–	–	–	–	–	11.7	VG,LG	999
Amylose acetate	Nitromethane	25	–	51	589	–	2.22	–	VG	846
Amylose triacetate	Chloroform; nitromethane	30	–	47 ± 10	580 ± 60	250	2.32 ± 0.24		VG	3(524)
		30	–	48	580	250	2.32		VG	676
		30	–		800 ± 15	250	3.2 ± 0.06		VG	677
Amylose tributyrate	Butanone	25	–	–	557	–	–	–	LG	847
	Butanone; carbon tetrachloride	25	–	–	674	–	–	6.83	VG	847
	Ethyl acetate	25	–	–	595	–	–	–	LG	847

TABLE 9. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
	Ethyl acetate; tetrahydrofuran	25	–	–	611	–	–	5.63	VG	847
	–	–	–	–	–	–	2.21–2.24	–	–	861
Amylose tricarbanilate	Acetone; dioxane; pyridine	20	–	27 ± 5	470 ± 30	187	2.51 ± 0.16		VG	3(528)
	Dioxane/methanol (49/51, v/v)	20	–	–	2180	–	11.7		LT	678
	Pyridine	25	471–478	–	–	–	–	–	LG	848
Amylose tripropionate	Ethyl acetate	25	–	57	583	–	2.32	6.21	VT?	850
Carboxymethyl amylose, sodium salt	Aq. NaCl (0.65 M)	37.5					2.62	7.9[a]	VT	609
	Aq. NaCl (0.5 M; pH 8)	35					2.95	10.0[a]	VA	530
	Aq. NaCl (0.78 M; 0.02% NaN_3)	35					2.15	5.3[a]	VA	531
Diethylaminoethyl amylose hydrochloride	Aq. NaCl (0.78 M; 0.02% NaN_3)	35						6.4[a]	VA	531
Cellulose	Cupriethylene diamine	25	–	180 ± 80	900 ± 150	620	1.45 ± 0.25		VG	3(537)
	Cadoxen	25	0.24	495	1250	620	2.0		VG	691,534
	N,N-dimethylacetamide/ 9% LiCl	30	–	–	–	–	6.71	91.9	LG	1000
Cellulose diacetate										
Ac. acid content, 55.5 wt.%	Acetone	25	–	–	–	–	3.59	26.3	LS	854
	Tetrahydrofuran	25	–	–	–	–	2.56	13.5	LS	854
Cellulose triacetate	Acetone; chloroform; *o*-cresol	25–30	–	108 ± 10	750 ± 30	465	1.61 ± 0.07		VG	3(541,542)
	Ethylacetate; dioxane; methyl acetate; tetrahydrofuran	25			730–740	465	1.57–1.59		VG	680
	Chloroform	30	–	–	1180	–	–	–	VG	857
Cellulose tributyrate	Butanone	30	–	97 ± 15	730 ± 40	408	1.79 ± 0.10		VG	3(544)
	Dodecane/tetralin (75/25, v/v)	130	–	82	690	408	1.69		VT	544
Cellulose tricarbanilate	Acetone; dioxane; pyridine	20	–	130 ± 30	810 ± 70	346	2.34 ± 0.20		VG	3(528)
	Acetone	~25	–	65 ± 3	635	346	1.83		VG	693
	Acetone	25	–	–	1450	–	–	–	VWC	996
	Cyclohexane	~25	–	83.5 ± 3	690	346	1.99		VG	693
	Dioxane	~25	–	44 ± 3	560	346	1.61		VG	693
	Dioxane/methanol (42.5/57.5, v/v)	20	–	–	1120	346	3.24		LT	678
	Anisol	94	ca. 1000	130	805	346	2.32		LT,VT	546
	Cyclohexanol	73	ca. 1050	–	875	346	2.52		LT	546
		73	–	156	1090	–	–	–	VT	858
	Dioxane	15	–	76	860	–	–	–	VG	858
		30	–	68	830	–	–	–	VG	858
		45	–	61	800	–	–	–	VG	858
		60	–	56	780	–	–	–	VG	858
		70	–	51	750	–	–	–	VG	858
	Tetrahydrofuran	25	–	–	1410	–	–	–	VWC	996
Cellulose trihexanoate	Dimethylformamide	41	–	240	980	370	2.65		VT	547
	Dioxane/water (100/7, v/v)	63	–	224	960	370	2.60		VT	547
Cellulose trinitrate	Acetone; ethyl acetate	~25	–	130 ± 30	810 ± 50	458	1.77 ± 0.11		VG	3(535,537 548,549)
	Acetone	25	360	–	720	458	1.57		LG	3(549)
		22	0.26 ± 0.01	–	930 ± 15	458	2.03 ± 0.03		XS	641
		~20	0.40–0.70	–	1180–1590	458	2.58–3.46		XS	679
		20	0.22–0.28	–	850–975	458	1.85–2.12		XS	679
(N%, 13.9)	Acetone	25	970	–	2410	462	4.7		LG	686
(N%, 12.9)	Acetone	25	530	–	1780	475	3.4		LG	686
(N%, 13.5)	Ethyl acetate	30	700	–	2050	467	3.9		LG	555
(N%, 12.0)	Acetone	20	0.48	–		486	2.5		XS	687

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TABLE 9. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ (×10⁴) or a_p (nm)	K_0 (×10³) (ml/g)	$r_0/M^{1/2}$ ×10⁴ (nm)	$r_{0f}/M^{1/2}$ (×10⁴) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
Cellulose trioctanoate	Toluene	30	–	127 ± 15	800 ± 40	340	2.35 ± 0.12		VG	3(544)
	Dimethylformamide	140	–	113	770	340	2.27		VT	544
	γ-Phenylpropanol	48	–	129	805	340	2.37		VT	544
(Cyanoethyl)(hydroxypropyl) cellulose	Tetrahydrofuran	25	$d \ln r_0^2/dT = 3.8 \times 10^{-3}$ (deg^{-1})		–	–	–	–	VTe	1002
Ethyl cellulose	Methanol	25	–	232 ± 10	970 ± 20	520	1.87 ± 0.03		VG	3(559)
Ethyl hydroxyethyl cellulose	Water	25	–	550 ± 80	1300 ± 50	545	2.38 ± 0.09		VG	3(560)
		25	–	335	1100	545	2.0		VG	691,560, 692
Hydroxyethyl cellulose	Cadoxen; water	25	–	250	1000	514	1.9		VG	691,561
Methyl cellulose	Water	25	–	920 ± 100	1500 ± 60	581	2.58 ± 0.10		VG	3(563)
Pullulan	Water	25	360	91	–	–	–	–	VG	1003
Sodium carboxymethyl cellulose	Cadoxen	25	–	357	1130	563	2.0		VG	691,565
	Aq. NaCl (0.005–0.2 M)	25	–	420	1190	502	2.4		VG	691,565
Sodium cellulose xanthate	Aq. NaOH (1 M)	30	–	290	1380				VG	681
Hyaluronic acid	Aq. HCl (0.1 M)	25	–	–	–	–	2.5	–	VA	688

[a] These values of the characteristic ratio C_∞ of cellulosic chains were obtained by $C_\infty = r_0^2/\mathrm{DP}\, l^2$, where DP is the degree of polymerization and $l = 0.425$ (nm).

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TABLE 9. *cont'd*

Polymer	Solvent	Temp. (°C)	$S_{0z}/M_w^{1/2}$ ($\times 10^4$) or a_p (nm)	K_0 ($\times 10^3$) (ml/g)	$r_0/M^{1/2}$ $\times 10^4$ (nm)	$r_{0f}/M^{1/2}$ ($\times 10^4$) (nm)	$\sigma = r_0/r_{0f}$	$C_\infty = r_0^2/nl^2$	Method(s)	Refs.
Cellulose trioctanoate	Toluene	30	–	127 ± 15	800 ± 40	340	2.35 ± 0.12		VG	3(544)
	Dimethylformamide	140	–	113	770	340	2.27		VT	544
	γ-Phenylpropanol	48	–	129	805	340	2.37		VT	544
(Cyanoethyl)(hydroxypropyl) cellulose	Tetrahydrofuran	25	$d \ln r_0^2/dT = 3.8 \times 10^{-3}$ (deg^{-1})		–	–	–	–	VTe	1002
Ethyl cellulose	Methanol	25	–	232 ± 10	970 ± 20	520	1.87 ± 0.03		VG	3(559)
Ethyl hydroxyethyl cellulose	Water	25	–	550 ± 80	1300 ± 50	545	2.38 ± 0.09		VG	3(560)
		25	–	335	1100	545	2.0		VG	691,560, 692
Hydroxyethyl cellulose	Cadoxen; water	25	–	250	1000	514	1.9		VG	691,561
Methyl cellulose	Water	25	–	920 ± 100	1500 ± 60	581	2.58 ± 0.10		VG	3(563)
Pullulan	Water	25	360	91	–	–	–	–	VG	1003
Sodium carboxymethyl cellulose	Cadoxen	25	–	357	1130	563	2.0		VG	691,565
	Aq. NaCl (0.005–0.2 M)	25	–	420	1190	502	2.4		VG	691,565
Sodium cellulose xanthate	Aq. NaOH (1 M)	30	–	290	1380				VG	681
Hyaluronic acid	Aq. HCl (0.1 M)	25	–	–	–	–	2.5	–	VA	688

[a] These values of the characteristic ratio C_∞ of cellulosic chains were obtained by $C_\infty = r_0^2/\text{DP}\,l^2$, where DP is the degree of polymerization and $l = 0.425$ (nm).

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Note: References 508–511 and 575–589 are for biological polymers such as collagen, gelatin and poly(nucleotides), which do not appear in the present tables.

Sedimentation Coefficients, Diffusion Coefficients, Partial Specific Volumes, Frictional Ratios, and Second Virial Coefficients of Polymers in Solution*,**

M. D. Lechner, E. Nordmeier, D. G. Steinmeier
Physical Chemistry, University of Osnabrück, Osnabrück, FR Germany

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* Based on a table in the second edition, by P. E. O. Klärner, and H. A. Ende, BASF AG, Ludwigshafen, Germany.

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A. SEDIMENTATION COEFFICIENTS, DIFFUSION COEFFICIENTS, PARTIAL SPECIFIC VOLUMES, AND FRICTIONAL RATIOS OF POLYMERS IN SOLUTION

(2, 349–357, 799, 800)

1. Introduction

1.1. Sedimentation Coefficient The sedimentation coefficient s is defined as the sedimentation velocity in a unit force field

$$s = (\mathrm{d}r/\mathrm{d}t)/(\omega^2 r) \tag{A1}$$

where r is the distance from center of rotation, and ω, the angular velocity. For a given polymer–solvent system, the sedimentation coefficient is dependent on temperature T, pressure p, and polymer concentration C. Experimentally, sedimentation coefficients can be determined only with an ultracentrifuge.

Concentration Dependence
For polymer solutions studied by ultracentrifugation, the following concentration dependence of the sedimentation coefficient holds:

$$1/s = (1/s_0)(1 + k_s C + k_s' C^2 + \cdots) \tag{A2}$$

where s_0 is the sedimentation coefficient at zero concentration. In Section B the concentration dependence of s according to Eq. (A2) is listed. In some cases, special extrapolation procedures are used. The tables in Section B also refer to the appropriate reference. For special treatments, see, e.g., Gehatia (358,359).

Sector shaped cells are normally used in an ultracentrifuge. In these cells, the square-dilution rule has to be taken into account (360):

$$C_t/C_0 = (r_0/r_t)^2 \tag{A3}$$

where r_0 and r_t are the distances of the meniscus and of the boundary from the axis of rotation and C_0 and C_t the concentrations at zero time and at time t at the boundary, respectively.

Averages of the Sedimentation Coefficient
The average of a function $X(M)$ is defined as

$$X_\beta = \left(\int_0^\infty W(M)M^{\beta-1}X(M)\,\mathrm{d}M\right) \Big/ \left(\int_0^\infty W(M)M^{\beta-1}\,\mathrm{d}M\right) \tag{A4}$$

with $\int_0^\infty W(M)\,\mathrm{d}M = 1$, where $W(M)$ denotes the probability density function (in our case the molar mass distribution). The average with $\beta = 0$ is called the number average X_n, with $\beta = 1$, the mass average X_w, and with $\beta = 2$, the z-average X_z.

In principle it is possible to evaluate the various averages of the sedimentation coefficient from the distribution of the concentration gradient, $\partial C/\partial r$, in the cell:

$$s_\mathrm{n} = M_\mathrm{n} \int_0^\infty W(M)M^{-1}s(M)\,\mathrm{d}M$$
$$s_\mathrm{w} = \int_0^\infty W(M)s(M)\,\mathrm{d}M$$
$$s_\mathrm{z} = (1/M_\mathrm{w}) \int_0^\infty W(M)Ms(M)\,\mathrm{d}M \tag{A5}$$

where $W(M) = C(M)/\int_0^\infty C(M)\,\mathrm{d}M = C(M)/C_0$ is the mass distribution of the polydisperse polymer in the cell and s_n, s_w, and s_z the number average, mass average and z-average of the sedimentation coefficient. In many cases the migration of the maximum of the quantity $\partial C/\partial r$ is determined, which leads to a sedimentation coefficient s_t, that in turn is related, in a complicated manner, to the averages of s in Eq. (A5). Another method of evaluating the sedimentation coefficient is by observing the median, that is the line dividing the gradient curve in two equal areas, yielding a value s_m which is also a rather complicated average. Provided the skewness of the molar mass distribution is not very pronounced, s_w can be calculated by (Ref. 259)

$$s_\mathrm{w} = (3s_\mathrm{m} - s_t)/2 \tag{A6}$$

Most ultracentrifuges measure the refractive index difference between polymer and solvent, dn, or the refractive index gradient $\partial n/\partial r$ versus r (Schlieren optics). With certain assumptions $\partial n/\partial r$ can be related to the concentration gradient (Ref. 14)

$$\partial n/\partial r = R(\partial C/\partial r) \tag{A7}$$

where R is called the specific refractive index increment. The interference optics measure the deflection of the parallel interference lines in the solution. This deflection is directly proportional to the concentration of the polymer.

The absorption optics measure the optical density of the system as a function of the rotor distance, which, according to the Lambert–Beers law is proportional to the concentration of the polymer. The intensity is measured with a photoelectric scanner.

A multiplexer is used in order to measure several concentrations during one run (869–871).

Sedimentation Coefficient – Molar Mass Relationship
The dependence of s on the molar mass can be given by a power law expression:

$$s = K_s M^{a_s} \tag{A8}$$

where K_s and a_s are empirical constants determined for each polymer–solvent system at given values of temperature and pressure. In Section B, relationship (A8) is listed whenever quoted in the literature, in preference to single s values,

Temperature Dependence, Pressure Dependence
Svedberg and Pedersen (2) and Mosimann and Signer (361) derived expressions for the temperature and pressure dependence of the sedimentation coefficient with restricted validity:

$$s/s^\theta = (\eta_1^\theta/\eta_1)(1 - v_2^\theta \rho_1^\theta)/(1 - v_2\rho_1) \tag{A9}$$

where s^θ, η_1^θ, v_2^θ and ρ_1^θ denotes the values at the reference temperature and/or pressure. Equation (A9) holds in the case of an incompressible medium and if no changes of size, shape and solvation state of the dissolved molecules in the temperature and pressure region take place. From these assumptions it may be deduced that Eq. (A9) can be applied with sufficient accuracy only on proteins in aqueous solvents.

Due to the high centrifugal fields applied in the ultracentrifuge, pressure gradients with pressures up to 200 bars are encountered in the cell and change appreciably the viscosity and the density of the solvent and the partial specific volume of the polymer. Thus the sedimentation coefficient, s, measured at a pressure p differs from the sedimentation coefficient, s^0, measured at 0 bar. Application of Eq. (A9) for the calculation of s requires the knowledge of η_1 (362), ρ_1 (given in a number of Handbooks) and v_2 (148). More precise equations for the calculation of the pressure influence on the sedimentation have been worked out by several authors (363,364,365,800). The equation of Oth and Desreux (Ref. 363)

$$s = s^0(1 - \mu p) \tag{A10}$$

has very often been used for the calculation of s^0 (800). The coefficient μ depends on the polymer–solvent system and varies only slightly with pressure.

In Section B, the intrinsic sedimentation coefficient, $[s^0]$, instead of s^0, has been occasionally listed. $[s^0]$ is related to Eq. (9): $[s_0] = s_0\eta_1/(1 - v_2\rho_1)$.

1.2. Diffusion Coefficient

The translational diffusion coefficient D is defined by Ficks' first law:

$$J = -D\nabla C \tag{A11}$$

where J is the flow of substance (total number of particles transported in unit time across unit surface) and ∇C the concentration gradient. For one dimensional diffusion, Eq. (A11) reduces to

$$(1/A)(\partial n/\partial t) = -D(\partial C/\partial r) \tag{A12}$$

where A denotes the area and n the number of moles. The negative sign in Eqs. (A11) and (A12) indicate that diffusion takes place in the direction of decreasing concentration. For practical reasons, Ficks second law is prefered

$$(\partial C/\partial t) = D\Delta C \tag{A13}$$

where Δ denotes the Laplace operator. Eq. (A13) reduces to

$$(\partial C/\partial t) = D(\partial^2 C/\partial r^2) \tag{A14}$$

for the one dimensional case. Eqs. (A13) and (A14) allow the determination of D when solved with consideration to certain initial and boundary conditions.

Experimentally translational diffusion coefficients can be determined with an ultracentrifuge (see Section 1.3) in special diffusion cells using Eqs. (A11)–(A14) (800) and with dynamic light scattering (DLS). Since 1970, when the dynamic light scattering became available, nearly all diffusion coefficients have been measured by this method. Based on the theory of Pecora (853,854), the experimentally measured autocorrelation function $g_2(t)$ is linked with the diffusion coefficient in polymer solutions (Refs. 730,855):

$$\lim_{c\to 0} g_2(t) = A + B\left(M_w^{-1}\int_0^\infty MW(M)p(q,M)\exp(-q^2D(M)t)\mathrm{d}M\right)^n \tag{A15}$$

where $n = 1$ for the heterodyne procedure and $n = 2$ for the homodyne one. Eq. (A15) reduces, in the case of a monodisperse polymer solution, to

$$\lim_{c\to 0} g_2(t) = A + B(p(q,M)\exp(-q^2D(M)t))^n \tag{A16}$$

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A and B are measurable constants. Extrapolation of q against zero yields $P(q, M) = 1$. Note that $g_2(t)$ is the z-average of the function, $\exp(-q_2 D(M)t)$. In this way one obtains the direct measurable quantity D_z from dynamic light scattering on polydisperse polymer solutions.

For polydisperse polymer solutions, Eq. (A16) may be expanded in a series (Ref. 856):

$$\lim_{\substack{C\to 0\\ q\to 0}} g(t) = \exp(-q^2 D_z t)\,(1 + (\mu_2/2!)t^2 - (\mu_3/3!)t^3 + \cdots) \tag{A17}$$

where the moments, μ_i, are related to the molar mass distribution of the polymer (671).

More general methods for the determination of the distribution of the diffusion coefficient and of the molar mass are given elsewhere (857,858).

As has been pointed out, only the translational diffusion coefficient is listed in the tables. For higher modes of the autocorrelation function (e.g. rotation, vibration) see the appropriate literature (853,854).

The entire description of the translational diffusion of a polymer molecule in solution requires the determination of the mutual or cooperative diffusion coefficient, D_m, which characterizes the relaxation of a concentration gradient and the self-diffusion coefficient, D_s, which describes the Brownian or random motions of the polymer molecule (860–863).

$$D_m = (RT/f)\,(1 - v_2\rho_1)\,(1 + 2A_2MC + 3A_3MC^2 + \cdots)$$
$$D_s = RT/f$$

At infinite dilution, $D_m = D_s \times D_m$ is normally measured with classical diffusion cells or dynamic light scattering whereas D_s can be studied by measuring the migration of labeled solute molecules (864), by pulsed field gradient NMR (865), and by forced Rayleigh scattering (866). Normally, D_m is given in the tables. In some cases, especially where D_s is extrapolated to zero concentration, $D_s = D_m$ is given in the tables.

Concentration Dependence

The concentration dependence of the diffusion coefficient may be described as

$$D = D_0(1 + k_D C + k'_D C^2 + \cdots) \tag{A18}$$

where D_0 is the diffusion coefficient at zero concentration. In Section B a concentration dependence of D according to Eq. (A18) is listed. In some cases, special extrapolation procedures are used. In these cases Section B refers to the appropriate references.

Averages of the Diffusion Coefficient

Similar considerations as made on sedimentation coefficients hold for diffusion coefficients. From measurements in a diffusion cell, one obtains the various averages of the diffusion coefficient from the distribution of the concentration gradient, $\partial C/\partial r$, in the cell:

$$D_n = M_n \int_0^\infty W(M)M^{-1}D(M)\,dM$$
$$D_w = \int_0^\infty W(M)D(M)\,dM$$
$$D_z = (1/M_w)\int_0^\infty W(M)MD(M)\,dM \tag{A19}$$

where $W(M) = C(M)/C_0$.

The diffusion cell may be combined in the same manner as in the case of the ultracentrifuge with Schlieren optics, interference optics, and absorbtion optics. In most cases, the mass average and the area average of the diffusion coefficient are determined. They can be calculated with the help of Eqs. (A14) and (A19):

$$D_w = \left(\int_0^\infty r^2(\partial C/\partial r)\,dr\right) \Bigg/ \left(2t\int_0^\infty (\partial C/\partial r)\,dr\right) \tag{A20}$$

$$D_A = \int_0^\infty ((\partial C/\partial r)\,dr)^2/(4\pi t(\partial C/\partial r)_{max})^2 \tag{A21}$$

$(\partial C/\partial r)_{max}$ is the maximum height of $\partial C/\partial r$. The integral in Eq. (A21) is the area of the curve.

As has been pointed out, dynamic light scattering measurements normally yield the z-average of D. Nevertheless it might be possible to determine averages other than D_z with the help of Eqs. (A19) and (A21). In Section B the different averages of D are quoted. In some cases unusual averages are listed. In these cases Section B refers to the appropriate references.

Diffusion Coefficient – Molar Mass Relationship

The diffusion coefficient – molar mass dependence frequently takes the form

$$D = K_D M^{-a_D} \tag{A22}$$

where K_D and a_D are constants for each polymer–solvent system at given values of temperature and pressure. In Section B relationship A(22) is listed whenever quoted in the literature, in preference to single D values.

Temperature Dependence, Pressure Dependence

A similar expression as Eq. (A9) holds under the same restricted conditions for the temperature and pressure dependence of the diffusion coefficient:

$$(D/T)/(D^\theta/T_0) = \eta_1^\theta/\eta_1 \tag{A23}$$

where D^{θ} and η_1^{θ} denote the values at the reference temperature T_0 and/or pressure p_0. As has been pointed out in Eq. (A9), Eq. (A23) can be applied with sufficient accuracy on proteins in aqueous solvents only.

The temperature dependence of the diffusion coefficient is often described by the following exponential function

$$D = D_{\infty} \exp(-E_D/RT) \qquad \text{(A24)}$$

where E_D denotes the apparent activation energy of the diffusion and D_{∞} the diffusion coefficient at the limit $T = \infty$. In Section B we have listed the temperature and pressure dependence of D whenever quoted in the literature.

1.3. Molar Mass Averages Determined from Sedimentation and Diffusion Coefficients For the experimental determination of the molar mass from sedimentation and diffusion measurements, the Svedberg Eq. (A2) is used:

$$M = (s_0/(1/v_2\rho_1))/(D_0/RT) \qquad \text{(A25)}$$

Here s_0 and D_0 are the corrected and standardized coefficients for zero polymer concentration. For polydisperse polymers the various averages of the sedimentation and diffusion coefficient s and D are inserted, obtaining certain molar mass averages $M_{\beta,\gamma}$. Thus Eq. (A25) acquires the more general form:

$$M_{\beta,\gamma} = (s_{0,\beta}/(1 - v_2\rho_1))/(D_{0,\gamma}/RT) \qquad \text{(A26)}$$

For β = n, w, z, ... and γ = n, w, z, ... Eq. (A26) defines several different molar mass averages $M_{\mathrm{n,n}}$, $M_{\mathrm{w,n}}$, $M_{\mathrm{w,w}}$ etc. The averages, $M_{\mathrm{n,n}}$, and $M_{\mathrm{w,w}}$, are different from M_{n} and M_{w} respectively (859). The coefficients with β = n and z and γ = n are determinable only with large error. Instead, the coefficients with $\beta = t$ and m (see under Section 1.1.) and γ = A and w (see under Section 1.2.) are usually evaluated. Thus, rather peculiar averages, e.g. $M_{t,\mathrm{A}}$, $M_{\mathrm{m,w}}$, and $M_{\mathrm{m,A}}$, result. The more straightforward molar mass averages $M_{\mathrm{n,w}}$, $M_{\mathrm{w,w}}$, $M_{\mathrm{z,w}}$, etc., in relation to the familiar averages, M_{n}, M_{w}, and M_{z}, are found elsewhere in the literature (369–371,859).

1.4. Partial Specific Volumes The volume, V^{id}, of an ideal two component system can be expressed in terms of the masses m_1 and m_2 and the specific volumes, v_1^0 and v_2^0, of the two components by the equation

$$V^{\mathrm{id}} = m_1 v_1^0 + m_2 v_2^0 \qquad \text{(A27)}$$

Most components do not behave ideally upon mixing; i.e. they react with each other in a way so that the total volume deviates from V^{id}. The total volume can then be written as

$$V = m_1 v_1 + m_2 v_2; \quad v_i = (\partial V/\partial m_i)_{p,T,m_{j\neq i}} \qquad \text{(A28)}$$

where v_i $(i = 1, 2)$ is the partial specific volume of component i. When component 2 is polymer and component 1 solvent, then, for practical reasons it is convenient to introduce the so-called apparent partial specific volume v_2^* which is defined by

$$V = m_1 v_1^0 + m_2 v_2^* \qquad \text{(A29)}$$

where v_1^0 denotes the specific volume of the solvent. The quantity, v_2^*, now contains the parameter of nonideal mixing of both the solvent and the polymer. In practice, however v_2^* differs not much from v_2 if the polymer concentration is kept low (up to 1%). Dividing Eq. (A29) by the total mass $m_1 + m_2$ leads to

$$v = w_1 v_1^0 + w_2 v_2^* \qquad \text{(A30)}$$

where v is the specific volume of the solution and $w_i = m_i/\sum m_i$ are the mass fractions of the solvent ($i = 1$) and the polymer ($i = 2$).

With $v = 1/\rho$ and $v_1^0 = 1/\rho_1$, ρ and ρ_1 being the densities of the solution and the solvent, respectively, it is readily found that

$$v_2^* = (1/w_2)(\rho_1 - w_1\rho)/(\rho\rho_1) \qquad \text{(A31)}$$

Eq. (A31) demonstrates that v_2^* can be determined by measuring ρ_1 and ρ. Numerous methods for determining densities are described in the literature (268,372–379).

In order to determine the partial specific volume from the apparent specific volume, Eq. (A29) yields

$$(\partial(m_2 v_2^*)/\partial m_2)_{m_1} = m_2(\partial v_2^*/\partial m_2)_{m_1} + v_2^* = (\partial V/\partial m_2)_{m_1} \qquad \text{(A32)}$$

where $(\partial V/\partial m_2)_{m_1}$ is, according to definition, equal to v_2. In terms of mass fractions, Eq. (A32) can finally be written as

$$v_2 = v_2^* + w_1 w_2(\partial v_2^*/\partial w_2) \qquad \text{(A33)}$$

Most values reported in the literature are v_2^*-values rather than v_2-values, since extrapolation according to Eq. (A33) is usually omitted. The differences between v_2^* and v_2 are, however, often small.

1.5. Frictional Ratios The molar frictional coefficient, f_{sp}, of an unsolvated spherical molecule may be computed by the formula based on Stokes law:

$$f_{\mathrm{sp}} = 6\pi\eta R_{\mathrm{H}} N_{\mathrm{A}} = 6\pi\eta[3N_{\mathrm{A}} M v_2/(4\pi)]^{1/3} \qquad \text{(A34)}$$

where η is the viscosity of the solvent and N_{A} is Avogadro's number. When the shape of a molecule deviates from a sphere, or when it is solvated, then the frictional coefficient, f_0, of such a molecule is larger than that of the spherical molecule. The frictional ratio, f_0/f_{sp}, thus permits to draw conclusions concerning either solvation or shape of the

molecule. It is possible to calculate the dimensions of the nonspherical molecule, provided a particular model (ellipsoid, cylinder, etc.) for the molecule is adopted and either the degree of solvation is known or assumed to be negligible. The molar frictional coefficient can be determined either from sedimentation velocity data, provided the molar mass is known from independent measurements according to the Svedberg equation

$$f_0 s_0 = M(1 - v_2\rho_1) \qquad \text{(A35)}$$

or from diffusion measurements, using the relation

$$f_0 = RT/D_0 \qquad \text{(A36)}$$

Eqs. (A34)–(A36) are most frequently used for calculating the frictional ratio. f_0/f_{sp} is listed in the tables. Other relationships for the determination of f_0/f_{sp} are quoted in the literature (2). In these cases special reference to the literature is made in the tables.

In few cases, only the molar frictional coefficient f_0, rather than f_0/f_{sp}, was quoted in the literature. These values are inserted in the same column as the values for the frictional ratio.

1.6. List of Symbols and Abbreviations

Symbols

C	Concentration
C_0	Initial polymer concentration
C_t	Polymer concentration at time t
D	Diffusion coefficient
D_A	Area average of the diffusion coefficient
D_n, D_w, D_z	Number average, mass average, and z-average of the diffusion coefficient
D	Diffusion coefficient at reference temperature and/or pressure
D_0	Diffusion coefficient at zero concentration
η_1	Viscosity of solvent
η_1^θ	Viscosity of solvent at reference temperature and/or pressure
f_{sp}	Molar frictional coefficient of a spherical molecule
f_0	Molar frictional coefficient at zero concentration
k_s, k_s	Concentration coefficients defined by Eq. (A2)
k_D, k_D	Concentration coefficients defined by Eq. (A18)
M	Molar mass of the polymer
M_n, M_w, M_z	Number average, mass average and z-average of the molar mass of the polymer
M	Molar mass determined by Mark–Houwink equation
M_{MW}	Molar mass determined by equations from Mandelkern and Flory, or Wales and Van Holde (see Section 1.7)
$M_{\beta,\gamma}$	Molar mass average determined by Eq. (A26) from $s_{0,\beta}$ and $D_{0,\gamma}$
$M_{s,w}$, $M_{s,A}$, $M_{s,D}$	Molar mass average determined from undefined sedimentation coefficient s and D_w, D_A and undefined diffusion coefficient D, respectively
n	Refractive index or number of moles
ω	Angular velocity
r	Distance from center of rotation
r_0	Distance of meniscus from center of rotation
r_t	Distance of boundary from center of rotation at time t
ρ	Density of solution
ρ_1	Density of the solvent
R	Gas constant
s	Sedimentation coefficient
s_n, s_w, s_z	Number average, mass average, and z-average of the sedimentation coefficient
s_θ	Sedimentation coefficient at reference temperature and/or pressure
s^0	Sedimentation coefficient at pressure $p = 0$ bar
s_0	Sedimentation coefficient at zero concentration
$[s_0]$	Intrinsic sedimentation coefficient (see under Section 1.1)
s_m	Sedimentation coefficient determined from migration of gradient curve median
s_t	Sedimentation coefficient determined from migration of gradient curve maximum
T	Temperature
θ	Theta temperature ($A_2 = 0$)
t	Time
v_i	Partial specific volume of component i ($i = 1$, solvent; $i = 2$, solute)
v_1^0	Specific volume of component i
v_2^*	Apparent specific volume of solute

Abbreviations

A	Archibald method
approx.	approximately
CLS	Classical light scattering method
DLS	Dynamic light scattering method
NBS	National Bureau of Standards, USA (now National Institute of Standard and Technology, NIST)
OS	Osmometry
PCC	Pressure Chemical Co., Pittsburg, PA, USA
RT	Room temperature
SE	Sedimentation equilibrium
SRM	Standard reference material
SV	Sedimentation velocity
TS	Toyo Soda Co., Japan
V	Number of single values given in Ref. cited

1.7. Miscellaneous With certain assumptions it is possible to determine the molar mass from a combination of the intrinsic viscosity $[\eta]$ and the limiting sedimentation coefficient s_0. In this way, Mandelkern and Flory (128) and Wales and Van Holde (134) derived an expression. An expression similar to the equation between M, $[\eta]$, and s_0 was derived between M, $[\eta]$, and D_0 (128). The molar masses determined from either one of these relationships are refered to as MW.

B. TABLES OF SEDIMENTATION COEFFICIENTS, DIFFUSION COEFFICIENTS, PARTIAL SPECIFIC VOLUMES, AND FRICTIONAL RATIOS OF POLYMERS IN SOLUTION

TABLE 1. POLY(ALKENES)

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^{7}$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(ethylene)	1-Bromonaphthalene	110	4.7	1.42						M_v	38
			14.2	2.03							
			21.8	2.39							
			55.0	3.39							
linear	1-Bromonaphthalene	110	3.5–274	$s_0 = 7.74 \times 10^{-15} M^{0.344}$						M_v	38
		120	69	−4.09						M_{MW}	509
			136	−5.14							
branched		120	88	−5.18						M_{MW}	509
linear	1-Chloronaphthalene	120		−1.67						$[\eta] = 51$ cm³/g	27
				−2.37						90	
				−3.31						169	
branched, fractions											
branches per molec.											
1.9				−1.06						$[\eta] = 18$ cm³/g	27
2.6				−1.91						33	
3.0				−2.85						56	
2.9				−2.77						60	
4.6				−3.57						66	
5.7				−4.11						74	
6.4				−4.52						88	
13.7				−7.30						118	
16.1				−7.87						129	
26.3				−11.37						139	
		110							[a]		532
	Diphenyl	123							[a]		
		130	26			9.80				D_A, M_w, D_w given in Ref.	593
			60			6.42					
			79			6.42					
			99			4.73					
			261			3.13					
			493			2.15					
branched	Tetralin	80	25.7			0.87				$D_{0,z}$; $M_w/M_n \cong 3$	619
			503			0.20				$D_{0,z}$; $M_w/M_n \cong 5$	
Poly(1-butene)	Ethyl octanoate	22 ($T=\theta$)	800	1.30	55.5				1.106[b]	M_{MW};	409,410
Poly(isobutene)	Cyclohexane	34 ($T=\theta$)		6.4[c]	721 ± 159					M_v; Oppanol B 100	576
									1.091	M_n	32,621,622
		20	30.9	0.925	54						
			86.7	1.49	128						
			172	1.94	191						
			672	3.33	510						

			1420	4.45	836					
		25	21			6.32	4.8		M_w; $M_w/M_n = 3.2$	620
			78			2.99	41		M_w; $M_w/M_n = 2.1$	
			122			2.26	53		M_w; $M_w/M_n = 2.0$	
			176			1.84	79		M_w; $M_w/M_n = 2.7$	
			490			1.01	167		M_w; $M_w/M_n = 4.5$	
			698			0.79	379		M_w; $M_w/M_n = 5.1$	
			1800			0.43	348		M_w; $M_w/M_n = 10.8$	
	Ethyloctanoate	22	750	1.3	55.5			1.106	s_r	237
	n-Heptane	25	145						M_w; C from 0.53 to 2.95 g/dm^3; M_n, D_A given in Ref.	511
		25	65.2–308			$D_0 = 5.01 \times 10^4\ M^{0.555}$			M_w; CLS	449
	Octane	20.9	52					1.072	M	148
		23.2	1600					1.069		
		20.7	1600					1.075		
		25	1900	5.8					M_w, s^0, $C = 3.461$ g/dm^3; 25V; C from 3.461 to 16.293 g/dm$_3$ p from 0 to 46×10^5 Pa	623
	Tetralin	24	388			0.68			Oppanol B 50; $M_w/M_n = 3.0$	624
	Toluene	24	388			2.7			Oppanol B 50; $M_w/M_n = 3.0$	624
Poly(isobutylene)	Benzene	24.5				$D_0 = 1.27 \times 10^{-8}\ M_w^{-0.48}$;			$M_w/M_n = 1.2$	989
	Chloroform	25				$D_0 = 6.22 \times 10^{-8}\ M_w^{-0.60}$			$M_w/M_n = 1.2$	
	Cyclohexane	25				$D_0 = 1.78 \times 10^{-4}\ M_w^{-0.572}$ $1.33 \times 10^5 \le M_w \le 14.8 \times 10^5$ g/mol		CLS and DLS	990	
	Isoamyl isovalerate (IAIV)	25 ($T = \theta$)	18.1			5.1	−8.7		$M_w/M_n = 1.08$	1050
			48.5			3.1	−16		$M_w/M_n = 1.06$	
			139			1.9	−24		$M_w/M_n = 1.07$	
			422			1.1	−47		$M_w/M_n = 1.09$	
			634			0.86	−64		$M_w/M_n = 1.06$	
			819			0.75	−80		$M_w/M_n = 1.09$	
			1760			0.52	−110		$M_w/M_n = 1.09$	
	n-Heptane	25	18.1			16.3	−1.5		M_w	1050
			48.5			9.5	3.5		M_w	
			139			5.5	13		M_w	
			422			2.8	56		M_w	
			634			2.3	68		M_w	
			819			2.0	88		M_w	
			1760			1.3	180		M_w	
		25				$D_0 = 4.10 \times 10^{-4}\ M_w^{-0.560}$; $0.64 \times 10^5 \le M_w \le 14.8 \times 10^5$ g/mol			CLS and DLS	990
	Isoamyl isovalerate (IAIV)	22.1				$D_0 = 5.94 \times 10^{-5}\ M_w^{-0.493}$; $0.64 \times 10^5 \le M_w \le 14.8 \times 10^5$ g/mol			CLS and DLS	990
		25 ($T = \theta$)	420			1.06			$[\eta] = 70.9$ cm^3/g	1051
			634			0.86			$[\eta] = 88.2$ cm^3/g	
			819			0.75			$[\eta] = 99.8$ cm^3/g	
			1760						$[\eta] = 146$ cm^3/g	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(l-hexene)	Acetone	20	46.8	11.5		16.2				s_t; D_A; $M_{t,A}$	53
			222	21.5		6.4					
			571	33.8		3.0					
		20							0.793		54
Poly(tetrafluoroethylene)	Perfluorotetracosane	325	260			3.66	−35.2				1004
			2100			1.21	−130.0				

[a] See Ref.for various methods applied and values obtained.
[b] Corrected for pressure influence.
[c] See Ref. for def. of s.

TABLE 2. POLY(DIENES)

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(butadiene)	Diethyl ketone	10.3	60	1.76						M_{MW}	590
			187	2.76							
			350	3.45							
			436	4.28							
			778	4.52							
			1380	5.15							
cis-4	Dodecane	80				23.8					625
cis-4	Hexafluorobenzene	80				16.3					625
95%, 1,4 *cis*	Diethylketone	10.3 ($T=\theta$)		$s_0 = 0.53 \times 10^{-15}\ M^{0.5}$						s_n, s_w, s_t, $s_{m,0}$ given in Ref.	574
90%, 1,4 *cis* (TiJ_4)	Hexane/heptane (1/1)	20	55–1080	$s_0 = 2.80 \times 10^{-15}\ M^{0.48}$						$M_{s,D}$	323
90%, 1,4 *cis* (CoCl2)	Hexane/heptane (1/1)		34.7–1040	$s_0 = 2.33 \times 10^{-15}\ M^{0.50}$						$M_{s,D}$	323
cis-4	Hexatriacontan	80				4.78					625
linear	Cyclohexane	25				$D_0 = 1.45 \times 10^{-4}\ M_w^{-0.561}$; $11000 \leq M_w \leq 760000$ g/mol					987
	Dioxane	26.5 ($T=\theta$)				$D_0 = 6.34 \times 10^{-5}\ M_w^{-0.496}$; $11000 \leq M_w \leq 760000$ g/mol					
18-armed star	Cyclohexane	25				$D_0 = 2.39 \times 10^{-4}\ M_w^{-0570}$; $99000 \leq M_w \leq 1900000$ g/mol					
	Dioxane	26.5 ($T=\theta$)				$D_0 = 8.87 \times 10^{-5}\ M_w^{-0.497}$; $99000 \leq M_w \leq 1900000$ g/mol					
Poly(butadiene-*stat*-acrylonitrile)	Methyl ethyl ketone/cyclohexane (47.5/52.5)	22 ($T=\theta$)	34.8–780	$s_0 = 1.28 \times 10^{-2}\ M^{0.5}$		$D_0 = 1.38 \times 10^{-4}\ M^{-0.5}$;				D_A; $M_{s,D}$, k_s given in Ref.	552
	Methyl ethyl ketone/isopropanol (60/40)	20 ($T=\theta$)	475	7.58	19.7					D_A; $M_{s,D}$	552
			205	4.65	16.0						
			101	3.43	20.6						
Poly(butadiene-*co*-styrene)											
branched	Benzene	25	81.9–168	1.21–4.63				0.995 ± 0.005		See Ref.	406
	Methyl *n*-propyl ketone	21 ($T=\theta$)	49–514	$s_0 = 1.04 \times 10^{-15}\ M^{0.5}$							573
21 mass% styrene	Methyl *n*-propyl ketone	21 ($T=\theta$)	49–514	$s_0 = 0.83 \times 10^{-15}\ M^{0.5}$						M_n	344
Poly(chloroprene)	Methyl ethyl ketone	25	56–380	$s_0 = 3.1 \times 10^{-15}\ M^{0.5}$				0.773		M_w; OS; SE	444

Poly(isoprene)										
linear	Carbon tetrachloride	5	5		$D_0 = 10^{-7.73\pm0.08}\ M^{-0.54\pm0.04}$				$M_w/M_n = 1.05-1.11$	626
	Carbon tetrachloride	50	5		$D_0 = 10^{-7.47} \pm 0.05\ M^{-0.61\pm0.01}$				$M_w/M_n = 1.02-1.07$	
4-armed star	Carbon tetrachloride	50	21.2–122		$D_0 = 10^{-7.53\pm0.15}\ M^{-0.57\pm0.03}$				M_w	
18-armed star	Carbon tetrachloride	50	61.7–630		$D_0 = 10^{-7.22\pm0.12}\ M^{-0.61\pm0.03}$				M_w	
3-armed star	Cyclohexane	–	137		2.4	–			$[\eta] = 0.958$ dL/g	988
4-armed star			173		1.87	76.5			$[\eta] = 0.973$ dL/g	
			380		1.20	138			$[\eta] = 1.74$ dL/g	
8-armed star			795		0.91	235			$[\eta] = 1.83$ dL/g	
			1760		0.52	250			$[\eta] = 3.30$ dL/g	
			4400		–	–			$[\eta] = 6.37$ dL/g	
12-armed star			96		–	–			$[\eta] = 0.294$ dL/g	
			810		0.89	–			–	
			3900		0.37	560			$[\eta] = 4.33$ dL/g	
			5280		0.305	331			$[\eta] = 5.63$ dL/g	
18-armed star			93		–	–			$[\eta] = 0.182$ dL/g	
			218		2.4	–			–	
			384		1.88	35			–	
			800		1.06	100			$[\eta] = 1.02$ dL/g	
			1480		0.71	169			$[\eta] = 1.58$ dL/g	
			3570		0.455	303			$[\eta] = 2.90$ dL/g	
natural rubber, crepe	Chloroform	20	270	15.5	2.24		3.32		$M_{s,D}$; Determ. of f_0/f_{sp} see Ref.	337
			485	15.5	1.26		5.10			
			930	27.5	1.16		5.26			
			125		2.63		3.82		M_w; OS; Determ. of f_0/f_{sp} see Ref.	337
			275		1.64		4.71			
			330		1.55		4.67			
			450		1.41		4.64			
			760		1.44		3.82			
	Cyclohexane	20	1600	4.6	0.48				$M_{s,D}$	
			1750	4.76	0.46					
			1800	4.35	0.41					
			1600	4.6	0.48			1.10	s_r; $M_{t,A}$	29
natural rubber	Hexane	20	270	9	3				$M_{s,D}$	337
			1660	21	1.01			1.54		
1,4-*cis*	Hexane	20		$s_0 = 5.01 \times 10^{-15}\ M^{0.45}$	$D_0 = 3.98 \times 10^{-2}\ M^{-0.55}$				$M_{s,D}$	324
1,4-*cis* ($TiCl_4$/AL ($C_7H_{15})_3$)	Hexane	25	460–970	$s_0 = 7.76 \times 10^{-2}\ M^{0.42}$					$M_w/M_n = 1.8-2.9$	627

TABLE 3. ACRYLIC POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Poly(acrylamide)	Water	20	19.4–534	$s_t = 8.17 \times 10^{-15}\ M^{0.31}$		$D_A = 8.46 \times 10^{-4}\ M^{-0.69}$			0.769	D measured in H_2O/KCl (0.2 mol/dm^3); $M_{t,A}$	266,154
			130–8200	$s_w = 1.07 \times 10^{-15}\ M_w^{0.48\pm0.01}$		$D_{z,0} = 1.24 \times 10^{-4}\ M_w^{-0.53\pm0.01}$			0.708	SV; 15V; $M_w/M_n =$ 1.15–1.4	628
		20	5000						0.693	$C = 0.06$, 1.2 g/dm^3	629
			250, 610						0.696	M_w; $M_w/M_n = 1.5$; $C = 5$, 10 g/dm^3	630
	Water/NaCl (0.2 mol/dm^3)	20	250, 610						0.687	M_w; $M_w/M_n = 1.5$; $C = 5$, 10 g/dm^3	630
		20		$s_0 = 8.17 \times 10^{-15}\ M_{s,D}^{0.31}$		$D_0 = 8.46 \times 10^{-4}\ M^{-0.69}$					632
	Water/NaCl (0.5 mol/dm^3)	20	490–5150	$s_0 = 9 \times 10^{-15}\ M_w^{0.32}$						$M_w/M_n = 2.5$	633
		25	8400	$s_0 = 4.9 \times 10^{-15}\ M_w^{0.37}$	1570	0.3	88		0.697	M_w; $D_{z,0}$	631
									0.710		790
	Water/NaCl										
	Water/NaCl (0.1 mol/dm^3)		100–8000	$s_0 = 1.07 \times 10^{-15}\ M^{0.48\pm0.01}$		$D_0 = 1.24 \times 10^{-4}\ M^{-0.53\pm0.01}$					634, 635
	Water/NaCl (0.1 mol/dm^3)		8200							M_w; see Ref. for s_0 and k_s	667
H-acrylamide	Water/NaCl (1 M)	25	2330			0.505					1008
2,3,3-D_3- acrylamide		1710				0.630					
	Water/NaCl (2 g/dm^3)	20	8000			1.6	97			M_w; $D_{z,0}$	634
	Water/NaCl (20 g/dm^3)	20	160			0.14	1370			M_w; $D_{z,0}$	634
	Water/$NaNO_3$ (0.5 mol/dm^3)	25	260			1.29 ± 0.05	72			M_w; $D_{z,0}$	636
			460			1.15 ± 0.10	277			M_w; $D_{z,0}$	636
partially hydrolyzed Pusher 700	Water	26				0.280				D_z; $C = 0.5$ g/dm^3	637
(Dow Chemical)	Water/NaCl (0.1 mol/dm^3)					0.562				D_z; $C = 0.5$ g/dm^3; 4V	
	Water/NaCl (0.2 mol/dm^3)					0.383				D_z; $C = 0.5$ g/dm^3; 4V	
Poly(p-ethoxycarbonyl phenylmethacrylamide)	Acetone		479			7.05				M_w; D_A	267
			575			7.59					
			955			3.90					
			1060			2.52					
	Dimethylformamide		1000			2.18				M_w; D_A	267
	Dimethylformamide/ formamide (90/10)		740			1.16				M_w; D_A	267
			1100			1.11					
	Ethyl acetate		260–740			$D_A = 2.8 \times 10^{-4}\ M_w^{-0.69}$					267
Poly(N-isopropyl- acrylamide)	Water	15	290		99[a]			M_n 0.88[illegible] in chloroform		498	
		20		2.48							
		25	1000	3.04					0.896	M_w in chloroform	
		27.5		3.55							
		30		4.17							
		32		4.76							
		33		5.08						0.902	
Poly(N-isopropyl methacrylamide)	Water	20				$D_0 = 2.02 \times 10^{-4}\ M^{-0.57}$					1005

Poly(*N*-isopropylmethacrylamide-*co*-acrylamide)						
IPAM-100	Deionized water	–	3000	0.490	CLS, DLS	1006
IPAM-85			3100	0.439		
IPAM-70			4500	0.394		
IPAM-55			3900	0.421		
IPAM-40			2200	0.524		
IPAM			5200	0.335		
Poly(acrylamide-*co*-sodium-3-acrylamide-3-methylbutanoate-*co*-(2-(acrylamido)-2-methylpropyl) trimethylammonium chloride)					Terpolymer composition mol%	1023
AM	NaAMB		AMPTAC		AM: NaAMB: AMPTAC	
ATABAM 0.5–0.5	Water/NaCl (1 M)	25	3430	0.498	99 : 0.5 : 0.5	
ATABAM 2.5–2.5			13900	0.313	89.1 : 5.1 : 5.8	
ATABAM 5.0–5.0			3450	0.476	85.9 : 7.9 : 6.2	
ATABAM 10–10			10800	0.264	80.5 : 9.7 : 9.8	
ATABAM 15–15			12200	0.313	74.6 : 11.5 : 14.0	
ATABAM 5.0–10			11200	0.361	75.7 : 13.6 : 10.7	
ATABAM 10–5.0			19400	0.389	85.3 : 4.5 : 10.2	
Poly(acrylamide-*co*-3-(2-acrylamido-2-methylpropane dimethylammonio)-1-propane-sulfonate) (AM-*co*-AMPDAPS)					AMPDAPS in the copolymer mol%	
DAPSAM-1	Water/1 M NaCl	25	3200	0.505	1	1010
DAPSAM-5			12400	0.316	5	
DAPSAM-10-2			700	0.401	9.6	
DAPSAM-10-3			21500	0.320	10	
DAPSAM-25-2			8200	0.397	27.7	
DAPSAM-40-2			15100	0.362	38.9	
DAPSAM-40-3			17500	0.324	40	
DAPSAM-60-2			5400	0.360	58.8	
DAPSAM-75-2			6200	0.490	70.1	
DAPSAM-100			3000	0.628	100	
Poly(acrylamide-*co*-NaAMPS-*co*-AMPTAC)						
ATASAM 0.5–0.5	Water/1 M NaCl	25	6030	0.423	$dn/dC = 0.1426\ cm^3/g$	1022
ATASAM 2.5–2.5			2780	0.577	$dn/dC = 0.1481\ cm^3/g$	
ATASAM 5–5			5070	0.381	$dn/dC = 0.1510\ cm^3/g$	
ATASAM 10–10			5870	0.449	$dn/dC = 0.1395\ cm^3/g$	
ATASAM 15–15			6770	0.433	$dn/dC = 0.1344\ cm^3/g$	
ATASAM 10–5			3880	0.413	$dn/dC = 0.1376\ cm^3/g$	
Poly(NaAMPS-*co*-AMPTAC)					AMPTAC in the copolymer mol%	1021
ATAS-0	Water/1 M NaCl	25	6120	0.387	0.0	
ATAS-10-2			8220	0.419	14.7	
ATAS-25-2			6200	0.473	36.1	
ATAS-40-2			7920	0.385	45.4	
ATAS-50-2			7680	0.463	51.7	
ATAS-70-2			4980	0.406	65.7	
ATAS-100			1470	0.637	100.0	
Poly(1,4-benzamide)	Dimethylacetamide/ 3% (g/mol) LiCl	25	55	$D_0 = 4.38 \times 10^{-4}\ M_w^{-0.82}$		1007
Poly(1,4-phenylene terephthalamide)	96 wt.% H_2SO_4	30	48.3	0.072		
			38.4	0.088		
			22.7	0.113		
			15.9	0.159		

TABLE 3. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
			14.5			0.196					
						$D_{z,0} = 2.72 \times 10^{-5}\ M_w^{-0.77}$					
	96 wt.% H_2SO_4/ 0.05 M K_2SO_4	30	42.6			0.074					
			29.8			0.093					
						$D_{z,0} = 1.51 \times 10^{-5}\ M_w^{-0.72}$					
Poly(*m*-phenylene isophthalamide)	Dimethylacetamide	26	4.2–230	$s_0 = 1.72 \times 10^{-15}\ M_w^{0.44}$		$D_0 = 1.13 \times 10^{-4}\ M^{-0.56}$			0.66	SV	1082
	Dimethylacetamide/ 3% LiCl	25		$s_0 = 0.68 \times 10^{-15}\ M_w^{0.44}$		$D_0 = 0.55 \times 10^{-4}\ M^{-0.56}$			0.71		
Poly(acrylonitrile)	Dimethylformamide	20	78.7	1.72						M_V	569
			67–1030	1.65–4.68						See Ref. for s and M_{MW}	533
		25	48	1.52		3.6			0.83	s_t; D_w, $M_{t,w}$	115
			113	2.08		2.1					
			155	2.36		1.75					
			270	2.95		1.25					
		25	105	2.04					0.830	s_t; M_w	74
			210	2.48							
			16			7.14				D_w; D_n given in Ref.	206
			28			5.72					
			63			5.08					
			193			4.03					
			214			3.91					
		35	28–575			$D_0 = 2.19 \times 10^{-4}\ M^{-0.58}$	$k_D = 2.31 \times 10^{-9} \times D_0^{-1.29}$				201
			980	4.6						$C = 1.5–10\ g/dm^3$	792
	Dimethylformamide/ benzene 30%	RT	320	3.08						$M_{s,n}$	462
	Dimethylformamide/ benzene 37%	RT		7000	138					$M_{s,n}$ calculated from $s_0 = 0.025$	
	Dimethylformamide/ tetrahydrofuran (1/1)		1200	5.78[b]						M_n; $C = 0.648\ g/dm^3$; 5V	638
			210	2.94[b]						M_n; $C = 1.323\ g/dm^3$; 12V	
	Dimethylformamide/methanol		1200	4.03[b]						M_n; $C = 1.270\ g/dm^3$; 4V	
Poly(acrylonitrile-*stat*-styrene)	Butanone		330	12.1						$C = 1.5–10\ g/dm^3$	792
Poly(acrylonitrile-*alt*-styrene)	Butanone		170	10.2						$C = 1.5–10\ g/dm^3$	792
Poly(amidobenzimidazole)	Dimethylacetamide	25	74.7	1.33	537						1046
			72.3	1.32	525						
			63.1	1.28	550						
			55.7	1.25	428						
			46.9	1.11	285						
			39.6	0.99	183						
			27.3	0.93	142						
			10.1	0.80	51						

	Dimethylacetamide/ 0.3% LiCl	25	79.3	1.45	900					
			60.6	1.33	890					
			41.1	1.12	720					
			29.3	0.88	460					
Poly(benzyl acrylate-*co*-methyl acrylate)										
different comp.	Methyl ethyl ketone	20							v_2 and M given	506
Poly(*n*-butyl-acrylate)	Methyl isobutyl ketone	23.3	46					0.944	M_v	148
Poly(*tert*-butyl-acrylate)	Methyl ethyl ketone	25	306	17.7	0.94				M_w; s_0	512
	Acetone			0.207	0.84					
	Methanol			0.237	0.53					
	Pentane			0.266	0.22					
	Methyl ethyl ketone	25	237	0.160	0.88				M_w; s_0	
	Acetone			0.194	0.74					
	Methanol			0.230	0.49					
	Pentane			0.244	0.21					
	Acetone	25	180	0.182	0.64				M_w; s_0	
	Methanol			0.203	0.43					
	Pentane			0.228	0.20					
	Methyl ethyl ketone	25	149	0.139	0.65				M_w; s_0	
	Acetone			0.162	0.55					
	Methanol				0.39					
	Pentane			0.191	0.19					
	Methyl ethyl ketone	25	75	0.109	0.59				M_w; s_0	
	Acetone			0.117	0.32					
	Methanol			0.127	0.22					
	Pentane			0.137	0.13					
Poly(*n*-butyl methacrylate)	Methyl isobutyl ketone	21.2	820					0.922	M_v	148
	Propan-2-ol	21.5	40–8000			$6.3 \times 10^{-5}\ M^{-0.50}$				399
Microgels	Ethyl acetate	20	254			0.174			M_w, $C = 0.1–0.5\ g/dm^3$; see Ref.	646
			254			0.145			M_w, $C = 0.1–0.5\ g/dm^3$; see Ref.	
	Tetrahydrofuran		340			0.181			M_w, $C = 0.1–0.5\ g/dm^3$; see Ref.	
			380			0.191			M_w, $C = 0.1–0.5\ g/dm^3$; see Ref.	
		25		$s_0 = 0.12\ M^{0.31}$						1052
Poly(*tert*-butyl methacrylate)	Butyl acetate	20		$s_0 = 3.02 \times 10^{-5}\ M_w^{0.41}$					$C = 0.5\ g/dm^3$	551
		21				$D_0 = 2.51 \times 10^{-4}\ M_w^{-0.55}$			D_A; $M_{s,D}$ given in Ref.	
Poly(cetyl methacrylate)	Heptane	21		$s_0 = 1.42 \times 10^{-14} \times M^{0.36}$		$D_0 = 1.74 \times 10^{-3}\ M^{-0.64}$			$M_{s,D}$; D_A	560
Poly(cholesteryl acrylate)	Benzene	21	140–780	$s_0 = 1.9 \times 10^{-15}\ M^{0.46}$		$D_0 = 3.2 \times 10^{-4}\ M^{-0.54}$			$M_{s,D}$	580
Poly(2.6-diisopropyl-phenylmethacrylate)	Toluene	25						0.789		1053
Poly(2.6-dimethyl-phenylmethacrylate)	Toluene	25						0.894		1053
Poly(acrylic acid)	Water/NaCl (0.2 mol/dm^3)	20–22[c]	1100		5.6		4.77	0.73	$M_{s,D}$;	555
	(0.02 mol/dm^3)					35.0	20.0			
	(0.012 mol/dm^3)			7.3 ± 0.5	81.0	0.65 ± 0.02[d]	28.2			
	(0.006 mol/dm^3)				114.0		49.0			

TABLE 3. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
	($1.0\ mol/dm^3$)		420		2.4		0.2			$M_{s,D}$	
	($0.2\ mol/dm^3$)				4.2		1.0				
	($0.012\ mol/dm^3$)			6.5 ± 0.5	32.0	1.35 ± 0.05[d]	10.0				555
	($0.006\ mol/dm^3$)				60.0		27.4				
	($0.0012\ mol/dm^3$)						146				
	($1.0\ mol/dm^3$)		70				22.3			$M_{s,D}$	
	($0.2\ mol/dm^3$)				0.0		22.3				
	($0.012\ mol/dm^3$)			2.4 ± 0.1	2.75	3.2 ± 0.1[d]	150				
	($0.006\ mol/dm^3$)				8.0		286				
Poly(ethyl acrylate)	Methyl isobutyl ketone	24.3	34						0.951	M_v	148
	n-Propanol	28	18–155	$s_0 = 1.05 \times 10^{-2} M_n^{0.47}$						M_{MW}	456
Poly(ethyl acrylate-*co*-acrylic-acid)											
sodium salt	Water/NaCl ($0.05\ mol/dm^3$)		185–1300			$D_{o,z} = 5.76 \times 10^{-4}\ M^{-0.65}$				$M_w/M_n = 1.8$–2.3	637
	($0.1\ mol/dm^3$)					$D_{o,z} = 8.55 \times 10^{-4}\ M^{-0.67}$					
	($0.3\ mol/dm^3$)					$D_{o,z} = 3.73 \times 10^{-4}\ M^{-0.59}$					
	($0.5\ mol/dm^3$)					$D_{o,z} = 1.54 \times 10^{-4}\ M^{-0.52}$					
	($0.7\ mol/dm^3$)					$D_{o,z} = 1.41 \times 10^{-4}\ M^{-0.51}$					
	($1.0\ mol/dm^3$)					$D_{o,z} = 1.24 \times 10^{-4}\ M^{-0.50}$					
	($1.2\ mol/dm^3$)					$D_{o,z} = 1.10 \times 10^{-4}\ M^{-0.49}$					
	2-Heptanone					$D_{o,z} = 1.35 \times 10^{-4}\ M^{-0.51}$					
Poly(ethyl acrylate-*co*-methylacrylate)											
different comp.	Methyl ethyl ketone	20								v_2 and M given	506
Poly(ethyl methacrylate)	Acetone	20	77–7440	$s_0 \sim M^{0.43}$		$D_0 \sim M^{-0.57}$		$f_{sp} \sim M^{0.57}$	0.798	$M_{t,A}$	59
			34.1–9350	8.95–120		17.4–0.85			0.798	$M_{t,A}$; s_t; See Ref.	18
									0.7942	extrapolated value	268
			24.6–7440	7.45–107	23–60	20.0–0.95	0–63			$M_{t,w}$; s_t; D_A, See Ref.	52
	Methyl isobutyl ketone	22.9	410						0.863	M_v	148
Poly(isooctyl methacrylate)	(theta-solvent)[e]	25	1036	63.0–67.5					0.900	A[e]	427
			875							$C = 2.5\ g/cm^3$; s_w (Trautmann)	
Poly(phenyl methacrylate)	Toluene	25							0.789		1053
Poly(sulfoalkyl methacrylate)											
alkyl: hexyl	0.1 M NaCl	25	306			1.22	1.54×10^{-4}			$M_w/M_n = 1.5$; $dn/dC = 0.135\ cm^3/g$	100
octyl			494			1.02	1.72×10^{-4}			$M_w/M_n = 2.0$; $dn/dC = 0.140\ cm^3/g$	
decyl			701			1.00	1.99×10^{-4}			$M_w/M_n = 1.8$; $dn/dC = 0.149\ cm^3/g$	
ethyl			734			0.975	2.07×10^{-4}			$M_w/M_n = 2.1$; $dn/dC = 0.170\ cm^3/g$	
Poly(methacrylic acid)	Dimethylsulfoxide	25	34	0.46						M_{MW}	638
			130	1.02							
			260	1.27							
			429	1.66							
			432	1.85							
			381	1.60							

			777	2.80							
			1404	3.02							
Poly(methacrylic acid)	Sodium salt										
	Water/NaCl, $Y^f = 4$	20	237	2.90		1.150				s_t; apparent M	124
	5		339	3.87		1.072					
	7		442	4.36		0.923					
	9		530	4.73		0.838					
	14		690	5.46		0.742					
	19		768	5.66		0.692					
	29		880	6.04		0.643					
	39		943	6.28		0.621					
	49		986	6.43		0.611					
	59		1014	6.50		0.602					
	∞		1112	7.22				3.45		M of uncharged polymer	
	Water/HCl (pH = 2.0)	21.3	62						0.712	M_v	148
	Water/NaOH (pH = 12.0)	21.4	78						0.385	M_v	148
	Water/NaCl (0.01 mol/dm^3)/ NaOH(pH = 12.0)	21.8	78						0.412	M_v	148
Poly(methyl acrylate-*co*-styrene) different comp.	Methyl ethyl ketone	20								v_2 and M given	506
Poly(methyl methacrylate)	Acetone	20	115				10.25	1.19×10^{-5} cm^g		M_{MW}	460
			201	20.3	72	6.8	18	1.97×10^{-5} cm^g	0.789	$M_{t,A}$; s_t; D_A	15
			1380	46.1	224	2.2		5.35×10^{-5} cm^g		$M_{t,A}$; s_t; D_A	15
			6350	88.5	614	0.92		14.1×10^{-5} cm^g		$M_{t,A}$; s_t; D_A	15
		20	65–1980			$D_{0,z} = (8.09 \pm 0.68) \times 10^{-4}\ M_w^{-0.576 \pm 0.006}$				$M_w/M_n = 1.20–1.44$	639
		20	65–1980				−0.41–73.05			$M_w/M_n = 1.20–1.44$; see Ref.	639
		20	16			27.06 ± 0.70	−6.97			$D_{0,z}$; $M_w/M_n = 1.18$	639
		20	29			17.20 ± 0.17	−4.77			$D_{0,z}$; $M_w/M_n = 1.29$	
		25							0.798		1054
		30							0.825		494
	Acetonitrile	38		$s_0 = 18.6 \times 10^{-15}\ M^{0.51}$						See Ref. for range of M_w	570
		44	1.16			101	−0.7			M_w	1057
			1.80			82.1	−2.1			$M_w/M_n = 1.08$ for all	
			2.95			68.0	−3.7				
			4.18			57.5	−3.1				
			7.55			40.8	−3.7				
			10.9			36.4	−4.1				
			20.2			25.6	−5.1				
			35.3			21.0	−8.1				
			74.0			14.3	−11.4				
			119			11.6	−13.2				
			218			8.9	−24.2				
	Acetonitrile-d$_3$		1.1			74.1				NMR-selfdiffusion	1080
	Benzene	20	115				5.05	1.25×10^{-5} cm^g		M_{MW}	460
		25	1.9–77						0.8273–0.8077	M_{MW}; (AIBN) See Ref.	268
		25							0.8069 + 39.4/M	(B_2O_2) See Ref.	268
									0.818		211
		30							0.879		494
	Benzene-d$_6$		1.1			42.8				NMR-self diffusion	1080

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TABLE 3. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
	Butanone	25							0.799		1054
	n-Butyl acetate	25								Value for infinite molar mass	208
	n-Butyl chloride	34.5	65–1980			$D_{0,z} = (3.08 \pm 0.68) \times 10^{-4}\ M_w^{-0.498 \pm 0.007}$				$M_w/M_n = 1.20$–1.44	639
		34.5	65–1980							$M_w/M_n = 1.20$–1.44; see Ref.	639
		34.5	16			22.38 ± 0.01	-6.2			$D_{0,z}$; $M_w/M_n = 1.18$	639
		34.5	29			14.92 ± 0.05	-6.52			$D_{0,z}$; $M_w/M_n = 1.29$	
		35 ($T = \theta$)		40.1	251 ± 53					See Ref. for def. of s	
		35.6	200	15.7	22	7.18	-30	1.65×10^{-5} cm^g	0.82	$M_{t,A}$; s_t; D_A	6,15
			1300	39.1	41	2.91	-55	4.09×10^{-5} cm^g			
			6550	86.0	107	1.15	-35	9.38×10^{-5} cm^g			
		40.8	1.80			62.4	-3.0			M_w	1057
			2.95			51.5	-4.0			$M_w/M_n \approx 1.08$ for all	
			4.18			44.0	-3.8				
			7.55			32.7	-5.1				
			10.9			28.1	-6.1				
			20.2			21.8	-9.0				
			35.3			16.4	-10.7				
			74.0			11.2	-14.6				
			119			9.1	-18.8				
			218			6.8	-22.4				
	Carbon tetrachloride								0.8038	Value for infinite molar mass	268
	Chlorobenzene	25							0.8118	Value for infinite molar mass	268
	Chloroform	25							0.7942	Value for infinite molar mass	268
	Chloroform-d		1.1			46.7				NMR-self diffusion	1080
	Cyclohexanone	25–65	31							See Ref. for D_0 and k_D-values	640
	o-Dichlorobenzene	25							8 0.8187	Value for infinite molar mass	268
	Diethyl ketone								0.8015	Value for infinite molar mass	268
	1,4-Dioxane	25							0.8181	Value for infinite molar mass	268
		25	200	2.11	134			2.17×10^{-5} cm^g		$M_{t,A}$; s_t	15
			1300	4.5	412			6.35×10^{-5} cm^g			15
			6550	8.55	1040			17.6×10^{-5} cm^g			15
	Ethyl acetate								0.7963	Value for infinite molar mass	268
		20	79	7.6	2.5	7.21	0		0.787	$M_{s,0}$; D_w	211
			127	8.8	0.8	5.66	0			$s_0 = -0.06 + 0.026\ M^{0.5}$	
	Ethyl acetate		207	11.7	1.8	4.36					211
			315	14.1	1.9	3.73					

			381	16.3	2.4	3.79					
			473	19.4	5.2	3.38					
			701	21.5	5.2	2.54					
			931	25.0	6.0	2.34					
			180	9.86	0.59					$M_{r,w}$	212
			1965	34.0	3.1						
			18–1965	$s_0 = 1.51 \times 10^{-15}\ M^{0.48}$							
	Methyl ethyl ketone								0.7993	Value for infinite molar mass	268
	Methyl isobutyl ketone	21.8	480						0.816	M_v	148
	Methyl methacrylate		370			1.95	943			M_w; D_z; $M_w/M_n = 2$, $C = 1.34\ g/dm^3$	641
			454			1.51				M_w; D_z; $M_w/M_n = 2$, $C = 0.859\ g/dm^3$	641
	Tetrahydrofuran								0.8085	Value for infinite molar mass	268
			45–448			$D_{0,z} = 2.27 \times 10^{-5}\ M^{0.333}$					642
	Thiophenol	25	107	1.15	87					$s_0 = 1.17 \times 10^{-13}\ M_w^{0.40}$	1056
			260	1.63	126					$k_s = 2.50 \times 10^{-2}\ M_w^{0.69}$	
			265	1.66	150						
			401	2.08	201						
			844	2.56	315						
			1100	3.06	375						
			2140	3.94	615						
			4050	4.88	955						
	Toluene	20	115			5.80		1.19×10^{-5} cm[g]		M_n	460
									0.807	Value for infinite molar mass	268
									0.8101	Value for infinite molar mass	
		25	1400	20.62						M_v	645
	m-Xylene	17	190						0.8063	M_v	148
		22.15	190						0.8019	M_v	
		29.5	190						0.8190	M_v	
		45.0	190						0.8143	M_v	
atactic	Acetone	25	1.83			69.2	−1.6			M_w	1058
			4.18			48.2	−1.8			$M_w/M_n \approx 1.08$ for all	
			7.55			36.5	−2.9				
			20.2			22.4	−1.1				
			50.4			14.3	1.8				
			74.0			11.5	1.9				
			119			9.1	7.4				
			204			6.7	19				
			312			5.5	13				
			482			4.3	29				
			952			2.9	64				
	Acetonitrile	44 ($T = \theta$)	1.83			78.0	−1.7			M_w; $M_w/M_n \approx 1.08$ for all	1058
			4.18			57.5	−3.1				
			7.55			40.8	−3.7				
			20.2			26.9	−6.1				
			50.4			17.6	−8.0				

TABLE 3. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			74.0			14.3	−11				
			119			11.6	−13				
			204			8.9	−16				
			312			7.3	−15				
			482			5.9	−33				
			952			4.2	−38				
isotactic	Acetone	25	3.04			52.4	−1.5			M_w; $M_w/M_n \approx 1.06$ for all	1058
			7.27			34.5	−2.5				
			30.9			16.6	−2.8				
			70.1			10.9	−1.5				
			154			7.1	2.3				
			379			4.3	15				
			686			3.2	37				
			978			2.6	57				
	Acetonitrile	28 ($T=\theta$)	3.04			49.9	−2.6			M_w; $M_w/M_n \approx 1.06$ for all	1058
			7.27			33.0	−4.9				
	Acetonitrile		30.9			16.2	−9.8				
			70.1			10.6	−14				
			154			7.2	−21				
			379			4.6	−36				
			686			3.4	−52				
			978			2.9	−66				
Poly(methacrylic acid)/Poly(vinylpyrrolidone)											
complex	Water	25	1000	24.4						M_{MW}	638
			1384	30.3							
			1324	28.5							
			1313	30.3							
			1262	28.5							
			1335	33.3							
			1136	25.0							
			1138	26.6							
	Dimethylsulfoxide	25	1065	2.63						M_{MW}	638
			936	2.50							
			746	2.30							
			692	2.20							
			536	2.10							
			428	1.79							
			311	1.60							
			130	1.08							
Poly(methyl methacrylate-*co*-ethylene dimethylacrylate)											
randomly branched	Ethyl acetate	20								M_w; see Ref. for polymerization conditions, s_0, k_s and M values	549
	Mesitylene	47 ($T=\theta$)	380	20.7					0.680	M_w (measured in dioxane); $v_2\eta_1$	643
			800	30.8							
			1050	36.0							
			2630	58.6							

		47 ($T=\theta$)	380–2630	$s_0 = 3.1 \times 10^{13}\ M^{0.5}$						M_w	644
	Toluene	25	1000	20.57						M_w	645
			1350	26.39						M_w	
			170	12.6					0.702	M_w; (measured in dioxane); $v_2\eta_1$	643
			51	6.7							
			380	16.6							
			800	24.3							
			1050	26.5							
			2630	42.7							

[a] For all temperatures.
[b] See Ref.
[c] See Ref.
[d] See Ref. for def. of D
[e] See Ref.
[f] Y = total concentration (mol/dm^3) of Na-ions divided by concentration (mol/dm^3) of poly(methacrylic acid).
[g] $f_0' = kT/(D_0\eta_1)$.

TABLE 4. VINYL POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Poly(hydroxyether) composed of 1,4-anhydroerythritol and diglycidyl ether/bisphenol A											
		20	3.1			16				$[\eta] = 8.7\ cm^3/g$	1085
			2.5			13				$[\eta] = 9.9\ cm^3/g$	
			4.9			9.6				$[\eta] = 10.0\ cm^3/g$	
			6.95			8.0				–	
			8.26			7.5				$[\eta] = 11.1\ cm^3/g$	
			11.8			6.7				$[\eta] = 11.9\ cm^3/g$	
			12.3			5.8				$[\eta] = 12.2\ cm^3/g$	
			14.2			5.5				–	
Poly(methoxy ethylene)	Amyl alcohol	23.5	15						0.983	M_v	148
Poly(vinyl acetal)	Toluene	20.9							0.848		148
Poly(vinyl acetate)	Cyclohexanone	23.8	48						0.849	M_v	148
	Diethyl ketone	13							0.821		60
		40							0.833		
	Methyl ethyl ketone	20	17–1200	$s_0 = 9.8 \times 10^{-15}\ M_w^{0.38}$		$D_0 = 7.8 \times 10^{-4}\ M_w^{0.63}$				$M_{t,A}$; s_t; D_A	110,122
	1,2,3-Trichloropropane	13							0.83		60
		40							0.841		
microgels	Methanol	25	2360–17500			$D_{0,z} = 9.78 \times 10^{-5}\ M_w^{-0.478}$				M_w	647
	Methanol	25	31700–422900			0.16				M_w	647
Poly(vinyl alcohol)	Water	20	22.4						0.765		129
			13	0.96		7.46				$M_{t,w}$; s_t	129
			34	1.26		3.77					
			74	1.96		2.68					
			90	1.86		2.16					
				$s_0 = 4.4 \times 10^{-15}\ M^{0.32}$		$D_0 = 5.5 \times 10^{-10}\ M^{-0.68}$			0.765		130
		21.6	21						0.750	M_v	148

TABLE 4. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
		25	8.5	0.61		6.89	228				
			23.3	0.96		3.97	282				
			64.7	1.54		2.3	347	$1.04 \times M^{-0.166}$			119
			167	2.52		1.45	400				
		25	107			3.06	−8			D_A; $M_w/M_n = 1.01$	648
		25	9	1.10		7.56				$M_{s,D}$; s_t; $C = 2–10$ g/dm^3	649
			28	2.13		5.45		4.02			
			130	3.22		2.65		4.39			
			492	4.35		1.75		4.62			
		25	94.5						0.754		650
		25	18			12.3				M_v; $C = 10$ g/dm^3	658
		25	43			9.8				M_v; $C = 10$ g/dm^3	
		30	6.4						0.769	M_v	151
			19.8						0.766		
			54						0.763		
	Water/borax (0.0060 mol/dm^3)	25	94.5						0.767		650
	(0.0100 mol/dm^3)								0.768		
	(0.0149 mol/dm^3)								0.775		
	(0.0299 mol/dm^3)								0.771		
	(0.0498 mol/dm^3)								0.777		
	Water/NaCl (0.2 mol/dm^3)	25		2.14					0.79		152
	D_2O/NaCl (0.2 mol/dm^3)			1.22							
	Water/n-Propanol (10 mass%)	25	9	0.90		5.45				$M_{s,D}$; s_t; $C = 2–10$ g/dm^3	649
		20	1.14	4.10		3.82					
			63	1.82		3.55		3.45			
			200	2.33		2.45		3.22			
	Water/n-Propanol (20 mass%)	25	13	0.63		4.00				$M_{s,D}$; s_t; $C = 2–10$ g/dm^3	649
			30	0.95		2.15		4.00			
			74	1.25		1.65		5.08			
			230	1.45		1.05		5.30			
	Water/n-Propanol (30 mass%)	25	10	0.62		3.25				$M_{s,D}$; s_t; $C = 2–10$ g/dm^3	649
			21	0.92		2.85		3.45			
			74	1.05		1.55		4.25			
			200	1.15		0.85		4.70			
	Water/n-Propanol (35 mass%)	25 ($T = \theta$)	14	0.82		3.25				$M_{s,D}$; s_t; $C = 2–10$ g/dm^3	649
			21	0.92		2.80		3.42			
			76	1.32		1.55		4.15			
			217	1.64		1.05		4.23			
Poly(4-vinylbiphenyl)		25							0.82	See Ref. for solvent	480
Poly(vinyl butyral)	Amyl alcohol	20							0.883	$[\eta] = 122$ cm^3/g	148
Poly(4-vinyl-N-butyl-pyridinium bromide)	Water/NaCl (0.2 mol/dm^3)	20	115	3.0		2.8		2.38	0.77	$C = 1$ g/dm^3	135
		25	25	1.10							131

Poly(*N*-vinylcarbazole)	Benzene	20	4550	33.3			0.786	CLS	457
			847	16.3				CLS	
	Chlorobenzene	23.1					0.793	$[\eta] = 122\ cm^3/g$	148
Poly(vinyl chloride)	Cyclohexanone	23.4	940				0.711	M_v	148
		25					0.6926		602
			19	0.622			0.705	M_n	75
			53	1.075					
			66	1.18					
			120	1.56					
			29–110			a			640
		120	100–180	$s_0 = 2.195 \times 10^{-15}\ M^{0.49}$				M_w	651
	1-Dioxane		39			a			640
	Tetrahydrofuran	20	97–105	7.69–5.32	247–132			M_w; M_{MW} given in Ref.	544
		25					0.7429		181
							0.6951		602
Fractionated			90	6.8				M_w	602
			46	5.41					
			20.2–183	$s_0 = 6.50 \times 10^{-2}\ M^{0.41}$	55			M_v	596
Poly(vinyl chloride-*co*-vinyl acetate)	Cyclohexanone	23.5					0.723	$[\eta] = 72.2\ cm^3/g$	148
Poly(vinyl chloride-*co*-vinylidene chloride)	Cyclohexanone	23.5					0.703	$[\eta] = 77.4\ cm^3/g$	148
Poly(vinyl fluoride)	Dimethylformamide/LiBr (0.1 mol/dm^3)	100	114–521	$s_0 = 0.101 \times M^{0.40}$				M_n; M_{MW}	421
			143–654	$s_0 = 9.29 \times 10^{-2}\ M^{0.4}$			0.72	s_0 from $s_0 = s(1 + 1.66[\eta]C)$; M_{MW}	441
Poly(vinyl methyl ether) See Poly(methoxy ethylene)									
Poly(1-vinyl-naphthalene)	Toluene	25					0.82		480
Poly(2-vinyl-naphthalene)	Toluene	25					0.84		480
Poly(vinylpyridine)	Ethanol	25	97	3.6	179		0.682	M_{MW}; Ref. 134	132
			430	6.45	629		0.689		
Poly(vinyl sulfonic acid)	Sodium salt					21.3	0.410	s_i; See Ref. for *M* and *D*	116
	Water/NaCl (0.5 mol/dm^3)	20	3	1.57		15.0	0.428		
			5	1.96		11.0	0.430		
			9	2.32		9.75	0.424		
			12.5	2.94		5.95	0.408		
			29.5	4.27		6.40	0.424		
			29.5	4.46					
Poly(vinyl trimethylsilane)	Cyclohexane	RT	500			1.0 (1.04)		$M_w/M_n = 1.4–2.1$; $C = 0.5\ g/dm^3$	652
		25		$s = 1.02 \times 10^{-15}\ M_w^{0.43}$					761
						$D = 2.4 \times 10^{-4}\ M_w^{-0.57}$			
Poly(vinylpyrrolidone)	Methanol	25	23	3.41		9.60	0.730	$M_{l,D}$; SV	150
			20				0.776		144
	Water	20	500				0.783		144
			12–74	$s_0 = 8.81 \times 10^{-16}\ M^{0.50}$	$D_0 = 1.0 \times 10^{-4}\ M^{0.50}$			$M_{l,A}$; D_A	143,144

TABLE 4. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
			13–41.5	0.82–1.42		7.55–4.14		1.70–2.11	0.802	s_t; 7V; see Ref. for M and D v_2 at 24.85°C; D_A given in Ref.	40
			94.5	10	1.17	1.17		1.66		$M_{t,A}$; s_t; D_A	153
			2700	12.20	0.50	0.50				$M_{t,A}$	
			10.6	0.85	8.66	8.66				$M_{s,D}$; $C = 50\%$	178
			42	1.66	4.31	4.31		2.12		$M_{s,D}$; $C = 5\%$	178
			86	1.94	2.44	2.44		2.94		$M_{s,D}$; $C = 5\%$	178
unfractionated									0.775		178
		23.1	29						0.781	M_v	148
		25							0.820		150
			ca. 32						0.780	M_{MW}	487
			30	20					0.784		144
			50						0.801		144
	Water/CaBr (1 mol/dm^3)	20	24.5			5.5				$C = 10\,g/dm^3$	611,613
	Water/KBr (1 mol/dm^3)		24.5			4.78				$C = 10\,g/dm^3$	611,613
	Water/LiBr (1 mol/dm^3)		24.5			4.06				$C = 10\,g/dm^3$	611,613
	Water/$MgBr_2$ (1 mol/dm^3)		24.5			4.01				$C = 10.03\,g/dm^3$	611,613
	Water/NaCl (0.2 mol/dm^3)		12	1.0				1.46		$M_{t,A}$	144
			25	1.43	68						144
			39.2	1.59	85			2.09			144
			55.6	1.76				2.38			144
			310	4.77	391						144
			584	7.13				2.81			144
			1129	7.13	720			4.36			144
			1900	12.5	1310						144
			3420	16.7	1630						144
				$s_0 = 8.81 \times 10^{-16}\,M^{0.5}$							144
(Luviskol K 30)	Phosphate buffer (0.1 mol/dm^3; pH = 7)	20	945	7.15						$M_{t,A}$; s_t	153
	Water/NaSCN (0.6 mol/dm^3)	25							0.772	M_{MW}	487
	Water/Na_2SO_4 (0.2 mol/dm^3)								0.771	M_{MW}	487
	Water/NaAc (0.1 M)	25		$s_0 = 2.14 \times 10^{-15}\,M^{0.42}$		$D_0 = 2.42 \times 10^{-4}\,M^{-0.58}$				$M_w > 4 \times 10^4$ g/mol	1059
				$s_0 = 1.15 \times 10^{-15}\,M^{0.48}$		$D_0 = 1.29 \times 10^{-4}\,M^{-0.52}$				$M_w \leq 4 \times 10^4$ g/mol	

[a] See Ref.

TABLE 5. STYRENE POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(styrene)-poly(dimethylsiloxane)											1064
	THF	25	46.8			7.28	19			PS : $M_w = 32100$ g/mol	
	7.5 vol% PDMS/THF	25	46.8			1.32	36			PS : $M_w = 32100$ g/mol	
	15 vol% PDMS/THF	25	46.8			0.72	8.4			PS : $M_w = 32100$ g/mol	
Poly(styrene)-*b*-poly(ethylene/propylene)											1067
	2-Pentanol	25	105			7.03				$[\eta] = 16.2$ cm³/g	
	5% 2-Pentanol/5-methyl-2-hexanone	25	105			7.10				$[\eta] = 15.5$ cm³/g	
	10% 2-Pentanol/5-methyl-2-hexanone	25	105			6.96				$[\eta] = 13.6$ cm³/g	
	15% 2-Pentanol/5-methyl-2-hexanone	25	105			6.73				$[\eta] = 12.9$ cm³/g	
Poly(*o*-chlorostyrene)	Benzene	30							0.792		585
Poly(*p*-chlorostyrene)	Benzene	30							0.797		585
Poly(*p*-isopropyl-α-methylstyrene)	Toluene	21.5	18–625			$D_z = (5 \pm 2) \times 10^8\ M_w^{(-0.61 \pm 0.04)}$				M_w; $M_w/M_n = 1.1$–3.1; $C = 0.01$–0.3 g/dm³	653
		21.5	18–625			$D_z/K^{LN} = (4 \pm 2) \times 10^{-8}\ M_w^{(-0.57 \pm 0.03)}$				M_w; corrected for polydispersitiy (Log–Norm distribution)	653
Poly(α-methylstyrene) narrow distribution	Benzene	30	48.4–1670	$s_0 = 3.61 \times 10^{-15}\ M^{0.43}$						M_w from SE,LS; k_s, D_0, k_D given in Ref.	522
		30	8.64			19.88 ± 0.28				M_w (CLS); $M_w/M_n = 1.59$; $D_{z,0}$	654
			32.7			10.65 ± 0.11	4.67 ± 1.98			M_w (CLS); $M_w/M_n = 1.22$; $D_{z,0}$	
			91.7			6.02 ± 0.02	14.5 ± 0.4			M_w (CLS); $M_w/M_n = 1.03$; $D_{z,0}$	
			145.3			4.80 ± 0.05	20.8 ± 1.4			M_w (CLS); $M_w/M_n = 1.04$; $D_{z,0}$	
			394.6			2.74 ± 0.12	52.2 ± 1.0			M_w (CLS); $M_w/M_n = 1.26$; $D_{z,0}$	
			976.4			1.58 ± 0.07	101.4 ± 1.6			M_w (CLS); $M_w/M_n = 1.10$; $D_{z,0}$	
			100–1000			$D_{z,0} = (5.24 \pm 0.48) \times 10^{-4}\ M^{(0.59 \pm 0.01)}$				M_w (CLS); $M_w/M_n = 1.1$–1.6	654
	Chloroform	21	500			3.1				M_w; D_w	558
Poly(α-methylstyrene)	Cyclohexane	20				$D_z = 4.78 \times 10^{-5}\ M_w^{-0.425}$				$1.03 \leq M_w/M_n \leq 1.15$	1070
		28				$D_z = 6.49 \times 10^{-5} M_w^{-0.425}$				$1.03 \leq M_w/M_n \leq 1.15$	1070
		32	110–3280	$s_0 = 1.67 \times 10^{-15}\ M_w^{0.5}$		$D_0 = 1.36 \times 10^{-8}\ M_w^{-0.5}$				$M_z/M_w = 1.04$–1.2	657
		34.5	204			3.00					655
			204	8.06	20			$f_0 = 1.78 \times 10^{-5}$ cm		M_w; f_0 η_1	656
			444	11.7	36			2.60×10^{-5} cm			
			768	16.5	38			3.41×10^{-5} cm			
			1190	21.6	91			3.87×10^{-5} cm			
			1820	24.3	68			5.21×10^{-5} cm			
			3300	33.0	119			7.03×10^{-5} cm			

TABLE 5. STYRENE POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
			7470	49.8	134			10.6×10^{-5} cm			
			204–7470	$s_0 = 1.8 \times 10^{-15}\ M_w^{0.5}$					0.886		656
narrow distribution	Cyclohexane	39	48.4–1670	$s_0 = 2.0 \times 10^{-15}\ M^{0.5}$						M_w (SE); k_s given in Ref.	522
		35 ($T = \theta$)	37–627	$s_0 = 1.72 \times 10^{-15}\ M^{0.49}$						M_w; A; M_n given in Ref.; s_m	321
			730	13.89						s_0	616
			1520	19.47						M_w	
		37		$s_0 = 1.86 \times 10^{-15}\ M_w^{0.5}$				$f_0 = 4.1 \times 10^{-8}\ M_w^{0.5}$ cm		M_w; D_0 given in Ref.	68
		38.2		$s_0 = 1.93 \times 10^{-15}\ M_w^{0.5}$					0.889	M_w dep. of k_s given in Ref.	594
		35–125	6500							$C = 16.4$ g/dm^3; see Ref. for s_0-values	550
		39	42.7–1430	$s_0 = 2.0 \times 10^{-15}\ M^{0.5}$	$k_s = 6.2 \times 10^4\ M^{0.5}$					M_w; pressure dep. of s given in Ref.	601
		39	42.5–1170	$s_0 = 2.04 \times 10^{-15}\ M_w^{0.50}$					1.886	M_v; CLS; k_s given in Ref.	472
	trans-Decalin	9.5 ($T = \theta$)	204	1.74	29			$f_0 = 1.62 \times 10^{-5}$ cm		M_w; $f_0\ \eta_1$	656
			444	2.42	27			2.47×10^{-5} cm			
			768	3.40	38			3.12×10^{-5} cm			
			1190	4.41	62			3.72×10^{-5} cm			
			1820	5.15	57			4.82×10^{-5} cm			
	trans-Decalin	3300	6.85	89				$f_0 = 6.65 \times 10^{-5}$ cm			
			7470	10.6	106			9.73×10^{-5} cm			
			204–7470	$s_0 = 3.9 \times 10^{-16}\ M_w^{0.5}$					0.894	M_w; s_0	656
		20	1190	4.98	109			$f_0 = 4.19 \times 10^{-5}$ cm		M_w; $f_0\ \eta_1$	656
			1820	5.71	137			5.53×10^{-5} cm			
			3300	7.41	178			7.82×10^{-5} cm			
			7470	11.4	353			11.5×10^{-5} cm			
									0.892		
		40	204	2.71	45			$f_0 = 1.99 \times 10^{-5}$ cm		M_w; $f_0\ \eta_1$	656
			444	3.38	82			2.95×10^{-5} cm			
			768	5.26	134			3.68×10^{-5} cm			
			1190	6.41	167			4.91×10^{-5} cm			
			1820	7.41	207			6.43×10^{-5} cm			
			3300	10.3	356			8.74×10^{-5} cm			
			7470	14.3	628			13.8×10^{-5} cm			
									0.892		
	Toluene	25	42.5–1170	$s_0 = 3.01 \times 10^{-15}\ M^{0.44}$					0.873	M_n; A; LS	472
		35	19.8	11.37						M_v	616
			40.1	17.78						M_v	
		25–120	6500	2.38–8.0						$C = 16.4$ g/dm^3; see Ref. for s_0-values	550
		37	20	$s_0 = 4.02 \times 10^{-15}\ M_w^{0.43}$						M_w; D_0 and f_0 given in Ref.	68
		25	8.64			19.55±0.18	1.12 ± 0.30			M_w; (CLS) $M_w/M_n = 1.59$	654
			32.7			10.67 ± 0.05	4.63 ± 0.30			M_w; (CLS) $M_w/M_n = 1.22$	

			91.7			6.10 ± 0.02	13.5 ± 0.4			M_w; (CLS) $M_w/M_n = 1.03$	
			145.3			4.76 ± 0.07	19.7 ± 2.4			M_w; (CLS) $M_w/M_n = 1.04$	
			394.6			2.77 ± 0.02	46.0 ± 1.8			M_w; (CLS) $M_w/M_n = 1.26$	
			792.9			1.80 ± 0.02	88.9 ± 4.9			M_w; (CLS) $M_w/M_n = 1.20$	
			976.4			1.61 ± 0.02	105.3 ± 7.2			M_w; (CLS) $M_w/M_n = 1.10$	
			100–1000			$D_{z,0} = (5.24 \pm 0.48) \times 10^{-4}\ M^{-0.59 \pm 0.01}$					654
			204	6.76	91			$f_0 = 2.25 \times 10^{-5}$ cm		M_w; $f_0\ \eta_1$	656
			444	9.26	167			3.49×10^{-5} cm			
			768	12.0	247			4.78×10^{-5} cm			
			1190	15.1	353			6.04×10^{-5} cm			
			1820	17.2	457			7.81×10^{-5} cm			
			3300	22.7	743			10.9×10^{-5} cm			
			7470	33.8	1450			16.5×10^{-5} cm			
			204–7470	$s_0 = 3.6 \times 10^{-15}\ M_w^{0.43}$							
Poly(α-methylstyrene-*block*-butadiene)	Toluene								0.873		656
Poly(α-methylstyrene-*stat*-butadiene) different comp.	Cyclohexane	37								s_0 and M_v given in Ref.	567
Poly(styrene)	Acetone	20	1200–2450	11.9–16.7		1.18–0.80				s_t; D_w; $M_{t,w}$	50
		25							0.899	Extrapolated value	263
	Benzene	20	150						0.911	M_n; $M_w = 450.10$	606
		25								See Ref. for v_2	532
		25	9.2								480
			1.32			27.9					180
			1.95			25.0					
			2.8			21.1					
			3.9			17.2					
		25	10.6			11.7				SV; M_w	150
			67	2.5		4.1					
			606	7.14		1.50					
		25							0.91		150
	Benzene	25	∞						0.9175		268
			1.18–520	$s_0 \sim M^{0.47}$		$D_0 \sim M^{0.53}$					43
			2.3–222						0.9078–0.9177	M_{MW}; $v_2 = v_{2,\infty} - 23/M$; B_2O_2	268
NBS 705		35	179			3.29	22			M_w; D_A	577
NBS 419			411			1.57	59			M_w; D_A	577
Styron 683-7			277			3.26	45			M_w; D_A	577
						$D_0 = 3.05 \times 10^{-4}\ M^{-0.55}$				577	
		40	4000	19.89	100.4				0.917	M_w; CLS	172
PCC		25	392, 1700							M_w; see Ref. for s_0 and k_s	793
four branched star		25	312, 2210							M_w; see Ref. for s_0 and k_s	793
			140	4.3						$C = 1.5–10$ g/dm^3	792
		25	24.8			12.4 ± 0.1				D_z; $C = 1.5–89$ g/dm^3	661
			86.6			5.7 ± 0.1				D_z	
			162			3.6 ± 0.1				D_z	
			411			2.5 ± 0.1				D_z	
			1110			1.1 ± 0.1				D_z	

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
			4330			0.6 ± 0.1				D_z	
			88700			0.7 ± 0.1				D_z	
		30	79.8			5.18 ± 0.02	15.44			M_w; $D_{z,0}$	659
		30	775			1.41	120			$M_w/M_n = 1.01$	660
			2420			0.745	310			$M_w/M_n = 1.04$	
			5530			0.512	490			$M_w/M_n = 1.04$	
			9700			0.353	640			$M_w/M_n = 1.03$	
			13400			0.284	740				
four branched star	Benzene	20	24–3800			$D_{z,0} = (2.18 \pm 0.32) \times 10^{-4}\ M_z^{-(0.55 \pm 0.02)}$				M_w; $M_w/M_n = 1.13$	662
		25	785			1.30	150			M_w; $M_w/M_n = 1.01$	663
			24–24000			$D_{z,0} = (2.18 \pm 0.32) \times 10^{-4}\ M_z^{-(0.55 \pm 0.02)}$				M_w; $M_w/M_n = 0.02–1.2$; k_s given in Ref.	664
PCC, 4b		20	117			4.17				M_w; D_z; $C = 4$ g/dm^3	
PCC, 1c			186			3.26					
PCC, 3b			372			2.29					
PCC, 13a			596			1.92					
PCC, 4b	Benzene/cyclohexane	20	117			4.23				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(90/10)		186			3.42					
PCC, 3b			372			2.30					
PCC, 13a			596			1.84					
PCC, 4b	Benzene/cyclohexane		117			4.14				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(80/20)		186			3.33					
PCC, 3b			372			2.27					
PCC, 13a			596			1.80					
PCC, 4b	Benzene/cyclohexane		117			4.15				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(70/30)		186			3.26					
PCC, 3b			372			2.24					
PCC, 13a			596			1.74					
PCC, 4b	Benzene/cyclohexane		117			4.15				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(60/40)		186			3.37					
PCC, 3b			372			2.26					
PCC, 13a			596			1.82					
PCC, 4b	Benzene/cyclohexane		117			4.18				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(50/50)		186			3.24					
PCC, 3b			372			2.15					
PCC, 13a			596			1.69					
PCC, 4b	Benzene/cyclohexane		117			3.96				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(40/60)		186			3.12					
PCC, 3b			372			2.25					
PCC, 13a	Benzene/cyclohexane (40/60)		596			1.75					
PCC, 4b	Benzene/cyclohexane		117			3.86				M_w; D_z; $C = 4$ g/dm^3	665
PCC, 1c	(30/70)		186			2.96					

PCC, 3b			372			2.00				
PCC, 13a			596			1.75				
PCC, 4b	Benzene/cyclohexane		117			3.64			M_w; D_z; $C=4$ g/dm^3	665
PCC, 1c	(20/80)		186			2.88				
PCC, 3b			372			1.99				
PCC, 13a			596			1.57				
PCC, 4b	Benzene/cyclohexane		117			3.39			M_w; D_z; $C=4$ g/dm^3	665
PCC, 1c	(10/90)		186			2.64				
PCC, 3b			372			1.88				
PCC, 13a			596			1.48				
	Benzene/methanol (1/3.27 vol)	25						0.660		150
	Benzene/propane-2-ol	25.5 ($T=\theta$)	33			8.2			M_w; $D_{z,0}$	666
	(64/36)		111			4.14	−21.0			
			180			3.367 ± 0.012	−31.6 ± 1.2			
			392			2.266 ± 0.006	−34.4 ± 0.6			
			670			1.751 ± 0.007	−45.0 ± 1.0			
			860			1.512 ± 0.014	−48.7 ± 2.6			
			1000			1.411 ± 0.001	−5.03 ± 0.8			
			1800			1.065 ± 0.004	−58.4 ± 1.0			
			2050			0.942 ± 0.006	−64.6 ± 1.7			
			33–2050			$D_{z,0} \sim M^{-0.497\pm0.006}$			M_w; $D_{z,0}$	666
Poly(styrene)	Benzene	25	5.0			10.4			DLS	1038
			10.0			7.5	2		DLS	
			17.5			5.1	3		DLS	
			35.5			3.5	7		DLS	
			50.0			2.8	10		DLS	
Polyscience	Bromobenzene		10.000						M_w; see Ref. for s_0 and k_s	667
Waters			3800						M_w; see Ref. for s_0 and k_s	667
	Butanone	20	110	7.13					CLS; M: av. of 6 obs.	11
			331	13.41					CLS; M: av. of 6 obs.	
			985	26.0					CLS; M: av. of 6 obs.	
			720	23.8					CLS; M: av. of 6 obs.	
			528	18.4		3.25			M_w; s_t; D_A	3
			250	12.6	73					125
			550	18.2	130					
			800	21.3	170					
			1300	26.0	230					
			90	12		12	1.38		$M_{w,w}$; s_w; D_w	126
			180	21		6.4	2.05			
			750	21		2.6	3.18			
			960	22		2.04	3.75			
			1700	31		1.70	3.71			
			2800	45		1.48	3.59			
			3400	30		0.83	6.05			

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			5000	45		0.84	5.24				
			5500	48		0.81	5.25				
			450	17.9		3.4				D_A; av. of 4 obs.	4
						3.75				D_w;	4
			528					$f_0 = 3.12 \times 10^{-5}$ cm		$f_0 = kT/(D_0\,\eta_1)$	3
		23.4	1800			1.56				CLS	568
	Butanone	25				$D_0 = 3.1 \times 10^{-4}\ M^{-0.53}$				CLS	568
	2-Butanone	25				$D_z = 4.58 \times 10^{-4}\ M_w^{-0.55}$				$3.7 \le M_w \times 10^{-4} \le 302$	1071
										$1.03 \le M_w/M_n \le 1.15$	1071
		30	238			5.13	5.89			DLS	995
			426			3.83	13.4			DLS	
			1210			2.21	55.3			DLS	
			3850			1.19	140			DLS	
			5470			0.976	140			DLS	
PCC, 4b, 13a, 61208	Butanone		110, 670, 950							M_w; See Ref. for D_0 and k_D	897
		25	20.8–1700			$D_{z,0} = (3.1 \pm 0.2) \times 10^{-4}\ M^{(-0.53 \pm 0.02)}$				M_w	669
PCC		20	100–1800			$D_{z,0} = 4.1 \times 10^{-4}\ M^{-0.54}$				M_w; $M_w/M_n \le 1.06$; 4V	670
PCC-1c		21–2	200			5.86 ± 0.06				M_w; $M_w/M_n = 1.04$; $D_{z,0}$	671
NBS 705			190			5.66 ± 0.09				M_w (SE); $M_w/M_n \le 1.11$; $D_{z,0}$	
PCC-50124			254			4.89 ± 0.06				M_w; $M_w/M_n \le 1.17$; $D_{z,0}$	
NBS 706			288			4.37 ± 0.03				M_w (SE); $M_w/M_n \le 2.1$; $D_{z,0}$	
blend			233			5.22 ± 0.06				M_w; (DLS); $M_w/M_n \le 1.4$; $D_{z,0}$	
		25	5400–15300			$D_{w,0} = 5.5 \times 10^{-4}\ M_w^{-0.561}$				M_w; $M_w/M_n = 1.3–1.6$; 4V	672
PCC, 2b		25	20.8			22.5 ± 1.0	-25 ± 5			M_w; $M_w/M_n = 1.06$;	673
PCC, 7b			33			16.0 ± 0.6	-26 ± 5			M_w; $M_w/M_n = 1.06$; $D_{z,0}$	
PCC, 4b			111			8.1 ± 0.3	-11 ± 4			M_w; $M_w/M_n = 1.06$; $D_{z,0}$	
PCC, 1c			200			5.95 ± 0.1	-2 ± 3			M_w; $M_w/M_n = 1.06$; $D_{z,0}$	
PCC, 3b			392			3.95 ± 0.15	9 ± 4			M_w; $M_w/M_n = 1.1$; $D_{z,0}$	
PCC, 5a			507			3.30 ± 0.10	19 ± 4			M_w; $M_w/M_n = 1.2$; $D_{z,0}$	
PCC, 13a			670			2.9 ± 0.1	27 ± 4			M_w; $M_w/M_n = 1.1$; $D_{z,0}$	
PCC, 14b			2700			1.30 ± 0.03	72 ± 5			M_w; $M_w/M_n = 1.3$; $D_{z,0}$	
JVC, 7M			8700			0.70 ± 0.03				M_w; $M_w/M_n = 1.3$; $D_{z,0}$	
		25	20.8–8700			$D_{z,0} = (5.5 \pm 0.2) \times 10^{-4}\ M_w^{-0.561 \pm 0.005}$				M_w; $M_w/M_n = 1.06–1.3$	673
PCC, 2b		25	21			22.5				M_w; $M_w/M_n = 1.06$	674
PCC, 4b			110			7.90				M_w; $M_w/M_n = 1.06$	
PCC, 1c			200			5.96				M_w; $M_w/M_n = 1.06$	
PCC, 13a			670			2.95				M_w; $M_w/M_n = 1.15$	
PCC, 14b			270			1.37				M_w; $M_w/M_n = 1.3$	
		25	10000			0.62 ± 0.01				M_w	675
		25	∞						0.9078	Extrapolated value	268
			325–2800	$\log s_0 = 17.845 + 0.455 \log M_w$						$[s_0] = 1.385 \times 10^{-2} s_0^0$	169

NBS 706		25	257.8			3.88			M_w; CLS	571
NBS 705			179.3			5.4			M_w; CLS	571
Waters sample W-61970			2145			1.62			M_w; CLS	571
						$D_0 = 1.96 \times 10^{-4}\ M^{-0.49}$				571
		25 ($T = \theta$)	127	35.76–37.82					For solvents See Ref.; s_w; A; $C = 2$ g/dm^3	427
		27	82	9.8	43	9.4	−86		M_n; D_w; $D_w = k\ M_{t,w}^{-0.53}$	12
			140	13.3	48	5.14	−12			
		25		$s_0 = 4.62 \times 10^{-15}\ M^{0.452}$	$0.107\ M^{0.55}$				$M_w/M_n = 1.6$–2.3	745
					$k_s = 8.08 \times 10^{-2}\ M^{0.70}$					
		25	107			7.44	5		M_w; $M_w/M_n = 1.01$; D_A; $C = 15.1$ g/dm^3	648
			45–448			$D_{z,0} = 5.85 \times 10^{-4}\ M^{-0.58}$			M_w; DLS	642
						50			M_w; $D_{z,0}$; $C = 7.9$ g/dm^3	716
			2.2			6.18			M_w; $D_{z,0}$; $C = 1.7$ g/dm^3	
	Butanone	27	480	20.0	111	3.32	49			12
			770			2.51	0			
			1100	25.0	175	2.64	40			
	Butanone/butanol (74/26)	25	200							169
			372.5	18.05						
			830	26.6	123				M_w; CLS	
			1065	32.0	162					
			2300	47.1	272					
	Butyl acetate	25	∞					0.9162		268
	Carbon tetrachloride	23	600			1.0			M_w; $D_{z,0}$; k_D given in Ref.	677
		24	2880			0.7			DLS; $M_w/M_n = 1.09$	991
		25	10000			0.179 ± 0.012			M_w; $D_{z,0}$	676
		25						0.931	A. Paar Digital Densitometer	1060
		25	2000			0.63			M_w; $M_w/M_n < 1.3$; $C = 20$ g/dm^3; 3V	799
		27	82			4.43	−1.31[a]		M_n; D_w	12
			140			2.27	0[a]			
			480			1.41	0[a]			
			1100			1.04	0.5[a]			
								0.9087	Extrapolated value	268
						$D_w = k\ M_{t,w}^{-0.59}$				12
		30	79.8			3.70 ± 0.2	38.92		M_w; $D_{z,0}$	659
	Chlorobenzene	25	∞					0.9207	Extrapolated value	268
		25						0.912		1060
	Chloroform	20	250	9.2	180					125
								0.908		5
		25						0.924		1060
			550	13.1	320					
			800	15.4	400					
			1300	17.8	500					
			540	−15.1		(1.84)	$f_0 = 3.86 \times 10^{-5}$ cm		s_f; M_w; $f_0 = kT/(D_{0.1})$	3
standard sample no. 706		21	278			5.8			M_w; D_w	558
		25						0.9100	Extrapolated value	268
			115–2800	$\log s_0 = 17.992 + 0.415 \log M_w$					$[s_0] = -1.595 \times 10^{-2}\ s_0$	268

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
PCC, 4b		22	110			6.1				M_w; $M_w/M_n = 1.06$	678
		21	500	−12.30	330					M_w; flotation	748
			5000	−20.80	690						
			13300	−27.10	950						
			16400	−33.3	1420						
	Cyclohexane	25	∞						0.9293	Extrapolated value	268
			181–1040	$s_0 = 3.85 \times 10^{-15}\ M_w^{0.42}$						$M_{s,d}$	605
		28	180			ca. 2.2				M_n	414
		30	180			ca. 2.5				M_n	414
			90			4.0				$C = 17.8$ g/dm³	587
			237			ca. 3.1				$C = 1.47$–17.9 g/dm³	587
		34 ($T=\theta$)	1150	16.9[b]	72 22					M_v	576
		34.5 ($T=\theta$)	0.37			67.4	−1.03			$M_w/M_n \approx 1.02$	1069
			0.58			58.2	−1.67			$M_w/M_n \approx 1.02$	
			0.90			43.1	−1.91			$M_w/M_n \approx 1.02$	
			1.78			32.9	−3.45			$M_w/M_n \approx 1.02$	
			3.48			21.7	−3.78			$M_w/M_n \approx 1.02$	
			10.1			13.0	−6.07			$M_w/M_n \approx 1.02$	
			40.0			6.58	−10.0			$M_w/M_n \approx 1.02$	
			191.0			3.04	−21.7			$M_w/M_n \approx 1.02$	
			732.0			1.57	−38.9			$M_w/M_n \approx 1.02$	
			1320.0			1.17	−68.4			$M_w/M_n \approx 1.02$	
		35.1 ($T=\theta$)	702			1.69				DLS	1061
			2300			0.93				DLS	1061
	Cyclohexane	35	32–1640							M_w $f_0 = kT/(D_0\eta_1)$ given in Ref.	6
			540	12.1		1.92		$f_0 = 2.95 \times 10^{-5}$ cm		M_w; $f_0 = kT/(D_0\eta_1)$	3
									0.934		5
			11.4–1040	$s_0 = 1.69 \times 10^{-15}\ M^{0.48}$						M_w; A	107
				$s_0 = 1.35 \times 10^{-15}\ M_w^{0.51}$		$D_0 = 1.21 \times 10^{-4}\ M_w^{-0.49}$					96
			4000	28.1	5.06				0.928	M_w; CLS	172
										See Ref. for v_2	532
Styron 683–7			125			3.86	−7			M_w; M_n given in Ref.; D_w	592
						2.71					592
NBS 705						3.19	5			D_w	592
						2.88				D_A	592
			309	8.43						M_n	486
			975	16.2					0.943		
			4900	34.5							
Styron 683-7		35	277			3.86	−6			M_w; D_A	577
NBS 705			179			3.19	−4			M_w; D_A	
NBS 419			411			2.67	−4			M_w; D_A	
				$s_0 = 1.50 \times 10^{-15}\ M^{0.5}$		$D_0 = 1.21 \times 10^{-4}\ M^{-0.5}$				M_w; dep. of k_s given in Ref.	594
			194–929	$s_0 = 1.50 \times 10^{-15}\ M^{0.5}$		0.928				$M_{s,D}$	605
			150						0.933	M_n; $M_w = 450.000$	606

Waters sample no. 25170			13	51	2.28	−4.3			M_{MW}; $M_w = 51.000$, $M_n = 49.000$	543
		16		2.42	−1.4					
		22		2.61	−0.8					
		28		2.88	5.8					
		35		3.26	12.1					
		32	1500	16.8	24				M_{MW}	
		34		17.2	46					
		36		17.6	71					
		38		18.0	86					
		40		18.6	105					
		42		19.0	125					
		28–40	180			ca. 2.9			M_n	414
		45	4000	29.0	1570			0.934	M_w (CLS)	172
		55	4000	34.0	3570			0.936	M_w (CLS)	172
		35	79.8			4.61 ± 0.2	−17.62			659
		35	498			1.5			M_w; D_z; see Ref. M_n	679
		35	179, 1050						M_w; D_z given in Ref.	679
		35	179			3.23 ± 0.02			M_w; $M_w/M_n = 1.06$; $D_{z,0}$;k_D	680
		38				3.37 ± 0.05			Given in Ref.	680
		40.4				3.64 ± 0.01				
		45				3.83 ± 0.04				
		55				4.61 ± 0.08				
		45	900			1.49 ± 0.02				
		55				1.83 ± 0.03				
		35 ($T = \theta$)	4100–48000			$D_{z,0} = 1.39 \times 10^{-4}\ M^{-0.5}$			M_w	681
		40	200			2.9			M_w $C = 10$ g/dm^3	682
NBS 705		35	179.3			2.62			M_w; $M_w/M_n = 1.07$; D_z	684
Waters sample no. 25167				867			1.20		M_w; $M_w/M_n = 1.12$; D_z	
Waters sample no. 61970				2145			0.80		M_w; $M_w/M_n = 1.21$; D_z	
			4500			0.34			M_w; D_z; $C = 5.4$ g/dm^3	
PCC, 4a		34.5 ($T = \theta$)	97	4.64 ± 0.04	19 ± 1.5				M_w; $M_w/M_n = 1.06$	685
PCC, 1a			160	5.93 ± 0.03	21.5 ± 1				M_w; $M_w/M_n = 1.06$	
PCC, 1c	Cyclohexane		190	6.44 ± 0.03	26 ± 1				M_w; $M_w/M_n = 1.06$	685
PCC, 3a			410	9.68 ± 0.08	38 ± 4				M_w; $M_w/M_n = 1.06$	
PCC, 6a			860	14.05 ± 0.08	58 ± 4				M_w; $M_w/M_n = 1.15$	
			1800						$M_w/M_n = 1.20$	
			97–1800	$s_0 = (1.51 \pm 0.02) \times 10^{-15}\ M^{0.5}$						
				$s_0 = (0.062 \pm 0.003)\ M^{0.5}$					M_w; $M_w/M_n = 1.15$	
		35.4	233	7.3					M_w	
TS-6			422	9.7					M_w	686
PCC, 60914			600	11.6					M_w; $M_w/M_n = 1.04$	
TS-8			1260	18.2					M_w; $M_w/M_n = 1.1$	
TS-34			3840	29.4					M_w; $M_w/M_n = 1.05$	
TS-31			8420	40.8					M_w; $M_w/M_n = 1.05$	
TS-33			20600	66.7					M_w; $M_w/M_n = 1.19$	
			233–20600	$s_0 = (1.50 \pm 0.01) \times 10^{-15}\ M^{0.5}$					M_w	686
				$s_0 = (0.052 \pm 0.010)\ M^{0.5}$						
PCC, 4b, 13a, PS-705; F-4		35	110–4100			$D_{z,0} = (1.38 \pm 0.04) \times 10^{-4}\ M^{-0.5}$			M_w; $M_w/M_n =$ 1.06–1.15, k_s given in Ref.	687

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
		35 ± 0.2	110–4100			$D_{z,0} = (1.38 \pm 0.04) \times 10^{-4}\ M^{-0.5}$				M_w; M_w/M_n = 1.06–1.15, k_s given in Ref.	688
PCC		35.4	230	7.3 ± 0.2						M_w; $C = 2.5$ g/dm^3; s_0 given in Ref.	689
		28	230	7.2 ± 0.2						M_w	689
SRM 1478		35	37.4						0.9320 ± 0.0007		690
		35	51 ± 2.5			2.07 ± 0.02				M_w; $M_z/M_w < 1.1$; D_z	691
			410 ± 20			5.86 ± 0.22				M_w; $M_z/M_w < 1.1$; D_z	
			186 ± 10			2.56 ± 0.07				M_w; $M_z/M_w = 1.87$; D_z	
			254 ± 13			2.56 ± 0.03				M_w; $M_z/M_w = 1.24$; 0.05; D_z	
PCC		10	37			3.69				M_w; M_w/M_n = 1.06; $D_{z,0}$	692
		15				4.08					
		20				4.51					
		30				5.44					
		35 ($T = \theta$)				5.01					
		40				6.36					
		50				7.27					
PCC		15	110			ca. 2.51				M_w; M_w/M_n = 1.06; $D_{z,0}$	692
		20				2.78					
		30				3.38					
		35 ($T = \theta$)				3.69					
		40				3.97					
		50				4.57					
		60				5.17					
		70				5.91					
		80				6.67					
		90				7.47					
		100				8.28					
PCC		20	350			1.72				M_w; M_w/M_n = 1.1; $D_{z,0}$	692
		30				1.99					
		35 ($T = \theta$)				2.12					
		40				2.26					
		50				2.61					
		60				2.96					
		70				3.36					
		80				3.80					
		90				4.25					
		100				4.77					
PCC		35 ($T = \theta$)	37–350			$D_{z,0} = (1.24 \pm 0.05) \times 10^{-8}\ M_z^{-0.498 \pm 0.02}$				M_w; M_w/M_n = 1.06–1.1; $D_{z,0}$	692
PCC	Cyclohexane	35	670			1.66				M_w; $D_{z,0}$; C = 4.2–79.9 g/dm^3	795
PCC		35	107–775	$s_0 = 1.49 \times 10^{-15}\ M^{0.5}$		$D_{z,0} = 1.40 \times 10^{-4}\ M^{-0.5}$				M_w; C = 0.9–8.08	694

									g/dm^3; 7V; corrected for polydispersity	
		35 ($T=\theta$)	2.41 ± 0.20			2.43 ± 0.05			M_w; M_z/M_w = 1.61 ± 0.05; D; $C = 2$ g/dm^3	695
			2.45 ± 0.26			2.46 ± 0.09			M_w; M_z/M_w = 1.59 ± 0.19; D; $C = 2$ g/dm^3	
PCC, 4b		20	117			3.14			M_w	665
		37	250			2.25			M_w; D_z; $C = 10$ g/dm^3	693
			269			1.95			M_w; D_z; $C = 10$ g/dm^3	
		35	670						D_z given in Ref.	796
Styron 683-7		35	340	7.14	24	3.69	−8.4		M_w; M_n = 111000; $D_{w,0}$; see Ref.	797
			265	7.76		3.23	−5.4		M_w; M_n = 182000; $D_{w,0}$; see Ref.	
			425	9.23		3.07	−7.1		M_w; M_n = 202000; $D_{w,0}$; see Ref.	
			365	8.25		3.35	−9.4		M_w; M_n = 168000; $D_{w,0}$; see Ref.	
		35 ± 0.1	4100–48000			$D_{z,0} = 1.39 \times 10^{-4}\ M^{-0.5}$			M_w; M_w/M_n = 1.02–1.17	696
						$D_z = D_{z,0} - 7.76 \times 10^9\ C$				696
		34.5	98	4.64 ± 0.04					M_w; $M_w/M_n \leq 1.06$; pressure dependence of s_0 given in Ref.	697
			160	5.93 ± 0.03						
			190	6.44 ± 0.03					M_w; $M_w/M_n \leq 1.06$	
			411	9.68 ± 0.08					M_w; $M_w/M_n \leq 1.06$	
			860	14.05 ± 0.08					M_w; $M_w/M_n \leq 1.15$	
		35						0.934		743
		34.5 ($T=\theta$)	238			2.74	−22.0		DLS	995
			426			2.09	−26.6		DLS	
			1210			1.24	−48.6		DLS	
			3850			0.67	−50.0		DLS	
			5470			0.58	−85.6		DLS	
		44.5	238			3.22	−10.6		DLS	
			426			2.46	−8.3		DLS	
			1210			1.42	1.21		DLS	
			3850			0.75	8.67		DLS	
			5470			0.612	43.5		DLS	
TS-32	Cyclohexane	35.6	6770	38.02					M_w; $M_w/M_n = 1.14$	698
		38.7		38.06						
TS-31		35.6	8420	41.19					M_w; $M_w/M_n = 1.17$	
		36.6		40.79						
		39.0		40.70						
TS-33		35.6	20600	64.36					M_w	
		36.6		64.75						
		38.0		63.19						
		39.0		61.75						
		35.4	100–20600	$s_0 = 1.50 \times 10^{-15}\ M^{0.50}$					M_w	

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TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
NBS-705		35	179							M_w;$M_w/M_n = 1.07$; $D_{z,0}$, k_D given in Ref.	700
PCC, 8a		35	10.3							M_w; $M_w/M_n = 1.06$; $D_{z,0}$, k_D given in Ref.	700
		30	37			6.4 ± 0.02				M_w; $M_w/M_n = 1.03$; $D_{z,0}$; DLS	701
		20.3 ($T = T_c$)	85	3.00					0.9214	M_w; $M_w/M_n \leq 1.06$; T_c critical temp.	702
		34.5 ($T = \theta$)		3.7					0.9285		
		24.3 ($T = T_c$)	140	4.96		0.9280			0.9225		
		34.5 ($T = \theta$)		5.0		0.9219					
		27.0 ($T = T_c$)	320	7.60		0.9260					
		34.5 ($T = \theta$)		8.8		0.9195					
		30.0 ($T = T_c$)	700	12.60		0.9220					
		34.5 ($T = \theta$)		12.0		0.9179					
		31.0 ($T = T_c$)	1100	13.20		0.9200					
		34.5 ($T = \theta$)		14.2						M_w	702
		34.5 ($T = \theta$)	85–1100	$s_0 = 1.58 \times 10^{-15}\ M^{0.49}$		4.33	−4			M_w; $M_w/M_n = 1.01$; D_A; $C = 15.3$ g/dm^3	648
F 10		35	107			2.81	−8			M_w; $M_w/M_n \approx 3$; D_A; $C = 13$ g/dm^3	
Styron 683-7		35	302			6.10				M_w; $M_w/M_n \leq 1.06$; s_0	703
PCC, 7a		34.5	51	3.28		4.50					
Waters, 41995			98.2	4.66		4.03			0.936		
PCC, 4b			110	5.09		3.36					
NBS-705			183	6–33		2.33			0.936		
PCC, 3b			390	9.26		2.26					
Waters, 25166N			470	9.34		2.20					
Water, 25166			411	9.62		2.05					
PCC, 5a			498	11.16		1.64					
Waters, 25167			867	13.64		1.12				M_w; $M_w/M_n = 1.2$; s_0	703
PCC, 14a		34.5	1800	19.41		1.09					
Waters, 61970			2145	19.41		$D_{z,0} = (1.388 \pm 0.42) \times 10^{-4}\ M^{-0.5}$				M_w; $M_w/M_n = 1.2$	704
		34.5	51–2145	$s_0 = (1.514 \pm 0.077) \times 10^{-15}\ M^{0.5}$							
					$k_s = (0.65 \pm 0.17)$						
		34.5	1.2			35.0	−2.0			DLS	993
			3.1			22.3	−2.8			DLS	993
			4.0			19.45	−3.9			DLS	993
			10.7			12.30	−5.7			DLS	993
			30.2			7.31	−10.8			DLS	993
PCC, 2b		35	21			8.97	−9			M_w; $M_w/M_n < 0.06$; DLS	674
PCC, 4b			110			4.20	−18			M_w; $M_w/M_n < 0.06$; DLS	
PCC, 1c			200			3.05	−16			M_w; $M_w/M_n < 0.06$; DLS	
PCC, 13a			670			1.66	−34			M_w; $M_w/M_n < 0.15$; DLS	
PCC, 14b			2700			0.84	−56			M_w; $M_w/M_n < 0.3$; DLS	
			21–2700			$D_{z,0} = (1.3 \pm 0.2) \times 10^{-4} \times M_w^{-0.497 \pm 0.006}$				M_w; $M_w/M_n = 1.6$–2.3; DLS	674

			21–2700	$s_0 = 1.46 \times 10^{-15} M^{0.501}$			$k_D = (4.1 \pm 0.3) \times 10^{-4} \times M_w^{048 \pm 0.04}$		
					$k_s = 5.69 \times 10^{-2} M^{0.50}$				
		35	500	11.50	40			M_w; $M_w/M_n = 1.6–2.3$	745
	Cyclohexane		5000	24.40	104			M_w	748
			16400	50.00	150				
linear, S102		35	84	4.29				M_w; s_D corrected for pressure influence	683
linear, PS100f2			116	4.94					
linear, S108			238	7.66					
linear, PS800f2			675	12.2					
linear, PS1000f2			1700	20.15					
star		35	960			1.66 ± 0.04	-4100 ± 400	M_w; $D_{z,0}$; DLS	719
branched		34.5	980			1.63		$M_w/M_n = 1.17$	994
branched			1730			1.28		$M_w/M_n = 1.24$	
branched			2390			1.09		$M_w/M_n = 1.19$	
branched			4780			0.767		$M_w/M_n = 1.06$	
branched			14300			0.509		$M_w/M_n = 1.03$	
branched		44.5	980			1.82			994
branched			1730			1.37			
branched			2390			1.18			
branched			4780			0.860			
branched			14300			0.569			
branched, 4-armed stars, S131A		35	50.7	3.38				M_w; s_0	683
branched, 4-armed stars, S121A			93.5	4.72					
branched, 4-armed stars, S111A			154	6.17					
branched, 4-armed stars, S161A			351	9.34					
branched, 4-armed stars, S141AA			521	12.0					
branched, 4-armed stars, S181A			1027	16.2					
branched, 4-armed stars, S191A			1390	18.7					
branched, 6-armed stars, HS061A		35	110	5.51				M_w; s_0	683
branched, 6-armed stars, HS051A			1090	17.4					
Comb, C612		35	475	10.8				M_w; s_0	683
Comb, C622			624	13.7					
Comb, C632			913	17.4					
Comb, C642			1630	25.0					
Comb, C652			3130	35.6					
Comb, C732			1530	20.6					
Comb, C742			2230	26.5					
Comb, C752			3620	36.3					
		35		$s_0 = 1.49 \times 10^{-15} M_w^{0.5}$				s_0	683
PCC, 3b		35	392					M_w; $M_w/M_n \leq 1.10$ s_0 and k_s given in Ref.	793
PCC, 14a			1700					M_w; $M_w/M_n \leq 1.20$	793
branched, 4-armed stars			312					M_w; $M_w/M_n \leq 1.15$	793
			2210					M_w; $M_w/M_n \leq 1.2$	
branched, 3-armed stars			12.4			11.73		M_w;D_z	705
			920			1.47			
			1190			1.28			
branched, 12-armed stars			55			6.61			
			149			4.04			
			467			2.42			

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			808			1.85					
			1110			1.61					
			1690			1.35					
branched, 18-armed stars			8770			0.621					
branched, 9-armed stars		35	950			1.66 ± 0.04	− 41 ± 4			M_w; $D_{z,0}$	706
PCC	Cyclohexanone	25	200			5.2				M_w; $M_w/M_n \leq 1.06$	624
PCC, 4b	Cyclopentane	5	111	8.07	2.0 g/g					M_w; $M_w/M_n \leq 1.06$	707
		11		8.40	10.9 g/g						
		15		8.84	16.1 g/g						
		20		8.90	17.1 g/g						
		30		9.94	22.9 g/g						
		40		11.03	27.0 g/g						
PCC, 2b		20 ($T=\theta$)	20.8	3.97	9.7 g/g					M_w; $M_w/M_n \leq 1.06$	707
PCC, 3b		20 ($T=\theta$)	392	16.12	36.5 g/g					M_w; $M_w/M_n \leq 1.10$	707
PCC, 61208		20 ($T=\theta$)	900	26.60	64.9 g/g					M_w; $M_w/M_n \leq 1.10$	707
		20 ($T=\theta$)	20.8–900	$s_0 = 8.7 \times 10^{-14}\ M_w^{0.50}$							707
					$k_s = 1.9\ M_w^{0.50}$						707
TS-12		20 ($T=\theta$)	4480	34.85						M_w; $M_w/M_n \approx 1.14$; $C = 4.448$ g/dm³; 4V	708
PCC		20.4 ($T=\theta$)	110			5.91				M_w; $M_w/M_n \approx 1.06$; D_z $C = 0.55$ mass%; 6V	756
		24.8				4.54				D_z; $C = 5.95$ mass%; 3V	
		29.0				5.27				D_z; $C = 5.95$ mass%; 3V	
		34.0				6.13				D_z; $C = 5.95$ mass%; 3V	
Polym. Soc. (Japan), stand. sample	*trans*-Decalin	18.2	150			0.85				M_n; D_A; D_w; M_w; M_{MW} given in Ref.	502
		30				1.16					
		40				0.93					
		50				1.43					
		60				1.52					
		70				1.82					
		80				1.96					
		90				2.69					
		100				3.30					
		110				3.59					
		18.2	450			0.69				M_n; D_A; D_w; M_w; M_{MW} given in Ref.	502
		40				0.76					
		60				1.10					
		80				1.45					
		110				2.23					
		27	770	2.73	73	0.50	− 15			M_n; D_w	12
TS, F80		20.4 ($T=\theta$)	775			0.5223	− 38.8 ± 2.4			M_w	709
TS, FF33			2420			0.3035	− 82.2 ± 7.3				
TS, FF35			5530			0.1935	− 104 ± 11				
TS, FF36			9700			0.1458	− 119 ± 19		0.13	M_w	
		20.4	775–9700			$D_0 = (4.60 \pm 0.08) \times 10^{-5}\ M^{-0.5}$			0.43 ± 0.02	M_w	710
		25 ($T=\theta$)	1800	5.43						M_w; $M_w/M_n \approx 1.20$	711

		20	390	2.34	27.3				M_w; $M_w/M_n \le 1.10$	712
		25		2.60	58.8					
		30		2.78	65.6					
		35		3.06	79.1					
		40		3.34	94.9					
NBS-705		20	179.3			1.11	1.72×10^{-5}		M_w; $M_w/M_n = 1.07$, $D_{z,0}$, DLS; f_0/η_0	713
		30				1.33	1.77×10^{-5}			
		40				1.59	1.82×10^{-5}			
		20.5 ($T=\theta$)	37			6.95			M_w; $M_w/M_n = 1.06$; $D_{z,0}$; DLS	714
			180			3.13			M_w; $M_w/M_n = 1.06$; $D_{z,0}$; DLS	
			670			1.65			M_w; $M_w/M_n = 1.15$; $D_{z,0}$; DLS	
			1260			1.172			M_w; $M_w/M_n = 1.05$; $D_{z,0}$; DLS	
	trans-Decalin		2880			0.736			M_w; $M_w/M_n = 1.09$; $D_{z,0}$; DLS	714
			5050			0.566			M_w; $M_w/M_n = 1.02$; $D_{z,0}$; DLS	
		20.5 ($T=\theta$)	37–5050			$D_{z,0} = 1.309 \times 10^{-4}\ M_w^{-0.5}$			M_w; $M_w/M_n =$ 1.02–1.15; DLS	
PCC, 3b		20	390			0.70		0.9259	M_w; 10V; $C = 0\text{–}84.5\ \mathrm{g/dm^3}$	724,725
		25						0.9282		
		30				0.86		0.9308	M_w; 9V; $C = 0\text{–}86.7\ \mathrm{g/dm^3}$	
		35						0.9336		
		40				1.01		0.9357	M_w; 9V; $C = 0\text{–}83.0\ \mathrm{g/dm^3}$	
	Dibutyl phthalate	25	680						M_w; $D_{z,0}$; DLS	715
		120								
	o-Dichlorobenzene	25	∞					0.9289	Extrapolated value	268
	Dichloroethane	21	500	−4.26	292				M_w; flotation	748
			5000	−8.35	880					
			13300	−13.30	1330					
			16400	−16.70	1960					
	Diethyl ketone	25	∞					0.9106	Extrapolated value	268
	Dimethylformamide	21	500	3.60	103				M_w	748
			5000	6.70	167					
			13300	7.70	190					
	Dioxane	25						0.930		1060
	1,4-Dioxane	50	2			27.7			Taylor dispersion method	1062
			4			19.8				
			9			14.9				
			17.5			9.9				
			50			5.8				
			100			4.1				
		75	2			41.8				
			4			30.0				
			9			21.3				
			17.5			14.1				

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
			50			8.2					
			100			5.9					
		95	2			52.7					
			4			39.1					
			9			28.0					
			17.5			18.4					
	1,4-Dioxane	95	50			10.8				Taylor dispersion method	1062
			100			7.6					
		105	2			59.5					
			4			44.1					
			9			32.5					
			17.5			20.9					
			50			12.4					
			100			8.7					
	Dioxane	25	∞						0.9270	Extrapolated value	268
		30	79.8			3.10 ± 0.2	13.7			M_w; $D_{z,0}$; DLS	659
	Epichlorohydrin	21	500	−1.97	145					M_w; flotation	748
			5000	−3.85	460						
			13300	−7.15	1160						
			16400	−11.10	2170						
	Epichlorohydrin/ dimethyl maleate (1.3/1.0 mol/mol)		500	−1.35	36					M_w; flotation	748
			5000	−2.63	97						
			13300	−3.03	168						
			16400	−5.26	278						
	Ethyl acetate	25	∞						0.9132	Extrapolated value	268
		27				2.64	12			M_n; D_w	12
PCC, 4b		20	117			6.23				M_w; D_z	665
PCC, 1c			186			5.05					
PCC, 3b			372			3.31					
PCC, 13a			596			2.45					
	Ethyl acetate/ cyclohexane (90/10)	20	117			6.05				M_w; D_z	665
			186			4.54					
			372			3.21					
			596			2.38					
	Ethyl acetate/ cyclohexane (80/20)	20	117			5.81				M_w; D_z	665
			186			4.55					
			372			3.05					
			596			2.45					
	Ethyl acetate/ cyclohexane (70/30)	20	117			5.73				M_w; D_z	665
			186			4.36					
			372			2.89					
			596			2.20					

	Ethyl acetate/ cyclohexane (60/40)	20	117			5.28			M_w; D_z	665
			186			4.11				
			372			2.76				
			596			2.15				
	Ethyl acetate/ cyclohexane (50/50)	20	117			4.95			M_w; D_z	665
			186			3.92				
			372			2.53				
			596			1.99				
	Ethyl acetate/ cyclohexane (40/60)	20	117			4.72			M_w; D_z	665
			186			3.68				
			372			2.39				
			596			1.92				
	Ethyl acetate/ cyclohexane (30/70)	20	117			4.27			M_w; D_z	665
			186			3.54				
			372			2.31				
			596			1.81				
	Ethyl acetate/ cyclohexane (20/80)	20	117			4.08			M_w; D_z	665
			186			3.09				
			372			2.10				
			596			1.53				
	Ethyl acetate/ cyclohexane (10/90)	20	117			3.69			M_w; D_z	665
			186			2.73				
			372			1.79				
			596			1.49				
	Ethyl benzene	27	770	9.5	3.55	0.96	130		M_n; D_w	12
		30	42.5–1430	$s_0 = 3.28 \times 10^{-15} M^{0.42}$					M_v; 12V; k_s given in Ref.	612
		130							D given in Ref.	794
	Ethyl *n*-butyrate	25						0.919		1060
	Mesitylene	25						0.9260	Extrapolated value	268
	Methylethylketone	25						0.919		1060
	Methyl isopropyl ketone	20	94–1200	7.2–34		6.95–2.5			7V; s_t; $D_A = D_w$; $M_{t,w}$	66
	Nitrobenzene	25						0.904		1060
	Tetrahydrofuran	25	3840			0.682	571		$M_w/M_n = 1.04$	992
			5480			0.531	1114		$M_w/M_n = 1.15$	992
			8420			0.432	1071		$M_w/M_n = 1.17$	
			20000			0.241	1501		$M_w/M_n = 1.20$	
	Tetrahydrofuran	25						0.9102	Extrapolated value	268
linear		25	10.5			15.8	8		$M_w/M_n = 1.15$	996
			45.0			8.1	20		$M_w/M_n = 1.19$	
			79.5			6.15	38		$M_w/M_n = 1.08$	
			182.0			3.95	46		$M_w/M_n = 1.10$	
						$D_0^{\text{linear}} = (1.40 \pm 0.20) \times 10^{-4} M_w^{-0.48 \pm 0.02}$				
cyclic			11.1			6			$M_w/M_n = 1.20$	
			37.8			14			$M_w/M_n = 1.21$	
			79.4			20			$M_w/M_n = 1.14$	

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			181.5			27				$M_w/M_n = 1.11$	
						$D_0^{\text{cyclic}} = (2.40 \pm 0.17) \times 10^{-4}\ M_w^{-0.52 \pm 0.02}$					
		30	198			13.41				M_w; $D_{z,0}$; k_D given in Ref.; DLS	718
			370			8.81					
			570			8.02					
			110			4.92					
			390			2.47					
			411			2.51					
			3000			0.813					
			10000			0.435					
linear		30	180			3.25	36 ± 8			M_w; $D_{z,0}$; DLS	719,722
			390			2.48	96 ± 7				
			3000			0.813	390 ± 90				
			10000			0.435	620 ± 30				
star			960			1.71 ± 0.04	5100 ± 500			M_w; $D_{z,0}$; DLS	719,722
linear		30	180–10000			$D_{z,0} = (3.2 \pm 0.1) \times 10^{-4}\ M_w^{-0.56 \pm 0.02}$				M_w; DLS	720,722
		30	19.8			13.41	76			M_v; $M_w/M_n = 1.06$; $D_{z,0}$; DLS	721
			37			8.81	24				
			51			8.02	14.9				
			110			4.92	32				
			411			2.51	75				
		30	20–411			$D_{z,0} = (3.0 \pm 0.4) \times 10^{-4}\ M^{-0.549 \pm 0.013}$				DLS	721
		24	20.4			12.7	7			M_w; $D_{z,0}$; DLS	723
			51			7.65	16				
			97.2			5.43	28				
			160			3.99	44				
			411			2.35	91				
			860			1.59	136				
			1800			1.01	264				
			20–1800			$D_{z,0} = (3.45 \pm 0.18) \times 10^{-4}\ M_w^{-0.564 \pm 0.004}$				M_w; DLS	723
atactic	4-*tert*-Butyltoluene	50	5.38			19.2	−2.69			DLS	1068
			20.2			9.31	−2.44			DLS	
			359			2.01	20.4			DLS	
			732			1.38	57.0			DLS	
			1270			1.02	77.1			DLS	
			3840			0.53	129			DLS	
atactic	Toluene	15	0.92			52.0	−1.22			$M_w/M_n = 1.01$	1068
			5.38			20.0	0.525			$M_w/M_n = 1.03$	
			9.98			14.1	2.38			$M_w/M_n = 1.03$	
			40.0			6.85	10.7			$M_w/M_n = 1.02$	
			97.3			4.15	21.8			$M_w/M_n = 1.02$	
			191			2.82	40.6			$M_w/M_n = 1.02$	
			359			1.96	71.2			$M_w/M_n = 1.01$	
	Toluene		732			1.33	130			$M_w/M_n = 1.03$	1068
			1270			0.978	206			$M_w/M_n = 1.03$	
			3840			0.502	319			$M_w/M_n = 1.05$	

	20	536	8.75		1.95	$f_0 = 3.55 \times 10^{-5}$ cm		M_w; s_t; D_A; $f_0' = kT/(D_0\eta_1)$	3
		450	7.92		2.02			Av. of 3 obs.	4
							0.910		5
		150					0.917	M_n; $M_w = 450000$	606
		1.2–520	$s_0 \sim M^{0.47}$		$D \sim M^{-0.53}$				43
		300	6.25		2.50			M_w; s_t; D_A	1
		45	7.20		2.85			M_n; s_w; D_w	
		140	4.75		4.03			$M_{t,A}$; s_t; D_A	16
		960	9.65		1.17				
		2850	18.1		0.74				
		250–1300	5.9–11.2					4V; k_s given in Ref.	125
Szwarc "living polymer"			57.5–226	3.7–5.20		8.05–3.29		4V; $M_{t,A}$ $C = 1$ g/dm^3	44
	22.7	190					0.918	M_v	148
	23.5		3.24	36.4				s_t	237
		75.0	3.24	36.4			0.917	M_{MW}	409
	25						0.916	Extrapolated value	268
					$D = 2.15 \times 10^{-4}\ M_w^{-0.53}$				591
								v_2 given in Ref.	532
		74			4.13			D_A; $C = 0.79$ g/dm^3	511
					3.78			D_A; $C = 1.19$ g/dm^3	511
	25	1260			1.265			DLS	1078
		2950			0.81			DLS	1078
		8000			0.43			DLS	1078
		15000			0.31			DLS	1078
	27						0.917		57
		770			1.22	96		M_n (Ref. 13); D_w	12
		1.2	0.66					s_t	17
		2	0.44						17
		40					0.917		1,237
	30	13.3					0.948	M_n	467
PCC	25	200			3.4			M_w; $M_w/M_n < 1.06$	624
TS-12	25	4480	14.01					M_w; $M_w/M_n = 1.14$; $C = 0.429$ g/dm^3; 12V ($C = 0.429$–37.02 g/dm^3	708
TS-33	25	20600	15.47					M_w; $C = 0.487$ g/dm^3; 6V ($C = 0.487$–4.445 g/dm^3)	708
	30	250			2.57			M_w; $M_n = 100000$; $D_{z,0}$; DLS	721
		269			2.37			M_w; $M_n = 59000$; $D_{z,0}$; DLS	
		411			1.982			M_w; $M_n = 388000$; $D_{z,0}$; DLA	
	30	238			3.19	56.7		DLS	995
		426			2.32	74.2		DLS	995
		1210			1.28	190		DLS	995
		3850			0.68	361		DLS	995
		5470			0.55	546		DLS	995
	30	79.8			6.32 ± 0.2	20.57		M_w; $D_{z,0}$; DLS	659
		93.46			5.22 ± 0.2	10.476			
		347.22			2.20 ± 0.1	61.36			
		1136.36			1.20 ± 0.1	173.3			
		3802.28			0.85 ± 0.05	1552.94			

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
		30	37			12.6 ± 3.8				M_w; $M_w/M_n = 1.03$; $D_{z,0}$; DLS	701
PCC		20	670							M_w; D_z given in Ref.; DLS	796
PCC		20	670			1.58				M_w; $D_{z,0}$ $C =$ 4.2–79.9 g/dm^3; DLS	795
	Toluene	23	179			3.59 ± 0.25	85.9 ± 73.7			M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $k_D = k_D$ $D_{z,0}$; DLS	680
		55	179			5.09 ± 0.03	198.1 ± 10.1			M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $k_D = k_D$ $D_{z,0}$; DLS	680
PCC, 4b		10	110			2.3				M_w; $M_w/M_n = 1.06$; D_z; $C = 28.7$ g/dm^3, DLS	678
		20	99.5			4.45	19			M_w; $M_w/M_n = 1.07$; $D_{z,0}$; DLS	727
F 80			783			1.34	113			M_w; $D_{z,0}$; DLS	
F 126			1280			1.01	173			M_w; $D_{z,0}$; DLS	
F 288			2890			0.53	432			M_w; $D_{z,0}$; DLS	
		20	18800			0.207				M_w; $M_w/M_n = 1.16$; $D_{z,0}$; $C = 0.0715$–0.3511 g/dm^3, DLS	730
		20	37			8.027				M_w; $M_w/M_n = 1.03$; $D_{z,0}$; DLS	731
			110			4.180				$M_w/M_n = 1.03$	
			200			3.175				$M_w/M_n = 1.03$	
			422			1.900				$M_w/M_n = 1.04$	
			775			1.360				$M_w/M_n = 1.01$	
			1230			1.083				$M_w/M_n = 1.02$	
			2420			0.720				$M_w/M_n = 1.04$	
	Toluene	20	1.2			40.1	−0.8			DLS	993
			3.1			28.5				DLS	
			4.0			25.8				DLS	
			10.7			15.7	1.7			DLS	
			30.2			8.82	5.0			DLS	
			48.5			6.78	10.0			DLS	
			97.0			4.39	21.0			DLS	
			424			1.96	70.9			DLS	
		25	25.6			2.56				M_w; $M_w/M_n = 1.1$; $D_{z,0}$; DLS	744
			38.6			1.95					
			64.9			1.32					
			238			0.80					
				$s_0 = 3.43 \times 10^{-15}\ M^{0.413}$ $k_s = 8.08 \times 10^{-2}\ M^{0.74}$						$M_w/M_n = 1.6$–2.3	745
linear	Toluene	25							0.916		1075
4-ring-shaped		25	30	2.554					0.922	SV	1075
			78.5	3.869						SV	1075
			123	4.808						SV	1075

			272	6.909				SV	1075
			3.1			28.5		DLS	1076
			4.0			25.8		DLS	1076
			10.7			15.1		DLS	1076
		21	500	7.30	270			M_w	748
			5000	15.20	840				
			13300	18.50	1000				
			16400	25.00	1490				
			4590			0.497		$M_w/M_n = 1.05$	731
			9500			0.310		$M_w/M_n = 1.03$	
			16100			0.205		$M_w/M_n = 1.16$	
		20	37–16100			$D_0 = 3.32 \times 10^{-4}\ M^{0.574}$		M_w; extrapolated for $C = 0$ and $M_w/M_n = 1.0$; DLS	728,729, 731
		20	110			4.25 ± 0.10		M_w; $D_{z,0}$; DLS	732
			200			3.25 ± 0.10		M_w; $D_{z,0}$; DLS	732
		25	111			3.954 ± 0.002	25.8 ± 0.003	M_w	733
microgel		24	410			2.07		Cross link ratio 1:20	1066
	Toluene								
NBS 706		25	260			$D_1 = 3.38$; $D_2 = 2.96$; $D_3 = 2.86$		M_w; $D_1 \leq D_2 \leq D_3$; $C < 0.45$ g/dm^3	734
PCC, 4b		25	110	4.00		4.25, 4.50		M_w; 23V; $C = 0–120$ g/dm^3	724
TS, F870			9500					M_w; $M_w/M_n = 0.03$; D given in Ref.	735
TS, F225			2420					M_w; $M_w/M_n = 0.04$; D given in Ref.	
TS, F510			5530					M_w; $M_w/M_n = 0.04$; D given in Ref.	
	Toluene	25	17.4			14.4		Taylor dispersion technique	1074
			110			4.42			
			900			1.34			
		25	111			4.35	30 ± 3	M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $p = 1$ bar	726
						2.48	22 ± 6	M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $p = 960$ bar	
						1.52	20 ± 6	M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $p = 1940$ bar	
						0.92	20 ± 5	M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $p = 2900$ bar	
						0.56	20 ± 6	M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $p = 3870$ bar	
						0.35	23 ± 10	M_w; $M_w/M_n = 1.06$; $D_{z,0}$; $p = 4840$ bar	
PCC, 7a		25	51	2.98		7.20		M_w; $M_w/M_n = 1.06$; s_0; $D_1 = D_A$	736
Waters, 41995			98.2	3.94		5.31			
PCC, 4b			110.0	4.32		4.58			
NBS 705			183	5.12		3.48			

TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
NBS 705	Toluene		191			3.49				DLS	1019
NBS 1479			939			1.44				DLS	1019
TS 550	Toluene		5850			0.62				DLS	1019
TS 2000			15900			0.31				DLS	1019
PCC, 3b			390	7.15		2.46					736
Waters, 25166 N			470	7.20		2.33					
Waters, 25166			411	7.32		2.24					
PCC, 5a			498	7.93		2.05					
Waters, 25167			867	9.92		1.52					
PCC, 14a			1800	13.70		1.00				M_w; $M_w/M_n = 1.2$; s_0; $D_1 = D_A$	736
Waters 61970	Toluene		2145	13.53		1.00			0.917	M_w	736
		25	51–2145		$k_s/[\eta] = 1.65 \pm 0.15$					M_w	736
		25	51–2145	$s_0 = 2.84 \times 10^{-15}\ M_{s,D}^{0.43}$							736
		RT	1000			1.3				M_w; D_z; $C = 0.05\%$; DLS	717
			13000			0.6				M_w; D_z; $C = 0.05\%$; DLS	717
linear		35	116	4.80						M_w; s_0	683
			216	6.22							
			275	7.06							
			675	9.97							
			860	11.1							
			1700	15.0							
branched	Toluene	30	980			1.88					994
			1730			1.39					994
			2390			1.28					994
			4780			0.895					994
			14300			0.595					994
branched, 4-armed stars		35	50.7	3.60						M_w; s_0	683
			93.5	4.59							
			154	5.81							
			351	8.33							
			521	9.75							
			1027	13.2							
			1390	14.5							
branched, 6-armed stars		35	110	5.41						M_w; s_0	683
			1090	14.6							
comb		35	475	9.91						M_w; s_0	683
			624	11.8							
			913	14.6							
			1630	20.4							
			3130	29.0							
			1050	12.9							
			1190	14.6							
			1530	16.4							

			2230	21.3						
			3620	27.6						
		21	500	7.30	270				M_w; D_z; $C = 0.05\%$; DLS	748
			5000	15.20	840					
			13300	18.50	1000					
			16400	25.00	1490					
	Toluene	25						0.919		1060
	Toluene/butanone (3/1)	20	528	9.9		2.11	$f_0 = 3.65 \times 10^{-5}$ cm		s_A; D_A; $f_0 = kT/(D_0\eta_1)$	3
	(1/1)		553	12.9		2.45	$f_0 = 3.43 \times 10^{-5}$ cm		s_A; D_A; $f_0 = kT/(D_0\eta_1)$	3
	(1/3)		554	15.6		2.82	$f_0 = 3.29 \times 10^{-5}$ cm		s_A; D_A; $f_0 = kT/(D_0\eta_1)$	3
	m-Xylene	20						0.9205	Extrapolated value	268
	p-Xylene	25							v_2 given in Ref.	532
halomethylated, containing 5.66% P	Tetrachloroethane	20	90.7–507	$s_0 = 9.77 \times 10^{-15} M^{0.266}$					M_{MW}	561
latex	Water								See Ref.	737
latex, DCC, 481 nm		20				0.081			D_z; DLS	727
latex		20				0.475			D_z; DLS	738
latex, 481 nm		RT				0.41			D_z; DLS; $C = 0.05\ g/dm^3$	739
latex, 109 nm		RT				0.089			D_z; DLS; $C = 0.05\ g/dm^3$	739
latex, 109 nm		20				0.415			D_z; DLS	740
latex		24.7				0.431			D_z; DLS	723
		40.2				0.637				
		55.2				0.865				
		70.4				1.15				
latex		25				0.439			D_z; DLS; $C = 0.11\%$	684
latex		25				0.652 ± 0.007			D_z; DLS; $C = 0.004\%$	741
latex		25				0.654 ± 0.007			D_z; DLS; $C = 0.022\%$	741
latex	Water/NaCl (0.01 mol/dm^3)	25				0.687 ± 0.007			D_z; DLS; $C = 0.004\%$	741
						0.696 ± 0.008			D_z; DLS; $C = 0.023\%$	741
latex		20				0.856 ± 0.043			$D_{z,0}$; DLS	746
	PMMA/benzene	30								
	$C_{PMMA} = 0\ g/cm^3$		8420			0.38				
	$C_{PMMA} = 0.91\ g/cm^3$		8420			0.0594			$M_{PMMA} = 4.05 \times 10^6$ g/mol	1077
	$C_{PMMA} = 1.29\ g/cm^3$		8420			0.0330				
	$C_{PMMA} = 2.72\ g/cm^3$		8420			0.0055				
	$C_{PMMA} = 3.65\ g/cm^3$		8420			0.0021				
	$C_{PMMA} = 0.91\ g/cm^3$		8420			0.125			$M_{PMMA} = 1.93 \times 10^6$ g/mol	1077
	$C_{PMMA} = 1.28\ g/cm^3$		8420			0.0837				
	$C_{PMMA} = 2.69\ g/cm^3$		8420			0.0281				
	$C_{PMMA} = 3.67\ g/cm^3$		8420			0.0148				
	$C_{PMMA} = 3.70\ g/cm^3$		8420			0.0258			$M_{PMMA} = 1.09 \times 10^6$ g/mol	1077
	$C_{PMMA} = 3.67\ g/cm^3$		8420			0.0364			$M_{PMMA} = 8.5 \times 10^5$ g/mol	
	$C_{PMMA} = 0\ g/cm^3$		1260			1.10				
	$C_{PMMA} = 3.65\ g/cm^3$		1260			0.0347			$M_{PMMA} = 4.05 \times 10^6$ g/mol	1077
	$C_{PMMA} = 3.65\ g/cm^3$		1260			0.0727			$M_{PMMA} = 1.93 \times 10^6$ g/mol	

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TABLE 5. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
	$C_{PMMA} = 3.65$ g/cm^3		1260			0.111				$M_{PMMA} = 1.09 \times 10^6$ g/mol	1077
	$C_{PMMA} = 3.70$ g/cm^3		1260			0.137				$M_{PMMA} = 8.5 \times 105$ g/mol	
Poly(styrene-*co*-butadiene)	Methyl *n*-propyl ketone	21	125–985	$s_0 = 3.31 \times 10^{-16}\ M^{0.62}$						M_n	590
24 mass% St.		21 ($T=\theta$)	49–514	$s_0 = 8.3 \times 10^{-16}\ M^{0.5}$							
Poly(styrene)-*block*-(dimethylsiloxane)	THF	25	46.8			7.280	19			Tracer diff. coef.	1064
	7.5 vol% PDMS/THF	25	46.8			1.320	−36				
	15 vol% PDMS/THF	25	46.8			0.715	−8.4				
Poly(styrene)-*block*-(hydrogenated polybutadiene)-*block*-polystyrene											
	1,4-Dioxane/0–30 vol% *n*-heptane	25	4800				4.02			0 vol% *n*-Heptane	1018
			4440				6.63			10 vol% *n*-Heptane	1018
Poly(styrene)-*block*-(hydrogenated polybutadiene)-*block*-polystyrene											
	1,4-Dioxane/0–30 vol% *n*-heptane		4200				7.54			20 vol% *n*-Heptane	1018
			3770				11.95			30 vol% *n*-Heptane	1018
Poly(styrene-*co*-divinylbenzene)											
30/70	*n*-Octane	21	65–710	$s_0 = 1.59 \times 10^{-15}\ M^{0.50}$		$D_0 = 1.49 \times 10^{-4}\ M^{-0.50}$			1.05	$M_{s,D}$	322
Poly(styrene-*co*-isooctyl methacrylate)											
20/80	Theta-solvent (see Ref.)	25 ($T=\theta$)	59.6 53.5	25.87–28.42					0.761	s_w; A $C = 1.67$ g/dm^3	427
Poly(styrene-*block*-methyl methacrylate)											
	Butyl acetate	RT	600			1.6				M_w; D_z; $C = 0.05\%$; DLS	717
Poly(α-methylstyrene)	Toluene	25				$D_{z,0} = 3.14 \times 10^{-4}\ M_w^{-0.556}$				$7000 \le M_w \le 1140000$ g/mol	998
	n-Butylchloride	25	53.8			11.4	−24.8			$[\eta] = 17.0$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
			74.3			10.1	−22.3			$[\eta] = 20.5$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
			171			6.38	−24.3			$[\eta] = 32.5$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
			303			4.56	−23.2			$[\eta] = 46.4$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
			666			3.04	−26.1			$[\eta] = 74.1$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
			881			2.67	−25.4			$[\eta] = 86.2$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
			3540			1.26	−21.9			$[\eta] = 198$ cm^3/g; $D_0 = 3.81 \times 10^{-4}\ M_w^{-0.531}$	997
Poly(styrenesulfonic acid)	Water/KCl (0.2 mol/dm^3)	20	670–1150	8.6–11.5						M_{MW}; single data given in Ref.	127
	Water/NaCl (0.005–0.2 mol/dm^3)	25	350–2650	4.95–16.4						M_{MW}; single data given in Ref.	452
PCC	Water/NaCl (0.01 mol/dm^3)		400			0.90				M_w; M_w/M_n<1.1; $D_{z,0}$; 10V $C = 0.01-17.5$ g/dm^3	742

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PCC			650	0.75		M_w; M_w/M_n<1.1; $D_{z,0}$; 9V $C = 0.049–26.4$ g/dm^3	742
PCC			1200	0.40		M_w; M_w/M_n<1.1; $D_{z,0}$; 12V $C = 0.01–27.0$ g/dm^3	742
PCC	Water/NaCl (0.01 mol/dm^3)		650	0.727 ± 0.007		M_w; D_z; $C = 0.05$ g/dm^3; 9V; DLS	747
PCC	Water/NaCl (0.025 mol/dm^3)		650	0.864 ± 0.09		M_w; D_z; $C = 0.075$ g/dm^3; 14V; DLS	
PCC	Water/NaCl (0.05 mol/dm^3)		650	0.92 ± 0.01		M_w; D_z; $C = 0.28$ g/dm^3; 9V; DLS	
PCC	Water/NaCl (0.10 mol/dm^3)		650	1.01 ± 0.01		M_w; D_z; $C = 0.05$ g/dm^3; 11V; DLS	
	Water/NaCl (0.1 mol/dm^3)	12	340	1.05		M_w; D_z; $C = 13.1$ g/dm^3; DLS	756
		15		1.20		M_w; D_z; $C = 13.1$ g/dm^3; DLS	
		20		1.65		M_w; D_z; $C = 13.1$ g/dm^3; DLS	
		25		2.7		M_w; D_z; $C = 13.1$ g/dm^3; DLS	
Sulfonated Poly(styrene) Ionomers							
	DMF/1 × 10^{-4} M salt	25	400	1.63	828	Ion content: 2.6%	1089
	DMF/1 × 10^{-3} M salt			1.58	237		
	DMF/1 × 10^{-2} M salt			1.68	21		
	DMF/1 × 10^{-1} M salt			1.77	8		
Poly(sodium-styrene-sulfonate-*co*-2-vinylnaphthalene)				$D_{z,0} = (1.5 \pm 0.8) \times 10^{-3}\ M_w^{-(0.75\pm0.06)}$		1073	
Poly(styrene)	PMPS	50	2	0.415 ± 0.041	105	PC-spectroscopy; PMPS: $M_w = 2600$ g/mol; $M_w/M_n = 1.5$	1079
			10.2	0.321 ± 0.028	46		
			12.2	0.289 ± 0.026	94		
			17.5	0.265 ± 0.032	122		
		65	2	0.728 ± 0.041	121		
			10.2	0.554 ± 0.033	49		
			12.2	0.448 ± 0.059	80		
			17.5	0.419 ± 0.045	121		

[a] See Ref.
[b] See Ref. for def. of *s*.

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TABLE 6. (O,C)-HETEROCHAIN POLYMERS (POLY(ETHERS), POLY(ESTERS), POLY(CARBONATES))

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Poly(carbonate)											
PMC	1,4-Dioxane	25	41.8						0.804	$M_w/M_n = 1.10$	1045
PMC	Methylene chloride	20	41.8						0.8999	$M_w/M_n = 1.10$	
PMC	Tetrahydrofuran	20	41.8						0.7738	$M_w/M_n = 1.10$	
PPhC	Benzene	25	47.0						0.762	$M_w/M_n = 1.09$	
Poly(thiocarbonate)											
PHTC	Benzene	25	19.1						0.753	$M_w/M_n = 1.23$	
PHTC	1,4-Dioxane		19.1						0.795	$M_w/M_n = 1.23$	
PMTC-1			9.4						0.790	$M_w/M_n = 1.34$	
PMTC-2			63.0						0.808	$M_w/M_n = 1.30$	
PetTC	Benzene		14.0						0.790	$M_w/M_n = 1.40$	
PiBuTC			40.0						0.834	$M_w/M_n = 1.24$	
PPhTC			93.0						0.780	$M_w/M_n = 2.07$	
P3ClPhTC-1			5.8						0.719	PAAR DMA 55	1044
P3ClPhTC-2			34.0						0.718		
P4ClPhTC-1			5.0						0.738		
		35	5.0						0.724		
		50	5.0						0.729		
P4ClPhTC-2		25	31.0						0.732		
P34ClPhTC-1			4.5						0.700		
	1,4-Dioxane		4.5						0.704		
	Chlorobenzene		4.5						0.705		
P34ClPhTC-2	Benzene		28.0						0.694		
Poly(ethylene terephthalate) See Poly(oxyethyleneoxyterephthaloyl)											
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)											
	Methylene chloride	20							0.8099		45
	Tetrahydrofuran	20	8.5–266	$s_0 = 1.33 \times 10^{-14}\ M_{s,D}^{0.362}$		$1/D_0 = 1.569 \times 10^{-3}\ M_{s,D}^{0.638}$				$M_{t,w}$; s_t	45
Poly(oxycarbonyl-propylene)	Chloroform	20	780	−9.95					0.812	M_w from Scheraga–Mandelkern-Eq. (Ref. 536)	535,537
			370	−8.16							
			156	−4.96							
			83.5	−3.50							
			21.1	−2.00							
Poly(oxyethylene)	Acetone	25	4.3			37.8				M_w; CLS	184
	Formamide	25	4.3			5.76				M_w; CLS	184
	Methanol	25	4.3			23.5				M_w; CLS	184
			23.8			10.7					
			19.2	3.18		10.7			0.785	$M_{t,D}$; s_t	150
			40			8.23				$T_\theta = 16.1$°C; $[\eta] = 79.5 \times 10^{-3}\ M^{0.58}$ for $T = 25$°C	1003
			74			5.92				$T_\theta = 17.2$°C	
			145			4.05				$T_\theta = 16.7$°C	
			594			1.63				$T_\theta = 17.0$°C	
			1200			1.10				$T_\theta = 16.5$°C	
	Water	20	0.29			37.0				D_z	177
			0.625			29.2					

			1.25		24.0				
			3.3		13.3				
			5.8		11.6				
			8.8		10.3				
			10.6		7.2				
	Water	20	1.426		23.6				180
			1.470		22.6				
			1.778		19.7				
			1.822		20.1				
		22.8	470				0.834	M_v	148
		23	0.24				0.846		
		25	4.3		11.5				184
		25	177		1.33			$M_w/M_n = 1.04$	1002
			300		1.08			$M_w/M_n = 1.05$	
			679		0.79			$M_w/M_n = 1.10$	
			1190		0.63			$M_w/M_n = 1.12$	
			20				0.9058	For $p = 1$ MPa	1001
							0.8689	For $p = 100$ Mpa	
							0.8420	For $p = 200$ Mpa	
			12	0.59	7.35				184
			23.8	0.93	4.85				
			37.3	1.09	3.95			M_w; CLS	150
TS, SE 15		25	17.7		1.33			M_w; $M_w/M_n = 1.04$; D_z; $C = 1.003$ g/dm^3; DLS	744
TS, SE 30			30.0		1.08			M_w; $M_w/M_n = 1.05$; D_z; $C = 1.003$ g/dm^3; DLS	
TS, SE 70			67.9		0.79			M_w; $M_w/M_n = 1.10$; D_z; $C = 1.003$ g/dm^3; DLS	
TS, SE 150			119		0.63			M_w; $M_w/M_n = 1.12$; D_z; $C = 1.003$ g/dm^3; DLS	
			17.7–119		$D_z = K_D\ M^{-0.39}$			M_w; $M_w/M_n = 1.12$ $C = 1.003$ g/dm^3; DLS	744
		25 ± 0.02	1130	3.73	1.58	26.8		M_w; $D_{0,A}$; $M_{s,D}$; M_w given in Ref.; $f_0 = RT/D_{0,A}$	749
			1470	4.16	1.33	29.1			
			1490	4.18	1.36	28.4			
			1900	4.67	1.15	30.9			
			2000	4.78	1.12	31.2			
			2610	5.39	0.93	34.4			
			2630	5.42	0.93	34.2			
			2670	5.34	0.94	33.8			
			1130–2670	$s_0 = 6.40 \times 10^{-16}\ M_s^{0.456}$	$D_0 = 1.86 \times 10^{-4}\ M_D^{-0.67}$			M_w	749
TS, SE 8, SE 30, SE 150		25	5.7–1200					M_w; $M_w/M_n = 1.12$; D given in Ref.	750
		25	320	2.15	1.0			$M_{s,D}$; $M_{s,D}/M_n = 1.1$	751
Poly(ethylene glycol)	D_2O	5			$D_0 = k\ M^{-0.597 \pm 0.020}$				1088
		25			$D_0 = k\ M^{-0.534 \pm 0.021}$				
	D_2O/diethylene glycol 1/1	25			$D_0 = k\ M^{-0.542 \pm 0.058}$				
Poly(oxy-2,6-dimethyl-1,4-phenylene)	Toluene	40–54			0.0206–0.0251			$C = 30$ mass%	765
		55–65			0.0463–0.0509			$C = 40$ mass%	765
		69–78			0.0556–0.0624			$C = 50$ mass%	765

TABLE 6. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(oxyethyleneoxyterephthaloyl)(polyethylene terephthalate)											
	m-cresol	25	111	0.103		0.120				$M_{s,D}$	526
			77.3	0.153		0.155				A_2 given in Ref.	
			61.0	0.138		0.186					
			41.3	0.132		0.263					
			36.8	0.125	180	0.280					
			23.0			0.365					
			60.2			0.205					
unfractionated			87.3			0.130					
				$s_0 = K_s M^{0.26}$		$D_0 = K_D M^{-0.74}$					
		50	111	0.435					0.678	$M_{s,D}$	526
			77.3	0.405							
			61.0	0.391							
			41.3	0.372	140	0.992	80				
			36.8	0.338							
			23.0	0.439							
unfractionated			60.2	0.408		0.381					
			87.3	$s_0 = K_s M^{0.22}$							
Poly(oxypropylene)	Acetone	20	0.074–3.375			$D_0 = K_D M^{-0.52}$		$f_0 = 4.4 \times 10^{-7} M^{0.52}$		D_A; $f_0 = kT/(D_0\eta_1)$	465
	Benzene	20	0.134–3.375			$D_0 = K_D M^{-0.55}$		$f_0 = 3.2 \times 10^{-8} M^{0.55}$		D_A; M from condensation and boiling temperature elevation	465
TS, SE 5	Water	25	40			3.73				M_w; $M_w/M_n = 1.03$; D_z; $C = 14$ g/dm³; DLS	765
TS, SE 8			73			2.09				M_w; $M_w/M_n = 1.02$; D_z; $C = 4.8$ g/dm³; DLS	
TS, SE 15			148			1.66				M_w; $M_w/M_n = 1.04$; D_z; $C = 3.2$ g/dm³; DLS	
TS, SE 30			278			1.72				M_w; $M_w/M_n = 1.05$; D_z; $C = 10.6$ g/dm³; DLS	
TS, SE 70			661			1.07				M_w; $M_w/M_n = 1.10$; D_z; $C = 3.6$ g/dm³; DLS	
TS, SE 15		15	148			1.73				M_w; $M_w/M_n = 1.04$; D_z; $C = 10.5$ g/dm³; DLS	
		34				2.47					
		43				2.88					
TS, SE 15		25	148			2.63				M_w; $M_w/M_n = 1.0$; D_z; $C = 25.6$ g/dm³; DLS	
		30.3				2.72					
		35.4				3.08					
		40.5				3.25					
		45.5				3.49					

TABLE 7. (N,C)-AND (O,N,C)-HETEROCHAIN POLYMERS (POLY(AMIDES), POLY(UREAS), POLY(URETHANES))

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(ethylenimine)											
linear	100 mM NaCl	25	41.5			2.48	2.3			DLS	1090
	25 mM NaCl		41.5			1.92	9.2				
	10 mM NaCl		41.5			1.39	25				
	25 mM NaCl		88.2			1.12	15				
Poly(n-butyliminocarbonyl) (Poly(butylisocyanate))											
	Tetrahydrofuran	20	18–211	$s_0 = 3.05 \times 10^{-14}\ M^{0.16}$		$D_0 = 1.69 \times 10^{-4}\ M^{-0.85}$				$M_{s,D}$	325
Poly(hexyliminocarbonyl) (Poly(hexylisocyanate))											
	Hexane	25	52.7			8.11	27.3			M_w; $D_{0,z}$; $C = 0.2$–6.0 g/kg	752
			202			3.17	−263				
			411			1.85	−242				
Poly(iminohexamethyleneiminoadipoyl) (Nylon 66)											
	Formic acid (98–100%)	22.4	16						0.890	M_v	148
Poly(iminoisophthaloylimino-1,3-phenylene)											
	Dimethylformamide	25	30.2–156	$s_0 = 1.9 \times 10^{-15}\ M^{0.44}$					0.678		589
	LiCl (2.5 g/dm³ + 96% H_2SO_4) in dimethylformamide		20.7–142	$s_0 = 2.8 \times 10^{-15}\ M^{0.39}$					0.682		589
Poly(iminoisophthaloylimino-1,3-phenylene-sulfonyl-1,3-phenylene) (Poly(3,3′-diphenylsulfonisophthalamide))											
		25	79	2.2						M_w	764
			82	2.5							
			110	2.6							
			130	2.8							
			175	3.3							
			240	3.5							
			360	4.4							
		25	79–360	$s_0 = 2.56 \times 10^{-15}\ M^{0.40}$						$M_w/M_n \approx 2.6$	764
Poly(iminoterephthaloylimino-1,4-phenylene-sulfonyl-1,3-phenylene) (Poly(4,4-diphenylsulfonterephthalamide))											
		20	25.0	1.50						M_w	763,764
			33.4	1.71							
			50.0	2.00							
			68.5	2.40							
			72.0	2.57							
			90.0	2.70							
			98.0	2.77							
			109.0	2.86						$M_w/M_n \approx 1.5$	763
			25–109	$s_0 = 2.34 \times 10^{-15}\ M^{0.42}$						From dn/dc (see Ref.)	532
Poly(iminoterephthaloylimino-1,4-phenyleneanthron-9-ylidene-1,4-phenylene)											
	Dimethylformamide	25		$s_0 = 3.0 \times 10^{-15}\ M^{0.40}$					0.747		579
Poly(l-lysine)											
branched by benzyl aspartate and benzyl glutamate											
	Dimethylformamide	20								s_0, k_s, D_A as function of composition and M given	448
Poly(4,4′-oxydiphenylene) pyromellitamic acid)											
	Dimethylformamide/ LiBr (0.1 mol/dm³)	25		$s_0 = 3.9 \times 10^{-15}\ M^{0.39}$					0.578		753

TABLE 7. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Poly(4,4′-phenylene) pyromellitamic acid)											
	Dimethylformamide/ LiBr (0.1 mol/dm^3)	25								s_0 given in Ref.	753
Poly(oxy-1,4-phenyleneiminocarbonyl-2,5-dicarboxy-1,4-phenylenecarbonylimino-1,4-phenylene)											
	Dimethylacetamide/	15	9.9–266	0.99–3.22						17V; CLS	455
	LiBr (0.1 mol/dm^3)	15	18.4–45.4	$s_0 = 3.72 \times 10^{-15}\ M_w^{0.36}$						M_n	403
Poly(iminoisophthaloylimino-1,3-phenylene)											
	Dimethylformamide/ LiCl (0.25%)	25		(3.30–3.70)	0.18					$C = 0.55$–1.10 g/dm^3; See Ref.	754
	Dimethylformamide/	25	4.3	0.33		6.19				$M_{s,D}$	755
	LiCl (3%)		5.9	0.33		4.47					755
			7.7	0.39	49	4.03					
			10.6	0.43		3.24					
			11.2	0.37		2.65					
			15.5	0.57		2.95					
			20	0.66	107	2.65					
			24	0.53		1.78					
			25	0.76		2.47					
			27	0.76	160	2.00					
			37	0.86		1.85					
			38	0.77		1.62					
			41	0.86	210	1.67					
			43	0.73	90	1.37					
			47	0.78		1.33					
			48	0.81	190	1.35					
			50	0.82		1.31					
			55	0.88		1.28					
			57	0.89		1.26					
			65	0.92		1.13					
			69	0.90		1.04					
			70	0.95		1.08					
			72	0.95		1.05					
			74	0.96	283	1.04					
			75	0.98		1.05					
			80	0.98	270	0.98					
			82	1.08		1.06					
			96	1.14	250	0.95					
			112	1.15	315	0.82					
unfractionated			112	1.18		0.84					
			113	1.24		0.88					
			113	1.24	290	0.88					
			118	1.19		0.81					
			124	1.18		0.76					
			133	1.25		0.75					
			143	1.23		0.69					
			147	1.36	465	0.74					
			154	1.33		0.69					

			163	1.47		0.72				
			184	1.54	575	0.67				
			209	1.67		0.64				
			233	1.95	667	0.67				
			237	1.81		0.61				
			296	1.82	875	0.49				
			305	2.06	870	0.54	227			
		25	4.3–305	$s_0 = 0.88 \times 10^{-15}\ M^{0.43}$		$D_0 = 0.71 \times 10^{-8}\ M^{-0.57}$		0.71 ± 0.02	$M_{s,D}$	755
	Dimethylformamide/ LiCl (0.005 g/dm^3)	25	112			1.91			$M_{s,D}$; $C = 0.3$–0.4 g/dm^3	755
	Dimethylformamide/ LiCl (0.010 g/dm^3)	25	237			0.88				
			124			1.20				
	Dimethylformamide/ LiCl (0.030 g/dm^3)	25	305			0.50			$M_{s,D}$; $C = 0.3$–0.4 g/dm^3	755
			237			0.68				
			124			1.08				
			112			1.28				
Poly(iminoisophthaloylimino-1,3-phenylene)										
	Dimethylformamide/ LiCl (0.040 g/dm^3)	25	305			0.40			$M_{s,D}$; $C = 0.3$–0.4 g/dm^3	755
			124			0.71				
	Dimethylformamide/ LiCl (0.050 g/dm^3)	25	305			0.30			$M_{s,D}$; $C = 0.3$–0.4 g/dm^3	755
			112			0.97				
Poly(naphthoylene imidobenzimidazole)										
	sulfuric acid 96%	30				$D_0 = 3.9 \times 10^{-6}\ M^{-0.55}$			$M \geq 50 \times 10^3$ g/mol	1043
						$D_0 = 3.4 \times 10^{-5}\ M^{-0.74}$			$M \leq 80 \times 10^3$ g/mol	
Poly(urethane) from Poly(oxycaproyl) (A) diphenylmethanediisocyanate, ethylenediamine										
linear										
A:$M_n = 1.3 \times 10^3$	Dimethylformamide	25	26.2–128	$s_0 = 1.36 \times 10^{-15}\ M^{0.44}$				0.848	M_{MW}	607,608
A:$M_n = 2.8 \times 10^3$			266–306	$s_0 = 9.86 \times 10^{-16}\ M^{0.46}$				0.8745	7V; k_s given in Ref.	
A:$M_n = 1.8 \times 10^3$			146.4–17.9	$s_0 = 1.18 \times 10^{-15}\ M^{0.45}$				0.8581	7V; k_s given in Ref.	
branched			200	2.91	292				M_{MW}	
			96.7	2.10	176				M_{MW}	
branched			137	2.50	243				M_{MW}	
			71.2	1.85	159					
Poly(ureyleneheptamethylene)	Dimethylformamide	55						0.955		183
		90						0.949		
	Formic acid (97%)	25						0.915		183
	Sulfonic acid (96%)	25	23.5					0.974	M_w; CLS	183
		60						0.965		
Poly(ureylene-2,4,4-trimethylpentamethylene)										
	Dimethylformamide	55						0.955		183
		90						0.949		
	Formic acid (97%)	25						0.915		

TABLE 8. OTHER SYNTHETIC POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Poly(bibenzoate):											
Poly(heptamethylene p,p'-bibenzoate)											
	Cl_3CH	25							0.814		1086
	Cl_2CH_2								0.820		
	$Cl_4C_2H_2$								0.835		
Poly(oxybis(ethylene oxide) p,p'-bibenzoate)											
	Cl_3CH	25							0.733		1086
	$Cl_4C_2H_2$								0.768		
Poly(oxytris(ethylene oxide) p,p'-bibenzoate)											
	Cl_3CH	25							0.745		1086
	$Cl_4C_2H_2$								0.761		
Poly(oxytetraquis(ethylene oxide) p,p'-bibenzoate)											
	Cl_3CH	25							0.759		1086
	$Cl_4C_2H_2$								0.783		
Phenol novolac	Acetone	RT	0.770			70.2				M_n; D_w; M_w; D_A given in Ref.	762
			1.300			63.7					
			1.930			53.5					
			2.280			43.6					
			4.030			34.2					
Phenol resol	Acetone	RT	0.370			106.8				M_n; D_w; M_w; D_A given in Ref.	762
			0.740			88.3					
			1.500			71.1					
			2.800			46.0					
			7.530			27.1					
Poly(terephthalic acid-4-aminobenzohydrazide)											
	Dimethylsulfoxide	23	3.78			4.02				CLS, DLS	1017
			5.67			2.97					
			7.06			2.28					
			9.16			2.25					
			9.79			1.75					
			16.6			1.32	− 16.2				
			28.5			1.00	− 31.0				
			47.1			0.806	− 101				
			83.9			0.665	− 192				
			155			0.393	− 349				
			260			0.255	− 588				
Poly(acenaphthylene)	Benzene	25							0.77		480
Poly(o-methyl-phenylene)	Toluene	20	5.6	1.10		18.5		1.68	0.841	$M_{t,w}$; D_w; v_2 independ. of M	140
			9.3	1.36		12.5		1.94		D_w	
			12.6	1.55		11.1		2.04		D_A	
			15.8	1.73		11.0		2.06		$M_{r,w}$; D_w	
			16.8	2.20		12.1				D_w	
			23.4	2.35		9.41		2.04		$M_{t,w}$; D_A	
			36.7	2.87		8.38		2.26		D_w	
			77.2	4.40		5.34		2.42		$M_{t,w}$; D_w	
			270	8.25		3.52		2.97		D_w	

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(L-p-tolyl-2,5-dioxopyrrolidine-3,4-diyl) (Poly-p-tolyl-maleimide)											
	Dimethylformamide	21	40–560	$s_0 = 2.76 \times 10^{-14}\ M^{0.42}$		$D_0 = 3.47 \times 10^{-3}\ M^{-0.58}$			0.74	$M_{s,D}$	563
Poly(N-phenylmaleimide-co-styrene)											
	Tetrahydrofuran	25							0.9064	$w_{NPI} = 0$	1047
									0.8040	$w_{NPI} = 0.430$	
									0.7768	$w_{NPI} = 0.528$	
									0.7584	$w_{NPI} = 0.569$	
									0.7400	$w_{NPI} = 0.702$	
									0.6988	$w_{NPI} = 1.000$	

TABLE 9. INORGANIC POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Poly(bis(m-chlorophenoxy)phosphazene)											
	Chloroform	25 ± 0.01	3450 ± 240			1.40 ± 0.01	116			$D_{0,z}$	757
						$D_0 = (2.08 \pm 0.06) \times 10^{-4}\ M^{-0.57}$					757
Poly(metaphosphoric acid)											
magnesium complex	Water/NaCl (0.4 mol/dm³)	38	1000				1.39	2.8	0.370		139
potassium salt	Water/NaCl (0.1 mol/dm³)	14	480				1.05	5.2	0.311	$M_{t,w}$; s_t; D_w	139
	Water/NaCl (0.4 mol/dm³)	32	1100				1.08	3.8	0.316		
	Water/NaCl (0.1 mol/dm³)/ethanol (5%)	20	570				1.25	4.1	0.315		
	Water/NaCl (0.1 mol/dm³)/ethanol (8%)	25	650				1.36	3.6	0.318		
Poly(3-methyl-1-butene-1-silsesquioxane), cyclolinear											
	Butylacetate	24	92–600	$s_0 = 1.1 \times 10^{-14}\ M^{0.31}$		$D_0 = 1.1 \times 10^{-3}\ M^{-0.69}$			0.863 ± 0.003	$M_{s,D}$; s (13V); D (13V)	583
Poly(oxydimethylsilylene) (polydimethyl siloxane)											
	Bromocyclohexane	28	101	−2.40		1.66				$M_{s,D}$	326
			165	−2.70		1.15					
			550	−4.60		0.59					
									1.025		326
linear		28 ($T = \theta$)	0.312			28.2				M_n; $M_w/M_n = 1.0$; D; $C = 0.69$ mass%	758
			0.386			23.5				M_n; $M_w/M_n = 1.0$; D; $C = 0.77$ mass%	
			0.700			17.4				M_n; $M_w/M_n = 1.01$; D; $C = 0.80$ mass%	
			1.130			13.3				M_n; $M_w/M_n = 1.04$; D; $C = 0.76$ mass%	
			2.130			9.69				M_n; $M_w/M_n = 1.11$; D; $C = 0.72$ mass%	
			5.280			5.96				M_n; $M_w/M_n = 1.03$; D; $C = 0.98$ mass%	

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TABLE 9. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			10.240			4.32				M_n; $M_w/M_n = 1.20$; D; $C = 0.71$ mass%	
			14.980			3.27				M_n; $M_w/M_n = 1.14$; D; $C = 0.80$ mass%	
		28 ($T = \theta$)	4.030			9.61				M_n; $M_w/M_n = 1.08$; D; $C = 0.68$ mass%	758
			10.240			5.75				M_n; $M_w/M_n = 1.20$; D; $C = 0.71$ mass%	
			14.980			4.47				M_n; $M_w/M_n = 1.12$; D; $C = 0.63$ mass%	
						$D_0 = K_D M^{-0.54\pm0.02}$					758
cyclic		15	0.222			33.7				M_n; $M_w/M_n = 1.0$; D; $C = 0.74$ mass%	
			0.296			27.4				M_n; $M_w/M_n = 1.0$; D; $C = 0.78$ mass%	
			0.520			21.7				M_n; $M_w/M_n = 1.02$; D; $C = 0.76$ mass%	
			1.070			15.0				M_n; $M_w/M_n = 1.04$; D; $C = 0.79$ mass%	
			2.080			10.9				M_n; $M_w/M_n = 1.01$; D; $C = 0.76$ mass%	
			3.710			8.30				M_n; $M_w/M_n = 1.04$; D; $C = 0.73$ mass%	
			8.480			5.56				M_n; $M_w/M_n = 1.14$; D; $C = 0.73$ mass%	
			17.380			3.53				M_n; $M_w/M_n = 1.08$; D; $C = 0.73$ mass%	
		28	3.710			11.5				M_n; $M_w/M_n = 1.04$; D; $C = 0.77$ mass%	758
			8.480			7.67				M_n; $M_w/M_n = 1.06$; D; $C = 0.72$ mass%	
			17.380			4.81				M_n; $M_w/M_n = 1.08$; D; $C = 0.73$ mass%	
	Butanone	10	16						1.018		148
		20							1.0282	M_v	
		35							1.0468		
	Toluene	20	301	4.09		3.00				M_{sD}	326
			920	6.07		1.60					
		22.4	9.4						1.024	M_v	148
linear		25	0.3122			124.00				M_n; $M_w/M_n = 1.0$; D; $C = 1.405$ mass%	759
			0.3863			107.10				M_n; $M_w/M_n = 1.0$; D; $C = 1.375$ mass%	
			0.6086			80.00				M_n; $M_w/M_n = 1.03$; D; $C = 1.388$ mass%	
			1.053			58.92				M_n; $M_w/M_n = 1.02$; D; $C = 1.333$ mass%	

			1.442		49.42			M_n; $M_w/M_n = 1.02$; D; $C = 1.371$ mass%	
Poly(oxydimethylsilylene) (polydimethyl siloxane)									
linear	Toluene		3.573		33.52			M_n; $M_w/M_n = 1.04$; D; $C = 1.243$ mass%	
			6.018		26.65			M_n; $M_w/M_n = 1.05$; D; $C = 1.337$ mass%	
			14.460		15.03			M_n; $M_w/M_n = 1.07$; D; $C = 1.249$ mass%	
Poly(oxydimethylsilylene) (polydimethyl siloxane)									
			23.570		10.88			M_n; $M_w/M_n = 1.08$; D; $C = 1.750$ mass%	
			0.3–23.6		$D_0 = K_D\, M^{-0.436\pm0.002}$			M_n; $M_w/M_n \approx 1.08$	759
cyclic	Toluene		0.2223		145.20			M_n; $M_w/M_n = 1.0$; D; $C = 1.483$ mass%	759
			0.2964		123.30			M_n; $M_w/M_n = 1.0$; D; $C = 1.294$ mass%	
			0.7410		78.00			M_n; $M_w/M_n = 1.07$; D; $C = 1.180$ mass%	
			1.189		64.73			M_n; $M_w/M_n = 1.08$; D; $C = 1.512$ mass%	
			1.534		57.13			M_n; $M_w/M_n = 1.05$; D; $C = 1.180$ mass%	
			3.171		40.95			M_n; $M_w/M_n = 1.06$; D; $C = 1.504$ mass%	
			4.172		37.07			M_n; $M_w/M_n = 1.04$; D; $C = 1.351$ mass%	
			9.077		24.22			M_n; $M_w/M_n = 1.06$; D; $C = 1.237$ mass%	
			17.673		16.26			M_n; $M_w/M_n = 1.07$; D; $C = 1.432$ mass%	
			0.2–17.7		$D \sim M^{-0.43\pm0.002}$			M_n; $M_w/M_n \approx 1.08$	759
linear		25	23.30		11.15	8.18		M_w; $D_{0,z}$	760
			12.40		17.35	3.36			
			0.627		82.05	−2.08			
cyclic			23.20		13.05	2.33		M_w; $D_{0,z}$	760
			11.50		21.75	−2.00			
			0.296		125.4	−1.503			
Poly(oxydiphenylsilylene) (Poly(phenyl siloxane))									
	Benzene	21	4–3350	$s_0 = 9.16 \times 10^{-15}\, M^{0.37}$	$D_0 = 6.16 \times 10^{-4}\, M^{-0.63}$		0.807	$M_{s,D}$; D_A	556
Poly(oxymethylphenylsilylene)									
	Toluene	22					0.006	$[\eta] = 132\ cm^3/g$	148

TABLE 10. POLY(SACCHARIDES)

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
Amylose	1,4-dioxane	20	2.8	0.303		11.4	−3			M_w; s_0; $D_{z,0}$	768
			5.8	0.642		10.8	0				
			9.2	0.805		8.2	1				
			17.3	1.27		6.9	−4				
			32.9	1.44		4.1	10				
			49.0	1.86	62	3.56	5				
			83.5	1.92	33	2.15	17			$M_{s,D}$; s_0; $D_{z,0}$	768
			121	2.29	41	1.77	22				
			356	3.13	77	0.825	36				
			860	4.16	141	0.452	52				
			1130	4.16	160	0.344	142				
			1280	4.54	183	0.332	166				
			2050	5.40	280	0.247	346				
			2730	5.85	284	0.20	447				
				$s_0 = 6.6 \times 10^{-15} M_{s,D}^{0.30}$		$D_0 = 6.6 \times 10^{-4} M_{s,D}^{-0.70}$					768
Carboxymethyl cellulose	Water	RT				1.2				$C = 0.1$ mass%	766
						2.8				$C = 0.5$ mass%	
						3.7				$C = 1.0$ mass%	
						12.0				$C = 2.0$ mass%	
sodium salt	Water/NaOH(0.01 mol/dm³; pH = 12.0)	20.6	700						0.505	M_v	148
	Water/NaCl(0.001 mol/dm³)	25	44.7	2.40							314
			46	2.30							
			90.6	2.50							
			94.2	2.58							
			163	2.65							
			194	2.62							
			280	2.85							
			346	2.96							
	Water/NaCl(0.005 mol/dm³)		70	2.54						M_n	277,278
			104	3.00							
			175	3.14							
			290	3.97							
	Water/NaCl(0.01 mol/dm³)		70	2.76						M_n	277,278
			104	3.18							
			175	4.25							
			290	4.28							
			44.7	2.70							314
			163	3.11							
			346	4.53							
	Water/NaCl					51.5					767
Cellulose											
absorbent cotton	Cuprammonium hydroxide	20		4.28		2.64				s_i; $C = 1.0$ g/dm³	63
aged, alkali cell.			150	3.8	110	0.84	30	5.3	0.508	$M_{i,w}$; s_i; D_w	14
overaged			44	1.9	20	1.54	45	4.6	0.508		14
cotton (Georgia)			1750	10.4	900	0.2	350	9.8	0.508		14
Holo cellulose (spruce)			340	7.2	390	0.72	145	4.7	0.508		14

linters, unbleached			1500	10.3	600	0.23	320	9.0	0.508		14
linters, bleached			490	7.2	520	0.43	130	6.1	0.508		14
			1200	9.2	690	0.26	250	8.6	0.508		14
linters, cotton filter paper				3.94		2.83					63
Cellulose											
flax fiber			5900	17.5	1700	0.1	1200	13.1	0.508	s_t; $C = 1$ g/dm^3	14
nettle fiber			1900	14.0	1000	0.25	320	7.7	0.508	$M_{t,w}$; s_t; D_w	14
ramie fiber			2000	10.8	860	0.18	250	10.4	0.508		14
sulfate cell.			400	6.5	390	0.54	105	5.9	0.508	$M_{t,w}$; s_t; D_w	14
sulfate cell., acetylated			570	6.3		0.37	190	7.7	0.508		14
sulfate cell., precipit.			320	6.3		0.66	165	5.2	0.508		14
sulfite cell.			500	6.3	380	0.45	115				14
sulfite cell., bleached				4.28		2.72				s_t; constituent A	63
			2.73			3.67				s_t; constituent B	63
viscose staple fiber (sulfate cellulose)											
–, (spruce)			75	2.6	50	1.04	0	4.8	0.508	$M_{t,w}$; s_t; D_w	14
–, (pine)			230	4.1	170	0.54	75	6.4	0.508		14
wood cellulose (Cross and Bevan aspen)				4.28		2.70				s_t; constituent A	63
				2.73		3.53				s_t; constituent B	63
–Cellulose, cotton linters			53	4.6		5.4			0.642	s_t	62
–Cellulose, holo cellulose			680	6.5	320	0.32	295	8.4	0.508	$M_{t,w}$; s_t; D_w	14
β Cellulose			27	1.6	50	1.97	50	4.0	0.508		14
Cellulose	Cupriethylenediamine	25	175	5.5		1.2				$M_{s,w}$; D_w	234
			9.5	8.3		0.95					
									0.65		97
	Cadmium ethylenediamine	12	33.6	1.25						M_w; SE	425
			24.5	1.13							
			18.8	1.04							
			10.1	0.74							
linters hydrol.		25							0.50		97
			43	1.80	153	1.77				$M_{t,w}$; s_t; D_w	97
			155	2.75	370	0.75					97
			210	3.17	465	0.64					97
			275	3.80	710	0.58					97
			435	4.53	1000	0.44					97
			745	5.49	1410	0.31					97
sulfite pulp			115	2.87	367	1.06					97
	Iron–tartaric acid Complex Na salt	20	111	1.75		0.89			0.654	$M_{s,A}$; s_t; D_A	235
			201.4	2.17		0.60					
			364	2.98		0.46					
			539	3.35		0.35					
Cellulose acetate	Acetone		100			5.4	0			D_w	13
		20	10.35	4.07	600	20.7				$M_{t,w}$; s_t; D_A	39
			51	7.5	5600	7.7					
			143	10.9	14300	4.0					

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TABLE 10. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			194	12.5	19100	3.4					
			10.4–194	$s_0 = 1.22 \times 10^{-14}\ M^{0.38}$					0.68	$M_{t,w}$; $M_w/M_n = 1.27$	39,769
from cotton linters	Acetone	25	150	16.7					0.687	M_n; OS; M_{MW} given in Ref.	554,557
			136	16.0					0.687		
			66	10.5					0.692		
			145	14.7					0.698		
			110	12.8					0.697		
			26	7.0					0.690		
			24.2–249	$s_0 = 1.2 \times 10^{-14}\ M^{0.39}$						$M_w/M_n = 1.15–1.99$	557
Cellulose acetate											
from wood cellulose	Acetone			10.0					0.700		
			40	8.4					0.700		557
		20	21.2–122	$s_0 = 2.21 \times 10^{-14}\ M^{0.33}$						$M_{s,D}$; $M_w/M_n =$ 1.12–2.44	770
degree of substitution: 2.46		25	24.2	5.28	24.3					M_w	769
			37.6	6.26	43.8						
			59.0	7.31	65.1						
			75.0	7.67	68.3						
			111	9.80	104						
			159	11.60	169						
			249	12.50	188						
			24.2–249	$s_0 = 1.02 \times 10^{-14}\ M^{0.39}$						M_w; $M_w/M_n = 1.2–1.3$	
degree of substitution: 2.92											
	N,N-Dimethylacetamide	25	36.7	2.27	71.7					M_w	769
			82.2	2.83	101						
			137	3.32	131						
			308	4.04	205						
			500	4.17	228						
Cellulose triacetate	sym-Tetrachloroethane	21.9	250						0.744	M_v	148
Cellulose acetate-*co*-butyrate	sym-Tetrachloroethane	22.7	97						0.777	M_v	148
Cellulose carbanilate	Acetone		3930	45.4							792
	Dioxane	20	1.35–2580	$s_0 = 2.35 \times 10^{-15}\ M^{0.36}$					0.72	$M_{s,D}$; D_A, k_s and k_D given in Ref.	68
		23	14							$M_{s,D}$	771
			24			4.7					
			28			4.9					
			34			4.1					
			39			3.4					
			46			3.6					
			44			3.2					
			66			2.6					
			61			2.8					
			84			2.5					
			107			2.3					

			14–107			$D_0 = 9.6 \times 10^{-6}\ Z_{s,D}^{-0.68}$				Z = degree of polymerization	771
	Dioxane	20	4.43	0.520		11.0	−5			M_w; s_0; $D_{z,0}$; DLS	768
			8.70	0.743		8.0	0				
			11.9	0.823		6.5	0				
			17.8	0.95		5.0	5				
			42.0	1.25		2.80	2				
			80.8	1.51	177	1.75	10				
			141	1.88	145	1.25	8				
			215	2.18	150	0.95	60				
			278	2.34	164	0.79	64				
			1040	4.00	380	0.36	188				
			1570	4.35	574	0.26	262				
			2580	5.50	863	0.20	400				
		20	4.43–2580	$s_0 = 2.35 \times 10^{-15}\ M_{s,D}^{-0.37}$		$D_0 = 2.2 \times 10^{-4}\ M_{s,D}^{-0.63}$					768
	Ethyl acetate	23	14	3.9		19.4			0.72	$M_{s,D}$	771
			24	4.7		13.8					
			28	4.8		12.1					
			34	5.3		10.9					
			39	5.4		9.6					
Cellulose carbanilate	Ethylacetate		46	6.1		9.3					771
			44	5.5		8.8					
			66	6.9		7.3					
			61	7.0		8.0					
			84	7.0		5.8					
			107	8.3		5.4					
			14–107	$s_0 = 1.3 \times 10^{-13}\ Z^{0.32}$		$D_0 = 2.2 \times 10^{-5}\ Z_{s,D}^{-0.68}$			0.72	Z = degree of polymerization	771
Cellulose glycolate sodium salt	Water/NaCl(0.2 mol/dm^3)	20	55			3.08	185			$M_{t,w}$; D_w	14
	Water/NaCl(0.5 mol/dm^3)				3.30	215				D_w	14
	Water/NaCl(1.0 mol/dm^3)		55	3.4	1.3	3.22		3.2	0.53	$M_{t,w}$; s_t; D_w	14
Methyl cellulose	Water	25	19	3.44	78	4.34				$[\eta] = 67\ cm^3/g$	1083
			31	2.62		3.80				$[\eta] = 110\ cm^3/g$	
			39	2.57	140	3.12				$[\eta] = 138\ cm^3/g$	
			58	2.50		2.44				$[\eta] = 242\ cm^3/g$	
			91	2.07		1.63				$[\eta] = 238\ cm^3/g$	
			89	1.90	270	1.75				$[\eta] = 260\ cm^3/g$	
			87	1.80						$[\eta] = 270\ cm^3/g$	
			102	1.71		1.75				$[\eta] = 310\ cm^3/g$	
			163	1.62	540	1.33				$[\eta] = 450\ cm^3/g$	
			190	1.40		1.17				$[\eta] = 500\ cm^3/g$	
			252	1.36	620	0.90				$[\eta] = 760\ cm^3/g$	
			408	0.94	740	0.73				$[\eta] = 830\ cm^3/g$	
Cellulose nitrate 13.8% N	Acetone	20	6.2					1.7	0.51	$M_{s,D}$	223
			30					3.2		SE	
			80.2	12.0				4.6		SE	
			199					5.4		$M_{s,D}$	
			613	30.0				6.9		$M_{s,D}$	
			100	13.9		6.5		3.74		$M_{s,D}$	276
									0.57		64
			190	14.0		3.29				s_t; $D_A = D_w$	65

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TABLE 10. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
			242	14.2		2.60				$M_{t,w}$	
			13.8	6.5		20.9				$M_{w,w}$; s_w; D_w	259
			16.3	7.1		19.3			0.572		
			27.8	8.3		13.3			0.570		
			100	12.6		5.6			0.566		
			153	15.3		4.5					
			187	14.5		3.5					
			267	16.8		2.8					
			495	25.3		2.3					
			1175	26.2		1.0					
cotton (13.8% N)			13	7.2		25.0				$M_{t,w}$; s_t; $D_A = D_w$	64
			23	8.8		16.5					
			46	11.1		10.8					
			74	10.8		6.45					
			90	12.8		6.30					
			178	15.2		3.80					
			262	17.1		2.90					
			456	20.5		2.00					
			630	21.5		1.50					
			2490	37.5		0.66					58,64
cotton (13.5–14% N)			74	10.8		6.45				$M_{t,w}$; s_t; $D_A = D_w$	49,58
	Acetone		178	15.2		3.80					58
			262	17.1		2.90					
			456	20.5		2.00					
			593	20.0		1.50					
			1130	30.5		1.20					
holo cellulose (spruce)			340	21.6	420	2.57	175	6.3	0.51	$M_{t,w}$; s_t; D_w	14
			780	13.4	210	2.4	65				14
holo cellulose (-cellulose)			230					7.7	0.51	$M_{t,w}$; s_t; D_w	14
linters			250	16		2.8				$M_{t,w}$; s_t; $D_A = D_w$	65
			344	15.8		2.05					
			780	19.0	420	1.0	210	12.2	0.510	$M_{t,w}$; s_t; D_w	14
linters, bleached			400	14.0	280	1.44	120	10.6	0.510		14
			600	19.0	420	1.11	225				
			680					11.5	0.510		
linters, bleached and unbleached			6	5.2		35				$M_{s,D}$	223
			30	8.7						SE	
			80	12.0						SE	
			199	18.0		3.7				$M_{s,D}$	
			613	30.0		2.0				$M_{s,D}$	
rayon pulp			24	17.6	480	3.01	235	6.0	0.51	$M_{t,w}$; s_t; D_w	14
			300	15.5	260	2.15	100	7.9	0.51		
			350	16.7	360	1.94		8.2	0.51		
			510	18.3	480	1.48		9.6	0.51		
			570	23.3	1150	1.66		8.2	0.51		
sulfate pulp			410	16.2	350	1.56	280	9.6	0.51	$M_{t,w}$; s_t; D_w	14
sulfite pulp			430	16.4	360	1.56	265	9.6	0.51	$M_{t,w}$; s_t; D_w	14
13.9% N			533			1.46				M_w; $D_{z,0}$; DLS	772

			870			1.03				
			1750			0.69				
			3600			0.43				
			430–3600			$D_0 = K_D\, M^{-0.72}$			M_w; DLS	772
	Butyl acetate							0.584		259
	Cyclohexanone		80.2	1.1				0.59	SE; $[s_0]$ given in Ref.	223
			613	2.0					$M_{s,D}$	
	Ethyl acetate	21.3	350					0.556	M_v	148
chemical cotton		20	370	11.4		1.49			$M_{l,w}$; s_l; D_w	91
			690	13.1		0.91				
raw cotton (Delfos variety)				1500			0.47			91
linters			195	9.3		2.40			$M_{l,w}$; s_l; $D_A = D_w$	65
viscose rayon			93	9.26		4.77			$M_{l,w}$; s_l; D_w	91
		20	17.5					0.545	M_n	91
		20	$Z_w = 3300$ (CLS)			0.59			$Z_n = 2600$ (OS); $D_{w,0}$; DLS; Z = degree of polymerization	773
			$Z_w = 2800$ (CLS)			0.77			$Z_n = 2100$ (OS); $D_{w,0}$; DLS	
			$Z_w = 2400$ (CLS)			0.97			$Z_n = 1600$ (OS); $D_{w,0}$; DLS	
purified chemical linters		30	41.3	6.34					M_w; $M_n = 34600$	90
			76	7.10					M_w; $M_n = 60600$	
			128	8.65					M_w; $M_n = 89000$	
			110	9.62					M_n	
			248	11.13					M_w	
			573	12.66					M_w; $M_n = 257000$	
			41.3–573	$s_0 = 3.04 \times 10^{-14}\, M_w^{0.29}$						90
	Methanol	20	80.2					0.54		223
	Pentyl acetate	20	27			13.3			$M_{w,w}$	259
			91			5.8				
			100			5.6				
			153			4.5				
			186			3.5				
			282			2.9				
			80.2	4.0				0.55	SE	223
			613	6.5					$M_{s,D}$	
unfractionated	Water	21	335	10.2	540				$M_{s,D}$	774
fractionated			63	5.8	100				$M_{s,D}$	774
			106	6.4	120					
			143	7.2	220					
			191	8.2	320					
			228	8.7	400					
			260	9.5	470					
			300	9.7	500					
			342	9.8	610					
			444	11.1	690					
			600	11.8	870					
			658	12.4	870					
			822	13.9	1250					

TABLE 10. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
			983	15.1	1220						
		21							0.59		774
Cellulose xanthate	Water/NaCl (1 mol/dm³)	0	$Z = 1460$	2.10				$f_0 = 1.16 \times 10^6$ g s^{-1} mol		See Ref. for degree of subst.	437
			$Z = 1060$	2.25				$f_0 = 1.01 \times 10^6$ g s^{-1} mol		Z = degree of polymerization	
			$Z = 590$	1.68				$f_0 = 0.73 \times 10^6$ g s^{-1} mol			
			$Z = 450$	1.81				$f_0 = 0.57 \times 10^6$ g s^{-1} mol			
			$Z = 360$	1.22				$f_0 = 0.52 \times 10^6$ g s^{-1} mol			
			$Z = 350$	1.05				$f_0 = 0.49 \times 10^6$ g s^{-1} mol			
sodium salt	Water/NaOH (0.2 mol/dm³)/NaCl (1.0 mol/dm³)	20	35–126	2.3–4.4	70–280	3.35–1.83	20–0	3.4–4.3	0.530	$M_{l,w}$; D_w	14
α-Cyclodextrin	Water	25 ± 0.01				32.0					775
Pullulan	Water + 0.02% (m/m) Sodium azide	25	167			2.36	−32.0			$[\eta] = 42.5$ cm³/g	1087
		40				3.20	−37.1				
		60				4.30	−35.3				
		80				6.70	−46.3				
		25	303			1.80	0			$[\eta] = 65.3$ cm³/g	
		40				2.50	0				
		60				4.10	5.1				
		80				5.00	12.8				
		25	513			1.40	23.6			$[\eta] = 95.4$ cm³/g	
		40				2.00	28.0				
		60				3.00	26.7				
		80				3.80	27.5				
		25	1000			1.00	55.0			$[\eta] = 154.2$ cm³/g	
		40				1.40	65.7				
		60				1.90	84.2				
		80				2.95	54.9				
	Water	25	107			2.56	−20.1			$[\eta] = 44$ cm³/g	1013
			188			1.94	−22.7			$[\eta] = 70$ cm³/g	
			384			1.34	−30.5			$[\eta] = 102$ cm³/g	
			572			1.12	−40.2			$[\eta] = 145$ cm³/g	
			811			0.92	−36.4			$[\eta] = 175$ cm³/g	
			1050			0.787	−35.0			$[\eta] = 225$ cm³/g	
			1490			0.630	76.2			$[\eta] = 250$ cm³/g	
			2100			0.567	30.2			$[\eta] = 310$ cm³/g	
			2360			0.530	114			$[\eta] = 338$ cm³/g	
Dextran											
T 500, linear	Ethanediol	5	154.3			4.40				M_w; $M_w/M_n = 1.26$; $C = 1$ g/dm³	779
			191.4			4.26				M_w; $M_w/M_n = 1.17$; $C = 1$ g/dm³	
			242.1			4.34				M_w; $M_w/M_n = 1.17$; $C = 1$ g/dm³	
			309.6			3.66				M_w; $M_w/M_n = 1.25$; $C = 1$ g/dm³	

		367.7	3.34	M_w; $M_w/M_n = 1.23$; $C = 1$ g/dm^3	
		434.1	3.48	M_w; $M_w/M_n = 1.32$; $C = 1$ g/dm^3	
linear		28.9	6.01	M_w; $M_w/M_n = 1.22$; $C = 1$ g/dm^3	779
		57.3	4.90	M_w; $M_w/M_n = 1.16$; $C = 1$ g/dm^3	
		92.5	4.72	M_w; $M_w/M_n = 1.16$; $C = 1$ g/dm^3	
		142.9	4.12	M_w; $M_w/M_n = 1.17$; $C = 1$ g/dm^3	
		185.6	2.86	M_w; $M_w/M_n = 1.13$; $C = 1$ g/dm^3	
		272.0	3.20	M_w; $M_w/M_n = 1.24$; $C = 1$ g/dm^3	
		433.4	2.80	M_w; $M_w/M_n = 1.31$; $C = 1$ g/dm^3	
branched		380.5	2.88	M_w; $M_w/M_n = 1.20$; $C = 1$ g/dm^3	779
		443.1	2.79	M_w; $M_w/M_n = 1.24$; $C = 1$ g/dm^3	
		493.3	2.77	M_w; $M_w/M_n = 1.29$; $C = 1$ g/dm^3	
		564.6	2.29	M_w; $M_w/M_n = 1.38$; $C = 1$ g/dm^3	
		617.7	2.38	M_w; $M_w/M_n = 1.35$; $C = 1$ g/dm^3	
		782.5	2.53	M_w; $M_w/M_n = 1.50$; $C = 1$ g/dm^3	
branched		280.8	3.66	M_w; $M_w/M_n = 1.34$; $C = 1$ g/dm^3	779
		324.6	3.49	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
		360.0	2.77	M_w; $M_w/M_n = 1.20$; $C = 1$ g/dm^3	
		401.6	2.76	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
		424.0	2.77	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
		472.5	2.49	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
		580.7	2.93	M_w; $M_w/M_n = 1.35$; $C = 1$ g/dm^3	
T 500, linear	5	154–434	$D_z = K_D\, M^{-0.28}$	M_w; $M_w/M_n < 1.3$; $C = 1$ g/dm^3	779
linear		29–434	$D_z = K_D\, M^{-0.30}$	M_w; $M_w/M_n < 1.3$; $C = 1$ g/dm^3	779
branched		380–783	$D_z = K_D\, M^{-0.25}$	M_w; $M_w/M_n < 1.5$; $C = 1$ g/dm^3	779
branched		280–580	$D_z = K_D\, M^{-0.40}$	M_w; $M_w/M_n < 1.4$; $C = 1$ g/dm^3	779

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TABLE 10. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm³/g)	D_0 ($\times 10^7$) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
	Water	20	10–200	1.1–6.0						s_t vs. M diagram	23
			20	2.02						M determ. by Ogston's method (Ref. 24,25)	
			44	3.04						s_t	24
			65	3.47							
			150	5.47							
			460	9.6							
		20.9	160						0.60	M_v	148
		20	18–400	$s_0 = 2.45 \times 10^{-16} M_w^{0.44}$							26
			13–200	$s_0 = 2.36 \times 10^{-16} M_n^{0.45}$							26
T 10		20	6			8.9				M_w; $D_{z,0}$; $M_w/M_n =$ 1.68; DLS	776
T 20			16.5			6.7				M_w; $D_{z,0}$; $M_w/M_n = 1.24$; DLS	
T 70			39.5			3.3				M_w; $D_{z,0}$; $M_w/M_n = 1.76$; DLS	
T 150			86.0			2.2				M_w; $D_{z,0}$; $M_w/M_n = 1.80$; DLS	
Dextran											
FDR 7783			120.3			2.2				M_w; $D_{z,0}$; $M_w/M_n = 1.32$; DLS	
			6–120.3			$D_{z,0} = (1.17 \pm 0.3) \times 10^{-4} M_z^{0.52 \pm 0.021}$				M_w/M_n 1.8; DLS; see Ref.	776
		25								$C = 2.72$ mass%; self diffusion; 5V	777
				3.24 ± 0.2						$C = 0.36$ mass%; 19V	777
								0.643 ± 0.002			777
		75				7.3 ± 0.4				$C = 2.72$ mass%; self diffusion; 9V	
Leuconostoc mesenteroides		20	9.8 ± 0.5			7.3 ± 0.3				M_w(CLS); $M_w/M_n =$ 1.6; $D_{z,0}$; DLS	
			20			5.8 ± 0.4				M_w(CLS); $M_w/M_n = 1.2$; $D_{z,0}$; DLS	
			43 ± 4			3.9 ± 0.1				M_w(CLS); $M_w/M_n = 1.3$; $D_{z,0}$; DLS	
			75 ± 4			3.1 ± 0.1				M_w(CLS); $M_w/M_n = 1.6$; $D_{z,0}$; DLS	
			110 ± 5			2.8 ± 0.1				M_w(CLS); $M_w/M_n = 1.4$; $D_{z,0}$; DLS	
			150 ± 7			2.3 ± 0.1				M_w(CLS); $M_w/M_n = 1.8$; $D_{z,0}$; DLS	
			230 ± 10			1.90 ± 0.05				M_w(CLS); $M_w/M_n = 2.1$; $D_{z,0}$; DLS	
			490 ± 30			1.25 ± 0.05				M_w(CLS); $M_w/M_n = 2.3$; $D_{z,0}$; DLS	
		20	10–500			$D_{z,0} = 2.25 \times 10^{-4} M^{-0.45}$				D in mm²/s, M in kg/mol	778

T 500 linear	Water	25	154.3	2.40	M_w; $M_w/M_n = 1.26$; $C = 1$ g/dm^3	779
			191.3	2.22	M_w; $M_w/M_n = 1.17$; $C = 1$ g/dm^3	
			242.1	2.08	M_w; $M_w/M_n = 1.17$; $C = 1$ g/dm^3	
			309.6	1.93	M_w; $M_w/M_n = 1.25$; $C = 1$ g/dm^3	
			367.7	1.75	M_w; $M_w/M_n = 1.23$; $C = 1$ g/dm^3	
			434.1	1.55	M_w; $M_w/M_n = 1.32$; $C = 1$ g/dm^3	
linear			28.9	3.17	M_w; $M_w/M_n = 1.22$; $C = 1$ g/dm^3	779
			57.3	3.08	M_w; $M_w/M_n = 1.16$; $C = 1$ g/dm^3	
			92.5	2.52	M_w; $M_w/M_n = 1.16$; $C = 1$ g/dm^3	
			142.9	2.51	M_w; $M_w/M_n = 1.17$; $C = 1$ g/dm^3	
			185.6	2.13	M_w; $M_w/M_n = 1.13$; $C = 1$ g/dm^3	
			272.0	1.82	M_w; $M_w/M_n = 1.24$; $C = 1$ g/dm^3	
			433.4	1.46	M_w; $M_w/M_n = 1.31$; $C = 1$ g/dm^3	
branched			380.5	1.68	M_w; $M_w/M_n = 1.20$; $C = 1$ g/dm^3	779
			443.1	1.53	M_w; $M_w/M_n = 1.24$; $C = 1$ g/dm^3	
			493.3	1.49	M_w; $M_w/M_n = 1.29$; $C = 1$ g/dm^3	
			564.6	1.42	M_w; $M_w/M_n = 1.38$; $C = 1$ g/dm^3	
			617.7	1.35	M_w; $M_w/M_n = 1.35$; $C = 1$ g/dm^3	
			782.5	1.24	M_w; $M_w/M_n = 1.50$; $C = 1$ g/dm^3	
			280.8	1.95	M_w; $M_w/M_n = 1.34$; $C = 1$ g/dm^3	779
			324.6	1.83	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
			360.0	1.72	M_w; $M_w/M_n = 1.20$; $C = 1$ g/dm^3	
			401.6	1.67	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
			424.0	1.62	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
			472.5	1.53	M_w; $M_w/M_n = 1.28$; $C = 1$ g/dm^3	
			580.7	1.41	M_w; $M_w/M_n = 1.35$; $C = 1$ g/dm^3	

TABLE 10. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
T 500, linear		25	154–434			$D_z = K_D M^{-0.40}$				M_w; $M_w/M_n = 1.3$; $C = 1$ g/dm^3	779
linear			29–434			$D_z = K_D M^{-0.29}$				M_w; $M_w/M_n = 1.3$; $C = 1$ g/dm^3	779
branched			380–783			$D_z = K_D M^{-0.41}$				M_w; $M_w/M_n = 1.5$; $C = 1$ g/dm^3	779
branched			280–580			$D_z = K_D M^{-0.44}$				M_w; $M_w/M_n = 1.4$; $C = 1$ g/dm^3	779
T 250				3.3						Extrapolated value (C = 0); 25V	
									0.598	$C = 0.0903$–0.1508 mass%	
			11; 19; 100; 510							D given in Ref.	750
	Water	25	9.9			9.10	~10			$M_w/M_n = 1.62$	999
			39.7			4.39	~10			$M_w/M_n = 1.60$	
			65.0			3.32	~10			$M_w/M_n = 1.85$	
			481			1.40	~20			$M_w/M_n = 2.69$	
Dextran	Water		2270			0.74	~60				
			3250			0.66	~90				
PL 10	0.05 g/cL sodium azide	20	7.5			9.00				$[\eta] = 7.42$ cm^3/g	1015
PL 15			14.5			6.31				$[\eta] = 10.53$ cm^3/g	
PL 40			41.6			4.14				$[\eta] = 18.85$ cm^3/g	
PL 100			120.7			2.57				$[\eta] = 29.77$ cm^3/g	
PL 400			374			1.30				$[\eta] = 50.57$ cm^3/g	
PL 900			1270			0.78				$[\eta] = 64.20$ cm^3/g	
	Water/Na_2HPO_4 (0.025 mol/dm^3)/NaH_2PO_4 (0.025 mol/dm^3)	20	14	1.64		7.50		1.88		$M_{t,A}$; s_t; D_A	92
			36	2.64		4.69		2.19			
			84	4.1		3.12		2.49			
			141	5.3		2.40		2.79			
			240	6.55		1.73		3.15			
			1990	23.3		0.75		3.61			
			3050	26.4		0.55		4.25			
			38000	150		0.25		4.03			
p/bar	Water										
1		30	1000			1.04	81.5			DLS	1084
2000						1.00	71.4				
1		70	1000			1.58	124.1				
2000						1.46	100.7				
1		100	1000			2.60	105.8				
2000						2.26	112.4				
1		30	7400			0.58	63.3				
2000						0.53	59.2				
1		70	7400			1.42	32.9				
2000						1.19	29.0				
1		100	7400			2.00	30.8				
2000						1.66	35.5				
1		30	17500			0.42	−49.6				

2000					0.38	−45.2				
1		50	17500		0.61	−51.0				
2000					0.54	−46.3				
1		100	17500		1.48	−49.3				
2000					1.23	−47.1				
1		30	21100		0.98	−29.4				
2000					0.35	−31.6				
1		50	21100		0.85	−37.9				
2000					0.73	−33.4				
1		70	21100		0.60	−38.2				
2000					0.52	−28.1				
1		100	21100		1.45	−53.7				
2000					1.15	−54.0				
Leuconostoc mesenteroides										
ca. 5% branched	Water/Na_2HPO_4 (0.05 mol/dm^3)/NaH_2PO_4 (0.05 mol/dm^3)	20	11.2–437	1.57–9.82	8.80–1.40		1.74–3.22	0.611	$M_{t,A}$; s_t; D_A see Ref. for f_0/f_{sp} and D_0	167
				$s_t = 1.45 \times 10^{-15}\ M_{t,A}^{0.50}$						
highly branched	Water/Na_2HPO_4 (0.05 mol/dm^3)/NaH_2PO_4 (0.05 mol/dm^3)	20	28.8					0.603	$M_{t,A}$; s_t; D_A see Ref. for f_0/f_{sp} and D_0	167
Dextran										
				$s_t = 3.43 \times 10^{-15}\ M_{t,A}^{0.42}$						167
2-(Diethylamino)ethyl-dextran										
DEAE PL 1	0.8 M sodium nitrate	20	1.58		17.6				$[\eta] = 3.34\ cm^3/g$	1015
DEAE PL 10			11.30		7.8				$[\eta] = 8.72\ cm^3/g$	
DEAE PL 15			21		5.52				$[\eta] = 11.59\ cm^3/g$	
DEAE PL 40			45.7		3.56				$[\eta] = 19.45\ cm^3/g$	
DEAE PL 100			131		2.04				$[\eta] = 31.49\ cm^3/g$	
DEAE PL 400			429		1.13				$[\eta] = 52.15\ cm^3/g$	
DEAE PL 900			1474		0.709				$[\eta] = 65.73\ cm^3/g$	
β-Dextrin	Water	20	1.134	0.48				0.627	$C = 1\ g/dm^3$	171
Ethyl cellulose	Acetone	20	78.8	5.53	5.7			0.885	$M_{s,D}$; D_A	412
			52.1	4.81	7.5					
			35.9	4.33	9.8					
			19.4	3.48	14.6					
			11.45	3.02	21.4					
			20		3.46				$C = 6.1\ g/dm^3$; see Ref. for D	21
			53		1.43				$C = 5.0\ g/dm^3$	
			90		1.05				$C = 5.16\ g/dm^3$	
	sym-tetrachloroethane	21.9	190					0.864	M_v	148
Ethyl hydroxyethyl cellulose										
ca. 18% ethoxyl	Water	20	92	2.0	1.9	30	3.8	0.721	$M_{t,w}$; s_t; D_w; D_A given in Ref.	94
ca. 30% ethoxyl + hydroxyethyl			140	2.32	1.4	30	4.1	0.711		
			200	2.63	1.1	30	5.1	0.703		
			300	3.0	0.8	30	6.0	0.705		
			92–300	$s = 3.1 \times 10^{-15}\ M^{0.36}$	$D_w = 10^{-4}\ M^{-0.7}$				MA,w; s_t	94

TABLE 10. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Ficoll (Pharmacia)	Water	25	400	4.37						M_w; s_0; 11V; $C = 5.7–298$ g/dm^3	782
Galactomannan											
Carob	Water	20	319	4.65		0.97			0.629	$M_{w,w}$; $D_{w,0}$; $M_{s,D}$;	781
Guar			657	5.33		0.54			0.635	$D_{A,0}$ given in Ref.	
Lotus I			3.7	1.35		24.2			0.628		
Lotus II			332	5.43		1.09			0.630		
Lucerne			239	7.69		2.14			0.636		
Redclover			416	4.81		0.77			0.630		
Galactomannan											
S. japonica			152	3.02		1.32			0.629		
Soybean			16.6	1.72		6.90			0.634		
										k_s, k_D, a_s, a_D given in Ref.	781
Glucose carbanilate	1,4-dioxane	20	0.76	0.190		23.5	−50			M_w; $D_{z,0}$; DLS	768
Hydroxyethyl	Water	19.2	470						0.678	M_v	148
		25	125	2.82	385	1.86		3.96	0.701	$M_{t,w}$; s_t; v_2 at 20°C	98
			330	4.45	1020	1.11		4.78			
			420	4.90	1190	0.96	5.12				
			545	5.65	1580	0.85		5.29			
Hydroxyethyl											
			125–545	$s = 1.0 \times 10^{-15}\, M_{t,w}^{0.46}$		$D = 8.2 \times 10^{-5}\, M^{-0.54}$				$M_{t,w}$; s_t	98
Natrosol 250 G		25	150	2.89						$M_{s,D}$; s_0; 9V; $C = 0.4–48$ g/dm^3	782
Hydroxypropyl cellulose										$M_{s,D}$; s_0; 11V; $C = 1.1–98$ g/dm^3	782
Klucel-L	Water	25	73	1.72							
		25	73	1.87	101.4				0.773	$M_{s,D}$; $M_{s,D}/M_n < 2$; s_0	783
		30	73	2.17	96.8						
		34	73	2.28	74.8						
		37	73	2.36	59.2						
	Water	40 ($T = \theta$)	73	2.54	44.4	5.0				M_w; $C = 10$ g/dm^3	784
			11			5.0					
			17			3.0					
			60			2.7					
			110			1.9					
			1000			0.57				M_w; s_0; $D_{z,0}$; DLS	768
Maltotriose carbanilate	1,4-Dioxane	20	1.8	0.332		17.3	−6				
Methyl cellulose											
22.6% methoxyl	Water	20	14	0.83				3.0	0.68	M_w; SE	222
27.05% methoxyl			70.6	1.29		1.49				$M_{t,A}$; s_t; D_A	19
27.44% methoxyl			151	1.67		0.92			0.704		
28.45% methoxyl			302	2.50		0.71			0.710		
28.8% methoxyl			22.6	0.79		3.05			0.683		19,20
			24.3	0.79				3.9	0.717	M_w; SE	222
31.7% methoxyl			34.3	0.89		2.34			0.720	$M_{t,A}$; s_t; D_A	19,20
31.8% methoxyl			38.1	0.89				4.5	0.73	M_w; SE	222

Polymer	Solvent	T (°C)	M (×10^-3) (g/mol)	s_0 (×10^13) (s)	k_s (cm³/g)	D_0 (×10^7) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
ca. 28% methoxyl									$v_2 = 0.0560 + 0.0542\ C_{OCH_3}$ (C in%)		19,20
				$s_0 = 0.85 \times 10^{-15}\ M_{\eta,A}^{0.45}$		$D_0 = 7.9 \times 10^{-5} M_{\eta,A}^{-0.56}$					
	Water/NaCl (0.2 mol/dm³)	20	14.1			4.45				av. of M not specified; see Ref. for D	21
			24.3			3.05				$C = 5.0$ g/dm³; see Ref. for D	
			38.1			2.47				See Ref. for D	
Xanthan	Water (deionized)	RT	2000			0.242				$D_{z,0}$; DLS	785
			2000							M_w; $D_{z,0}$; DLS	785
	Water/NaCl (0.3 mol/dm³)		2000			0.194				$D_{z,0}$; DLS	785
	Water/NaCl (1 mol/dm³)		2000			0.155					785
	Water/urea (4 mol/dm³) (heat treated)		2000			0.280					785
	Water 0.1 M NaCl	25	9000			0.166				M_w; $D_{z,0}$; DLS; $C = 0.025–0.1\%$	786,787
native			2940			0.155	873			DLS	1011,1012
pyruvate-free			1370			0.260	296				
acetate-free			1770			0.260	231				

TABLE 11. OTHER BIOPOLYMERS [PROTEINS, POLY(NUCLEOTIDES)]

Polymer	Solvent	T (°C)	M (×10^-3) (g/mol)	s_0 (×10^13) (s)	k_s (cm³/g)	D_0 (×10^7) (cm²/s)	k_D (cm³/g)	f_0/f_{sp}	v_2 (cm³/g)	Remarks	Refs.
β-Alanine	Water	25				101.4				D; $C = 1$ mass%	788
		36				147.1					
Aldolase			40			2.65	$D_0 k_D = -0.07$			$D_{0,z}$; $D_0\eta_0/T = 13.04$	789,718
Poly(γ-benzyl-L-glutamate)	Dichloroacetic acid										
	0 to 100 vol%[a]	25	530	3.8–4.2						M_v; s	566
	N,N-Dimethylformamide	21	59–364	$s_c = 2.8 \times 10^{-14}\ M^{0.2}$		$D_c = 2.8 \times 10^{-3}\ M^{-0.8}$			0.786	$M_{s,D}$; for s_c and D_c see Ref.	559
		25	300		100	1.1			0.779	CLS	581
			550		180	0.75				CLS	
		25	51–410	1.62–3.91	9–141					for s_0 and k_s see Ref.	434
			36.4–4350	1.77–3.95	15–141					CLS; for s_0, k_s and M_A see Ref.	450

[a] helix to coil transition between 60 and 80 vol%

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TABLE 11. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
		RT	83	2.2						M_v; D_z	717
			220	3.0		1.30					
			370	3.5		0.84					
			38				2.0			M_w; $M_n = 29000$; $D_{0,z}$ given in Ref.	668
			73				6.8			M_w; $M_n = 43000$; $D_{0,z}$ given in Ref.	
			80				3.9			M_w; $M_n = 48000$; $D_{0,z}$ given in Ref.	
			95				4.9			M_w; $M_n = 55000$; $D_{0,z}$ given in Ref.	
			200				15.0			M_w; $M_n = 101000$; $D_{0,z}$ given in Ref.	
			210				18.6			M_w; $M_n = 128000$; $D_{0,z}$ given in Ref.	
			560				33.5			M_w; $M_n = 190000$; $D_{0,z}$ given in Ref.	
		25	320	3.70						M_w; 10V (C = 0.58–15.08 g/dm^3)	782
		30	300			1.33	11				1016
Poly(γ-benzyl-α,L-glutamate)	Benzylalcohol	70	318			0.4763					1042
Poly(L-lysine)-hydrobromide		25									
	Water/NaBr (3.02 × 10^{-1} mol/dm^3)			84.8		$c_p = 3 \times 10^{-3}$ g/cm^3; $D = 2.6 \times 10^{-7}$ cm^2/s					1041
						$c_p = 1 \times 10^{-3}$ g/cm^3; $D = 2.2 \times 10^{-7}$ cm^2/s					
						$c_p = 5 \times 10^{-4}$ g/cm^3; $D = 2.0 \times 10^{-7}$ cm^2/s					
	Water/NaBr (7.41 × 10^{-2} mol/dm^3)		84.8			$c_p = 3 \times 10^{-3}$ g/cm^3; $D = 3.0 \times 10^{-7}$ cm^2/s					
						$c_p = 1 \times 10^{-3}$ g/cm^3; $D = 2.4 \times 10^{-7}$ cm^2/s					
						$c_p = 5 \times 10^{-3}$ g/cm^3; $D = 2.2 \times 10^{-7}$ cm^2/s					
	Water/NaBr (5.75 × 10^{-3} mol/dm^3)		84.8			$c_p = 5 \times 10^{-3}$ g/cm^3; $D = 18 \times 10^{-7}$ cm^2/s					
						$c_p = 1 \times 10^{-3}$ g/cm^3; $D = 8 \times 10^{-7}$ cm^2/s					
						$c_p = 1 \times 10^{-4}$ g/cm^3; $D = 1.7 \times 10^{-7}$ cm^2/s					
	Water/NaBr (2.00 × 10^{-3} mol/dm^3)		84.8			$c_p = 5 \times 10^{-3}$ g/cm^3; $D = 32 \times 10^{-7}$ cm^2/s					
						$c_p = 1 \times 10^{-3}$ g/cm^3; $D = 11 \times 10^{-7}$ cm^2/s					
						$c_p = 5 \times 10^{-5}$ g/cm^3; $D = 1.6 \times 10^{-7}$ cm^2/s					
	Water/NaBr (7.41 × 10^{-4} mol/dm^3)		84.8			$c_p = 3 \times 10^{-3}$ g/cm^3; $D = 30 \times 10^{-7}$ cm^2/s					
						$c_p = 7.5 \times 10^{-4}$ g/cm^3; $D = 12 \times 10^{-7}$ cm^2/s					
						$c_p = 8 \times 10^{-5}$ g/cm^3; $D = 1.9 \times 10^{-7}$ cm^2/s					
	Water/NaBr (6.92 × 10^{-5} mol/dm^3)		84.8			$c_p = 5 \times 10^{-3}$ g/cm^3; $D = 40 \times 10^{-7}$ cm^2/s					
						$c_p = 3 \times 10^{-3}$ g/cm^3; $D = 42 \times 10^{-7}$ cm^2/s					
						$c_p = 1.5 \times 10^{-3}$ g/cm^3; $D = 30 \times 10^{-7}$ cm^2/s					
Poly(adenylic acid)											
	Water/NaCl (0.1 mol/dm^3)	20	3500			0.84				D_z; $C = 4.8$ g/dm^3; DLS	883
	Water/NaCl (0.01 mol/dm^3)		3500			0.38				D_z; $C = 2.4$ g/dm^3; DLS	

	Water/cacodylate (pH = 7.4)		3500		0.10		D_z; $C = 0.12\ g/dm^3$; DLS	
Bovine plasma albumin								
	Water/NaCl (0.2 mol/dm^3)	18–22	68		5.8 ± 0.1		M_w; $D_{0,w}$; DLS	876
	Water/NaCl (0.1 mol/ dm^3)/phosphate (0.1 mol/dm^3; pH = 7)	20			D_z $M_w = 4.0 \times 10^{-2}$ cm/s g/mol		$C = 25\%$	852
Bovine serum albumin								
	Water (pH = 5.2)	20			6.70		D_{app}	872
	Water	25			9.03		D; $C = 1$ mass%	788
		36			16.5		D; $C = 1$ mass%	788
	Water/NaCl (0.10–0.15 mol/dm^3)	22			5.65 ± 0.35		$D_{0,z}$; DLS	879
	Water/Tris/HCl (0.5 $mmol/dm^3$; pH = 7.4)	20			6.00		D_{app}	740
	(10.0 $mmol/dm^3$; pH = 7.4)				5.50		D_{app}	740
	(100.0 $mmol/dm^3$; pH = 7.0)				6.1		D_{app}	873
	(120.0 $mmol/dm^3$; pH = 4.7)				5.90		D_{app}	874
	(1000.0 $mmol/dm^3$; pH = 7.8)				5.00		D_{app}	875
	Water/Gdn-HCl	30	67		1.907	$D_0 k_D = (3.26 \times 10^{-6}\ cm^5/g/s$	DLS; Gdn = Guanidin	718
	Water/phosphate buffer	20		4.5			$s_{0,w}$; SV	877
	Water/phosphate buffer (pH = 6)	20			5.76 ± 0.05		$D_{0,z}$; DLS	878
denaturated	Water/Gdn-HCl	25	69		1.907	$D_0 k_D = 3.28 \times 10^{-6}\ cm^5/g/s$	$D_{0,z}$; DLS; Gdn = Guanidin	789
globular		25	69		6.69	$D_0 k_D = -4.52 \times 10^{-6}\ cm^5/g/s$	$D_{0,z}$; DLS	789
Casein micelles								
α_{S1}-casein	0.2 M phosphate buffer, pH = 6.7	35	3400		0.45 ± 0.03			1048
Chromatin subunit								
	Water/NaCl (0.1–2 mol/dm^3)				3.4–1.8		$M_w/M_n = 1.07$; see Ref.	880
Chymotrypsinogen	Water/Gdn-HCl	30	5.7		3.15	$D_0 k_D = -0.70 \times 10^{-6}\ cm^5/g/s$	DLS; Gdn = Guanidin	718
		25	25.7		3.15	$D_0 k_D = -0.70 \times 10^{-6}\ cm^5/g/s$	DLS	789
	Water/NaCl (0.2 mol/ dm^3)	18–22	29		7.4 ± 0.3		M_w; $D_{0,w}$; DLS	876
Collagen	Water	5			4.36		D_z; $C = 158\ g/dm^3$; DLS	881
		12			4.32		D_z; $C = 157\ g/dm^3$; DLS	
		20			4.12		D_z; $C = 147\ g/dm^3$; DLS	
native		20			0.86 ± 0.02		D_z; $C = 0.4$ mass%; DLS	
DNA	Water/NaCl (0.2 mol/ dm^3)/Na_2EDTA (0.01 mol/dm^3)	20			0.223 ± 0.06		D_z; DLS; pH = 6.5	884
calf thymus	Water/NaCl (0.1 mol/ dm^3)	20	14500	22.0	0.080		D_z; DLS	885,887
		20	156		2.06		CLS and DLS	1014

TABLE 11. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
	Water/NaCl (0.5 mol/dm^3)	20	10000	20.0		0.114					
	Water/NH_4Ac (0.4 mol/dm^3)	20	11700	17.1		0.096					
	Water/LiCl (5.5 mol/dm^3)	20	10300	9.3		0.130–0.193				D_z; DLS; see Ref.	885,887
	Water/NaCl (0.14 mol/dm^3)/Tris (0.01 mol/dm^3)	25				0.05				D_z; DLS; pH = 8	886
	Water/NaCl (1.0 mol/dm^3)	20				0.118				D_z; DLS; pH = 7	887
	Water/NaCl (1.0 mol/dm^3)/EDTA	22–23				0.15				D_z; $C = 0.04$ g/dm^3; DLS; pH = 9.6	888,887
	Water/NaCl (1.0 mol/dm^3)	22–23				0.14				D_z; $C = 0.04$ g/dm^3; DLS; pH = 10.3	
histone (1:1)	Water/NaCl (0.8 mol/dm^3)	20	1500			0.265 ± 0.008				D_z; DLS; urea (2 mol/dm^3); phosphate buffer	889
	Water/NaCl (1.0 mol/dm^3)					0.234 ± 0.009					
	Water/NaCl (1.2 mol/dm^3)					0.183 ± 0.005					
	Water/NaCl (1.4 mol/dm^3)					0.187 ± 0.005					
	Water/NaCl (1.5 mol/dm^3)					0.186 ± 0.005					
pure	Water/NaCl (0.8 mol/dm^3)	20	1500			0.155 ± 0.003				D_z; DLS; $C = 0.7$ g/dm^3	889
	Water/NaCl (0.8 mol/dm^3)	20	1500			0.166 ± 0.012				D_z; DLS; $C = 0.35$ g/dm^3	
	Water	5				4.36				D_z; $C = 158$ g/dm^3; DLS	881
histone F_1 (1:1)		20									
	Water/NaCl (0.8 mol/dm^3)	20	1500			0.103 ± 0.004				D_z; DLS	889
histone F_2A (1:1)	Water/NaCl (0.8 mol/dm^3)	20	1500			0.259 ± 0.009				D_z; DLS	
E. coli phage 14	Water	20	(1.9 ± 0.2) 10^5			0.25 × 0.03				$D_{0,z}$; DLS	738
			(1.925 ± 0.066) 10^5			0.295 ± 0.003				$D_{0,z}$; DLS	895
Gelatin	Formamide	25	292			0.358	35			$M_w/M_n = 2.3$	1000
			346			0.324	50			$M_w/M_n = 2.7$	
			371			0.311	63			$M_w/M_n = 1.8$	
Glycoprotein ovomucoid	Water					4.03	$D_0k_D = 7.25 \times 10^{-6}$ cm^5/g/s			$D_{0,z}$; DLS	789
Glycoproteins											
Blood-group-specific glycoprotein (human)		–						0.731		Nonprotein component 2%	1049
Butyrylcholinesterase (horse)									0.707	20%	
Cervial (bovine)									0.635	74%	
Fibrinogen (human)									0.725	2.5%	
Prothrombin (human)									0.713	10%	
Submaxillary (ovine)									0.685	41%	

Submaxillary (porcine)						0.66	54%	
Tamm-Horsfall (human)						0.692	28%	
Lipoproteins								
HDL (human)						0.884	50%	1049
HDL_2 (human)						0.897	59%	
LDL_1 (porcine)						0.952	72%	
LpB (human)						0.953	78.5%	
$VHDL_1$ (human)						0.83	38%	
Nucleoproteins								
Alfalfa mosaic virus						0.703	16%; RNA	1049
Bacteriophage fd (*E. coli*)						0.71	12%; DNA	
Bacteriophage R 17 (*E. coli*)						0.681	30%; RNA	
Bacteriophage T 7 (*E. coli*)						0.639	51%; DNA	
Bacteriophage T 2 (*E. coli*)						0.66	55%; DNA	
Fog virus 3						0.713	10% lipide	
Nucleosome (chicken)						0.654	45%; DNA	
30 S Ribosome (*E. coli*)						0.601	70%; RNA	
Southern bean mosaic virus (cowpeas)						0.693	21%; RNA	
Tobacco mosaic virus						0.728	5%; RNA	
Metalloprotein								
Ferritin (horse spleen)						0.589	38% iron hydroxide	1049
haemocyanin (*M. trunculus*)	Water/NaCl (0.1 mol/dm^3)/ acetate buffer (0.1 mol/dm^3)		9200		(1.03 ± 0.01)–(1.08 ± 0.01)		$D_{0,z}$; DLS; pH = 5.7	878
Haemoglobin	Water	13			5.58		D_z; DLS; $C = 1.25$ mass%	890
		15			6.46		D_z for $C = 17$ mass% given in Ref.	
		18			6.81			
		21			7.38			
		24			7.82			
		27			8.13			
		30			8.33			
		33			8.50			
		35			8.59			
		37			8.61			
Histone (lysin rich)	Water/NaCl (0.14 mol/ dm^3)/Tris (0.01 mol/dm^3)	25	11		8.5		$D_{0,z}$; DLS; pH = 8	891
Lysozyme	Water	20			10		D_z; $C = 20\,g/dm^3$; DLS	892
	Water/NaCl (0.1 mol/ dm^3)/phosphate buffer	20			10.6 ± 0.02		$D_{0,z}$; DLS; pH = 6.0	878
Nitrochitin	Dimethylformamide	26		$s_0 = 1.12 \times 10^{-14}\ M_w^{0.29}$ $10000 \le M_w \le 170000$ g/mol	$D_0 = 7.02 \times 10^{-4}\ M_w^{-0.70}$ $10000 \le M_w \le 170000$ g/mol			1081
Polynucleosome								
	Water/Tris–HCl (30.0 mmol/dm^3)	20			0.65		D_z; DLS; pH = 7.4	740
	Water/Tris–HCl (10.0 mmol/dm^3)				0.61		D_z; DLS; pH = 7.4	
	Water/Tris–HCl (0.5 mmol/dm^3)				0.53		D_z; DLS; pH = 7.4	
	Water/Tris–HCl (0.1 mmol/dm^3)				0.39		D_z; DLS; pH = 7.4	

TABLE 11. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	s_0 ($\times 10^{13}$) (s)	k_s (cm^3/g)	D_0 ($\times 10^7$) (cm^2/s)	k_D (cm^3/g)	f_0/f_{sp}	v_2 (cm^3/g)	Remarks	Refs.
Pepsinogen	Water	25	40			2.52	$D_0 k_D = 3.95 \times 10^{-6}$ cm^5/g/s			$D_{0,z}$; DLS	789,718
Phosphatidyl choline vesicles											
	D_2O/CsCl (0.001 mol/dm^3)	25				0.341				D_z; DLS; $C = 13$ g/dm^3	893
						1.24					
Serum albumin	Water/NaCl (0.2 mol/dm^3)/NaF (0.005 mol/dm^3)	20	69	4.0		6.1 ± 0.1				$D_{0,z}$; D_w and D_s given in Ref.	896
Sucrose	Water	25				52.3				$C = 1$ mass%	788
		36				65.8				$C = 1$ mass%	
Urease	Water/NaCl (0.2 mol/dm^3)	18–22	60			3.4 ± 0.1				M_w; $D_{0,w}$	876
Virus R 17	Water	20	4020 ± 170			1.534 ± 0.015				$D_{0,z}$; DLS	894
Qβ			4550 ± 160			1.423 ± 0.014				$D_{0,z}$; DLS	
BSV			8810 ± 170			1.246 ± 0.013				$D_{0,z}$; DLS	
PM2			47900 ± 1700			0.650 ± 0.007				$D_{0,z}$; DLS	
T7			50900 ± 1100			0.644 ± 0.007				$D_{0,z}$; DLS	
Proteins	Water/Gdn HCl (6 mol/dm^3)/mercaptoethanol (0.1 mol/dm^3)	25				$D_{0,z} = 6.96 \times 10^{-6}\ n^{-0.560}$				DLS; n = number of chain segments; Gdn = Guanidine	789

C. SECOND VIRIAL COEFFICIENTS OF POLYMERS IN SOLUTION

1. Introduction

The behavior of polymers in solution can be described by the colligative properties introducing the virial coefficients A_2, A_3, etc.

According to the theory of McMillan and Mayer (866–868), the second virial coefficient of a monodisperse polymer solution is defined as

$$A_2 = (N_A/(2VM^2)) \int (F_1(1)F_1(2) - F_2(1,2))\,d(1,2) \quad \text{(C1)}$$

where N_A is Avogadro's number, V is the volume of the system, M is the molar mass of the dissoluted polymer, $F_1(1)$, $F_1(2)$, and F_2 (1,2) are the molecular distribution functions of species 1 (solvent molecule) and species 2 (solute molecule), and d(1,2) is the differential volume element in hyperspace. The integral in Eq. (C1) is called the cluster integral. The distribution functions for the molecules, F_1 and F_2, are to be evaluated at zero concentration.

There are a couple of methods for the experimental determination of the second virial coefficient.

1.1. Colligative Properties The vapor pressure depression of the solvent in a polymer solution is expressed as

$$\begin{aligned}(p_1^0 - p_1)/p_1 &= \Delta p_1/p_1 \\ &= V_1^0 C(1/M_n + A_2 C + A_3 C^2 + \cdots)\end{aligned} \quad \text{(C2)}$$

where p_1^0 and p_1 are the vapor pressure of the pure solvent and the solvent in the solution, V_1^0 is the molar volume of the pure solvent, C is the mass concentration of the polymer, M_n is the number average of the molar mass, and $A_2, A_3, \ldots$ are the virial coefficients. For theta conditions, the virial coefficents are zero.

The freezing point depression, $T_{F,1}$, of a polymer solution is

$$T_1^0 - T_1 = \Delta T_{F,1} = E_F C(1/M_n + A_2 C + A_3 C^2 + \cdots) \quad \text{(C3)}$$

and the boiling point increase, $T_{B,1}$, is

$$T_1 - T_1^0 = \Delta T_{B,1} = E_B C(1/M_n + A_2 C + A_3 C^2 + \cdots) \quad \text{(C4)}$$

with T_1^0 and T_1 the boiling point (freezing point) of the pure solvent and of the solvent in the solution, and E_F and E_B are the cryoscopic and ebullioscopic constants.

The osmotic pressure of a polymer solution can be described as

$$\pi = RTC(1/M_n + A_2 C + A_3 C^2 + \cdots) \quad \text{(C5)}$$

where R and T are the gas constant and the absolute temperature. In some cases $B = RTA_2$ is given (instead of A_2).

With certain assumptions it is possible to express the third virial coefficent, A_3, in terms of the second virial coefficient (379–381). Especially when A_2 is small, it is found that, for example, Eq. (C5) can be approximately expressed as (Ref. 382)

$$\pi = (RTC/M_n)(1 + (A_2 M_n/2)C)^2 \quad \text{(C6)}$$

if $A_3 = A_2^2 M_n/4$.

Following Eqs. (C2)–(C6), the dimension of A_2 is given in mol cm^3/g^2 or mol m^3/kg^2.

1.2. Scattering Methods (Classical Light Scattering, X-ray Scattering, Neutron Scattering) Based on the fluctuation theory of Smoluchowski (383) and Einstein (384), which links osmotic pressure with classical light scattering, Debye (385) established the fundamental equation for the light scattering of polymers in solution:

$$KC/R(q) = (M_w p_z(q))^{-1} + 2A_2 Q(q)C + \cdots \quad \text{(C7)}$$

with $q = (4\pi/\lambda)\sin\theta/2$ and

$$p(q) = (2/N^2) \int_0^N (N - n)\sin q h_n / q h_n \,dn$$

Equation (C7) makes it possible to determine the virial coefficients from classical light scattering measurements and can also be applied on X-ray and neutron scattering. In Eq. (C7), K is a constant and $R(q)$ is the excess intensity of the scattered beam at the value q, at unit distance and unit primary intensity. M_w denotes the mass average of the molar mass and $P_z(q)$ is the z-mean of the scattering function from which the dimensions of the dissoluted polymer can be calculated (h_n is the distance between scattering points 0 and n). The $Q(q)$-function corresponds to the q-dependence of A_2. $P(q)$ denotes the scattering function of a monodisperse polymer.

1.3. Sedimentation Velocity The determination of sedimentation and diffusion coefficient, s and D, yields the virial coefficients of a polymer solution (Ref. 800):

$$(D/s)(1 - v_2\rho_1) = RT(1/M + 2A_2 C + 3A_3 C^2 + \cdots) \quad \text{(C8)}$$

where v_2 is the partial specific volume of the solute and ρ_1 is the density of the solvent.

1.4. Sedimentation Equilibrium The sedimentation equilibrium in an ultracentrifuge gives (Ref. 800)

$$\omega^2 r(1 - v_2\rho_1)/(\partial \ln C/\partial r) = RT(1/M + 2A_2C + 3A_3C^2 + \cdots) \tag{C9}$$

where ω is the angular velocity and r is the distance from the center of rotation.

1.5. p–V–T Measurements The virial coefficients are related to thermodynamic quantities

$$A_2 + A_3C + \cdots = -\mu_1^E/(RTC^2V_1) \tag{C10}$$

where V_1 is the partial molar volume of the solvent and μ_1^E is the excess chemical potential of the solvent in the solution.

$$\mu_1^E = (\partial G_m^E/\partial x_1)_{p,T,x_2};\ G_m = G_m^E - G_m^{id} \tag{C11}$$

G_m^E is the molar excess Gibbs energy, G_m is the molar Gibbs energy, and G_m^{id} is the molar Gibbs energy of an ideal solution. With the help of the equation

$$(\partial G_m/\partial p)_{T,x_j} = V_m^E \tag{C12}$$

μ_1^E, and consequently the virial coefficients, can be calculated from p–V–T measurements.

1.6. Averages of the Second Virial Coefficient The average of A_2 for heterogeneous polymers is rather complicated and depends on the measuring method. If A_2 is obtained from measurements based on colligative methods, it will give the average (Ref. 860)

$$A_2^\pi = \int_{i=0}^{\infty}\int_{j=0}^{\infty} A_{ij}\, w(M_i)w(M_j)\, dM_i\, dM_j = (A_2)_{w,w} \tag{C13}$$

This is a double mass average of A_2.

Classical light scattering measurements will give the average (Ref. 860)

$$A_2^{LS} = (1/M_w)^2 \int_0^{\infty}\int_0^{\infty} A_{ij} M_i M_j\, w(M_i)w(M_j)\, dM_i\, dM_j = (A_2)_{z,z} \tag{C14}$$

This is a double z-average of A_2. A_{ij} is defined as

$$A_{ij} = (N_A/(2VM_iM_j)) \int (F_1(i)F_1(j) - F_2(i,j))d(i,j) \tag{C15}$$

where i stands for a molecule of the ith species and j for one of the jth species.

1.7. Second Virial Coefficient – Molar Mass Relationship The dependence of A_2 on the molar mass can be given by a power expression

$$A_2 = K_A M^{a_A} \tag{C16}$$

where K_A and a_A are empirical constants determined for each polymer solvent system at given values of temperature and pressure.

In Section C, relationship (C16) is listed whenever quoted in the literature, in preferences to single A_2 values.

1.8. Temperature Dependence, Pressure Dependence There is no general equation concerning the temperature and pressure dependence. The equation (Ref. 860)

$$A_2 = (N_A/2)(\beta_0/M_0)(1 - \theta/T) \tag{C17}$$

where β_0 is for the independent part of the excluded volume, M_0 is the molar mass of a segment, and θ is the theta temperature, has only a restricted validity.

1.9. Abbreviations

A	Archibald method
approx.	Approximately
CLS	Classical light scattering
DLS	Dynamic light scattering
Cont.	Continued
GPC	Gel permeation chromatography
LALLS	Low angle laser light scattering
OS	Osmotic pressure osmometry
RT	Room temperature
SANS	Small angle neutron scattering
SAXS	Small angle X-ray scattering
SE	Sedimentation equilibrium
SV	Sedimentation velocity
V	Number of single values given in ref. cited
VOS	Vapor pressure osmometry

1.10. Miscellaneous For solvent mixtures, the volume fraction $\varphi_i = v_i/\sum v_i$ is used.

In some cases the second virial coefficient is replaced by $B = RTA_2$.

Several attempts have been made to find theoretical explanations for the nonideal behavior of polymer solutions. There exist numerous excellent books on this topic (272,387,389–398,618,860).

The following tables give second virial coefficients for different polymer solutions. The polymers are arranged according to the hierarchial system in this book. In order to indicate the number of values reported in the original reference, a number, e.g., 5V is given in the column "Remarks". Values for solvent mixtures of different ratios, data for different pH etc., are treated separately in some cases. The user is asked to refer to the original references to find the detailed data and conditions.

D. TABLE OF SECOND VIRIAL COEFFICIENTS OF POLYMERS IN SOLUTION

TABLE 12. POLY(ALKENES), POLY(ALKYNES)

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(L-butene)						
atactic	n-Nonane	35	44.1–1300	2.4	CLS	109
isotactic		80	105–935	6.05–1.05		
atactic	Toluene	45	26.3–558	10.8–4.10	OS	109
isotactic		45	90.1–775	6.57–3.73		
atactic	Toluene	45		$M^{-0.32}$	OS	316
isotactic				$M^{-0.25}$		
Poly(ethylene)	1-Chloronaphthalene	125	115–2160	12.0–0.78	9V; CLS; A_2M; (cm^3/g)	291
		135	107	3.5	CLS	820
			113	3.9		
			120	3.0		
			141	5.6		
		135	13.63	15.9	CLS	821
			32.1	10.9		
			119.6	10.3		
	Diphenylmethane	142	82–89	– 0.25 to 0.93	CLS	820
	1,2,4-Trichlorobenzene	135	55	21.0	CLS	820
			91	19.0		
			99	18.8		
			131	23.5		
			91	19.0		
	1,2,4-Trichlorobenzene	135	570	15	CLS	905
	Trichlorobenzene	135	89	11.4	CLS	904
			415	9.1		
NBS standard		140	11.4–28.9	41.1–45.2	4V; VOS $M_w/M_n = 1.11$–4.56	822
linear			1.75–2.06	20.11–34.37	3V; VOS $M_w/M_n = 1.39$	822
			3.53	7.59	VOS	822
			3.72	6.70	$M_w/M_n = 1.03$	
			22.95, 24.8	4.17	VOS $M_w/M_n = 1.08$	822
			3.77	4.36	VOS $M_w/M_n = 1.39$	
branched			17.6 (GPC)	2.64	VOS $M_w/M_n = 22.96$	822
			22.7 (GPC)	2.17	VOS $M_w/M_n = 9.24$	822
			26.6 (GPC)	3.22	VOS $M_w/M_n = 18.59$	822
low pressure			121–526	10.5 (approx.)	8V; CLS	296
Marlex			310	11.6	CLS	296
			625	10.6	CLS	296
high pressure			144–720			
linear, fractions		135	20–1000	$6.3 \times 10^{-3} M^{-0.15}$		231a
	n-Decane	115	145–700	5.9–1.6	2V; CLS; M_n given in Ref.	231
	1,2,3,4-Tetrahydro-naphthalene	105	145–690	21.8–6.6	2V; CLS; M_n given in Ref.	231
		125	105–219	26.8–1.68	8V; CLS; A_2M; (cm^3/g)	291
branched, varying degree		81	38–735	3.6–0.9	6V; CLS	292
			2600–6100	0 (approx.)		
high pressure		81	573	0.92	CLS	293
			1980	0.82		
low pressure		105	125–465	23.1–15.9	3V; CLS	293
high pressure, fractionated	p-Xylene	81	9–215	27.8–6.54	12V; OS	292
low pressure, fractionated		105	11.2–160	33.5–26.1	4V; OS	292
				$26.2 \times 10^{-3} M^{-0.24}$		292a
HDPE, linear	n-Decane	130	600	4.8	CLS, $A_{2,1} = 4.70 \times 10^{-3} M_w^{-0.17}$	906
			520	5.0		
			310	5.4		
LDPE, branched	n-Decane	130	520	2.0	CLS	906
			310	2.4		
Lupolen 1840 D	n-Decane	130	600	1.9	CLS	906
Poly(ethylene-*co*-tetrafluoroethylene)	Diisobutyladipate	240	540	1.97	CLS	1026
			1160	1.02		
			3210 ± 290	0.511 ± 0.054		

TABLE 12. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
Poly(isobutene)	Benzene	24–30	1260	78.1×10^{-4}	(1 − (298/T)); CLS; M_v	308
						311
		30	556	45.0	A_2M; (cm³/g)	160
			722	0.52		
		40		$A_2 = 0.75 \times 10^{-3}\ M^{-0.12}$	OS	317
	Chloroform	25	–	$A_2 = 3.45 \times 10^{-3}\ M^{-0.204}$	$M_w/M_n \approx 1.2$	989
	Cyclohexane	23	27–16100	$A_2 = 6.88 \times 10^{-3}\ M_w^{-0.203}$	CLS	990
				$A_2 = 6.88 \times 10^{-3}\ M_w^{-0.203}$	CLS	898
		25	550	260.0	CLS	202
	Cyclohexane	25	26.1	10.6	CLS; A_3 reported	901
			42.9	9.55	CLS; A_3 reported; $M_w/M_n = 1.08$	
			77.7	8.40	CLS; A_3 reported; $M_w/M_n = 1.10$	
			181	7.05	CLS; A_3 reported; $M_w/M_n = 1.09$	
			488	5.30	CLS; A_3 reported; $M_w/M_n = 1.10$	
			878	4.55	CLS; A_3 reported; $M_w/M_n = 1.09$	
			1580	3.85	CLS; A_3 reported	
			3390	3.13	CLS; A_3 reported	
			7830	2.68	CLS; A_3 reported	
			14100	2.54	CLS; A_3 reported	
			2400	5.0	CLS	454
		–	391–4700	4.39	CLS	843
	Dibutyl ether	0	9000 ± 1000	1.0 (approx.)	CLS; graphical representation of T-dependence given in Ref.	438
	Ethyl caprylate	25	674	41.0	CLS	202
	Ethyl heptanoate	25–75	56	0.430–1.62	6V; CLS; $M_w/M_n = 1.13$	934
		25–75	122	− 0.234 to 1.69	6V; CLS; $M_w/M_n = 1.20$	
		25–75	230	− 0.363 to 1.14	6V; CLS; $M_w/M_n = 1.19$	
		26–70	612	− 0.358 to 1.093	6V; CLS; $M_w/M_n = 1.24$	
		25–75	1100	− 0.270 to 1.012	6V; CLS; $M_w/M_n = 1.30$	
	n-Heptane	23	167–16100	$A_2 = 3.08 \times 10^{-3}\ M^{-0.188}$	CLS	990
		23		$A_2 = 3.08 \times 10^{-3}\ M^{-0.188}$	CLS; $1.14 \leq M_w/M_n \leq 2.28$	898
		25	27.1	4.96	CLS; A_3 reported	900
			42.5	4.45		
			81.3	3.94		
			179	3.22		
			487	2.65		
			890	2.42		
			1580	2.08		
			3310	1.78		
			7750	1.51		
			50–22	$A_2 = 1.49 \times 10^{-2}\ M^{-0.28}$	17V; CLS; different methods of polymer preparation; see Ref.	600
			400–1900	2.85–2.75	3V; CLS	56
		60	1900	1.75		56
	Heptane/propyl alcohol					
	90/10	25	1900	1.95	CLS	56
	80/20		1900	0		56
		60	1900	0.85	CLS	56
	72/28	60	1900	− 0.25		56
	Isoamyl isovalerate	21	80.4	− 0,23	CLS; see Ref. for A_3	899
			178	− 0.31		
			482	− 0.30		
			872	− 0.33		
			1600	− 0.40		
		23	80.4	− 0.14	CLS; see Ref. for A_3	899
			178	− 0.20		
			482	− 0.20		
			872	− 0.19		
			1600	− 0.20		
		25	80.4	− 0.06	CLS; see Ref. for A_3	899
			178	− 0.09		
			482	− 0.10		
			872	− 0.08		
			1600	− 0.10		

TABLE 12. *cont'd*

Polymer	Solvent	T (°C)	M (× 10^{-3}) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
		27	80.4	00	CLS; see Ref. for A_3	899
			178	0.0		
			482	0.0		
			872	0.0		
			1600	0.0		
		29	80.4	0.10	CLS; see Ref. for A_3	899
			178	0.10		
			482	0.10		
			872	0.09		
			1600	0.08		
		31	80.4	0.20	CLS; see Ref. for A_3	899
			178	0.18		
			482	0.18		
			872	0.15		
			1600	0.13		
		33	80.4	0.30	CLS; see Ref. for A_3	899
			178	0.25		
			482	0.25		
			872	0.23		
			1600	0.19		
		35	80.4	0.35	CLS; see Ref. for A_3	899
			178	0.30		
	Isoamyl isovalerate		482	0.28		899
		35	872	0.28		
			1600	0.24		
		37	80.4	0.40	CLS; see Ref. for A_3	
			178	0.35		
			482	0.35		
			872	0.33		
			1600	0.30		
	Isooctane	25	5	7.96	CLS	902
			6.2	8.03		
			8.9	6.9		
			11.8	6.61		
			15.8	6.2		
			22.9	5.56		
			26.1	5.30		
			33.9	5.00		
			39.0	4.76		
			56.4	4.42		
			61.4	4.23		
			80.5	4.09		
			87.0	3.93		
			95.0	4.08		
			122	3.84		
			140	3.72		
			180	3.67		
			230	3.57		
			270	3.51		
			393	3.34		
			612	3.15		
			832	3.14		
			1100	3.00		
			1360	2.94		
	Isooctane	25	2400	1.1	CLS	454
	n-Pentane	0	9000 ± 1000	1.2 (approx.)	CLS; graphical representation of T-dependence given in Ref.	438
Poly(1-octadecene/maleic anhydride)	Ethylacetate	25	28	3.0	CLS	981
			37	2.9		
			51	2.8		
			68	2.5		
			99	2.1		
Poly(1-octene)	Bromobenzene	25	250–4000	3.12–1.62	CLS	420

TABLE 12. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(propylene)	1,2,4-Trichlorobenzene	140	23.0–28.0	12.0–16.9	5V; VOS; $M_w/M_n = 10.00$	822
			44.5–49.8	12.5–15.0	3V; VOS; $M_w/M_n = 5.70$	822
			34.7–37.1	23.8–22.4	2V; VOS; $M_w/M_n = 8.60$	822
isotactic	α-Chloronaphthalene	147 ± 1	484 (approx.)	4.3 (approx.)	3V; CLS; three different wavelengths used	446
			116 (approx.)	3.65 (approx.)	3V; CLS; three different wavelengths used	
atactic	Benzene	25		$3.2 \times 10^{-3}\ M^{-0.20}$	CLS	318
	Bromobenzene	100	2.16	1.21	OS	518,520
				10.8	CLS	518,520
		37–130	2.16	−2– +46.5	4V; OS; B; (bar cm^6/g^2)	518,520
	Carbon tetrachloride	37	1.25–2.50	54–69.5	6V; OS; B; (bar cm^6/g^2); values for four more solvents given in Ref.	518,520
isotactic	1-Chloronaphthalene	125		$4.3 \times 10^{-3}\ M^{-0.16}$	CLS	318
		135		$16.5 \times 10^{-3}\ M^{-0.27}$	CLS	318
		140	107–1110	3.9 (approx.)	4V; CLS	315
atactic	Cyclohexane	25		$20 \times 10^{-3}\ M^{-0.26}$		318
Poly(1-pentene)						
(80% *trans*)	Hexane	25	105–17200	1.8–3.2	11V; CLS; $M_z/M_w = 1.1–1.9$	835
isotactic	Toluene	30	549–25.2	0.86–2.96	7V; OS; (cm^4/g)	604
Poly(tetrafluoroethylene)	Poly(chlorotrifluoro-ethylene) mixed oligomeres	340	290 ± 20	0.67 ± 0.13		1039
	Perfluorotetracosane	325	260 ± 15%	0.19 ± 21%	CLS	1004
			2100 ± 15%	0.10 ± 20%	CLS	
Poly(1-phenyl-1-propene)	Toluene	25	1450	2.91	CLS	1034
			1320	3.78		
			613	3.58		
			372	4.31		
			258	3.84		
			142	4.82		
			140	4.77		
			100	5.46		
			57	6.05		
			55.9	6.75	SE; $M_z/M_w = 1.06$	
Poly(1-phenyl-1-propene)	Toluene	25	43.9	9.50	SE; $M_z/M_w = 1.08$	1034
			28.2	9.88	SE; $M_z/M_w = 1.06$	
			22.1	10.0	SE; $M_z/M_w = 1.09$	
			15.5	15.7	SE; $M_z/M_w = 1.06$	

TABLE 13. POLY(DIENES)

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(butadiene)						
1,4-*cis*	Benzene	28.6	60–293	15.3 (approx.)	11V; OS	297
			138	27.9	OS	
	Cyclohexane	25	20	16.4 (14.9)	OS, (CLS)	903
			46	25.0		
			70.9	13.2 (12.7)		
			76	13.6		
			130	11.6 (10.3)		
			355	9.2 (8.5)		
			548	(7.9)		
			925	(6.7)		
			2950	(4.9)		
			3740	(4.6)		
			16500	(3.6)		
linear		25	11–760	$A_2 = 1.32 \times 10^{-2}\ M_w^{-0.218}$	CLS	987
18-armed-star			99–1900	$A_2 = 5.0 \times 10^{-3}\ M^{-0.22}$	CLS	
unfractionated		28.6	840–4350	2.92 (approx.)	11V; CLS	297

TABLE 13. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
fractionated		28.6	143–1640	7.50 to − 1.63	7V; CLS	297
1,4-*trans* 69%		28.6	1070	1.67	CLS	297
60–70% unfractionated		25	5400–19000	0.52 (approx.)	7V; CLS	288
fractionated		25	3400–18000	2.6 to − 0.4	12V; CLS	288
			2300–11000	2.67 (approx.)	5V; CLS	
		34.2	17.4–370	18.3–9.48	4V; OS	497
	Dioxane	34.2	17.9–434	3.81–1.49	4V; OS	497
	Toluene	34.2	18.2–466	19.4–11.5	7V; OS	497
Poly(butadiene-*co*-styrene)						
25-30% styrene	Benzene	28.6	58–112	13.5 (approx.)	4V; OS	297
25–30%	Cyclohexane	28.6	800–26700	0.9 (approx.)	4V; CLS	297
24%		30	49–514	1.7–1.0	8V; OS	344
diblock, 32.9–3.59 mass% PST						
		34.2	42.6–625	10.0–7.55	4V; OS	497
	Dioxane	34.2	43.6–610	5.8–1.64	4V; OS	
	Toluene	34.2	43.0–625	12.6–8.17	4V; OS	
triblock, 45.9–4.05 mass% PST	Cyclohexane	34.2	35.8–517	10.1–8.69	8V; OS	497
	Dioxane	34.2	34–170	6.63–2.16	6V; OS	
	Toluene	34.2	34.6–516	12.5–9.57	8V; OS	
Poly(chloroprene)	Butanone	25	147–2920	0	7V; CLS	493
	n-Butyl acetate	25	149–3020	2.52–1.24	7V; CLS	493
	Carbon tetrachloride	25	156–3180	4.59–2.03	7V; CLS	493
	trans-Decalin	0.4–48.7	587	− 0.10 to + 1.49	12V; CLS	493
		1.1–48.7	865	− 0.074 to + 1.43	13V; CLS	
		0.4–48.7	1660	− 0.05 to + 1.12	12V; CLS	
Chlorinated rubber	Butanone	29	156	3.60	OS	478
		35	4410	− 0.18	CLS	478
Chlorinated rubber-*co*-poly(ethyl methacrylate)						
20.72%	Butanone	29	197	4.80	OS	478
Poly(isoprene)						
cis	Cyclohexane	20	1600	6.5	$M_{s,D}$; B; (bar cm⁶/g²)	29
		25	620 ± 10%	5.0 ± 20%	OS	508
	Carbon tetrachloride	25	32.4	0.123	CLS; M_w/M_n given	927
			71.95	0.114		
			97.2	0.109		
			295	0.104		
			452	0.088		
natural rubber		7	1700	14.2	CLS; B; (bar cm⁶/g²)	30
		27		14.3		
		7	1300	11.7	CLS; B; (bar cm⁶/g²)	28
		27	1300	12.7		
		25	300	6.2	OS; values for CLS in Ref.	508
epoxidized 10 mole%	Chloroform	25	430	3.30	CLS	980
nitrile rubber 100% hydrogenated						
	Chloroform	25	150	3.34	CLS	980
brominated, 0% bromine	Cyclohexane	20	1800	14.3	CLS; B; (bar cm⁶/g²)	31
5.8% bromine			1850	9		
7.3% bromine			1900	4.5		
25.8% bromine			2900	2.6		
41.5% bromine			3100	0.4		
43.8% bromine			3800	0		
Poly(isoprene)						
long-arm-stars						
functionality 2.9–4.0	Cyclohexane	–	35.2–410	7.0–12.6	16V; CLS	988
functionality 4.9–18.1	Toluene	–	41–6800	1.6–9.4	28V; CLS	988
Poly(isoprene-*co*-styrene)						
block copolymer	Cyclohexane	30	221–370	5.51–4.40	CLS; values for OS given in Ref.	495
	Methyl isobutyl ketone	30	221–370	1.25–1.74	CLS; values for OS given in Ref.	495
	Toluene	30	221–370	9.04–10.2	CLS; values for OS given in Ref.	495

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TABLE 13. *cont'd*

Polymer	Solvent	T (°C)	M (× 10^{-3}) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
Poly(isoprene)/Poly(ethylenepropylene)						
star polymers	Cyclohexane	–	61	8.06	CLS	928
	Methylcyclohexane	–	13.5	2.91	CLS	
	Tetrahydrofuran	–	4.2	11.1	CLS	
	Methylcyclohexane-d_{14}	–	61	8.24	SANS	928
		–	13.5	3.03	SANS	
		–	4.2	5.5	SANS	

TABLE 14. POLY(ACRYLICS)

Polymer	Solvent	T (°C)	M (× 10^{-3}) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
Poly(acrylamide)	Dimethylsulfoxide	25	1100	1.3	CLS	827
	Ethanolamine	25	1500	7.3	CLS	827
	Water	25–60	390	217 × (1-(235/T))	CLS	308
		25	4700	0.64	CLS; (J cm^6/g^2)	93
			1100–2000	4.9–5.4	5V; CLS	827
		25	1400	1.8	5V; CLS; $M_w/M_n = 2.5$ p dependence given in Ref.	832
	Aq. NaCl 0.1 M	4	33	3.3	CLS	974
		9.5		4.5		
		18		5.2		
		25		6.1		
		28		6.0		
		39		6.5		
		49		6.8		
		60		6.8		
		4.5	220	2.0	CLS; $M_w/M_n = 1.7$	
		14		2.4		
		24.5		3.0		
		25		2.8		
		34.5		3.0		
		44		3.1		
		55.5		3.2		
		2.5	6700	0.3	CLS; $M_w/M_n = 2.2$	
		6.5		0.5		
		10		0.7		
		18.5		1.1		
		26.4		1.3		
		30		1.8		
	Aq. NaCl 0.2 M	20	255–2750	3.06–2.81	$M_z/M_w = 1.44–1.73$	833
	Aq. NaCl 0.5 M	25	900–1400	5.3–7.7	6V; CLS	827
	Aq. NaCl 1 M	25	2330	3.66		1008
			1710	3.14	Deuterated monomer	
			2130	0.43	Microemulsion	
			3670	0.29	Microemulsion, deuterated	
Poly(acrylamide-*co*-3-(2-acrylamido-2-methylpropanedimethylammonio)-1-propanesulfonate) (AMPDAPS)						
AMPDAPS 1 mol%	Aq. NaCl 1 M	25	3200	2.67	CLS	1010
5 mol%			12400	1.76		
9.6 mol%			7000	1.49		
10 mol%			21500	1.69		
27.7 mol%			8200	1.33		
38.9 mol%			15100	0.75		
40 mol%			17500	1.21		
58.8 mol%			5400	0.49		
70.1 mol%			6200	0.48		
100 mol%			3000	0.25		
Poly(acrylamide-*co*-sodium acrylate) (AM)						
100 mol% AM	Water	25	5000	5.1	CLS	1036
				3.7	LALLS	
	Aq. Na_2SO_4 0.1 M		5000	2.5	CLS	
				2.4	LALLS	
83 mol% AM			5290	3.8	CLS	

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
70 mol% AM			5550	4.8		
55 mol% AM			5960	8.1		
36 mol% AM			6110	12.3		
				9.7	LALLS	
9.4 mol% AM			6450	8.9	CLS	
				7.7	LALLS	
Poly(acrylamide-*co*-sodium acrylate)						
5.6 mol% AM			6160	5.5	CLS	1036
				6.8	LALLS	
3.7 mol% AM	NaBr 0.5 M		6500	2.8	CLS	
Poly(acrylamide-*co*-sodium-3-methacrylamido-3-methylbutanoate)						
(AM)	(NaMAMB)					
0 mol% AM	0.1 M NaCl	25	2600	3.5	CLS	1025
31.7 mol% AM			2000	3.2		
42.7 mol% AM			4200	3.3		
58.1 mol% AM			6600	3.5		
70.4 mol% AM			6900	3.1		
87.9 mol% AM			7200	3.2		
100 mol% AM			8900	3.5		
Poly(sodium-2-(acrylamido)-2-methylpropanesulfonate-*co*-(2-(acrylamido)-2-methylpropyl)trimethylammonium chloride)						
	(NaAMPS)		(AMPTAC)			
0 mol% AMPTAC	Aq. NaCl 1 M	25	6120	0.92	CLS	1021
14.7 mol% AMPTAC			8220	0.49		
36.1 mol% AMPTAC			62000	−0.02		
45.4 mol% AMPTAC			7920	0.59		
51.7 mol% AMPTAC			7680	0.76		
65.7 mol% AMPTAC			4980	0.34		
100 mol% AMPTAC			1470	2.11		
Poly(acrylamide-*co*-sodium-2-(acrylamido)-2-methylpropanesulfonate-*co*-(2-(acrylamido)-2-methylpropyl)trimethyl ammonium chloride)						
	(NaAMPS)			(AMPTAC)		
mol% (NaAMPS)/mol% (AMPTAC)						
0.5/0.5	Aq. NaCl 1 M	25	6030	2.95	CLS	1022
2.5/2.5			2780	1.65		
5/5			5070	2.00		
10/10			5870	1.57		
15/15			6770	1.31		
10/5			3880	1.56		
Poly(acrylamide-*co*-sodium-3-acrylamide-3-methylbutanoate-*co*-(2-(acrylamido)-2-methylpropyl)trimethylammonium chloride)						
	(NaAMB)		(AMPTAC)			
mol% (NaAMB)/mol% (AMPTAC)						
0.5/0.5	Aq. NaCl 1 M	25	3430	3.61	CLS	1023
5.1/5.8			13900	1.66		
7.9/6.2			3450	1.63		
9.7/9.8			10800	2.06		
11.5/14.0			12200	1.75		
13.6/10.7			19400	1.85		
4.5/10.2			11200	1.84		
Poly(acrylamide-co-maleic anhydride)	Aq. Na NO_3	21.5	24.4	4.0	CLS	828
Poly(acrylic acid)	Aq. NaCl 1 M	25	500	2.8	CLS	829
	0.1 M			13		
	0.01 M			88		
	IS: 0.102–0.994	27.5	770	5.95–196	6V; CLS; IS = ionic strength	320
	Dioxane	–	230	−0.1	CLS	970
			420	0.1		
			890	0.2		
			1510	0.2		
			2440	0.0		
			5600	0.3		
	1,4-Dioxane	25	134–1220	28.0–18	5V; CLS; A_2M; (cm³/g)	202
	0.2 M Hydrogen chloride	20–68	1100	49.9 × (1-(287/*T*))	CLS	308
sodium salt	Aq. NaCl 0.01 M	25	64	7.98	OS; *B*; (bar cm⁶/g²)	254
	0.05 M		58.7	1.22	OS;	
	0.1 M		30–644	0.68 (approx.)	6V;	
	1.0 M		58	0.07		

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(acrylic acid-*co*-acrylamide-*co*-3-((2-acrylamido-2-methylpropyl)dimethylammonio)-1-propanesulfonate)						
(AA)	(AM)		(AMPDAPS)			
AA/AM/AMPDAPS mol% (in feed)						
90/5/5			3000	2.77	LALLS	1035
80/10/10			5400	2.95		
50/25/25			7900	2.23		
20/40/40			4700	2.23		
90/10/0			4000	5.76		
75/25/0			1900	9.49		
90/0/10			7000	1.49		
75/0/25			8200	1.33		
Poly(*n*-butyl acrylate)	Acetone	20	32–920	5.0–2.9	7V; CLS	525
	Tetrahydrofuran	–	29	4.8	CLS	970
			76	4.5		
			110	5.0		
			200	3.9		
			790	3.4		
Poly(*n*-butyl acrylate)	Tetrahydrofuran		1480	3.3		970
		25	118–245	0.0146–0.0197	4V; CLS	1037
Poly(*n*-butyl acrylate-*co*-methyl methacrylate)						
mass% 79.5/20.5	Acetone	20	22–740	8.0–2.6	7V; CLS	524
56/44			24–710	11.0–4.0	7V; CLS	
29.5/70.5			27–800	9.5–3.6	7V; CLS	
Poly(*tert*-butyl acrylate)	Butanone	25	306–75	2.37–4.27	5V; CLS	512
	Tetrahydrofuran	–	110	4.7	CLS	970
			180	3.7		
			350	3.9		
			700	3.5		
			820	2.5		
Poly(*n*-butyl methacrylate)	Acetone	20	57–490	2.3–1.5	5V; CLS	525
		RT	108–582	3.61–1.69	5V; OS	280
	Carbontetrachloride	20	21633 ± 1700	$A_2 = 1.760 \times 10^{-3}\ M_w^{-0.18}$	CLS	910
			116–613	3.04–1.33	5V; CLS; A_3 reported	
	Butanone	23	250–2580	2.08–1.69	7V; CLS	165,205
			117–666	3.65–1.95	5V; CLS; A_3 reported	280
	Isopropyl alcohol	20	108–506	– 0.7 to 0.39	4V; CLS	279
		23.7	107–650	– 0.15 to 0.1	5V	
		25.0	107–653	0.03 to 0.2	5V	
		31.0	107–653	0.54 (approx.)	5V	
		45.0	109–262	1.44 (approx.)	3V	
	Methyl ethylketone	25	21633 ± 1700	$A_2 = 2.585 \times 10^{-3}\ M_w^{-0.21}$	CLS	910
Poly(*tert*-butyl methacrylate)						
	Butanone	25	27.7	3.81	CLS; $A_2 = 1.25 \times 10^{-3}\ M_w^{-0.115}$; anionic polymerization	912
			66.0	3.55		
			190	3.14		
			414	2.73		
			835	2.61		
			1070	2.56		
			34.2	5.63	CLS; $A_2 = 7.55 \times 10^{-3}\ M_w^{-0.25}$; free-radical polymerization	912
			68.3	5.23		
			138	4.53		
			242	3.34		
			342	3.01		
			611	2.79		
			1550	2.44		
Poly(butyl methacrylate-*co*-methyl methacrylate)						
50/50 mass%	Acetone	20	70–430	3.2–2.2	5V; CLS	525
Poly(*tert*-butylphenyl methacrylate)						
Poly(carbethoxyphenyl-methacrylamide)	Dimethylformamide	20	995	2.2	CLS	267
	DMF/formamide 90/10			1.2		
	Ethyl acetate			6.2		
Poly(cetyl methacrylate)	Heptane	25	200–1070	3.38–1.9	9V; CLS	263

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(1,1-dihydroperfluorobutyl acrylate)						
	Benzotrifluoride	25	2000–38000	0.2 (approx.)	10V; CLS	203
	Methyl perfluorobutyrate		5200–14100	0.5	2V; CLS	203
Poly(ethyl acrylate)	Acetone	20	55–860	5.0–3.1	6V; CLS	525
		28	320–8000	10.52 (approx.)	10V; OS; B; (bar cm^6/g^2)	208
		30	145–691	14.6 (approx.)	13V; OS; B; (bar cm^6/g^2)	233
			132–691	18.1–14.1	7V; OS; B; (bar cm^6/g^2)	271
			145–711	13.3 (approx.)	5V; OS; B; (bar cm^6/g^2)	270
	Tetrahydrofuran	–	69	8.1	CLS	970
			180	4.7		
			230	5.3		
			420	4.1		
			810	3.8		
			1040	4.3		
Poly(ethyl acrylate-*co*-methyl methacrylate)						
50/50 mass%	Acetone	20	220–660	4.3–3.5	5V; CLS	525
	Dimethylformamide	20		see Ref.	CLS	515
	Butanone	20		see Ref.	OS	515
Poly(2-ethylhexyl acrylate)	Tetrahydrofuran	–	210	2.6	CLS	970
			280	2.4		
			400	2.1		
			490	2.4		
			880	1.7		
			1340	2.0		
	Toluene	37	660–72	$A_2 = 0.0045\ M^{-0.25}$	4V; OS	586
Poly(ethyl methacrylate)	Ethyl acetate	35	926–11620	1.45–1.01	9V; CLS	471
				1.38–1.20	Calculated acc. to Orofino, Flory	
	Butanone	23	200–2630	4.9–1.83	9V; CLS	162
Poly(n-hexyl acrylate)	Tetrahydrofuran	–	100	4.7	CLS	970
			170	4.5		
			320	3.4		
			590	3.2		
			1040	2.4		
Poly(n-hexyl methacrylate)	Butanone	23	640–4050	1.77–1.17	8V; CLS	295
Poly(i-butyl acrylate)	Tetrahydrofuran	–	200	4.5	CLS	970
			490	3.6		
			780	3.0		
			1000	3.0		
Poly(isopropyl acrylate)						
highly isotactic	Bromobenzene	60	74.3–509	6.21–3.52	6V; OS	429
moderately isotactic	Bromobenzene	60	109–46	5.83–4.12	4V; OS	
syndiotactic	Bromobenzene	60	142–564	7.06–3.71	4V; OS	
atactic	Benzene	25	71.7–703	7.27–3.60	5V; OS	
Poly(isopropylacrylamide (IPAM)/Poly(acrylamide) copolymer						
IPAM = 100 mol%	Water	–	3000	2.94	CLS	1006
IPAM = 85 mol%			3100	3.01		
IPAM = 70 mol%			4500	3.31		
IPAM = 55 mol%			3900	3.46		
IPAM = 40 mol%			2200	3.62		
IPAM = 0 mol%			5200	3.78		
Poly(N-isopropyl-methacrylamide)	Water	20	–	$A_2 = 5.9 \times 10^{-3}\ M_w^{-0.25}$	CLS	1005
Poly(n-lauryl acrylate)	Tetrahydrofuran	–	95	6.5	CLS	970
			260	2.3		
			600	1.6		
			1000	0.9		
Poly(lauryl methacrylate)	n-Butyl acetate	23	260–3600	1.10–0.47	8V; CLS	205
Poly(methacrylamide)	Water	22–56	320	4.49 (1 – (279/T))	CLS	308
Poly(methacrylic acid)	Hydrochloric acid	27–53	590	14.8 ((329/T) – 1)	CLS; T in K	308
	0.02 M					
	0.1 M		146–682	1.76 (approx.)	3V; OS	240
	0.114 M	25	200–427	16.9 (approx.)	5V; CLS	240
	1.0 M		84–169	2.2–0.4	3V; OS	240
	LiBr in ethanol 0.125 M	25	42–383	5.2–2.3	4V; CLS	249
		30	34–421	4.9–1.8	5V; OS	249

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M (×10⁻³) (g/mol)	A_2 (×10⁴) (mol cm³/g²)	Remarks	Refs.
	Methanol	20–40	517 (approx.)	2.42 (approx.)	3V; CLS	346
	0.05 M NaCl	20–60	505 (approx.)	1.465–0	4V; CLS	346
	0.5 M NaCl	20–40	510	0.96–0.1	3V; CLS	
	Water + x M NaCl					
	x = 0.18–0.0007	25	196	0–780	5V; CLS	355
Poly(methyl acrylate)	Acetone	20	77–880	4.5–2.8	5V; CLS	525
		25	280–2500	4.2–2.4	17V; CLS	246,247
	Ethyl acetate	35	362–1480	1.92 (approx.)	5V; CLS	482
	Butanone/isopropanol 58/42	20	290–1720	0.1–0.06	8V; CLS	246
	Tetrahydrofuran	–	49	4.1	CLS	970
			69	4.7		
			100	3.8		
			260	3.7		
			430	3.0		
			570	4.1		
Poly(methyl acrylate-*co*-chlorinated rubber) 86.9/13.1						
graft copolymer	Butanone	35	33940	0.079	CLS	478
Poly(methyl acrylate-*co*-methyl methacrylate)						
50/50 mass%	Acetone	20	80–525	5.5–3.5	10V; CLS	525
Poly(methyl butacrylate)	Butanone	30	75.2–4280	2.77–1.00	10V; CLS	445
Poly(methyl ethacrylate)	Butanone	30	46.1–1910	4.78–1.72	10V; CLS	445
Poly(methyl methacrylate)	Acetone	20		See Ref.	Small angle X-ray scat. varying tacticities measured	
			0.2–510	30–1.5	10V; small angle X-ray scat.	492
			23–5300	12.2–1.55	10V; SE; B; (bar cm⁶/g²)	52
			200–6550	2.25–0.68	3V; SE	15
		22	550	1.9	CLS; identical samples;	469
			510	1.5	Small angle X-ray scat.	469
		25	0.203–0.385	−24.2 to 113.0	4V; B; (bar cm⁶/g²); M_n	408
			0.691–2.480	627–47.5	3V; B; (bar cm⁶/g²); M_n	408
		–	341–7800	12	CLS	842
	Acetonitrile	20	0.613–20	−4.4 to 6.5	8V; CLS	915
		25	0.613–50.2	−3.6 to 8.0	9V; CLS	
		30	0.613–496	−3.0 to 9.5	11V; CLS	
		35		−2.3 to 11	11V; CLS	
		40		−1.9 to 12	11V; CLS	
		44 (θ)		−1.5 to 13	11V; CLS	
		47		−1 to 14	11V; CLS	
		50		−0.5 to 15	11V; CLS	
Poly(methylmethacrylate)	Acetonitrile	55		0–16.5	11V; CLS	915
		28–42	20–496	−1 to −0.08	17V; CLS	
	Acetonitrile/1-butanol φ_{MeCN} = 0.3–0.9	25	169	−0.89 to 2.24	7V; CLS MeCN = acetonitrile	916
	Acetonitrile/pentyl acetate φ_{MeCN} = 0–0.95			−0.76 to 2.58	11V; CLS	
	Acetonitrile/1-propanol φ_{MeCN} = 0.3–0.9			−0.16 to 2.30	7V; CLS	
	Acetonitrile/methanol φ_{MeCN} = 0.5–1			−0.97 to 0.38	7V; CLS	
	Acetonitrile/carbon tetrachloride	25	120		10V; CLS MeCN = acetonitrile	823
	φ_{MeCN} = 0%			0.6		
	φ_{MeCN} = 40%			5.9		
	φ_{MeCN} = 100%			−0.65		
atactic			51 ± 4.3	8.2 ± 0.61	CLS; B; (bar cm⁶/g²)	419
			3670 ± 50	2.12 ± 0.05	CLS; B; (bar cm⁶/g²)	419
				$2.9 \times 10^{-3} M^{-0.22}$	CLS	273
			68–1370	(7.1–3.5) × 10³	7V; CLS; 981(cm¹²/g)	232
			240–4470	2.3–1.1	5V; CLS	264
			27.7–7800	0.975–0.29	12V; CLS; (J cm³/g²)	99
			1450	19	CLS	202
			2.69–2500	0.97–390	13V	275
			86–1050	2.90–1.58	7V; OS	202
			92–798	1.89–1.52	9V; CLS	202

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
			486–6620	2.38–0.82	4V; CLS	55
		30		$2.63 \times 10^{-3}\ M^{0.78}$	OS; A_2M; (cm^3/g)	274
			161	1.85	OS	494
atactic	Acetonitrile	44	0.594–204	− 1.5 to 12.5	10V; CLS	917
		47	312	0.100	CLS	
			482	0.114		
			765	0.107		
		50	312	0.175	CLS	
			482	0.184		
			765	0.177		
		55	312	0.256	CLS	
			482	0.279		
			765	0.292		
	Acetone	25	0.594–1580	1.25–47.3	19V; CLS	
	Chloroform	25	204	5.66	CLS	
			312	5.06		
			482	4.39		
			765	3.91		
			1580	3.31		
	Nitroethane	30	204	3.32	CLS	
			312	2.97		
			482	2.61		
			765	2.32		
			1580	1.99		
isotactic	Acetone	25	0.789–1930	1.23–17.2	16V; CLS; M_w/M_n see Ref.	918
	Acetonitrile	35	688	0.20	CLS; M_w/M_n see Ref.	
		45		0.40		
		55		0.57		
	Chloroform	25	155	6.92	CLS; M_w/M_n see Ref.	
			313	6.12		
			380	5.57		
			688	4.91		
			946	4.39		
			1930	3.80		
	Nitroethane	30	155	4.33	CLS; M_w/M_n see Ref.	
			313	3.66		
			380	3.47		
			688	3.03		
			946	2.64		
			1930	2.33		
	Tetrahydrofuran	–	90	5.0	CLS; M_w/M_n given	956
		–	305	3.9		
		–	506	3.2		
unfractionated	Acetonitrile	30.5	162–647	28.8–88	12V; OS; $A_2\ M$; (cm^3/g)	274
fractionated			64–726	12.3–95	5V; OS; $A_2\ M$; (cm^3/g)	274
	Acetonitrile	40	10	− 0.1	SAXS	492
		43.3	10	0	SAXS	492
		50	10	0.2	SAXS	492
	Benzene	25	0.188–0.935	− 222.2 to 8.9	8V; B; (bar cm^6/g^2); M_n	408
		30	433	2.63	OS	494
	Butanone	25	5–52.8	7.38–2.18	6V; CLS	418
	Butanone/isopropanol		75.5	2.70	CLS	418
	58.2/41.8	4–36	210	0.001–0.369	9V; CLS; (J cm^3/g^2)	13
	55/45	4–36	210	− 0.128 to 0.293	9V; CLS; (J cm^3/g^2)	13
	50/50	8–40	210	− 0.365 to 0.237	9V; CLS; (J cm^3/g^2)	13
fractionated	Butanone/isopropanol					
	46.8/53.2	18–40	210	− 0.248 to 0.174	7V; CLS; (J cm^3/g^2)	13
	Butyl acetate	25	486–6620	0.96–0.36	4V; CLS	55
		− 18 to 60	210	0–1.20	6V; CLS	210,215
	Butyl chloride	14–48	210	− 0.242 to 0.088	10V; CLS; (J cm^3/g^2)	13
	Carbon tetrachloride	25	0.202–0.755	40.0–6.7	3V; B; (bar cm^6/g^2); M_n	408
			1.160–4.625	23.2–0.0	4V; B; (bar cm^6/g^2); M_n	408
	Chlorobutane	4–48	30	− 1.6 to 0.365	12V; CLS	210,215
		28–48	1100	− 0.3 to 0.325	7V; CLS	210,215
		28–48	4600	− 0.23 to 0.31	7V; CLS	210,215
		35.6	200–6550	− 0.24 to 0.07	3V; SD	15

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
	1-Chlorobutane/2-butanol $\varphi_{bu} = 0$–0.7991	40	2400–2690	0–1.28	12V; CLS	909
	1-Chlorobutane/2-methoxy-ethanol	40 ± 0.2	2330–2640	0–116	14V; CLS	913
	Chloroform	25	830–1370	$(12-10) \times 10^3$	2V; CLS; 981 (cm^3/g)	232
			0.204–0.379	− 53.9 to 81.0	4V; B; (bar cm^6/g^2); M_n	408
			0.710–5.240	49.6–21.9	3V; B; (bar cm^6/g^2); M_n	408
	Chloroform/butyl acetate	25			CLS; apparent values for M_w	914
	% butyl acetate					
	0		172	0.75		
	20		260	0.30		
	40		270	0.31		
	60		294	0.53		
	80		227	0.33		
	90		212	0.51		
	100		172	0.05		
	Dimethylformamide		32.2 ± 0.3	10.9–0.16	OS; B; (bar cm^6/g^2); M_n	419
			2180 60	6.2–0.08	OS; B; (bar cm^6/g^2); M_n	419
	Dioxane		486–6620	3.24–1.43	4V; CLS	5
			1220–2000	3.1–3.0	2V; CLS	294
		38	5690	1.82	CLS	908
	α-Chloronaphthalene/toluene $\varphi_{CNA} = 0.72$	38	5690	1.75	CLS	908
	α-Chloronaphthalene/polystyrene ($C_{PS} = 3.76$ g/l)	38	5690	− 0.11	CLS	908
	Ethyl acetate		172–3100	1.9–1.2	3V; OS	196
	4-heptanone	16–62	2100	− 0.76 to 0.52	10V; CLS	210,215
	Isoamyl acetate	20–60	210	− 0.276 to 0.014	11V; CLS; (J cm^3/g^2)	13
	Isopentyl acetate	20–60	2100	− 1.13–0.055	12V; CLS	210,215
unfractionated	Butanone	25	20–1730	$(4.02-1.39) \times 10^{-2}$	7V; CLS; A_2M; (cm^3/g^2); A_3 reported	273
			130–2760	$(3.04-1.07) \times 10^{-2}$	4V; CLS	273
			760–1400	$(5.4-4.2) \times 10^3$	4V; CLS; 981 (cm^{12}/g)	232
			1220	1.6	CLS	294
			34–9800	2.78–1.46	10V; CLS	253
			410–3260	1.92–1.66	7V; CLS	163
	Butanone/isopropyl alcohol					
	55/45	23	410–3260	0.08–0.02	6V; CLS	163
	58.2/41.8	4–36	210	0.005–1.44	9V; CLS	210,215
	55/45	4–36	210	− 0.57 to 1.14	10V	210,215
	50/50	8–50	210	− 1.56 to 0.91	10V	210,215
	46.8/53.2	8–40	210	− 1.02 to 0.68	8V	210,215
linear	Butanone	40	45.9–940	4.43–2.34	8V; CLS; OS results also given in Ref.	570
randomly branched			48.9–4490	5.02–1.95	12V; CLS; OS results also given in Ref.	570
			1470–6990	1.44–0.61	3V; CLS; OS results also given in Ref.	570
unfractionated	Nitroethane	25	22–1710	5.51–1.68	6V; CLS; A_3 reported	273
			114–564	3.38–1.73	2V; CLS; A_3 reported	273
				$0.67 \times 10^{-3}\ M^{-0.257}$	CLS	273
			1220–2000	2.6 (approx.)	2V; CLS	294
	Tetrahydrofuran		47–9300	5.3–1.1	6V; CLS	121
	Toluene	30.5	12.3–20	5.7–8.5	3V; OS	274
Poly(methyl methacrylate-*co*-chlorinated rubber) (45.9/54.1)						
graft polymer	Butanone	35	8150	0.36	CLS	478
Poly(methyl methacrylate-*co*-ethylene dimethacrylate)						
randomly branched	Butanone	40		See Ref.	11V	549
Poly(methyl methacrylate)/90% poly(styrene) (side chains)						
graft polymer	Benzene	–	1800	0.52	1V; CLS	824
Poly(*n*-octyl methacrylate)	Butanone	23	3260–12520	0.77–0.35	7V; CLS	209
Poly(*N*-phenylmethacrylamide)	Acetone	20	100–3200	4.1–3.2	CLS	229
Poly(phenyl acrylate)	Ethyl lactate	11.55	1460	0.0	CLS; $M_n = 0.90 \times 10^6$ g/mol	919
		13.65		6.0		

TABLE 14. *cont'd*

Polymer	Solvent	T (°C)	M (×10⁻³) (g/mol)	A_2 (×10⁴) (mol cm³/g²)	Remarks	Refs.
		16.65		29.2		
		22.75		51.7		
		31.65		68.7		
		45.45		94.0		
		59.45		117		
		74.45		125		
		89.85		141		
		106.15		150		
Poly(*n*-propyl acrylate)	Tetrahydrofuran	–	110	4.0	CLS	970
			200	5.3		
			440	3.6		
			630	3.3		
			800	3.0		
			980	2.9		
			1080	2.9		
Poly(sulfodecylmethacrylate)	Aq. NaCl 0.1 M	25	734	1.91	CLS; $M_w/M_n = 2.1$	1009
Poly(sulfoethylmethacrylate)	Aq. NaCl 0.1 M	25	306	6.41	CLS; $M_w/M_n = 1.5$	
Poly(sulfohexylmethacrylate)	Aq. NaCl 0.1 M	25	494	5.61	CLS; $M_w/M_n = 2.0$	
Poly(sulfooctylmethacrylate)	Aq. NaCl 0.1 M	25	701	2.03	CLS; $M_w/M_n = 1.8$	

TABLE 15. POLY(VINYLS)

Polymer	Solvent	T (°C)	M (×10⁻³) (g/mol)	A_2 (×10⁴) (mol cm³/g²)	Remarks	Refs.
Poly(acrylonitrile)	Dimethylformamide	20	1041	4.217	CLS	971
			1132	4.064		
			1235	3.988		
			1371	3.589		
			1778	3.631		
			2367	3.456		
			2973	3.291		
			3078	3.311		
				$A_2 = 9.44 \times 10^{-3}\ M_w^{-0.219}$		
		20	98–120	22.9–21.4	CLS	603
				$4.94 \times 10^{-2}\ M^{-0.24}$	2 Different wavelengths used	
		20	9–69	32.2–7.0	5V; OS; (cm⁴/g)	248
			91–762	$2.43 \times 10^{-2}\ M^{-22}$	CLS	95
		25	43–298	21 (approx.)	7V; OS	199
			27–159	16–20	OS	200
		25	103	18.3	CLS	938
		25–40	33–101	19.1 (approx.)	13V; OS	74
		35	28–575	$2.74 \times 10^{-2}\ M^{-0.24}$	9V; *M*	201
highly isotactic, 73.4% iso triades						
	HNO_3; 60–70 mass%	25	150–174	0.073–0.254	4V; CLS	973
	HNO_3; 70 mass%	25	158–263	0.252–0.420	5V; CLS	
	Dimethylsulfoxide	25	155–2620	−0.002 to 0.153	4V; CLS	
Poly(acrylonitrile)/vinylidene chloride						
copolymer, 59 wt.% AN	Dimethylacetamide	25	42	0.132	CLS; $A_2 = 5.77 \times 10^{-3}\ M_w^{-0.14}$	972
			62	0.121		
			90	0.120		
			140	0.120		
			204	0.115		
			270	0.110		
			348	0.095		
			500	0.090		
	Butyrolactone	25	200	0.119	CLS	
	Dimethylformamide	25	196	0.137	CLS	
	70 mass% HNO_3	25	–	0.0075	CLS	
Poly(*n*-butoxyethylene)	Butanone	25	215–861	2.3–0.7	2V; CLS	149
Poly(ethoxyethylene)	Butanone	25	347–409	3.4–2.3	2V; CLS	149
Poly(isopropoxyethylene)	Butanone	25	536–894	1.9–1.7	2V; CLS	149
Poly(methoxyethylene)	Butanone	25	13–450	3.89 (approx.)	12V; CLS	149

TABLE 15. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(2-methyl-5-vinylpyridine)	Butanone	25	67–1200	2.8–1.2	13V; CLS	432
Poly(1-trimethylsilyl ethylene)	Cyclohexane	25	2130–590	4.85–12.00	6V; CLS	553
Poly(vinyl acetate)	Acetone	30 (approx.)	27–845	8.80–3.34	9V; CLS	330
			343–722	3.66–3.50	CLS	331
			78–660	6.5–2.5	18V; CLS	289
	Methanol	25	2360–422900	7.50–0.172	9V; DLS	831
branched	Benzene	30	258–45.2	4.76 (approx.)	10V; OS	453
			5203–331	0.208–2.066	8V; CLS	
	Methanol	30 (approx.)	370–620	3.5 (approx.)	2V; CLS	331
linear		30 (approx.)	1620–1900	1.14–1.3	2V; CLS	333
branched		36 (approx.)	2920	0.99	3V; CLS	333
		36 (approx.)	3580	1.06		
	Butanone	25	870–3420	3.51–2.43	11V; CLS	111
			58–367	10 (approx.)	8V; OS; B; (bar cm^6/g^2)	112
			93–1100	5 (approx.)	CLS; B; (bar cm^6/g^2)	112
		30	40–1268	7.00–2.95	12V; CLS	330
			300–772	3.93–2.90	CLS	331
linear	Butanone	36 (approx.)	440–3580	3.2–2.74	10V; CLS	333
branched		36 (approx.)	430–12.60	2.99–0.66	9V; CLS	333
	Tetrahydrofuran	25	13.8–47.7	0.160–0.280	3V; CLS	1037
linear	Trichlorobenzene	36 (approx.)	1380–3760	2.29–1.75	12V; CLS	333
				$5.94 \times 10^{-3}\ M^{-0.230}$		333
branched	Trichlorobenzene	36 (approx.)	1610–4110	1.69–1.18	19V; CLS	333
Poly(vinyl alcohol)	Water	30	180–196	3.9–5.2	2 V; CLS	282,283
		73.5	245	1.119	CLS	282,283
		80	100–458	2.189–0.775	5V; CLS	282,283
Poly(vinyl bromide)	Tetrahydrofuran	RT	6–76	6–0	14V; CLS	287
			104–270	2.7–2.0	2V; CLS	
Poly(vinyl butyral)	Dioxane	37	541–89.5	5.53–10.3	8V; OS	597
			208–73.9	9.15–11.3	5V; OS	
			181–57.5	9.45–12.2	7V; OS	
Poly(vinyl-*iso*-butyral)			462–207	6.9–9.6	6V; OS	
Poly(vinyl caprolactam)	Dimethylformamide	20	377–1670	0.337–0.662	8V; CLS	1024
Poly(vinyl carbanilate)	Cyclohexanol	40–90	1100	− 1.2 to 1.2 (approx.)	8V; CLS	504
	Cyclohexanone	15–90		2.2–1.9 (approx.)	6V; CLS	504
	Diethylene glycol/ diethyl ether	5–95		2.7–1.5 (approx.)	7V; CLS	504
	Diethyl ketone	20–90		− 0.5–1.8 (approx.)	8V; CLS	
	Dioxane	20	7.2–183	$(3.4–1.71) \times 10^{-4}$	11V; CLS; (cm^2/g^2)	401
		5–95	1100	2.7–2.2 (approx.)	7V; CLS	504
	Pyridine	10–90		2.5–2.0 (approx.)	4V; CLS	504
Poly(*N*-vinylcarbazole)	Benzene	25	4550–136	0.57–1.32	CLS	457
			1630	0.61	CLS	499
			2290	0.54	CLS	499
	Dioxane	37	42.4–1070	2.35–0.91	8V	499
				$4.26 \times 10^{-3}\ M^{-0.27}$		
	Toluene	37–43	298	0–0.27	3V; OS	499
		37–43	522	0.01–0.26	3V; OS	499
Poly(vinyl chloride)	Cyclohexanone	25	118 (119)	11	A; (CLS)	602
			59 (50)	12 (18)	A; (CLS)	602
		30	32.3–97.4	3.7×10^2	OS; (cm^4/g)	108
		30–70	90	$3.9 \times (1 + (1613/T))$	CLS; M_v	308,309
		25	48.8	12.8×10^{-4}	OS;	451
			44.9	16.2×10^{-4}	OS; more values for seven different PVC-preparations given in Ref.	451
			24.8	6.85	OS; (J cm^3/g^2)	75
			37–110	2.5 (approx.)	5V; OS; (J cm^3/g^2)	75
			122	15	A	602
			56 (53)	14 (17)	A; (CLS)	602
		29	136	9.03	OS	478
Poly(vinyl chloride-*co*-butylacrylate) comonomer content (mol%)						
16.6	Tetrahydrofuran	25	173–302	0.0518–0.0649	4V; CLS	1037
40.0			205–632	0.0156–0.0244	3V; CLS	

TABLE 15. *cont'd*

Polymer	Solvent	T (°C)	M (×10^-3) (g/mol)	A_2 (×10^4) (mol cm^3/g^2)	Remarks	Refs.
Poly(vinyl chloride-*co*-*n*-butyl ether)						
comonomer content (mol%)						
9.2	Tetrahydrofuran	25	30–98	0.077–0.115	3V; CLS	1037
Poly(vinyl chloride-*co*-methylacrylate)						
comonomer content (mol%)						
25.5	Tetrahydrofuran	25	221–476	0.0503–0.0570	3V; CLS	1037
41.6			121–891	0.0316–0.0803	4V; CLS	
64.0			379–2510	0.014–0.033	4V; CLS	
Poly(vinyl chloride-*co*-vinyl acetate)						
comonomer content (mol%)						
11.4	Tetrahydrofuran	25	29.5–96.7	0.089–0.119	4V; CLS	1037
25.0			21–185	0.050–0.148	4V; CLS	
40.0			43–179	0.064–0.118	4V; CLS	
66.0			100–708	0.012–0.028	4V; CLS	
Poly(vinyl chloride-*co*-vinylidene chloride)						
comonomer content (mol%)						
15	Tetrahydrofuran	25	50–223	0.0449–0.0910	4V; CLS	1037
42			79–187	0.0260–0.0396	4V; CLS	
Poly(vinylchloride-*co*-poly(ethyl methacrylate))						
84.55%/15.45%	Tetrahydrofuran	29	161	4.80	OS	478
Poly(vinyl chloride-*co*-poly(methyl methacrylate))						
45.1%/54.9% *graft* copolymer	Tetrahydrofuran	29	302	9.55	OS	478
Poly(vinyl methyl ether) see Poly(methoxyethylene)						
Poly(2-vinylpiridine)	Aq. H_2SO_4; 0.01 M	25	288	11	CLS	977
	0.1 M			2.2		
	0.25 M			2.1		
	0.5 M			1.7		
	0.75 M			1.3		
	1.0 M			1.4		
	5.1 M			3.0		
	10.3 M			3.0		
Poly(4-vinylpiridine)	Ethyl alcohol	RT	102–1850	4.13 (approx.)	10V; CLS	286
Poly(vinylpyrrolidone)	Cyclohexanone	25	24.5–37.9	2.6 (approx.)	3V; OS	191
	Ethanol	20	63–500	1.15–5.47	8V; CLS	1024
	Water	20	310	4.2	$M_w/M_n = 1.5$	985
		25	11.6–75.4	3.39 (approx.)	12V; CLS	191
			19.5–933	64.7–2.52	6V; CLS	
			310	4.2	CLS; $M_w/M_n = 1.5$	942
Poly(vinylpyrrolidone-*co*-vinylcaprolactam)						
1:1 stat.	Ethanol	20	140–557	0.457–1.89	8V; CLS	1024

TABLE 16. POLY(STYRENES)

Polymer	Solvent	T (°C)	M (×10^-3) (g/mol)	A_2 (×10^4) (mol cm^3/g^2)	Remarks	Refs.
Poly(*p*-bromostyrene)	Toluene	30	3860–630	0.076–0.113	5V; CLS	516
Poly(*p*-*tert*-butylstyrene)-*b*-poly(dimethylsiloxane)-*b*-poly(*p*-*tert*-butylstyrene)						
anionically synthetized						
diblock	Toluene	30	92.7	4.23	CLS; M_w/M_n given	966
triblock			115	3.24		
			291	2.56		
			829	2.10		
Poly(*m*-chlorostyrene)	Butanone	30	1064–322	1.44–1.78	5V; CLS	595
				$A_2 = 1.54 \times 10^{-3} M^{-0.17}$		
	Toluene	35	1075–145	2.42–5.08	6V; CLS	
				$A_2 = 26.5 \times 10^{-3} M^{-0.33}$		
Poly(*o*-chlorostyrene)	*n*-Butyl acetate	5	415	0.570	OS	585
		30	403	0.449	OS	585
		55	401	0.337	OS	585
	Chlorobenzene	30	406	1.72	OS	585

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (×10⁻³) (g/mol)	A_2 (×10⁴) (mol cm³/g²)	Remarks	Refs.
	Toluene	25	1005–142	1.78–2.70	6V; CLS	527
		30	407	1.73	OS	585
		35	1087–435	2.18–2.70	6V; CLS	500
			1429–2350	1.96–3.00	4V; CLS	500
				$5.22 \times 10^{-3}\ M^{-0.23}$		
Poly(*p*-chlorostyrene)	Butanone	21	480–4220	1.29–0.752	10V; CLS	300
	n-Butyl acetate	5	180	2.96	OS	585
		30	176	2.39	OS	585
		50	165	1.90	OS	585
	Chlorobenzene	30	316	2.17	OS	585
	Toluene	30	472–192	0.96–1.69	5V; OS	609
				$A_2 = K\ M^{-0.6}$	A_3 given in Ref.	
			1370–214	0.570–0.895	6V; CLS	516
			206	0.825	CLS	516
			463	0.625	OS	585
Poly(2,5-dichlorostyrene)	Dioxane	20	590–19600	0.88–0.20	7V; CLS	250
Poly(*p*-methoxystyrene)	Butanone	25	870–220	$A_2 = K\ M^{-0.20}$	CLS; 6V	610
	Toluene	30	850–220	$A_2 = K\ M^{-0.40}$	CLS; 6V	
Poly(α-methylstyrene)	Benzene	25	1.45	17.4	CLS; *B*; (bar cm⁶/g²)	407
			6.76	13.7	CLS; *B*; (bar cm⁶/g²)	407
		30		See Ref.		522
	n-Butylchloride	–	6.9–3540	0.60–2.97	15V; CLS; M_w/M_n, M_z/M_w given	997
				$A_2 = 3.11 \times 10^{-3}\ M_w^{-0.255}$	$M_w/M_n = 1.03–1.15$	
Poly(α-methylstyrene)	Cyclohexane	20	60–313	$A_2 = 2.4 \times 10^{-7}\ M_w^{0.50}$	CLS	935
		24	61–1020	$A_2 = 6.0 \times 10^{-9}\ M_w^{0.72}$	CLS	
		30	180–1080	$A_2 = 5.5 \times 10^{-10}\ M_w^{0.84}$	CLS	
monodisperse		40	1220	0.218		484
		50	1220	0.509		484
		50–32	310	0.575 to −0.142	7V; CLS; A_2-values for mixtures of these samples given in Ref.	484
			17.3	0.461 to −0.116	7V; CLS; A_2-values for mixtures of these samples given in Ref.	484
			3000	0.406 to −0.109	7V; CLS; A_2-values for mixtures of these samples given in Ref.	484
Poly(α-methylstyrene)	Toluene	25	1.45	49	CLS; *B*; (bar cm⁶/g²)	407
			6.76	34	$M_{s,D}$; SE; *B*; (bar cm⁶/g²)	407
			20.1	8.05	CLS	998
			24.7	7.03		
			59.0	5.54		
			63.1	5.29		
			75.9	5.67		
			118	4.63		
			177	4.55		
			305	3.73		
			313	3.56		
			665	2.90		
			903	2.71		
			1140	2.56		
				$A_2 = 1.15 \times 10^{-2}\ M_w^{-0.273}$		
		34.5	204–7470	2.08	CLS	845
		37	278–46.9	4.2–5.9	8V; OS	584
Poly(α-methylstyrene-*co*-acrylonitrile)						
46 mol% acrylonitrile	Tetrahydrofuran	–	45–417	7.70 (mean)	19V; CLS	819
Poly(α-methylstyrene-*co*-styrene)						
50/50	Toluene	37	253–106	5.9–5.2	4V; OS	584
Poly(*o*-methylstyrene)	Toluene	30	430–102	2.64–4.80	7V; CLS	588
				$A_2 = 3.89 \times 10^{-2}\ M^{-0.38}$		
Poly(*p*-methylstyrene)	Butanone	30	1210–391	1.00–1.28	4V; CLS	517
	Cyclohexane	30	847–263	1.56–1.92	3V; CLS	517
	Dichlororethane	30	1180–500	1.70–2.28	3V; CLS	517

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (× 10^-3) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
	Diethyl succinate	60–16	1970	0.589 to −0.026	8V; CLS	517
			896	0.819 to −0.001	8V; CLS	
			762	0.900 to −0.013	8V; CLS	
			684	0.830 to −0.046	8V; CLS	
	Toluene	30	1800–192	2.18–4.37	9V; CLS	517
Poly(styrene)	Benzene	20	1330–7100	3.6–3.3	4V; CLS; A_2M; (cm^3/g)	514
			2700	3.4	CLS; A_2M; (cm^3/g); A_3 given in Ref.	514
		–	0.207–3100	54–3.1	9V; CLS	801
		20	150	3.95	CLS;	804
			35.6–1750	7.24–2.22	$M_z/M_w = 1.01–1.55$	833
		25	16700	2.23	CLS; A_2M; (cm^3/g)	805
			12500–19200	1.52–1.12	4V; CLS; $A_2 = 2.9 \times 10^{-3} M_w^{-0.59}$	807
			8760–56800	1.82–1.09	6V; CLS	808
				$A_2 = 1.05 \times 10^{-2} M_w^{-0.276}$	CLS	1038
		30	589	3.56, 3.30	CLS	818
		25	10.3	11.3	CLS; A_3 given in Ref.	922
			19.8	8.80		
			97.9	5.78		
			200	4.72		
			845	3.33		
			1380	2.85		
			3150	2.29		
			8560	1.80		
			14500	1.49		
			20100	1.38		
	Bromobenzene	20	35.5–1750	6.38–2.15	$M_z/M_w = 1.01–1.55$	833
	Butanone	20	150	0.0127	CLS	804
		25	–	0.58	CLS; A_2M; (cm^3/g)	806
	2-Butanone	25	50	6.90	CLS	926
			233	1.80	CLS	
			670	1.53	CLS	
			1800	1.46	CLS	
			mixtures			
			1800*/670; $w^a = 0.15–0.85$	1.390–1.496	6V; CLS	926
			1800*/233; $w^a = 0.20–0.63$	1.540–1.740	4V; CLS	
			1800*/50; $w^a = 0.13–0.91$	0.63–1.36	6V; CLS	
		30	233–5840	$A_2 = 4.37 \times 10^{-3} M_w^{-0.277}$	CLS; $M_w/M_n = 1.04–1.16$	995
	Carbon tetrachloride	20	150	3.58	CLS	804
			17.5–1800	2.23–7.69	5V; CLS; $M_w/M_n = 1.04–1.30$	934
		24	2880	2.58	CLS	991
		25	35	6.47	CLS	927
			45	5.73		
			61	5.57		
			186	4.83		
			422	3.52		
			775	2.08		
	Chloroform	25		6.56	CLS	804
	Cyclohexane	15	0.37–40	−2.75 to 10	11V; CLS; M_w/M_n given in Ref.	920
		20		−2.00 to 13	11V; CLS; M_w/M_n given in Ref.	
		25		−1.20 to 15	11V; CLS; M_w/M_n given in Ref.	
		30		−0.45 to 18	11V; CLS; M_w/M_n given in Ref.	
		34.5 (θ)		0.03–21	14V; CLS; M_w/M_n given in Ref.	
			20.7–3150	0–0.1	6V; A_3 given in Ref.	923
		40	0.37–40	0.40–22	11V; CLS; M_w/M_n given in Ref.	920
		44.5	233–5840	$A_2 = 6.30 \times 10^{-4} M_w^{-0.173}$	CLS;$M_w/M_n = 1.04–1.16$	995
		45		0.77–24	11V; CLS; M_w/M_n given in Ref.	920
		50		1.10–26	11V; CLS; M_w/M_n given in Ref.	
	Cyclopentane	23	160	28	CLS; M_w/M_n given in Ref.	924
			260	23		
			400	20		
	1,4 Dioxane	20	150	2.75	CLS	804

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
	Decalin (*trans*)	20	390	−0.06	CLS	815
		25		0.25	CLS	815
		30		0.58	CLS	815
		35		0.85	CLS	815
		40		1.11	CLS	815
	Dimethylformamide	25	704	1.9	CLS	938
	Dioctylphtalate	12 (θ)	5000	0	Extrapolated value	930
		22	2050	−0.036	CLS; $M_w/M_n \leq 1.30$	921
	Ethylbenzene	20	50–1800	3.10–8.41	5V; CLS; $M_w/M_n = 1.06–1.30$	934
		25		$A_2 = (0.011 \pm 0.005)\ M_w^{-0.27\pm0.02}$	CLS; $0.1106 \leq M_w \leq 8.48 \times 10^6$	929
	Methyl acetate	30	179.3	−0.235	DLS; $M_w/M_n = 1.07$	811
		43		0	DLS	811
		55		0.22	DLS	811
		70		0.39	DLS	811
		100		0.21	DLS	811
		114		0	DLS	811
		125		−0.35	DLS	811
	1-Phenyldecane	21.6	390	−3.22	CLS	813
		27.0		−0.83		
		31.3		1.54		
		35.0		2.04		
		41.3		3.97		
	Tetrahydrofuran	25	90–20000	1.41–5.91	9V; CLS; $M_w/M_n = 1.04–1.20$	992
			25.75 ± 1.10	10.52 ± 0.20	LALLS; $M_w/M_n = 1.03$	1031
			32.09 ± 1.28	9.07 ± 0.15	LALLS; $M_w/M_n = 1.02$	
		30		$A_2 = (0.0194 \pm 0.004)\ M_w^{-0.286\pm0.02}$	CLS; $0.110^6 \leq M_w \leq 8.48 \times 10^6$	929
	Tetrahydrofuran/15 vol% Poly(dimethylsiloxane)	25	25.75 ± 1.10	−14.7 ± 3.9	LALLS; $M_w/M_n = 1.03$	1031
			32.09 ± 1.28	−17.1 ± 9.1	LALLS; $M_w/M_n = 1.02$	
	Toluene	12	622–4400	2.27	CLS	841
		20	12300	2.18	CLS	810
			23400	1.82		
			24400	2.32		
			29700	1.75		
			35600	1.48		
			40200	1.37		
			150	0.0127	CLS	804
			1.2–424	3.5–21.7	8V; CLS	993
			21.6	7.3	SANS	993
		23	160	450	CLS; M_w/M_n given in Ref.	924
			260	510		
			400	540		
	Toluene	25	20.5	0 (approx.)	CLS; microgel containing; see Ref.	802
			95.4	10		
			9700	159		
			22300	336		
			2960	2.24	CLS; $M_w/M_n = 1.05$	803
			10800–22200	1.90–1.28	9V; CLS; $A_2 = 4.79 \times 10^{-3}\ M_w^{-0.63}$	807
			50–20000	5.94–1.4	11V; CLS; $M_w/M_n = 1.06–1.30$ values for A_3 given in Ref.	814
	Toluene		1810	2.14	CLS	812
			125–2960	3.29	CLS	847
		30	1290	2.35	CLS	809
			2580	1.99		
			6120	1.64		
			11100	1.34		
			15900	1.21		
			586	3.05	CLS	818
		30	6,7–533	3.04–74	10V; OS; M_w/M_n given in Ref. $A_2 = 0.964\ M^{-0.5} - 4.36 \times 10^{-3}$	925
			233–5840	$A_2 = 1.58 \times 10^{-2}\ M_w^{-0.286}$	CLS; $M_w/M_n = 1.04–1.16$	995
	Xylene	20	107 ± 5	4.8 ± 0.1	CLS	1032

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
linear	Tetrahydrofuran	25	10.5–182	4.62–11.0	4V; CLS; $M_w/M_n = 1.08–1.19$	996
cyclic			11.1–181.5	4.37–9.33	4V; CLS; $M_w/M_n = 1.08–1.20$	
	Xylene	24	120 ± 5	7.0 ± 1	SANS	937
linear	Toluene (deuterated > 99%)	22 ± 5	132	9.1	SANS	931
			143	9.2		
			163	7.7		
			196	6.8		
			215	8.0		
cyclic			127	7.8	SANS	931
			143	7.7		
			163	7.1		
			184	6.6		
			194	7.0		
linear	Toluene	–	10–390	3.9–24.4	8V; CLS	932
	Methyl ethylketone	–		1.48–19.5	7V; CLS	
	Cyclohexane	30-40	110	– 0.368 to 0.446	3V; CLS	
cyclic	Toluene	–	15–227	3.87–31.7	11V; CLS	
	Methyl ethylketone	–		1.69–14.8	11V; CLS	
	Cyclohexane	25–40	40	– 1.27 to 2.0	4V; CLS	932
			105	– 1.17 to 0.932	4V; CLS	
			132	– 1.93 to 0.599	4V; CLS	
			227	– 2.82 to 0.631	4V; CLS	
Mixtures A/B	Toluene	21	36 (A)		4V	851
mass% B: 0–1			1600 (B)	9.3–2.6		
Mixtures C/B			4.9 (C)		8V	851
mass% B: 0–1			1600 (B)	20.0–2.6		
Mixtures D/B			2.3 (D)		7V	851
mass% B: 0–1			1600 (B)	25–2.6		
NBS 705 standard	*trans*-Decalin	20	179.3	– 0.036	CLS; $M_w/M_n = 1.07$	830
		30		0.593		
		40		1.17		
	Toluene	–	179	6.00	CLS; $M_w/M_n = 1.05$	1019,1020
NBS 1479 standard	Toluene	–	50	4.00	CLS; $M_w/M_n = 1.1$	
Toyo Soda 550	Toluene	–	5500	2.09	CLS; $M_w/M_n = 1.2$	
Toyo Soda 2000	Toluene	–	20000	1.61	CLS; $M_w/M_n = 1.3$	
IUPAC-sample			79	6.2	OS	11
IUPAC-sample			233	5.0	OS	11
IUPAC-sample			630	5.1	OS	11
			3.38 ± 0.08	23 ± 3	M from isothermal distillation	463
branched			170	4.9	CLS	312
linear				5.7		312
branched			257	3.3		312
linear				5.4		312
		25	109–5000	3.83 (approx.)	8V; CLS	56
			3200–62	2.9–6.0	5V; CLS	454
atactic			680	4.9×10^{-4}	M_v; (cm^4/g)	562
		40	4000	3.2	CLS	172
		60		2.30		56
	Benzene/ethanol					
	80/20	25	1750	1.75	CLS	56
		60		1.55		56
	70/30	25		0		56
		60		1.1		56
	Benzene/heptane					
	Heptane 0–56 vol.%	35.0 ± 0.2	23.4–2370	3.06–0	9V; CLS; A_2-values corrected for preferential adsorption given in Ref.	440
	Benzene/hexane					
	50/50	25	1750	1.0		56
		60		0.9		56
	40/60	25		0		56
		60		0.65		56
	30/70	60		0		56

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
	Benzene/isopropanol					
	Isopropanol 0–39 vol.%	35.0 ± 0.2	2340–4170	3.06–0	8V; CLS	440
	n-Butyl acetate	5	411	1.88	OS	585
		30	404	2.08		
		55	402	2.00		
	Carbon tetrachloride	25	920	2.6	CLS	294
	Chlorobenzene	25	98.4	5.41	OS	404
		30	388	3.77	OS	585
	Chloroform	20	372–2800	8.0–6.6	4V; CLS	176
	Chloroform/methanol					
	100/0	25	330	7.5	CLS	176
	90/10			5.4		
	80/20			1.9		
	Chloroform	30	100	5.4–5.1	5V; CLS; $A_{2,S}$, $A_{2,H}$ given in Ref.	528
isotactic	1-Chloro-4-methylbenzene	RT	410–1050	2.4 (approx.)	2V; CLS	328
	1-Chloronaphthalene	130	34.5 (approx.)	1.33×10^2 (approx.)	OS; A_2 M/(cm^3/g); see Ref. for various extrapolation methods	523
isotactic	*o*-Dichlorobenzene	RT	196–264	2.9–1.9	3V; OS	328
atactic	*n*-Butylchloride	15	360	2.48	CLS	967
			739	2.00		
			1270	1.81		
			3920	1.35		
	4-*tert*-Butyltoluene	50	5.37	5.12	CLS	967
			20.2	4.18		
			364	2.03		
			743	1.74		
			1280	1.55		
			3950	1.17		
	1-Chloro-*n*-undecane	27.96–43.99	406	− 6.0 to 9.0	9V; CLS; A_2M; (cm^3/g); M_n given in Ref.	133
	Cyclohexane	23–45	68.7	− 0.410 to 0.226	6V; CLS; (J cm^3/g^2)	105
		27–41.5	1610	− 0.37 to 0.258	5V; CLS	166
		30	50–203	− 0.276 to − 0.445	4V; OS	106
		40		0.634–0.445	4V	106
		50		1.33–0.901	4V	106
		34.2	78–210	− 0.061 to 0.071	3V; OS	497
		35.5–55	See Ref.	− 0.153 to 0.538	5V; CLS	329
		35–55	3200	0–0.54	3V; CLS	334
			4000	0–0.88	3V; CLS	172
		31.94–43.99	406	− 131 to 23.1	5V; CLS; A_2M; (cm^3/g)	133
		29.92–44.03		− 16.3 to 22.7	5V; CLS; A_2M; (cm^3/g)	133
		28	500	0.07	CLS	454
		33		0		
		50		0.5		
		40	100	0.4–0.25	3V; CLS; p dependence in Ref.	528
		45		0.79–0.87	3V; CLS; p dependence in Ref.	528
		50		1.11–1.19	3V; CLS; p dependence in Ref.	528
		50	513–45.9	0.95–1.29	7V; CLS	503
	Cyclohexane	40	370	0.320	CLS	967
			744	0.304		
			1270	0.321		
		45	370	0.526		
			743	0.537		
			1280	0.509		
		50	5.48	2.50		
			10.3	1.62		
			20.5	1.20		
			370	0.764		
			746	0.738		
			1280	0.674		
		55	370	0.887		
			746	0.854		
			1280	0.797		

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
	Cyclohexane	34.5 (θ)	0.162	100	CLS; $M_w/M_n = 1.00$	968
			0.266	43	CLS; $M_w/M_n = 1.00$	
			0.370	33	CLS; $M_w/M_n = 1.00$	
			1.23	4.10	CLS; $M_w/M_n = 1.03$	
			2.27	1.33	CLS; $M_w/M_n = 1.05$	
			5.38	0.41	CLS; $M_w/M_n = 1.03$	
			10.1	0.28	CLS; $M_w/M_n = 1.03$	
			20.6	0.10	CLS; $M_w/M_n = 1.02$	
	Decalin		500	0.8×10^{-4}	M_v; (cm⁴/g)	562
		25	1800	0.19 to −0.01	4V; CLS; *p* dependence in Ref.	528
		30		0.40–0.20	5V; CLS; *p* dependence in Ref.	528
		40		0.72–0.45	5V; CLS; *p* dependence in Ref.	528
atactic	Dichloroethane	22	3–17	7–2.54	6V; CLS	166
		25	3	6.8	CLS	166
		35	439–5360	See Ref.	11V; CLS	564
		67	16	2.7	CLS	166
	Dichloroethane/cyclohexane					
	65/35	22	1610	3.98	CLS	166
		67		3.32		166
	35/65	22		2.76		166
		67		2.70		166
	6/94	22		0.78		166
		67		1.27		166
	Dioxane	25	900–920	2.9–2.8	2V; CLS	294
			97.3	3.08	OS; A_3 given in Ref.	404
		34.2	77.6–196	5.11–4.48	3V; OS	497
	Dioxane/heptane					
	Heptane 0–58.5 vol.%	35 ± 0.2	2240–2630	2.51–0	9V; CLS	440
	Ethyl acetate	25	243	0.7	OS	196
	Ethylbenzene		680	4.7×10^{-4}	M_v; (cm⁴/g)	562
	Hexyl-*m*-xylene	16	570–6000	0	3V; CLS; SAXS	492
		20	14.9–39.8	0.2–0.05	2V; CLS; SAXS	492
atactic	Poly(isobutene)/ cyclohexane	25–40	84.2	3.59	5V; CLS	599
		30	38.8	1.81		599
		35		0.93		599
		40		0.46		599
	Butanone	7.5–45	68.7	0.586	CLS; (J cm³/g²)	105
	Toluene	15	5.37	12.2	CLS	967
			20.0	8.80		
			191	4.36		
			357	3.72		
			723	3.12		
			1290	2.81		
			3940	2.07		
	Toluene	15	0.578	44	CLS; $M_w/M_n = 1.00$	968
			0.680	43	CLS; $M_w/M_n = 1.00$	
			0.904	37	CLS; $M_w/M_n = 1.01$	
			1.23	25	CLS; $M_w/M_n = 1.03$	
			2.27	17	CLS; $M_w/M_n = 1.05$	
			3.48	14.6	CLS; $M_w/M_n = 1.07$	
			5.38	12.2	CLS; $M_w/M_n = 1.03$	
			20.0	8.80	CLS; $M_w/M_n = 1.02$	
			39.4	6.45	CLS	
			191	4.36		
			357	3.72		
			723	3.12		
			1290	2.81		
			3940	2.07		
IUPAC-sample		RT	1030	1.29	CLS	253
		20	115–2800	2.2–0.72	8V; CLS	176
		22	2–1770	4.3–0.86	9V; CLS	166
		25	3.2–980	3.5–1.05	8V; CLS	166
			245–540	1.2–1.0	2V; OS	196

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
			96.3–785	166–5.3	5V; OS	176
			170–257	1.9	2V; CLS; OS	312
			900	1.3	CLS	294
		35	45.1–6350	See Ref.	13V; CLS	564
		67	517–980	0.89–0.81	3V; CLS	166
	Butanone/isopropyl alcohol					
	87/13	22	16.3–17.4	(0.2 to −0.3)	2V; CLS	166
		67		0	2V; CLS	166
	Tetrahydrofuran	30	24.4–5700	8.32–2.105	6V; CLS; $A_{2,H}$, A_{2S} given in Ref.	481
	Tetralin	25	680	4.0×10^{-4}	M_v; (cm⁴/g)	562
	Toluene	12	54–4400	30–792	8V; CLS; A_2M; (cm³/g)	548
branched	Cyclohexane	34.5	980–14300	−0.08–0.03	5V; CLS; $M_w/M_n = 1.03–1.24$	994
		44.5		0.02–0.18	5V; CLS; $M_w/M_n = 1.03–1.24$	
	Toluene	30		0.38–2.12	5V; CLS; $M_w/M_n = 1.03–1.24$	
star branched			384	115	CLS; A_2M; (cm³/g)	548
			1870	380	CLS; A_2M; (cm³/g)	548
comb branched			2320	404	CLS; A_2M; (cm³/g)	548
			3880	520	CLS; A_2M; (cm³/g)	548
		15	1800	2.24–2.39 (approx.)	5V; CLS	528
		20	5.85–125	9.4–4.5	5V; SAXS	492
		25	1800	2.27–2.41	5V; CLS	528
			209–3920	4.20–1.84	4V; CLS	492
			680	5.0×10^{-4}	M_v; (cm⁴/g)	562
			99–952	6.5–3.5	7V; CLS; OS	176
			237	1.23	See Ref.; (J cm³/g²)	56
comb branched	Toluene		72–1800	$(11–7.0) \times 10^3$	10V; CLS; (cm⁴/g)	245
		30	100	4.6	5V; CLS; $A_{2,H}$; A_{2S} given in Ref.	585
			373	3.45	OS	585
			13.3	4.49	OS	467
			418–37.6	4.54–5.88	7V; OS	503
			30.9–612	$7.41 \times 10^{-3} M^{0.75}$	A_2M; (cm³/g)	169
			155–710	4.17–1.56	4V; CLS	290
				$A_2 = k M^{-0.22}$	OS	317
				$= 4.6 \times 10^{-3} M^{-0.22}$	OS	319
				$= 2.1 \times 10^{-3} M^{-0.16}$	OS	319
		30.27	56–452	29–145	5V; OS; A_2M; (cm³/g)	327
		34.2	77.8–196	$(5.43–4.46) \times 10^{-4}$	3V; OS	497
		35	33.1–6460	See Ref.	16V; CLS	564
		37	366–50.9	5.5–6.9	8V; OS	584
		40	209–1600	4.28–2.46	3V; CLS	121
		22–67	1610	3.12–2.43	2V; CLS	166
		28–67	980	$20.4 \times [(479/T) - 1]$	M_v; CLS; A_2M; (cm³/g)	308,310
Poly(styrene)-*b*-(Polyethylene/Polypropylene)						
	4-Methyl-2-pentanone/ 2-Chlorobutane (mixtures)					
	100%/0%	25	50000	0.058	CLS; micelles	1033
	90%/10%		48000	0.061		
	80%/20%		35000	0.059		
	70%/30%		29000	0.062		
	60%/40%	20	20000	0.054		
	50%/50%	25	100	2.7	CLS; unassociated	
Poly(styrenesulfonate)						
sodium salt; degree of sulfonation = 0.84	$NaNO_3$-solutions; ionic strength 0.005–2.0	10	350	0.08–34.2	9V; CLS; $M_w/M_n \approx 1.2$	936
		20		0.3–43.2	9V; CLS; $M_w/M_n \approx 1.2$	
		30		0.3–64.8	9V; CLS; $M_w/M_n \approx 1.2$	
	Xylene + 2% methanol	24	110 ± 10	3.7 ± 1	SANS; sulfonation level 1.39 mol%	937
Poly(styrene)/Poly(acrylonitrile)						
mass ratio 3:1	Dimethylformamide	25	538	0.0051	CLS	938

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
Poly(styrene)(PST)/Poly(*p*-chlorostyrene) mixtures, mass frac. PST						
1.000	Butanone	30	341	1.15	OS	969
0.786			–	1.51		
0.593			–	1.70		
0.434			–	1.78		
0.272			–	1.76		
0.133			–	1.82		
0.000			330	1.72		
1.000	Cumene	55	341	2.90	OS	969
0.786			–	2.38		
0.593			–	1.92		
0.434			–	1.39		
0.272			–	0.84		
0.133			–	0.37		
0.000			330	– 0.20		
1.000	Toluene	30	341	3.73	OS	969
0.786			–	3.41		
0.593			–	2.99		
0.434			–	2.64		
0.272			–	2.30		
0.133			–	1.75		
0.000			330	1.20		
block-copolymer mass frac. PST						
0.650	Butanone	30	379	1.68	OS	969
0.467			325	1.78		
0.372			368	1.75		
0.655			374	1.68		
0.509			356	1.82		
0.311			299	1.85		
0.650	Cumene	55	379	2.19	OS	969
0.467			325	1.65		
0.372			368	1.37		
0.655			374	2.27		
0.509			356	1.85		
0.311			299	1.52		
0.650	Toluene	30	379	3.02	OS	969
0.467			325	2.62		
0.372			368	2.23		
0.655			374	3.00		
0.509			356	2.73		
0.311			299	2.14		
Poly(styrene)/poly (isobutylene)	Toluene	21	194–2400 (PS) 156–2440 (PIB)	– 9.80 to 8.36	16V; CLS; concentration and angle dependence given in Ref.	817
Poly(styrene)-*block*-Poly(ethylene/propylene)						
35 ± 3 mass% PS	Methyl ethylketone	25	105	420	Micelles; $M_w = 47.6 \times 10^{-6}$ g/mol	933
	Methyl propylketone			310	Micelles; $M_w = 18.2 \times 10^{-6}$ g/mol	
	Methyl isobutylketone			680	Micelles; $M_w = 42.2 \times 10^{-6}$ g/mol	
	Diethylketone			960	Micelles; $M_w = 43.0 \times 10^{-6}$ g/mol	
	5-Methyl-2-hexanone			780	Micelles; $M_w = 43.5 \times 10^{-6}$ g/mol	
Poly(styrene-*co*-maleic anhydride)/poly(ethyl acrylate)						
A	B					
graft copolymer						
A	B					
56.5/43.5	Acetone	25	53.4	2.1×10^{-4}	OS; (cm⁴/g)	489
77/23			71.2	2.1×10^{-4}		
0/100			350	5.7×10^{-4}		
Poly(styrene-*co*-*p*-methoxystyrene) random mol% *p*-methoxystyrene						
	Toluene	25	71–350	5.0–3.0	7V; OS	617
53.8			35.5–701	4.1–3.2	12V; OS	617

TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
75.6			44–421	5.9–3.5	8V; OS	617
26.4			61–665	5.34–4.29	9V; CLS	617
				$A_2 = 2.0 \times 10^{-3}\ M^{-0.115}$		
53.0			66–1783	5.46–3.41	11V; CLS	617
				$A_2 = 2.4 \times 10^{-3}\ M^{-0.135}$		
75.6			79–1717	4.54–3.00	8V; CLS	617
				$A_2 = 2.3 \times 10^{-3}\ M^{-0.145}$		
Poly(styrene-*co*-methyl acrylate)						
	Dimethylformamide	20			See Ref. OS	515
	Butanone	20			See Ref. CLS	515
Poly(styrene-*co*-methyl methacrylate)						
approx. 50/50	Carbon tetrachloride	25	1330–1900	2.3–2.4	2V; CLS	294
	Dioxane		1330–1900	3.8–3.6	2V; CLS	294
random, mol% St. 29.3	2-Ethoxyethanol	40.0 (68.0)	354	0	OS	443
56.2	(Cyclohexanol)	58.4 (61.3)	350	0		
70.2		72.8 (63.0)	342	0		
block copolymer						
mol% St. 27	1,4-Dioxane			11.0	CLS	816
33				9.98		
46				11.8		
56				10.9		
100				7.37		
mol% St. 49.6	2-Ethoxyethanol	81.0	317	0	OS	443
	(Cyclohexanol)	81.3	317	0		
73.2		84.0	392	0		
85.1		84.0	193	0		
100		81.8	206	0		
mass% St. 38	Benzene	30	1530	1.48	CLS	818
				1.25		
	Toluene			1.65		
		69		4.92		
fractionated	Butanone	25	49–2270	3.2–1.45	11V; CLS	294
unfractionated			970	1.55		294
	Isoamyl acetate				See Ref.	507
	Nitroethane		1330–1900	1.5–1.2	2V; CLS	294
	Toluene				See Ref.	507
Poly(styrene)-*block*-(hydrogenated Polybutadiene)-*block*-Poly(styrene)						
	1,4-Dioxane/*n*-heptane					
	n-Heptane 0 vol%	25	4800	0.021	CLS, micelles	1018
	n-Heptane 10 vol%		4440	0.042		
	n-Heptane 20 vol%		4200	0.075		
	n-Heptane 30 vol%		3770	0.127		

[a] w = mass fraction of component *.

TABLE 17. (O, C)-HETEROCHAIN POLYMERS (POLY(ETHERS), POLY(ESTERS), POLY(CARBONATES))

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(carbonate) see Poly(oxycarbonyloxy........)						
Poly(3,3′-dimethyl oxetane)		25	18.5	0.159	OS	976
	Cyclohexane					
			37.0	0.162		
			52.0	0.156		
			55.0	0.154		
			67.5	0.148		
			130	0.155		
Poly(ethylene terephthalate) see Poly(oxyethyleneoxyterephthaloyl)						
Poly(formaldehyde) see Poly(oxymethylene)						
Poly(oxybutene)	Butanone	30	2100–343	2.3–1.8	6V; CLS	598

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TABLE 16. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
75.6			44–421	5.9–3.5	8V; OS	617
26.4			61–665	5.34–4.29	9V; CLS	617
				$A_2 = 2.0 \times 10^{-3}\ M^{-0.115}$		
53.0			66–1783	5.46–3.41	11V; CLS	617
				$A_2 = 2.4 \times 10^{-3}\ M^{-0.135}$		
75.6			79–1717	4.54–3.00	8V; CLS	617
				$A_2 = 2.3 \times 10^{-3}\ M^{-0.145}$		
Poly(styrene-*co*-methyl acrylate)						
	Dimethylformamide	20			See Ref. OS	515
	Butanone	20			See Ref. CLS	515
Poly(styrene-*co*-methyl methacrylate)						
approx. 50/50	Carbon tetrachloride	25	1330–1900	2.3–2.4	2V; CLS	294
	Dioxane		1330–1900	3.8–3.6	2V; CLS	294
random, mol% St. 29.3	2-Ethoxyethanol	40.0 (68.0)	354	0	OS	443
56.2	(Cyclohexanol)	58.4 (61.3)	350	0		
70.2		72.8 (63.0)	342	0		
block copolymer						
mol% St. 27	1,4-Dioxane			11.0	CLS	816
33				9.98		
46				11.8		
56				10.9		
100				7.37		
mol% St. 49.6	2-Ethoxyethanol	81.0	317	0	OS	443
	(Cyclohexanol)	81.3	317	0		
73.2		84.0	392	0		
85.1		84.0	193	0		
100		81.8	206	0		
mass% St. 38	Benzene	30	1530	1.48	CLS	818
				1.25		
	Toluene			1.65		
		69		4.92		
fractionated	Butanone	25	49–2270	3.2–1.45	11V; CLS	294
unfractionated			970	1.55		294
	Isoamyl acetate				See Ref.	507
	Nitroethane		1330–1900	1.5–1.2	2V; CLS	294
	Toluene				See Ref.	507
Poly(styrene)-*block*-(hydrogenated Polybutadiene)-*block*-Poly(styrene)						
	1,4-Dioxane/*n*-heptane					
	n-Heptane 0 vol%	25	4800	0.021	CLS, micelles	1018
	n-Heptane 10 vol%		4440	0.042		
	n-Heptane 20 vol%		4200	0.075		
	n-Heptane 30 vol%		3770	0.127		

[a] w = mass fraction of component *.

TABLE 17. (O, C)-HETEROCHAIN POLYMERS (POLY(ETHERS), POLY(ESTERS), POLY(CARBONATES))

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
Poly(carbonate) see Poly(oxycarbonyloxy........)						
Poly(3,3′-dimethyl oxetane)		25	18.5	0.159	OS	976
	Cyclohexane					
			37.0	0.162		
			52.0	0.156		
			55.0	0.154		
			67.5	0.148		
			130	0.155		
Poly(ethylene terephthalate) see Poly(oxyethyleneoxyterephthaloyl)						
Poly(formaldehyde) see Poly(oxymethylene)						
Poly(oxybutene)	Butanone	30	2100–343	2.3–1.8	6V; CLS	598

TABLE 17. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)						
	Chloroform	25	76.9–28.5	11.9–14.4	6V; OS	496
			10.2–463	24–8.91	14V; CLS; two different wavelengths M_w/M_n given in Ref.	850
		30	88–37.3	12.5–18.0	6V; OS	496
	Cyclohexanone	25	76.9–31.6	8.8–10.1	5V; OS	496
	Dioxane			10.9–12.4	5V; OS	496
	Dioxane/cyclohexanone		76.9–28.5	0	4V; OS	496
	Ethylene chloride		76.9–31.6	10.6–12.7	5V; OS	496
	Ethylene dichloride	20	56.4–97.7	11.0–9.0	3V; OS; M_n given	850
		25	359	7.43	CLS	850
		30	146–401	7.83–5.75	4V; OS; M_n given	850
	Methylene chloride		76.9–28.5	12.1–14.4	4V; OS	496
			61–122	3.6–2.5	2V; CLS; (J cm^3/g^2)	45
		27	23–182	3.9–2.9	6V; OS; (J cm^3/g^2)	45
	Tetrahydrofuran	20	8–266	4–1.29	6V; $M_{s,D}$; (J cm^3/g^2)	45
		25	76.9–31.6	11.0–13.0	5V; OS	496
			59.2–469	8.7–5.23	7V; CLS	850
		27	23–92	2.5–1.7	6V; OS; (J cm^3/g^2)	45
Poly(oxyethylene)	Benzene	25	7.70	27.4	CLS; B; (bar cm^6/g^2)	407
			3.79	78	OS; B; (bar cm^6/g^2)	407
	Dimethylformamide		3.79	30	OS; B; (bar cm^6/g^2)	407
		25–120	3.5 (approx.)	37–47	4V; OS; B; (bar cm^6/g^2)	188
	Methanol	25	7.70	66.0	OS; B; (bar cm^6/g^2)	407
			3.79	56.0	OS; B; (bar cm^6/g^2)	407
			0.316–6.75	18.0–16.4	3V; OS	518
			See Ref.	170–34.8	3V; CLS	423
			0.062–37.3	1220–46	CLS; B; (bar cm^6/g^2); data for seven solvents and for OS; SE given in Ref.	423
			1–31	102.5–39	11V; CLS; B; (bar cm^6/g^2)	192
			1–10	84.5–47.5	4V; CLS; B; (bar cm^6/g^2)	193
			4–23	87–46	3V; CLS; B; (bar cm^6/g^2)	184
			3–48	48–27.5	2V; CLS; B; (bar cm^6/g^2)	185
	Methanol	25	$68.5 \leq M_w \leq 852$	$A_2 = 0.0329\, M_w^{-0.28\pm0.06}$	CLS	907
			40	29.5	CLS; $M_w/M_n = 1.03$	1003
			74	28.3	CLS; $M_w/M_n = 1.02$	
			145	23.9	CLS; $M_w/M_n = 1.04$	
			594	18.7	CLS; $M_w/M_n = 1.10$	
			1200	17.6	CLS; $M_w/M_n = 1.12$	
	Water	5	6.95	0.465	LALLS; $M_w/M_n = 1.04$	975
			35.7	0.318	LALLS; $M_w/M_n = 1.04$	
		20	1.59	0.2963	CLS	965
			2.88	0.2611	CLS	
		25	10.9–800	116–30.4	5V; B; (bar cm^6/g^2)	189
			10.1	62	CLS; B; (bar cm^6/g^2)	184
			6.95	0.289	LALLS; $M_w/M_n = 1.04$	975
			20.5	0.243	LALLS; $M_w/M_n = 1.03$	
			35.7	0.232	LALLS; $M_w/M_n = 1.04$	
			177	12.17	CLS; $M_w/M_n = 1.04$	1002
			300	9.25	CLS; $M_w/M_n = 1.05$	
			1190	1.36	CLS; $M_w/M_n = 1.12$	
		40	6.95	0.267	LALLS; $M_w/M_n = 1.04$	975
			20.5	0.196	LALLS; $M_w/M_n = 1.03$	
			35.7	0.195	LALLS; $M_w/M_n = 1.04$	
	Water (D_2O)	25	20 ± 2	24 ± 2	SANS; $p = 0$ MPa; $M_w/M_n < 1.1$	1001
			18 ± 2	16 ± 2	SANS; $p = 100$ MPa; $M_w/M_n < 1.1$	
			19	13 ± 2	SANS; $p = 200$ MPa; $M_w/M_n < 1.1$	
Poly(oxyethylene)/Poly(oxypropylene) copolymer star structure						
molar fraction oxyethylene 0.724–0.866	Water	25	30.1–36	0.06–0.215	4V; CLS	986

TABLE 17. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(oxyethyleneoxyterephthaloyl)						
fractionated	*o*-Chlorophenol	25	107–18.1	14–25.5	8V; OS	526
				40 (approx.)	Different types of osmometers used; see Ref.	
unfractionated		25	39	26	Different types of osmometers used; see Ref.	
fractionated		50	74–26.2	15 (approx.)	4V; OS	
	o-Chlorophenol/tetrachloroethylene 60/40	25	12.2	19	OS	542
	Hexafluoro isopropanol	25	33	39 ± 1.8	CLS	911
Poly(oxyhexamethylene-oxydipoyl)	Chloroform	25	17.2	53	OS	542
Poly(oxyhexamethylene-oxyterephthaloyl)	*o*-Chlorophenol/tetrachloroethylene 60/40	25	11.3	35	OS	542
Poly(oxymethylene)	Hexafluoroacetone hydrate	25	23–170	$(5.6–2.0) \times 10^{-3}$	5V; CLS; see Ref.	430
–; diacetate	Hexafluoroacetone	25	23–185	56–25	5V; CLS	236
unfractionated	*p*-Chlorophenol	70	41	32	OS	510
fractionated			86.5–27	35 av.	5V; OS	
unfractionate			35–58	31–28	3V; OS	
fractionated			46–66.5	32–31	2V	
Poly(oxymethylene-*co*-oxyethylene)	1H, 1H, 5H-Octafluoropentanol-1	110	34–56	See Ref.	OS; (cm^3/mol); CLS-measurements also given in Ref.	402
Poly(oxypentamethyleneoxy-terephthaloyl)	*o*-Chlorophenol/tetrachloroethylene 60/40	25	10.6	47	OS	542
Poly(oxypropylene)	Acetone	25	0.067	−90	CLS	475
			0.125	0	CLS	
			0.45–3.85	15.2 (approx.)	6V; CLS	
	Hexane	46	783–901	0.46–4.50	5V; CLS	428
	Methanol	20	0.535–3.31	$(10.75–0.95) \times 10^{-3}$	6V; A; A_2; (cm^3/g); see Ref.	470
	Iso-octane	48–85	901	0–1.58	9V; CLS	428
		50–89	783	−0.25–1.72	7V; CLS	
	Hexane	46	34.2–4410	3.16–0.523	16V; CLS	207
Poly(oxytetramethylene), Poly(tetrahydrofuran)	Ethyl acetate	30	34.6–1030	6.14–2.47	10V; CLS	413
Poly(oxytetramethylene-oxyadipoyl	Chloroform	25	14.7	40	OS	542
Poly(oxytetramethylene-oxyisophthaloyl)	*o*-Chlorophenol/tetrachloroethylene 60/40	25	12.8	27	OS	542
Poly(oxytetramethylene-oxyterephthaloyl)	*o*-Chlorophenol/tetrachloroethylene 60/40	25	13.4	30	OS	542
Poly(β-propiolactone)	2,2,2-trifluoroethanol	30	$6.80 \times 10^3 \leq M_w \leq 861 \times 10^3$			
				$A_2 = (0.025 \pm 0.003)\ M_w^{-0.19\pm0.01}$	CLS	978
Poly(terephthalic acid-4-aminobenzohydrazide)	Dimethyl sulfoxide	23	3.78	0.787	CLS	1017
			5.67	0.529		
			7.06	0.636		
			9.16	0.572		
			9.79	0.406		
			16.6	0.442		
			28.5	0.594		
			47.1	0.559		
			83.9	0.498		
			155	0.171		
			260	0.327		

TABLE 18. (N, C)- AND (O, N, C)-HETEROCHAIN POLYMERS (POLYAMIDES, POLYUREAS, POLYURETHANES)

Polymer	Solvent	T (°C)	M (× 10^{-3}) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
Poly(allylammonium hydrochloride)	Aq. NaCl 0.05–3.0 M	25	180	2.4–33.7	7V	1028
Poly(1,4-benzamide)	Dimethylacetamide, 3% LiCl	–	55	3.06	CLS	1007
Poly((*n*-butylimino)carbonyl) (Poly(*n*-butyl isocyanate))	Chloroform	22	61–10000	25.1	31V; CLS	565
	Toluene	37	23 ± 0.5 – 530 ± 60		7V; OS	433
				21.2 ± 2.7		433
		37	23–523	21.3	2V; OS	565
Poly(dimethyldiallyl-ammonium chloride)	Aq. NaCl 1.0 M (pH = 5.5)	23 ± 2	89	0.278	CLS	1029
			114	0.247		
			281	0.15		
			352	0.122		
			418	0.127		
			473	0.222		
Poly(ethylene imine)	Aq.. NaCl 1 M	35	16.6–5320	$A_2 = 0.135\ M_w^{-0.53\pm0.02}$	CLS; M_w/M_n = 1.8–2.2	1030
Poly(*N*-(3-hydroxypropyl)-L-glutamine)	Methanol	35	366 ± 5 – 100 ± 5		5V; CLS	534
				2.40–4.1 ± 0.6		534
			55 ± 1	3.3	CLS	
Poly(imino-1,4(2-cyano-phenylene)iminoterephthaloyl)	Sulfuric acid 96%	25	4.1–20.8	0.15–1.11	9V; CLS	849
Poly(imino(2,5-dicarboxy-terephthaloyl)imino-1,4-phenyleneoxy-1,4-phenylene)	Dimethylacetamide					
	0.1 M LiBr	15	22.5–266	(21.1–14.3) × 10^{-4}	13V; CLS; A_2M; (cm^3/g); OS	403
Poly(iminohexamethyleneiminoadipoyl)						
(Nylon 66)	*m*-Cresol	60	18	183	OS; *B*; (bar cm^6/g^2)	217
	Formic acid (90%)	25	18	840	OS; *B*; (bar cm^6/g^2)	217
	Formic acid (90%)/KCl					
	0.2–2.5 M KCl	25	31	59.2 to − 7.0	7V; CLS; *B*; (bar cm^6/g^2)	219
	Formic acid (90%)/KCl					
	2.3 M KCl	25	31	0		219
	Formic acid/2 M KCl					
	82.5–40% Acid	25	31	− 9.4 to 36.5	5V; CLS; *B*; (bar cm^6/g^2)	219
	Formic acid (90%)/ 2 M KCl	25	2–52	312–10.1	20V; CLS; *B*; (bar cm^6/g^2)	218
	Formic acid (75–98%)					
	0.5 M Sodium formide					
	2,2,3,3-Tetrafluoropropanol	25	32	1.0–4.0 (approx.)	6V; CLS	405
	0.1 M Sodium trifluoroacetate/2,2,3,3-tetrafluoropropanol	25	62	57.1	CLS; *B*; (bar cm^6/g^2)	220,221
Poly(*n*-hexyliminocarbonyl)	Toluene	37	61–606	20 (approx.)	3V; OS; see Ref. for measurements in THF	565
Poly(*n*-hexyl isocyanate)	Dichloromethane	20	111	6.10	CLS	983
			180	6.24		
			253	6.49		
			342	6.28		
			481	6.46		
			724	5.97		
			1060	6.23		
Poly((*n*-octylimino)carbonyl)	Toluene	37	68–200	20 (approx.)	3V; OS; see Ref. for measurements in THF	565
Poly(ureyleneheptamethylene)	Dichloroacetic acid	25	28.5	0	CLS; *B*; (bar cm^6/g^2)	400
		45	17.5	6.5	CLS; *B*; (bar cm^6/g^2)	400
		73	17.8	38	CLS; *B*; (bar cm^6/g^2)	400
		98	13.2	52	CLS; *B*; (bar cm^6/g^2)	400
		45	3.1–17.8	32–6.2	6V; CLS; *B*; (bar cm^6/g^2)	183
		73	2.6–23.5	82–8.0	6V; CLS; *B*; (bar cm^6/g^2)	183
		25–98	17.5 (approx.)	0–52	4V; CLS; *B*; (bar cm^6/g^2)	183
	Formic acid 98%/KCl					
	96/4	45	0.5	5	CLS; *B*; (bar cm^6/g^2)	183

TABLE 18. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(ureyleneheptamethylene)	Formic acid 98%/KCl 96/4	45	3–13.9	104–59	6V; CLS; B; (bar cm^6/g^2)	183
	Formic acid 85.8–99.5%/ KCl 3.0–10.0%	73	5.7–12.5	512–30	8V; CLS; B; (bar cm^6/g^2)	400
		83	19.5–26.3	83–0.0	6V; CLS; B; (bar cm^6/g^2)	400
	Formic acid 98%/KCl 4%	25	10.6	– 190	CLS; B; (bar cm^6/g^2)	400

TABLE 19. OTHER SYNTHETIC POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(acenaphthylene)	Toluene	25	1720–33	0.26–2.42	17V; CLS	458
			1140–23	0.28–2.10	17V; OS	
Poly(*tert*-butyl crotonate)	*n*-Butylchloride	25	60.6–351	7.75–5.81	4V; CLS	838
	Ethylacetate	25	60.6–351	2.11–1.46	4V; CLS	838
Poly(trimethylene sulfide)	Chloroform	25	19.3	0.2047	OS	1027
			21.5	0.1808		
			27.3	0.1750		
			33.4	0.1634		
			47.3	0.1651		

TABLE 20. INORGANIC POLYMERS

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Poly(dihexoxyphosphazene)	Tetrahydrofuran	18	2340	0.758	CLS	982
		25	26.3	3.98		
			245	1.67		
			917	1.27		
			2280	0.655		
		32	2260	0.576		
Poly(di-*N*-hexylsilane)	Hexane	20	6200	0.76	CLS; M_w/M_n given	953
	Tetrahydrofuran	–	100–10000	$A_2 = 0.0019\ M_w^{-0.19}$	CLS	955
Poly(ferrocenylsilane) symmetrically substituted	Tetrahydrofuran	20	229	1.3	CLS	954
Poly(oxydimethylsilylene) (Poly(dimethyl siloxane))	Toluene	–	3.6	10.3	CLS; M_w/M_n given	956
		–	7.2	8.6		
		–	25.5	6.3		
		–	79.2	4.4		
		–	282	3.6		
		–	625	3.0		
linear	Toluene	25	1.89–30.1	13.6–8.04	8V; CLS	836
cyclic			1.98–21.8	13.0–6.76	9V; CLS	836
linear	Bromocyclohexane	28	0.93	8.42	6V; CLS	836
			3.03	2.62		
			10.6–32.6	0		
	Bromobenzene	59.1–110.8	80	– 2.025 to 1.750	9V; CLS	216
		70–108.3	340	– 0.587 to 0.890	8V; CLS	
		73.7–111.1	1060	– 0.272 to 0.772	7V; CLS	
	Bromocyclohexane	16.7–60.2	33	– 1.3 to 2.260	8V; CLS	216
		18.2–60.2	85	– 0.782 to 2.012	8V; CLS	
		29.2–60.2	340	– 0.136 to 1.329	8V; CLS	
		24.1–90.3	780	– 0.257 to 1.985	10V; CLS	
		25.5–60.2	1060	– 0.190 to 0.985	6V; CLS	
			15400	32		437
			14000	37		437
			5800	36		437

TABLE 20. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
			5400	43		437
			4400	38		437
			4300	50		437
	Bromocyclohexane/	23.9–88.8	80	– 1.23 to 2.14	10V; CLS	216
	phenetol (6/7)	26.8–93.9	340	– 0.536 to 1.490	10V; CLS	
		31.8–90	1060	– 0.239 to 1.280	8V; CLS	
	Chlorobenzene	20	107	1.88	OS	501
			232	1.70	OS	501
	n-Dodecane (DOD)/	20	68	0.08–4.32	11V; CLS	957
	butanone φ_{DOD} = 0.00–1.00		80.5	0.92–4.29	10V; CLS	
			125	0.09–3.47	11V; CLS	
			150	0.10–3.08		
	n-Hexadecane (HED)/	20	80.5	0.01–2.49	11V; CLS	
	butanone φ_{HED} = 0.00–1.00		125	0.00–2.14		
			150	0.00–2.09		
	n-Undecane (UND)/	20	31.5	0.04–6.08	9V; CLS	958
	butanone φ_{UND} = 0.00–1.00		80.5	0.12–5.00		
			125	0.093–4.65	9V; CLS; LALLS	958,963
			150	0.096–4.50	9V; CLS; LALLS	958,963
Poly(oxydimethylsilylene)	(Poly(dimethyl siloxane))					
linear	*n*-Hexane (HEX)/	20	31.5	0.04–9.55	10V; LALLS	963
	butanone φ_{HEX} = 0–1		80.5	0.12–7.60	10V; LALLS	
			125	0.093–6.78	10V; LALLS	
			150	0.096–6.47	10V; LALLS	
	n-Heptane (HEP)/	20	31.5	0.04–8.95	11V; LALLS	963
	butanone φ_{HEP} = 0–1		80.5	0.12–7.00	11V; LALLS	
			125	0.093–6.36	11V; LALLS	
			150	0.096–6.03	11V; LALLS	
	n-Nonane (NON)/	20	31.5	0.04–7.92	10V; LALLS	963
	butanone φ_{NON} = 0–1		80.5	0.12–6.38	10V; LALLS	
			125	0.093–5.78	10V; LALLS	
			150	0.096–5.43	10V; LALLS	
	n-Decane (DEC)/	20	68	0.08–5.35	11V; LALLS	963
	butanone φ_{DEC} = 0–1		80.5	0.12–5.20	11V; LALLS	
			125	0.09–4.74	11V; LALLS	
			150	0.10–4.64	11V; LALLS	
	Phenetol	80.8–122.8	45	– 2.15 to 3.823	8V; CLS	216
		81.7–123.1	80	– 0.93 to 3.23	7V	
		79.5–122.8	340	– 0.54 to 1.796	7V	
		90–112.8	1060	0.015–1.466	6V	
	Styrene	14	23.5	– 2.19	CLS; A_3 given	962
		28		– 0.96		
		35		0		
		60		1.37		
		25	860	– 0.77	CLS; A_3 given	
		28		– 0.42		
		30		– 0.36		
		33		– 0.22		
		35		– 0.04		
		40		0.26		
		50		0.59		
		25	130	– 1.06	CLS	961
		30		– 0.86		
		35 (θ)		0		
		40		0.17		
		50		0.68		
	Toluene	20	100	3.53	OS	501
			235	3.18	OS	501
		25	0.66–2.015	25.0–4.05	3V; OS	518
				– 2.66 to 10.6	3V; CLS	519
Poly(oxymethyl phenylsilylene) (Poly(methylphenylsiloxane))	Acetone	25	257	1.6	CLS; M_w/M_n = 1.65	959
	Cyclohexane		270	1.2	CLS; M_w/M_n = 1.65	

TABLE 20. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
Poly(phenyl silsesquioxane)	Toluene	37	488.5–26.4	1.123–2.434	15V; OS	459
Poly(tetramethyl-*p*-silphenylene-siloxane)	Toluene	25	382	0.118	OS	960
		40		0.118		
		55		0.118		
		25	360	0.112	OS	960
		32.5		0.113		

TABLE 21. POLY(SACCHARIDES)

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
Amylose acetate	Nitromethane	–	148–3110	2.43	CLS	846
Cellulose						
hydrolized linters	Cadmium ethylenediamine	25	225–945	16.1 (approx.)	5V; CLS	97
sulfite pulp			215	12.1	CLS	
regenerated	Aq. NaOH, 8 wt.%	3.5	80	4.79	CLS	941
		10		3.75		
		26		3.33		
		35		2.75		
		41		– 0.58		
		45		– 3.06		
	Aq. LiOH, 6 wt.%	25	121	11.0	CLS	
Cellulose acetate	Acetone	RT	60–173	9.4–5.8	4V; CLS	302
Cellulose acetate phthalate acetyl content: 19.5% phthalyl content: 21.4%	0.5 N $NaHCO_3$	30		$A_2 = 2.34 \times 10^{-3}\ M_w^{1.11}$	CLS; $1.68 \leq M_w \leq 13.44$ (× 10⁶)	939
Cellulose diacetate	Acetone	12.1	94	4.1	CLS	825
		25.4		3.8		
		37.7		3.6		
		45.0		3.5		
		50.3		3.4		
Cellulose diacetate	Butanone	30	71	– 0.5	CLS	826
		40		– 0.25	$(dA_2/dT) = 0.25 \times 10^{-5}$ [cm³/(g K)]	
		50		0		
		60		0.25		
		40	92	– 0.25		
		50		0		
			141	– 2.1		
Cellulose carbanilate	Dioxane	20	2580–80.8	2.45–11.5	7V	68
			42.0–1.35	7.5–20.0	6V	68
Cellulose nitrate						
(13.9% N)	Acetone	25	81–3850	10.8–8.2	6V; CLS	477
(12.9% N)		25	141–1700	13.3–12.5	4V; CLS	
(ca. 13.55% N)		RT	61.6–2482	0.24 (approx.)	14V; OS; *B*; (bar L²/g²)	61
		25	77–2640	6.10 (approx.)	11V; CLS	22
		–	780	11.2	CLS	824
from row cotton						
(ca. 13.66% N)		15	22.8–417	0.24 (approx.)	8V; OS; *B*; (bar L²/g²)	195
from cotton		20	31–661	0.28 (approx.)	11V; OS; *B*; (bar L²/g²)	194
	Butyl acetate	20	150–400	1.0–0.5	CLS; *B*; (bar cm⁶/g²)	239
		25	30–360	3.5–0.3	OS; *B*; (bar cm⁶/g²)	239
from viscose rayon	Ethyl acetate	29.7	71.5	44.1	OS; A_2M; (cm³/g)	91
from chemical cotton			295–450	28.5–25.7	2V; OS; A_2M; (cm³/g)	91
(12.4% N)	Butanone	25	130	10.8	OS	196

TABLE 21. *cont'd*

Polymer	Solvent	T (°C)	M (× 10⁻³) (g/mol)	A_2 (× 10⁴) (mol cm³/g²)	Remarks	Refs.
Cellulose tricarbanilate	Tetrahydrofuran	25	105	7.0	CLS; M_w/M_n given	940
			200	7.2		
			294	5.7		
			385	5.0		
			508	5.6		
			578	4.2		
			787	4.2		
			1050	4.3		
			1330	4.2		
			1820	4.0		
			3700	3.8		
			86	5.5	CLS; M_w/M_n given	940
			128	4.5		
			185	8.0		
			225	6.7		
			267	3.7		
			400	4.8		
			513	4.8		
			885	4.5		
			1720	3.3		
Dextran	0.05 g/100 ml sodium azide	20	7.5	9.80	CLS	1015
			14.5	1.00		
			41.6	7.26		
			120.7	5.87		
			374	2.30		
			1270	1.05		
	Water	20	36.96	0.0616	CLS	965
			67.94	0.0421		
			113.07	0.0352		
			530.61	0.0302		
			485	4.6	$M_w/M_n = 1.95$	985
		25	485	4.6	CLS; $M_w/M_n = 1.95$	942
			9.9	13.8	CLS	999
			39.7	9.2		
			65.0	77		
			481	3.9		
			2270	0.9		
			3250	0.7		
(2-(Diethylamino)ethyl) dextran	Aq. sodium nitrate 0.8 M	20	1.58	1.34	CLS	1015
			11.3	11.6		
			21.0	9.5		
			45.7	4.6		
			131	3.31		
			405	2.1		
			429	2.28		
			495	1.95		
			640	1.4		
			1474	1.15		
Pullulan	Water	25	107	2.50	CLS; M_w/M_n given	1013
			188	2.20		
			384	1.60		
			572	1.60		
			811	1.38		
			1050	1.35		
			1490	1.50		
			2100	1.20		
			2360	1.46		
				$A_2 = 5.42 \times 10^{-3}\ M_w^{-0.26}$		
hydrophobized		25	760	2.60	CLS	943
Tetramethylammonium gellan gum						
	Tetramethylammonium chloride					
	$C = 0.0200$ mol/dm³	28	97	0.71	OS	984
	$C = 0.0500$ mol/dm³		98	0.45		
	$C = 0.0750$ mol/dm³		95	0.39		

TABLE 21. *cont'd*

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
	$C = 0.2000$ mol/dm^3		98	0.30		
	$C = 0.5000$ mol/dm^3		100	0.24		
	$C = 0.0125$ mol/dm^3	40	49	0.95	OS	984
	$C = 0.0200$ mol/dm^3		50	0.71		
	$C = 0.0500$ mol/dm^3		48	0.44		
	$C = 0.0750$ mol/dm^3		52	0.34		
	$C = 0.2000$ mol/dm^3		52	0.21		
	$C = 0.5000$ mol/dm^3		48	0.12		
Xanthan, A	Synth. seawater brine	–	4200	2.0	CLS	946
			5000	2.3		
			5100	2.6		
			5400	2.4		
			8100	2.7		
			8200	2.5		
			10100	2.5		
Xanthan B			4100	0.95		
Xanthan C			12200	1.5		
Xanthan D			5200	2.1		
Xanthan A	0.1 M NaCl	–	5000	3.6	CLS; 0.22 μm filter used	
			5100	4.0	CLS	
			9600	4.2	CLS	
Xanthan D			5800	3.5	CLS; 0.22 μm filter used	
powdered	0.1 M NaCl	–	7400	3.2	CLS	
broth	0.085 M NaCl	–	1800	6–8	CLS	
double stranded helix	0.1 N NaCl	25	74	6.80	CLS	944
			112	6.18		
			164	5.64		
			209	5.34		
			240	5.02		
			362	4.77		
			603	4.35		
			994	3.79		
			1420	3.99		
			2560	3.08		
			3940	2.91		
			7400	3.17		
sodium salt	0.005 M NaCl	25	233	20(±4)	CLS; A_3 given	945
	0.007 M		225	17.5(±3.5)		
	0.01 M		229	16(±1)		
	0.02 M		238	8.0(±1.0)		
	0.03 M		226	7.5(±0.5)		
	0.06 M		222	5.3(±0.5)		
	0.1 M		220	4.8(±0.3)		
	0.2 M		221	2.95(±0.05)		
	0.6 M		228	2.1(±0.1)		
	1.0 M		227	1.7 (±0.5)		
native	0.1 M NaCl	20	2940	4.94	CLS	1011,1012
acetyl-free			1770	6.00	CLS	
pyruvate-free			1370	5.22	CLS	

TABLE 22. OTHER BIOPOLYMERS (PROTEINS, POLY(NUCLEOTIDES))

Polymer	Solvent	T (°C)	M ($\times 10^{-3}$) (g/mol)	A_2 ($\times 10^4$) (mol cm^3/g^2)	Remarks	Refs.
Calf thymus desoxyribonucleic acid	Aq. NaCl 0.2 M	20	156 ± 5	0.0072 ± 0.0002	CLS	1014
Gelatin (30.2% C, 8.2% H, 18.5% N)	0.5 M KSCN	25	400	2.0	CLS	979
	Formamide		380	2.6	CLS	979
			292	3.7	CLS; M_w/M_n given	1000
			346	4.5		
			371	6.2		

TABLE 22. *cont'd*

Polymer	Solvent	T (°C)	M (× 10^−3) (g/mol)	A_2 (× 10^4) (mol cm^3/g^2)	Remarks	Refs.
Poly((γ-benzyl-L-glutamate)	Chlorobenzene	25	920	5.1	CLS	488
	Chloroform		130–358	5.0–4.7	4V; CLS	299
	Chloroform/formamide		392	2.0		435
			408	2.2		435
	Cyclohexanone		230	16	CLS	488
	Dochloroacetic acid		21.4–336	15.7–7.5	3V; CLS	299
	Dichloroethane		490	5.0	CLS	488
			555	23.2	CLS	476
	Dimethylformamide	5	179	3.52	CLS	949
		15	60	5.36	CLS	
			149	3.94	CLS	
			179	4.14	CLS	
		15–55	27.4	− 6 ± 1.3–2.5 ± 0.27	5V; OS	521
		20	179	4.43	CLS	949
		20–55	140	− 0.9 ± 0.44–2.6 ± 0.15	5V; OS	521
		25	18.5–414	2.5 (approx.)	13V; CLS	435
			350	4.7	CLS	488
			132–417	See Ref.	CLS	450
			179	3.46	CLS	949
		25–70	.6	16.0	3V; OS; CLS; M_w; B; (bar cm^6/g^2)	476
			33.4	9.1	5V; B; (bar cm^6/g^2)	476
			154	9.3	4V; B; (bar cm^6/g^2)	476
			222	9.1	4V; B; (bar cm^6/g^2); for measurements in five more solvents see Ref.	476
		30	277	3.35	CLS	949
			179 ± 1	3.1 ± 0.1		1016
		37	69–250	3.5–2.8	OS	450
			76–176	3.8–2.0	5V; OS	435
		40	60	5.38	CLS	949
			149	3.35	CLS	
			179	3.86	CLS	
		45	27.4–490	2.2 (approx.)	8V; OS	521
		75	60	5.70	CLS	949
			149	4.77	CLS	
			179	3.80	CLS	
			277	3.45	CLS	
		–	102	3.9	CLS	950
Poly(γ-benzyl-L-glutamate) (PBG)	Dimethylformamide	25	25–1100	1.1–3.3	10V; CLS	951
PBG-S-S-PBG			0.4–16	1.8–13.7	11V; CLS	
PBG-N = N-PBG			8–24	1.9–5.1	4V; CLS	
PBG-$(CH_2)_{10}$-PBG			19–44	1.2–2.6	6V; CLS	
	Dioxane	25	400	5.3	CLS	488
	Tetrahydrofuran		440	5.8	CLS	488
Desoxyribonucleic acid	Aq. NaCl, 1 M	25	105 ± 0.03	0.30 ± 0.02	CLS; A_3, A_4 given	947
			1.00 ± 0.05	0.26 ± 0.06		
	0.1 M		109 ± 0.03	0.69 ± 0.05		
	0.01 M		107 ± 0.05	2.9 ± 0.3		
fragments	Aq. NaCl, 0.002 M	25	117 ± 18	181 ± 4	CLS; theoretical values given	948
	0.005 M			61 ± 2		
	0.01 M			29 ± 2		
	0.02 M			20 ± 2		
	0.04 M			10 ± 1.5		
	0.1 M			6 ± 1.5		
	0.5 M			2 ± 1.5		
Poly(L-glutamic acid)	Aq. NaCl, 0.02 M	–	112	0.88	CLS	952
	0.05 M	–		0.48	CLS	
	0.1 M	–		0.38	CLS	
	0.05 M	–	104	0.50	CLS	
	0.2 M	–	104	0.30	CLS	

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Polymolecularity Correction Factors

Rolf E. Bareiss
Bergstraesser Weg 23, D-55268 Nieder-Olm, FR Germany

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A. LIST OF SYMBOLS USED

a_D	exponent in $D = K_D M^{a_D}$
a_s	exponent in $s = K_s M^{a_s}$
$a_{[\eta]}$	exponent in $[\eta] = K_{[\eta]} M^{a_{[\eta]}}$
A_2	second virial coefficient
$\bar{A}_2^{(OP)}$, $\bar{A}_2^{(LS)}$	A_2 from osmotic pressure, light scattering, resp.
B, B', B''	constants
D	diffusion coefficient
$\bar{D}_A$	"area average" diffusion coefficient $\bar{D}_A = \left(\sum_i w_i D_i^{-0.5}\right)^{-2}$
D_i	diffusion coefficient of component i
$\bar{D}_w$	weight-average diffusion coefficient $\bar{D}_w = \sum_i w_i D_i$
$\bar{D}_z$	z-average diffusion coefficient $\bar{D}_z = \left(\sum_i w_i M_i D_i\right) / \left(\sum_i w_i M_i\right)$
$[f]_\Theta$	intrinsic frictional coefficient in the theta state
i	integers 1,2,..., i
k	degree of coupling in Schulz–Zimm distributions of the molecular weight $k = (\bar{M}_w/\bar{M}_n - 1)^{-1}$
K_D	constant in $D = K_D M^{a_D}$
K_0	constant for the determination of unperturbed dimensions $K_0 = \Phi_\Theta(\langle r^2\rangle_0/M)^{3/2}$
K_s	constant in $s = K_s M^{a_s}$
$K_{\langle S^2\rangle}$	constant in $\langle S^2\rangle = K_{\langle S^2\rangle} M^{1+\varepsilon}$
$K_{[\eta]}$	constant in $[\eta] = K_{[\eta]} M^{a_{[\eta]}}$
L	reduced contour length $L = L'/\lambda^{-1}$
L'	contour length
$\bar{L}_n$, $\bar{L}_w$, $\bar{L}_z$	number-, weight-, z-average L
M	molecular weight[1]
$\bar{M}_{av}$	any average of the molecular weight
$\bar{M}_D$	molecular weight from D
M_i	molecular weight of component i
M_j	molecular weight of compound j
$\bar{M}_m$	molecular weight of median in logarithmic normal distributions
$\bar{M}_n$	number-average molecular weight $\bar{M}_n = 1/\sum_i w_i M_i^{-1}$
$\bar{M}_s$	molecular weight from s
$\bar{M}_{\langle S^2\rangle}$	molecular weight from $\langle S^2\rangle$
$\bar{M}_{sD}$	molecular weight from s and D
$\bar{M}_v$	viscosity-average molecular weight $\bar{M}_v = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{1/a_{[\eta]}}$
$\bar{M}_w$	weight-average molecular weight $\bar{M}_w = \sum_i w_i M_i$
$\bar{M}_{s[\eta]}$	molecular weight from s and $[\eta]$
$\bar{M}_{[\eta]D}$	molecular weight from $[\eta]$ and D
n_i	mole fraction of component i
N_L	Avogadro number
P_0	constant in $[f]_\Theta = P_0 \langle r^2\rangle_0^{1/2}$
q	polymolecularity correction factor
q_B	q for Baumann–Stockmayer–Fixman procedure
q_{BSF}	q for Burchard–Stockmayer–Fixman equation

[1] According to IUPAC recommendations (1,2), "molecular weight" is understood to be the relative molecular mass, the numerical values of which are identical to those of the molar mass in g/mol and therefore molecular weight is denoted here with the same symbol as the molar mass, viz. M.

q_{BKS}	q for Baumann–Kurata–Stockmayer procedure
$q_{CB,1}, q_{CB,2}$	q's for Cowie–Bywater procedure
q_{Diff}	q for $D = K_D M^{a_D}$
q_{FF}	q for Fox–Flory equation
q_{Gyr}	q for $\langle S^2 \rangle = K_{\langle S^2 \rangle} M^{1+\varepsilon}$
q_{KMSH}	q for $[\eta] = K_{[\eta]} M^{a_{[\eta]}}$
$q(\bar{L}_w)$	q for stiff polymer chains
$q_{\langle r^2 \rangle_n}$	q's for conversion of $[\langle r^2 \rangle^{3/2}]_n^{2/3}$ into $\langle r^2 \rangle_n$,
$q_{\langle r^2 \rangle_w}$	$\langle r^2 \rangle_w$ and
$q_{\langle r^2 \rangle_z}$	$\langle r^2 \rangle_z$, respectively
$q_{\langle S^2 \rangle_w}$	q's for conversion of $\langle S^2 \rangle_z$ into $\langle S^2 \rangle_w$ and
$q_{\langle S^2 \rangle_n}$	$\langle S^2 \rangle_n$, respectively
q_{Sed}	q for $s = K_s M^{a_s}$
$\langle r^2 \rangle$	mean-square end-to-end distance
$\langle r_i^2 \rangle$	$\langle r^2 \rangle$ of component i
$\langle r^2 \rangle_{av}$	any average of $\langle r^2 \rangle$
$\langle r^2 \rangle_0$	mean-square unperturbed end-to-end distance
$\overline{[\langle r^2 \rangle^{3/2}]_n}$	1.5th moment of number distribution of mean-square end-to-end distance $\overline{[\langle r^2 \rangle^{3/2}]_n} = \sum_i n_i \langle r_i^2 \rangle^{3/2}$
$\langle r^2 \rangle_n$	number-average mean-square end-to-end distance $\langle r^2 \rangle_n = \sum_i n_i \langle r_i^2 \rangle$
$\langle r^2 \rangle_w$	weight-average mean-square end-to-end distance $\langle r^2 \rangle_w = \sum_i w_i \langle r_i^2 \rangle$
$\langle r^2 \rangle_z$	z-average mean-square end-to-end distance $\langle r^2 \rangle_z = (\sum_i w_i M_i r_i^2)/(\sum_i w_i M_i)$
s	sedimentation coefficient
$\bar{s}_{max}$	sedimentation coefficient determined from the maximum of the concentration gradient curve
$\bar{s}_w$	weight-average sedimentation coefficient
$\langle S^2 \rangle$	mean-square radius of gyration
$\langle S^2 \rangle_0$	unperturbed mean-square radius of gyration
$\langle S_i^2 \rangle$	$\langle S^2 \rangle$ of component i
$\langle S^2 \rangle_{av}$	any average of $\langle S^2 \rangle$
$\langle S^2 \rangle_n$	number-average mean-square radius of gyration $\langle S^2 \rangle_n = \sum_i n_i \langle S_i^2 \rangle$
$\langle S^2 \rangle_w$	weight-average mean-square radius of gyration $\langle S^2 \rangle_w = \sum_i w_i \langle S_i^2 \rangle$
$\langle S^2 \rangle_z$	z-average mean-square radius of gyration $\langle S^2 \rangle_z = (\sum_i w_i M_i \langle S_i^2 \rangle)/(\sum_i w_i M_i)$
$\langle S^2 \rangle_{0,z}$	unperturbed $\langle S^2 \rangle_z$
v_2	partial specific volume of the solute (index 2)
w_i	mass fraction of component i
w_j	mass fraction of component j
ε	exponent in $\langle S^2 \rangle = K_{\langle S^2 \rangle} M^{1+\varepsilon}$
η	viscosity (index 1: solvent)
$[\eta]$	intrinsic viscosity
$[\eta]_i$	intrinsic viscosity of component i
$[\bar{\eta}]_w$	weight-average intrinsic viscosity $[\bar{\eta}]_w \equiv [\eta] = \sum_i w_i [\eta]_i$
λ^{-1}	length of Kuhn statistical segment
π	pi = 3.14159
ρ	density (index 1: solvent)
σ	standard deviation of logarithmic normal distribution
Θ	index theta state
$\sum_i$	summation over all components i
$\Phi(\varepsilon)$	viscosity function; $\Phi_\Theta = \Phi(\varepsilon = 0) = 2.5 \times 10^{23}\ \mathrm{mol}^{-1}$ for end-to-end distance and $[\eta]$ in cm^3/g is also called Flory constant

B. INTRODUCTION

Relationships between molecular weight M (1,2),[1] and properties dependent on M, for polymers exhibiting a molecular weight distribution (MWD, polymolecularity[2]) require the use of corresponding averages ("principle of corresponding averages" (3)). For example, in Staudinger's viscosity law (4), modified by Kuhn (5), Mark (6), Sakurada (7) and Houwink (8,9) (KMSH), the experimentally determined intrinsic viscosity $[\eta]$ is the weight-average intrinsic viscosity (10–12) but the corresponding molecular weight is the viscosity-average molecular weight (13,14) $\bar{M}_v$:

$$[\eta] = K_{[\eta]} \bar{M}_v^{a_{[\eta]}}$$

where

$$[\eta] = \sum_i w_i [\eta]_i \quad \text{and} \quad \bar{M}_v = \left(\sum_i w_i M_i^{a_{[\eta]}} \right)^{1/a_{[\eta]}}$$

A direct experimental determination of $\bar{M}_v$ is not possible (exception: the intrinsic viscosity $[\bar{\eta}]_\Theta$ and the weight-average sedimentation coefficient $\bar{s}_w$, both for the theta state, inserted in the Flory–Krigbaum–Mandelkern–Scheraga equation (15–17) result in the viscosity-average molecular weight for the theta state, $\bar{M}_{v,\Theta}$ (18)). Therefore, for the determination of the numerical values of the constant $K_{[\eta]}$ and the exponent $a_{[\eta]}$ in Eq. (B1) different molecular weight averages, $\bar{M}_{av}$, are usually applied, e.g. the weight-average molecular weight ($\bar{M}_{av} = \bar{M}_w$), the number-average molecular weight ($\bar{M}_{av} = \bar{M}_n$), or the molecular weight averages obtained with Svedberg's equation[3] (19) $\bar{M}_{sD}$ or the equations of Flory, Krigbaum, Mandelkern and Scheraga (15–17) $\bar{M}_{s[\eta]}$ and $\bar{M}_{[\eta]D}$. From $\bar{M}_{av}$, the viscosity-average molecular weight $\bar{M}_v$ can be calculated, provided the type and width of the molecular weight distribution of the polymer samples or fractions are known (14).

1. Alternatively, a polymolecularity correction factor q can be defined which corrects Eq. (B1) for the use of $\bar{M}_{av}$ instead of $\bar{M}_v$:

$$[\eta] = K_{[\eta]} \bar{M}_v^{a_{[\eta]}} = K_{[\eta]} q_{KMSH} \bar{M}_{av}^{a_{[\eta]}} \qquad \text{(B1)}$$

$$q_{KMSH} = (\bar{M}_v / \bar{M}_{av})^{a_{[\eta]}} \qquad \text{(B2)}$$

Equation (B2) reads, for $\bar{M}_{av} \equiv \bar{M}_w$:

$$q_{KMSH,\bar{M}_w} = \left(\sum_i w_i M_i^{a_{[\eta]}} \right) \bigg/ \left(\sum_i w_i M_i \right)^{a_{[\eta]}} \qquad \text{(B3)}$$

(see Tables 2 and 3).

[2] Polymolecularity is understood to describe the phenomenon that most polymers are nonuniform (2) with respect to relative molecular mass.
[3] See this Handbook page VII–85.

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\mathrm{n}}$:

$$q_{\mathrm{KMSH},\bar{M}_{\mathrm{n}}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right) \Big/ \left(\sum_i w_i M_i\right)^{a_{[\eta]}} \tag{B4}$$

(see Tables 4 and 5).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\bar{s}_{\mathrm{w}}\bar{D}_{\mathrm{w}}}$:

$$q_{\mathrm{KMSH},\bar{s}_{\mathrm{w}}\bar{D}_{\mathrm{w}}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)\left(\sum_i w_i M_i^{(2-a_{[\eta]})/3}\right)^{-a_{[\eta]}} \times \left(\sum_i w_i M_i^{-(1+a_{[\eta]})/3}\right)^{a_{[\eta]}} \tag{B5}$$

(see Tables 6 and 7).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\bar{s}_{\mathrm{w}}\bar{D}_{\mathrm{A}}}$:

$$q_{\mathrm{KMSH},\bar{s}_{\mathrm{w}}\bar{D}_{\mathrm{A}}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)\left(\sum_i w_i M_i^{(2-a_{[\eta]})/3}\right)^{-a_{[\eta]}} \times \left(\sum_i w_i M_i^{(1+a_{[\eta]})/6}\right)^{-2a_{[\eta]}} \tag{B6}$$

(see Tables 8 and 9).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\bar{s}_{\mathrm{w}}\bar{D}_{z}}$:

$$q_{\mathrm{KMSH},\bar{s}_{\mathrm{w}}\bar{D}_{z}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)\left(\sum_i w_i M_i\right)^{-a_{[\eta]}} \tag{B7}$$

(see Tables 10 and 11).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\bar{s}_{\mathrm{w}}[\bar{\eta}]_{\mathrm{w}}}$:

$$q_{\mathrm{KMSH},\bar{s}_{\mathrm{w}}[\bar{\eta}]_{\mathrm{w}}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{1-0.5a_{[\eta]}} \times \left(\sum_i w_i M_i^{(2-a_{[\eta]})/3}\right)^{-1.5a_{[\eta]}} \tag{B8}$$

(see Tables 12 and 13).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{[\bar{\eta}]_{\mathrm{w}}\bar{D}_{\mathrm{w}}}$:

$$q_{\mathrm{KMSH},[\bar{\eta}]_{\mathrm{w}}\bar{D}_{\mathrm{w}}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{a_{[\eta]}+1}\left(\sum_i w_i M_i^{-(1+a_{[\eta]})/3}\right)^{3a_{[\eta]}} \tag{B9}$$

(see Tables 14 and 15).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{[\bar{\eta}]_{\mathrm{w}}\bar{D}_{\mathrm{A}}}$:

$$q_{\mathrm{KMSH},[\bar{\eta}]_{\mathrm{w}}\bar{D}_{\mathrm{A}}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{1+a_{[\eta]}}\left(\sum_i w_i M_i^{(1+a_{[\eta]})/6}\right)^{-6a_{[\eta]}} \tag{B10}$$

(see Tables 16 and 17).

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{[\bar{\eta}]_{\mathrm{w}}\bar{D}_{z}}$:

$$q_{\mathrm{KMSH},[\bar{\eta}]_{\mathrm{w}}\bar{D}_{z}} = \left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{1+a_{[\eta]}}\left(\sum_i w_i M_i^{(2-a_{[\eta]})/3}\right)^{3a_{[\eta]}} \times \left(\sum_i w_i M_i\right)^{-3a_{[\eta]}} \tag{B11}$$

(see Tables 18 and 19).

2. Correspondingly, polymolecularity correction factors are useful for the relationship of sedimentation coefficient versus molecular weight,

$$s = K_s \bar{M}_s^{a_s} = K_s q_{\mathrm{Sed}} \bar{M}_{\mathrm{av}}^{a_s} \tag{B12}$$

the relationship of diffusion coefficient versus molecular weight,

$$D = K_D \bar{M}_D^{a_D} = K_D q_{\mathrm{Diff}} \bar{M}_{\mathrm{av}}^{a_D} \tag{B13}$$

and the relationship of mean-square radius of gyration[4] versus molecular weight

$$\langle S^2 \rangle = K_{\langle S^2 \rangle} \bar{M}_{\langle S^2 \rangle}^{1+\varepsilon} = K_{\langle S^2 \rangle} q_{\mathrm{Gyr}} \bar{M}_{\mathrm{av}}^{1+\varepsilon} \tag{B14}$$

if other than the corresponding molecular weight averages $\bar{M}_s$, $\bar{M}_D$, and $\bar{M}_{\langle S^2 \rangle}$, respectively (3), are to be used for the numerical evaluation of the constants K_s, K_D, $K_{\langle S^2 \rangle}$ and the exponents a_s, a_D, ε, respectively. Analogous to Eq. (B1) the polymolecularity correction factors for Eqs. (B12), (B13), and (B14) are found to be:

$$q_{\mathrm{Sed}} = (\bar{M}_s / \bar{M}_{\mathrm{av}})^{a_s} \tag{B15}$$

$$q_{\mathrm{Diff}} = (\bar{M}_D / \bar{M}_{\mathrm{av}})^{a_D} \tag{B16}$$

$$q_{\mathrm{Gyr}} = (\bar{M}_{\langle S^2 \rangle} / \bar{M}_{\mathrm{av}})^{1+\varepsilon} \tag{B17}$$

Eq. (B15) reads for $s \equiv \bar{s}_{\mathrm{w}}$, $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\mathrm{w}}$:

$$q_{\mathrm{Sed},\bar{s}_{\mathrm{w}}\bar{M}_{\mathrm{w}}} = \left(\sum_i w_i M_i^{a_s}\right) \Big/ \left(\sum_i w_i M_i\right)^{a_s} \tag{B18}$$

(see Tables 20 and 21).

For $s \equiv \bar{s}_{\mathrm{w}}$, $\bar{M}_{\mathrm{av}} = \bar{M}_{\mathrm{n}}$:

$$q_{\mathrm{Sed},\bar{s}_{\mathrm{w}}\bar{M}_{\mathrm{n}}} = \left(\sum_i w_i M_i^{a_s}\right)\left(\sum_i w_i / M_i\right)^{a_s} \tag{B19}$$

(see Tables 22 and 23).

[4] The symbol for the radius of gyration is a *capital S* – contrary to the recommendations by IUPAC (2) – in order to distinguish it from the symbol for the sedimentation coefficient s.

For $s \equiv \bar{s}_w$, $\bar{M}_{av} \equiv \bar{M}_{\bar{s}_w \bar{D}_w}$ (20):

$$q_{\mathrm{Sed},\bar{s}_w \bar{M}_{\bar{s}_w \bar{D}_w}} = \left(\sum_i w_i M_i^{-(a_{|\eta|}+1)/3} \right)^{(2-a_{|\eta|})/3} \div \left(\sum_i w_i / M_i^{(2-a_{|\eta|})/3} \right)^{-(1+a_{|\eta|})/3} \quad \text{(B20)}$$

(see Tables 24 and 25).
For calculating $\bar{s}_w$ from experimentally determined $\bar{s}_{max}$, see Tables 26 and 27 (21).

3. Equation (B16) reads for $D \equiv \bar{D}_A$, $\bar{M}_{av} \equiv \bar{M}_n$:

$$q_{\mathrm{Diff},\bar{D}_A \bar{M}_n} = \left(\sum_i w_i M_i^{-a_D/2} \right)^{-2} \left(\sum_i w_i M_i^{-1} \right)^{a_D} \quad \text{(B21)}$$

(see Tables 28 and 29).
For $D \equiv \bar{D}_A$, $\bar{M}_{av} \equiv \bar{M}_{\bar{s}_w \bar{D}_A}$ (20):

$$q_{\mathrm{Diff},\bar{D}_A \bar{M}_{\bar{s}_w \bar{D}_A}} = \left(\sum_i w_i M_i^{(2-a_{|\eta|})/3} \right)^{(a_{|\eta|}+1)/3} \times \left(\sum_i w_i M_i^{(a_{|\eta|}+1)/6} \right)^{2(a_{|\eta|}-2)/3} \quad \text{(B22)}$$

(see Tables 30 and 31).
For $D \equiv \bar{D}_w$, $\bar{M}_{av} \equiv \bar{M}_n$:

$$q_{\mathrm{Diff},\bar{D}_w \bar{M}_n} = \left(\sum_i w_i M_i^{a_D} \right) \left(\sum_i w_i M_i^{-1} \right)^{a_D} \quad \text{(B23)}$$

(see Tables 32 and 33).
For $D \equiv \bar{D}_z$, $\bar{M}_{av} \equiv \bar{M}_n$:

$$q_{\mathrm{Diff},\bar{D}_z \bar{M}_n} = \left(\sum_i w_i M_i^{1+a_D} \right) \left(\sum_i w_i M_i \right)^{-1} \times \left(\sum_i w_i M_i^{-1} \right)^{a_D} \quad \text{(B24)}$$

(see Tables 34 and 35).
For $D \equiv \bar{D}_A$, $\bar{M}_{av} \equiv \bar{M}_w$:

$$q_{\mathrm{Diff},\bar{D}_A \bar{M}_w} = \left(\sum_i w_i M_i^{-a_D/2} \right)^{-2} \left(\sum_i w_i M_i \right)^{-a_D} \quad \text{(B25)}$$

(see Tables 36 and 37).
For $D \equiv \bar{D}_w$, $\bar{M}_{av} \equiv \bar{M}_w$:

$$q_{\mathrm{Diff},\bar{D}_w \bar{M}_w} = \left(\sum_i w_i M_i^{a_D} \right) \left(\sum_i w_i M_i \right)^{-a_D} \quad \text{(B26)}$$

(see Tables 38 and 39).

For $D \equiv \bar{D}_z$, $\bar{M}_{av} \equiv \bar{M}_w$:

$$q_{\mathrm{Diff},\bar{D}_z \bar{M}_w} = \left(\sum_i w_i M_i^{1+a_D} \right) \left(\sum_i w_i M_i \right)^{-(1+a_D)} \quad \text{(B27)}$$

(see Tables 40 and 41).

4. Equation (B17) reads, for $\langle S^2 \rangle \equiv \langle S^2 \rangle_z$, $\bar{M}_{av} \equiv \bar{M}_w$:

$$q_{\mathrm{Gyr},\langle S^2 \rangle_z \bar{M}_w} = \left(\sum_i w_i M_i^{\varepsilon+2} \right) \left(\sum_i w_i M_i \right)^{-(\varepsilon+2)} \quad \text{(B28)}$$

(see Tables 42 and 43).
For $\langle S^2 \rangle \equiv \langle S^2 \rangle_z$, $\bar{M}_{av} \equiv \bar{M}_z$:

$$q_{\mathrm{Gyr},\langle S^2 \rangle_z \bar{M}_z} = \left(\sum_i w_i M_i^{\varepsilon+2} \right) \left(\sum_i w_i M_i \right)^{\varepsilon} \times \left(\sum_i w_i M_i^2 \right)^{-(\varepsilon+1)} \quad \text{(B29)}$$

(see Tables 44 and 45).
For $\langle S^2 \rangle \equiv \langle S^2 \rangle_z$, $\bar{M}_{av} \equiv \bar{M}_n$:

$$q_{\mathrm{Gyr},\langle S^2 \rangle_z \bar{M}_n} = \left(\sum_i w_i M_i^{\varepsilon+2} \right) \left(\sum_i w_i M_i \right)^{-1} \times \left(\sum_i w_i M_i^{-1} \right)^{\varepsilon+1} \quad \text{(B30)}$$

(see Tables 46 and 47).

5. In order to obtain the correct numerical values of constant K_{A_2} and exponent a_{A_2} in the exponential relationship between the second virial coefficient A_2 and molecular weight M

$$A_2 = K_{A_2} M^{a_{A_2}} \quad \text{(B31)}$$

it is necessary to determine the corresponding averages $\bar{A}_{2,av}$ and $\bar{M}_{av}$ with respect to Eq. (B31):

$$\bar{A}_{2,av} = K_{A_2} \bar{M}_{av}^{a_{A_2}} \quad \text{(B32)}$$

$\bar{A}_{2,av}$ is the measured second virial coefficient of a nonuniform (2) polymer sample, while $\bar{M}_{av}$ is the value of the molecular weight which fulfils Eq. (B32) if K_{A_2} and a_{A_2} are valid for strictly uniform (2) samples i:

$$A_{2,i} = K_{A_2} M_i^{a_{A_2}} \quad \text{(B33)}$$

In paper (22), the corresponding averages of the molecular weight $\bar{M}_{av,\bar{A}_2^{(OP)}}$ and $\bar{M}_{av,\bar{A}_2^{(LS)}}$ are calculated for the average second virial coefficients $\bar{A}_2^{(OP)}$ and $\bar{A}_2^{(LS)}$ obtained from

osmotic pressure (OP) and light scattering (LS) measurements, respectively, according to Flory and Krigbaum (23)

$$\bar{A}_2^{(\mathrm{OP})} = \sum_i \sum_j w_i w_j (A_2)_{ij} \tag{B34}$$

$$\bar{A}_2^{(\mathrm{LS})} = (1/\bar{M}_\mathrm{w})^2 \left[\sum_i \sum_j w_i M_i w_j M_j (A_2)_{ij} \right] \tag{B35}$$

where w_i is the mass fraction of uniform polymer species i, w_j the mass fraction of uniform polymer species j, M_i and M_j their molecular weights, respectively, and $(A_2)_{ij}$ is the second virial coefficient effective between species i and j. Since $\bar{M}_{\mathrm{av},\bar{A}_2^{(\mathrm{OP})}}$ and $\bar{M}_{\mathrm{av},\bar{A}_2^{(\mathrm{LS})}}$ are not directly experimentally accessible, polymolecularity correction factors (2) $q_{\bar{M}_\mathrm{n},\bar{A}_2^{(\mathrm{OP})}}$ and $q_{\bar{M}_\mathrm{w},\bar{A}_2^{(\mathrm{LS})}}$ are defined so that $\bar{M}_{\mathrm{av},\bar{A}_2^{(\mathrm{OP})}}$ and $\bar{M}_{\mathrm{av},\bar{A}_2^{(\mathrm{LS})}}$ can be calculated from experimentally determined $\bar{M}_\mathrm{n}$ and $\bar{M}_\mathrm{w}$, respectively:

$$\bar{A}_2^{(\mathrm{OP})} = K_{A_2} \bar{M}^{a_{A_2}}_{\mathrm{av},\bar{A}_2^{(\mathrm{OP})}} = K_{A_2} \bar{M}_\mathrm{n}^{a_{A_2}} q_{\bar{M}_\mathrm{n},\bar{A}_2^{(\mathrm{OP})}} \tag{B36}$$

$$\bar{A}_2^{(\mathrm{LS})} = K_{A_2} \bar{M}^{a_{A_2}}_{\mathrm{av},\bar{A}_2^{(\mathrm{LS})}} = K_{A_2} \bar{M}_\mathrm{w}^{a_{A_2}} q_{\bar{M}_\mathrm{w},\bar{A}_2^{(\mathrm{LS})}} \tag{B37}$$

Thus the respective polymolecularity correction factors

$$q_{\bar{M}_\mathrm{n},\bar{A}_2^{(\mathrm{OP})}} = (\bar{M}_{\mathrm{av},\bar{A}_2^{(\mathrm{OP})}} / \bar{M}_\mathrm{n})^{a_{A_2}} \tag{B38}$$

$$q_{\bar{M}_\mathrm{w},\bar{A}_2^{(\mathrm{LS})}} = (\bar{M}_{\mathrm{av},\bar{A}_2^{(\mathrm{LS})}} / \bar{M}_\mathrm{w})^{a_{A_2}} \tag{B39}$$

can be obtained. The numerical values of $q_{\bar{M}_\mathrm{n},\bar{A}_2^{(\mathrm{OP})}}$ and $q_{\bar{M}_\mathrm{w},\bar{A}_2^{(\mathrm{LS})}}$ are calculated numerically and listed for Schulz–Zimm (SZ), i.e. $q^{(\mathrm{SZ})}_{\bar{M}_\mathrm{n},\bar{A}_2^{(\mathrm{OP})}}$ and $q^{(\mathrm{SZ})}_{\bar{M}_\mathrm{w},\bar{A}_2^{(\mathrm{LS})}}$, and logarithmic normal (LN), i.e. $q^{(\mathrm{LN})}_{\bar{M}_\mathrm{n},\bar{A}_2^{(\mathrm{OP})}}$ and $q^{(\mathrm{LN})}_{\bar{M}_\mathrm{w},\bar{A}_2^{(\mathrm{LS})}}$, distributions of the molecular weight (see Tables 48–51).

6. Similarly, application of the principle of corresponding averages (3,9,24–26) to the relationship of Fox and Flory

$$[\eta] = \Phi(\varepsilon) \frac{\langle r^2 \rangle^{3/2}}{M} \tag{B40}$$

and defining a polymolecularity correction factor q_FF

$$[\eta] = \Phi(\varepsilon) q_\mathrm{FF} \frac{\langle r^2 \rangle^{3/2}_\mathrm{av}}{\bar{M}_\mathrm{av}} \tag{B41}$$

for the use of the z-average mean-square end-to-end distance $\langle r^2 \rangle_\mathrm{z}$ and $\bar{M}_\mathrm{av} \equiv \bar{M}_\mathrm{n}$ in Eq. (B41) leads to

$$q_{\mathrm{FF},\langle r^2 \rangle_\mathrm{z} \bar{M}_\mathrm{n}} = \left(\sum_i w_i M_i^{-1} \right)^{-1} \left(\sum_i w_i M_i^{a_{[\eta]}} \right) \times \left(\sum_i w_i M_i^{(2a_{[\eta]}+5)/3} \right)^{-3/2} \left(\sum_i w_i M_i \right)^{3/2} \tag{B42}$$

(see Tables 52 and 53), whereas for $\langle r^2 \rangle_\mathrm{z}$ and $\bar{M}_\mathrm{av} = \bar{M}_\mathrm{w}$ Eq. (B41) gives

$$q_{\mathrm{FF},\langle r^2 \rangle_\mathrm{z} \bar{M}_\mathrm{w}} = \left(\sum_i w_i M_i \right)^{5/2} \left(\sum_i w_i M_i^{(2a_{[\eta]}+5)/3} \right)^{-3/2} \times \left(\sum_i w_i M_i^{a_{[\eta]}} \right) \tag{B43}$$

(see Tables 54 and 55).

7. For converting the experimentally determined z-average mean-square radius of gyration $\langle S^2 \rangle_\mathrm{z}$ into the weight-average or the number-average mean-square radii of gyration $\langle S^2 \rangle_\mathrm{w}$ or $\langle S^2 \rangle_\mathrm{n}$, respectively

$$\langle S^2 \rangle_\mathrm{w} = q_{\langle S^2 \rangle_\mathrm{w}} \langle S^2 \rangle_\mathrm{z} \tag{B44}$$

$$\langle S^2 \rangle_\mathrm{n} = q_{\langle S^2 \rangle_\mathrm{n}} \langle S^2 \rangle_\mathrm{z} \tag{B45}$$

the polymolecularity correction factors $q_{\langle S^2 \rangle_\mathrm{w}}$ and/or $q_{\langle S^2 \rangle_\mathrm{n}}$

$$q_{\langle S^2 \rangle_\mathrm{w}} = \left(\sum_i w_i M_i^{1+\varepsilon} \right) \left(\sum_i w_i M_i \right) \left(\sum_i w_i M_i^{\varepsilon+2} \right)^{-1} \tag{B46}$$

$$q_{\langle S^2 \rangle_\mathrm{n}} = \left(\sum_i w_i M_i^{\varepsilon} \right) \left(\sum_i w_i M_i^{-1} \right)^{-1} \left(\sum_i w_i M_i^{\varepsilon+2} \right)^{-1} \times \left(\sum_i w_i M_i \right) \tag{B47}$$

are to be used (26) (see Tables 56–59).

8. Correspondingly, in order to convert the 1.5th moment of the number distribution of the mean-square end-to-end distance $[\overline{\langle r^2 \rangle^{3/2}}]_\mathrm{n}$,† resulting from Eq. (B40) if $\bar{M}_\mathrm{n}$ is used (27), into $\langle r^2 \rangle_\mathrm{n}$, $\langle r^2 \rangle_\mathrm{w}$ or $\langle r^2 \rangle_\mathrm{z}$

$$\langle r^2 \rangle_\mathrm{n} = q_{\langle r^2 \rangle_\mathrm{n}} [\overline{\langle r^2 \rangle^{3/2}}]_\mathrm{n}^{2/3} \tag{B48}$$

$$\langle r^2 \rangle_\mathrm{w} = q_{\langle r^2 \rangle_\mathrm{w}} [\overline{\langle r^2 \rangle^{3/2}}]_\mathrm{n}^{2/3} \tag{B49}$$

$$\langle r^2 \rangle_\mathrm{z} = q_{\langle r^2 \rangle_\mathrm{z}} [\overline{\langle r^2 \rangle^{3/2}}]_\mathrm{n}^{2/3} \tag{B50}$$

the polymolecularity correction factors $q_{\langle r^2 \rangle_\mathrm{n}}$, $q_{\langle r^2 \rangle_\mathrm{w}}$, and $q_{\langle r^2 \rangle_\mathrm{z}}$ are to be used:

$$q_{\langle r^2 \rangle_\mathrm{n}} = \left(\sum_i w_i M_i^{(2a_{[\eta]}-1)/3} \right) \left(\sum_i w_i M_i^{-1} \right)^{-1/3} \times \left(\sum_i w_i M_i^{a_{[\eta]}} \right)^{-2/3} \tag{B51}$$

† $[\overline{\langle r^2 \rangle^{3/2}}]_\mathrm{n} = \sum_i n_i \langle r_i^2 \rangle^{3/2} \neq \langle r^2 \rangle_\mathrm{n}^{3/2} = (\sum_i n_i \langle r_i^2 \rangle)^{3/2}$

$$q_{\langle r^2\rangle_w} = \left(\sum_i w_i M_i^{(2a_{[\eta]}+2)/3}\right)\left(\sum_i w_i M_i^{-1}\right)^{2/3} \times \left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{-2/3} \quad \text{(B52)}$$

$$q_{\langle r^2\rangle_z} = \left(\sum_i w_i M_i^{(2a_{[\eta]}+5)/3}\right)\left(\sum_i w_i M_i\right)^{-1} \times \left(\sum_i w_i M_i^{-1}\right)^{2/3}\left(\sum_i w_i M_i^{a_{[\eta]}}\right)^{-2/3} \quad \text{(B53)}$$

(see Tables 60–65).

9. The experimentally obtained ratio of the z-average unperturbed mean-square radius of gyration and the weight-average molecular weight $\langle S^2\rangle_{0,z}/\bar{M}_w$ of a polymolecular sample of stiff polymer chains can be transformed into $\langle S^2\rangle_0/M$ for a monomolecular polymer, the molecular weight M of which is equal to $\bar{M}_w$ of the polymolecular sample, according to:

$$\langle S^2\rangle_0/M = (\langle S^2\rangle_{0,z}/\bar{M}_w)(\bar{M}_w/\bar{M}_z)q(\bar{L}_w) \quad \text{(B54)}$$

where $q(\bar{L}_w)$ is the polymolecularity correction factor (28) (see Tables 66 and 67).

10. Application of the principle of corresponding averages to the various relationships for the experimental determination of the unperturbed dimensions of polymers in thermodynamically good solvents leads unambiguously to the correct polymolecularity correction factors (29).

10.1. The original (30) and modified (31) procedures of Burchard (32), Stockmayer and Fixman (30) can be handled with polymolecularity correction factors q_{BSF} depending upon which average of the molecular weight ($\bar{M}_w$ or $\bar{M}_n$) is to be used (33–35):

$$[\eta]/(q_{BSF,\bar{M}_w}\bar{M}_w^{1/2}) = K_0 + B'\bar{M}_w^{1/2}/q_{BSF,\bar{M}_w} \quad \text{(B55)}$$

$$[\eta]/({}^1q_{BSF,\bar{M}_n}\bar{M}_n^{1/2}) = K_0 + B'\bar{M}_n^{1/2}/{}^2q_{BSF,\bar{M}_n} \quad \text{(B56)}$$

The general formulae for $q_{BSF,\bar{M}_w}$ (33) and for ${}^1q_{BSF,\bar{M}_n}$ and ${}^2q_{BSF,\bar{M}_n}$ (34) were found to be

$$q_{BSF,\bar{M}_w} = \left(\sum_i w_i M_i^{1/2}\right)\left(\sum_i w_i M_i\right)^{-1/2} \quad \text{(B57)}$$

$${}^1q_{BSF,\bar{M}_n} = \left(\sum_i w_i M_i^{1/2}\right)\left(\sum_i w_i M_i^{-1}\right)^{1/2} \quad \text{(B58)}$$

$${}^2q_{BSF,\bar{M}_n} = \left(\sum_i w_i M_i^{1/2}\right)\left(\sum_i w_i M_i^{-1}\right)^{-1/2} \times \left(\sum_i w_i M_i\right)^{-1} \quad \text{(B59)}$$

(see Tables 68–70).

10.2. In the equation of Cowie and Bywater (36) also, two polymolecularity correction factors are necessary. If $\bar{M}_w$ and $\bar{s}_w$ are to be used, one obtains (14,33):

$$(\bar{M}_w^{1/2}/\bar{s}_w)(1-\bar{v}_2\rho_1)/(\eta_1 N_L) = P_0 q_{CB,1} + q_{CB,2}B''\bar{M}_w^{1/2} \quad \text{(B60)}$$

with

$$q_{CB,1} = \left(\sum_i w_i M_i^{1-0.5\varepsilon}\right)\left(\sum_i w_i M_i\right)^{-1/2} \times \left(\sum_i w_i M_i^{0.5(1-\varepsilon)}\right)^{-1} \quad \text{(B61)}$$

$$q_{CB,2} = \left(\sum_i w_i M_i^{1.5-0.5\varepsilon}\right)\left(\sum_i w_i M_i\right)^{-1} \times \left(\sum_i w_i M_i^{0.5(1-\varepsilon)}\right)^{-1} \quad \text{(B62)}$$

(see Tables 71–74).

10.3. Baumann (37) and later Banks and Greenwood (38) describe procedures for the evaluation of unperturbed dimensions from the determination of the molecular weight and the radius of gyration for a series of polymer homologues. The Baumann–Stockmayer–Fixman procedure uses the theory of Stockmayer and Fixman (30) and with the two polymolecularity correction factors $q_{B,\bar{M}_{av}}$ (for the molecular weight) and $q_{B,\langle S^2\rangle_{av}}$ (for the radius of gyration) reads (39):

$$[\langle S^2\rangle_{av} q_{B,\langle S^2\rangle_{av}}/(\bar{M}_{av} q_{B,\bar{M}_{av}})]^{3/2} = K_0^{3/2} + B_{BSF}(\bar{M}_{av} q_{B,\bar{M}_{av}})^{1/2} \quad \text{(B63)}$$

For $\bar{M}_{av} \equiv \bar{M}_w$:

$$q_{B,\bar{M}_w} = \left(\sum_i w_i M_i^3\right)^2\left(\sum_i w_i M_i\right)^{-1}\left(\sum_i w_i M_i^{5/2}\right)^{-2} \quad \text{(B64)}$$

and for $\langle S^2\rangle_{av} \equiv \langle S^2\rangle_z$:

$$q_{B,\langle S^2\rangle_z} = \left(\sum_i w_i M_i^3\right)^2\left(\sum_i w_i M_i\right)\left(\sum_i w_i M_i^{2.5+1.5\varepsilon}\right)^{2/3} \times \left(\sum_i w_i M_i^{5/2}\right)^{-8/3}\left(\sum_i w_i M_i^{2+\varepsilon}\right)^{-1} \quad \text{(B65)}$$

(see Tables 75–78).

10.4. Application of the theory of Kurata and Stockmayer (40) leads to the Baumann–Kurata–Stockmayer procedure (41)

$$\langle S^2\rangle_{\mathrm{av}} q_{\mathrm{BKS},\langle S^2\rangle_{\mathrm{av}}} / (\bar{M}_{\mathrm{av}} q_{\mathrm{BKS},\bar{M}_{\mathrm{av}}}) = K_0 + B_{\mathrm{BKS}} \bar{M}_{\mathrm{av}} q_{\mathrm{BKS},\bar{M}_{\mathrm{av}}} / (\langle S^2\rangle_{\mathrm{av}} q_{\mathrm{BKS},\langle S^2\rangle_{\mathrm{av}}})^{1/2} \quad \text{(B66)}$$

For $\bar{M}_{\mathrm{av}} \equiv \bar{M}_{\mathrm{w}}$:

$$q_{\mathrm{BKS},\bar{M}_{\mathrm{w}}} = \left(\sum_i w_i M_i\right)^{-1} \left(\sum_i w_i M_i^2\right)^{-3} \left(\sum_i w_i M_i^{2+\varepsilon}\right) \times \left(\sum_i w_i M_i^{2.5-0.5\varepsilon}\right)^2 \quad \text{(B67)}$$

and for $\langle S^2\rangle_{\mathrm{av}} \equiv \langle S^2\rangle_{\mathrm{z}}$:

$$q_{\mathrm{BKS},\langle S^2\rangle_{\mathrm{z}}} = \left(\sum_i w_i M_i\right) \left(\sum_i w_i M_i^2\right)^{-4} \left(\sum_i w_i M_i^{2+\varepsilon}\right) \times \left(\sum_i w_i M_i^{2.5-0.5\varepsilon}\right)^2 \quad \text{(B68)}$$

(see Tables 79–82).

The numerical values of the polymolecularity correction factors Eqs. (B3–B11, B18–B30, B42, B43, B46, B47, B51–B53, B57–B59, B61, B62, B64, B65, B67, B68) are tabulated on the following pages for Schulz–Zimm (SZ) distributions of the molecular weight (42,43)

$$w_i(M) = [(k/\bar{M}_{\mathrm{n}})^{k+1}/\Gamma(k+1)] M^k \exp[-(k/\bar{M}_{\mathrm{n}})M] \quad \text{(B69)}$$

and for logarithmic normal (LN) distributions of the molecular weight (44–47)

$$w_i(M) = [1/(\sigma\sqrt{2\pi})] M^{-1} \exp\{-[1/(2\sigma^2)][\log_e(M/\bar{M}_{\mathrm{m}})]^2\} \quad \text{(B70)}$$

as a function of the width of the respective distribution expressed as $\bar{M}_{\mathrm{w}}/\bar{M}_{\mathrm{n}}$ and where relevant of the exponent $a_{[\eta]}$ of Eq. (B1). The calculations have been conducted by inserting Eq. (B69) or Eq. (B70) for SZ or LN, respectively, into the general expressions Eqs. (B3–B11, B18–B30, B42, B43, B46, B47, B51–B53, B57–B59, B61, B62, B64, B65, B67, B68), replacing the summations by integrals and solution of the integrals (48). The resulting formulae of the polymolecularity correction factors $q^{(\mathrm{SZ})}$ and $q^{(\mathrm{LN})}$ are given on the titles of the tables.

Analogously, it is possible to calculate the corresponding formulae for the polymolecularity correctiom factors from the general expressions, Eqs. (B3–B11, B18–B30, B42, B43, B46, B47, B51–B53, B57–B59, B61, B62, B64, B65, B67, B68), for any molecular weight distribution (MWD) of which a closed mathematical expression can be formulated and for which the resulting integrals can be solved. In cases where the MWD is known but no closed mathematical expression can be formulated, or if the resulting integrals cannot be solved analytically, the polymolecularity correction factors nevertheless can be calculated numerically (22,28), i.e. because the general polymolecularity correction formulae represent moments (14) or products of moments of the MWD, they can in principle be taken from any experimentally determined (e.g. by gel-permeation chromatography) molecular weight distribution curve of the polymers or polymer fractions investigated.

In case the type of MWD of the polymers or polymer fractions investigated is not known the numerical values of the following tables still give an appropriate impression of the sensitivity of the methods listed towards type and width of the MWD as compared with the range of the experimental errors. Furthermore, as long as the difference between the numerical values of $q^{(\mathrm{SZ})}$ and $q^{(\mathrm{LN})}$ is not significant, the sensitivity of the method considered toward the type of MWD most probably is not strong, in other words any MWD other than SZ or LN will not exhibit a q value much different from $q^{(\mathrm{SZ})}$ or $q^{(\mathrm{LN})}$. When corresponding numerical values for $q^{(\mathrm{SZ})}$ and $q^{(\mathrm{LN})}$ differ substantially (cf. Tables 75 and 77) and/or $q \gg 1$ (cf. e.g. Table 47) or $q \ll 1$ (cf. e.g. Table 53), it is preferable to look for another experimental method which provides more adequate correction. A closer look upon the numerical values of the following tables also reveals that there are methods which are not sensitive towards polymolecularity (such as setting up $[\eta] = K_{[\eta]} M^{a_{[\eta]}}$ with $\bar{M}_{\bar{s}_{\mathrm{w}}\bar{D}_{\mathrm{A}}}$ (Tables 8 and 9) whereas others are very sensitive towards polymolecularity (such as correlating $\bar{D}_{\mathrm{z}}$ and $\bar{M}_{\mathrm{n}}$ in $D = K_D M^{a_D}$ (Tables 34 and 35)).

The exponents $a_{[\eta]}$, a_s, a_D, ε, and a_{A_2} of Eqs. B1, B12–B14 and B31 are interconnected with each other (49–55) by the "Exponents' Rule" (50,14):

$$a_{[\eta]} = 2 - 3a_s = -(1 + 3a_D) = 1.5\varepsilon + 0.5 = a_{A_2} + 1$$

In the following tables the numerical values for $\bar{M}_{\mathrm{w}}/\bar{M}_{\mathrm{n}}$ range from 1.1 to 20.0, those for $a_{[\eta]}$ from 0.4 to 0.9, in order to cover also limiting cases which occur in practical work (e.g., $a_{[\eta]} < 0.5; \varepsilon < 0$). The intervals for both parameters $\bar{M}_{\mathrm{w}}/\bar{M}_{\mathrm{n}}$ and $a_{[\eta]}$ as well as the number of digits behind the decimal sign for the polymolecularity correction factors are chosen so that for any value of $\bar{M}_{\mathrm{w}}/\bar{M}_{\mathrm{n}}$ and $a_{[\eta]}$ within the above-mentioned limits the numerical value of the polymolecularity correction factor can be found by interpolation of the numerical values given in the tables with an accuracy of at least about 1% except, of course, when extremely low numerical values are involved. In order to enable the user to calculate the numerical values of the polymolecularity correction factors for any $\bar{M}_{\mathrm{w}}/\bar{M}_{\mathrm{n}}$ and $a_{[\eta]}$ (or a_s, a_D, ε, and a_{A_2}, respectively) the exact formulae for all polymolecularity correction factors tabulated are given on top of the corresponding tables; for this purpose a table of the numerical values of the gamma function $\Gamma(x)$ for $1.00 \le x \le 2.00$ is included

(Table 1). For $x < 1$ and $x > 2$, the following formula can be used

$$\Gamma(x+1) = x\Gamma(x)$$

TABLE 1. NUMERICAL VALUES OF GAMMA FUNCTION $\Gamma(x)$

x	$\Gamma(x)$	x	$\Gamma(x)$	x	$\Gamma(x)$	x	$\Gamma(x)$
1.00	1.00000	1.25	0.90640	1.50	0.88623	1.75	0.91906
1.01	0.99433	1.26	0.90440	1.51	0.88659	1.76	0.92137
1.02	0.98884	1.27	0.90250	1.52	0.88704	1.77	0.92376
1.03	0.98355	1.28	0.90072	1.53	0.88757	1.78	0.92623
1.04	0.97844	1.29	0.89904	1.54	0.88818	1.79	0.92877
1.05	0.97350	1.30	0.89747	1.55	0.88887	1.80	0.93138
1.06	0.96874	1.31	0.89600	1.56	0.88964	1.81	0.93408
1.07	0.96415	1.32	0.89464	1.57	0.89049	1.82	0.93685
1.08	0.95973	1.33	0.89338	1.58	0.89142	1.83	0.93969
1.09	0.95546	1.34	0.89222	1.59	0.89243	1.84	0.94261
1.10	0.95135	1.35	0.89115	1.60	0.89352	1.85	0.94561
1.11	0.94739	1.36	0.89018	1.61	0.89468	1.86	0.94869
1.12	0.94359	1.37	0.88931	1.62	0.89592	1.87	0.95184
1.13	0.93993	1.38	0.88854	1.63	0.89724	1.88	0.95507
1.14	0.93642	1.39	0.88785	1.64	0.89864	1.89	0.95838
1.15	0.93304	1.40	0.88726	1.65	0.90012	1.90	0.96177
1.16	0.92980	1.41	0.88676	1.66	0.90167	1.91	0.96523
1.17	0.92670	1.42	0.88636	1.67	0.90330	1.92	0.96878
1.18	0.92373	1.43	0.88604	1.68	0.90500	1.93	0.97240
1.19	0.92088	1.44	0.88580	1.69	0.90678	1.94	0.97610
1.20	0.91817	1.45	0.88565	1.70	0.90864	1.95	0.97988
1.21	0.91558	1.46	0.88560	1.71	0.91057	1.96	0.98374
1.22	0.91311	1.47	0.88563	1.72	0.91258	1.97	0.98768
1.23	0.91075	1.48	0.88575	1.73	0.91466	1.98	0.99171
1.24	0.90852	1.49	0.88595	1.74	0.91683	1.99	0.99581
						2.00	1.00000

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C. INTRINSIC VISCOSITY VERSUS MOLECULAR WEIGHT RELATIONSHIP

TABLE 2. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,\bar{M}_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING WEIGHT-AVERAGE MOLECULAR WEIGHT $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,\bar{M}_w} = \frac{\Gamma(k + a_{[\eta]} + 1)}{(k+1)^{a_{[\eta]}}\Gamma(k+1)} \qquad [\eta] = K_{[\eta]}\bar{M}_w^{a_{[\eta]}} q^{(SZ)}_{KMSH,\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.70	0.90
1.1	0.9891	0.9887	0.9906	0.9960
1.3	0.9725	0.9716	0.9765	0.9900
1.5	0.9605	0.9594	0.9665	0.9858
1.7	0.9515	0.9502	0.9590	0.9827
2.0	0.9414	0.9400	0.9509	0.9793
2.5	0.9301	0.9287	0.9419	0.9755
3.0	0.9228	0.9213	0.9360	0.9731
4.0	0.9137	0.9123	0.9289	0.9701
5.0	0.9083	0.9069	0.9247	0.9684
10.0	0.8977	0.8964	0.9166	0.9650
20.0	0.8924	0.8913	0.9126	0.9634

TABLE 3. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,\bar{M}_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING WEIGHT-AVERAGE MOLECULAR WEIGHT $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]} - a_{[\eta]})/2} \qquad [\eta] = K_{[\eta]}\bar{M}_w^{a_{[\eta]}} q^{(LN)}_{KMSH,\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.70	0.90
1.1	0.9886	0.9882	0.9900	0.9957
1.3	0.9690	0.9677	0.9728	0.9883
1.5	0.9525	0.9506	0.9583	0.9819
1.7	0.9383	0.9358	0.9458	0.9764
2.0	0.9202	0.9170	0.9298	0.9693
2.5	0.8959	0.8918	0.9083	0.9596
3.0	0.8765	0.8717	0.8911	0.9518
4.0	0.8467	0.8409	0.8645	0.9395
5.0	0.8244	0.8178	0.8445	0.9301
6.0	0.8065	0.7993	0.8285	0.9225
8.0	0.7792	0.7711	0.8039	0.9107
10.0	0.7586	0.7499	0.7852	0.9016
20.0	0.6980	0.6877	0.7301	0.8739

TABLE 4. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,\bar{M}_n}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING NUMBER-AVERAGE MOLECULAR WEIGHT $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,\bar{M}_n} = \frac{\Gamma(k + a_{[\eta]} + 1)}{k^{a_{[\eta]}}\Gamma(k+1)} \qquad [\eta] = K_{[\eta]}\bar{M}_n^{a_{[\eta]}} q^{(SZ)}_{KMSH,\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0276	1.0370	1.0474	1.0589	1.0715	1.0852
1.3	1.0802	1.1078	1.1388	1.1733	1.2115	1.2537
1.5	1.1297	1.1750	1.2262	1.2837	1.3480	1.4199
2.0	1.2422	1.3293	1.4296	1.5447	1.6765	1.8274
2.5	1.3419	1.4684	1.6162	1.7888	1.9901	2.2253
3.0	1.4320	1.5958	1.7898	2.0197	2.2921	2.6155
4.0	1.5908	1.8245	2.1078	2.4514	2.8692	3.3782
5.0	1.7290	2.0279	2.3968	2.8529	3.4186	4.1222
6.0	1.8525	2.2129	2.6643	3.2317	3.9469	4.8516
8.0	2.0683	2.5429	3.1523	3.9380	4.9549	6.2762
10.0	2.2548	2.8348	3.5944	4.5937	5.9138	7.6655
15.0	2.6415	3.4586	4.5684	6.0836	8.1624	11.03
20.0	2.9579	3.9860	5.4197	7.4299	10.26	14.28

TABLE 5. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,\bar M_n}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING NUMBER-AVERAGE MOLECULAR WEIGHT $\bar M_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,\bar M_n} = (\bar M_w/\bar M_n)^{(a^2_{[\eta]}+a_{[\eta]})/2} \qquad [\eta] = K_{[\eta]}\bar M_n^{a_{[\eta]}} q^{(LN)}_{KMSH,\bar M_n}$$

	$a_{[\eta]}$					
$\bar M_w/\bar M_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0270	1.0364	1.0468	1.0583	1.0710	1.0849
1.3	1.0762	1.1034	1.1342	1.1690	1.2079	1.2515
1.5	1.1202	1.1642	1.2149	1.2728	1.3390	1.4144
1.7	1.1602	1.2202	1.2901	1.3713	1.4653	1.5741
2.0	1.2142	1.2968	1.3947	1.5105	1.6472	1.8088
2.5	1.2925	1.4100	1.5524	1.7249	1.9343	2.1890
3.0	1.3602	1.5098	1.6944	1.9226	2.2056	2.5582
4.0	1.4743	1.6818	1.9453	2.2815	2.7132	3.2716
5.0	1.5693	1.8286	2.1652	2.6055	3.1861	3.9593
6.0	1.6515	1.9580	2.3633	2.9040	3.6330	4.6272
8.0	1.7901	2.1810	2.7132	3.4462	4.4691	5.9176
10.0	1.9055	2.3714	3.0200	3.9355	5.2481	7.1614
20.0	2.3136	3.0753	4.2121	5.9445	8.6445	12.953

TABLE 6. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,\bar s_w\bar D_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar s_w$ AND $\bar D_w$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,\bar s_w\bar D_w} = \left(\frac{3}{3k - a_{[\eta]} + 2}\right)^{a_{[\eta]}} \frac{\Gamma(k + a_{[\eta]} + 1)}{\Gamma(k+1)}$$

$$[\eta] = K_{[\eta]}\bar M^{a_{[\eta]}}_{\bar s_w\bar D_w} q^{(SZ)}_{KMSH,\bar s_w\bar D_w}$$

	$a_{[\eta]}$					
$\bar M_w/\bar M_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0064	1.0120	1.0191	1.0279	1.0384	1.0506
1.3	1.0179	1.0331	1.0527	1.0771	1.1065	1.1413
1.5	1.0277	1.0509	1.0812	1.1190	1.1651	1.2203
1.7	1.0362	1.0662	1.1056	1.1551	1.2160	1.2898
2.0	1.0470	1.0854	1.1361	1.2006	1.2809	1.3795
2.5	1.0608	1.1100	1.1755	1.2598	1.3664	1.5000
3.0	1.0711	1.1284	1.2051	1.3048	1.4323	1.5943
4.0	1.0855	1.1539	1.2465	1.3684	1.5269	1.7326
5.0	1.0950	1.1708	1.2741	1.4113	1.5918	1.8291
6.0	1.1017	1.1828	1.2938	1.4421	1.6389	1.9003
8.0	1.1106	1.1987	1.3200	1.4836	1.7030	1.9983
10.0	1.1162	1.2088	1.3367	1.5102	1.7445	2.0626
20.0	1.1281	1.2301	1.3724	1.5676	1.8353	2.2059

TABLE 7. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,\bar s_w\bar D_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar s_w$ AND $\bar D_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,\bar s_w\bar D_w} = (\bar M_w/\bar M_n)^{(5a^2_{[\eta]}-a_{[\eta]})/6} \qquad [\eta] = K_{[\eta]}\bar M^{a_{[\eta]}}_{\bar s_w\bar D_w} q^{(LN)}_{KMSH,\bar s_w\bar D_w}$$

TABLE 7. *cont'd*

	$a_{[\eta]}$					
$\bar M_w/\bar M_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0064	1.0120	1.0192	1.0282	1.0389	1.0513
1.3	1.0176	1.0333	1.0539	1.0795	1.1107	1.1477
1.5	1.0274	1.0520	1.0845	1.1255	1.1761	1.2372
1.7	1.0360	1.0686	1.1120	1.1674	1.2365	1.3213
2.0	1.0473	1.0905	1.1487	1.2241	1.3195	1.4389
2.5	1.0630	1.1214	1.2011	1.3064	1.4427	1.6178
3.0	1.0760	1.1472	1.2457	1.3777	1.5518	1.7803
4.0	1.0968	1.1892	1.3195	1.4983	1.7411	2.0705
5.0	1.1133	1.2228	1.3797	1.5991	1.9037	2.3279
6.0	1.1269	1.2510	1.4310	1.6864	2.0477	2.5617
8.0	1.1487	1.2968	1.5157	1.8340	2.2974	2.9794
10.0	1.1659	1.3335	1.5849	1.9573	2.5119	3.3497
20.0	1.2211	1.4542	1.8206	2.3959	3.3145	4.8199

TABLE 8. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,\bar s_w\bar D_A}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar s_w$ AND $\bar D_A$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,\bar s_w\bar D_A} = \frac{\Gamma(k + a_{[\eta]} + 1)[\Gamma(k+1)]^{3a_{[\eta]}-1}}{[\Gamma((3k - a_{[\eta]} + 5)/3)]^{a_{[\eta]}}[\Gamma((6k + a_{[\eta]} + 7)/6]^{2a_{[\eta]}}}$$

$$[\eta] = K_{[\eta]}\bar M^{a_{[\eta]}}_{\bar s_w\bar D_A} q^{(SZ)}_{KMSH,\bar s_w\bar D_A}$$

	$a_{[\eta]}$			
$\bar M_w/\bar M_n$	0.40	0.50	0.70	0.90
1.1	1.0001	1.0029	1.0114	1.0236
1.5	1.0007	1.0113	1.0439	1.0907
2.0	1.0012	1.0176	1.0678	1.1404
3.0	1.0018	1.0243	1.0929	1.1926
5.0	1.0024	1.0299	1.1137	1.2363
10.0	1.0029	1.0342	1.1297	1.2700
20.0	1.0032	1.0364	1.1378	1.2871

TABLE 9. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,\bar s_w\bar D_A}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar s_w$ AND $\bar D_A$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,\bar s_w\bar D_A} = (\bar M_w/\bar M_n)^{(8a^2_{[\eta]}-3a_{[\eta]}-a^3_{[\eta]})/12}$$

$$[\eta] = K_{[\eta]}\bar M^{a_{[\eta]}}_{\bar s_w\bar D_A} q^{(LN)}_{KMSH,\bar s_w\bar D_A}$$

	$a_{[\eta]}$			
$\bar M_w/\bar M_n$	0.40	0.50	0.70	0.90
1.1	1.0001	1.0030	1.0118	1.0245
1.5	1.0005	1.0128	1.0512	1.1086
2.0	1.0009	1.0219	1.0891	1.1927
3.0	1.0015	1.0349	1.1448	1.3222
5.0	1.0021	1.0516	1.2191	1.5056
10.0	1.0031	1.0746	1.3276	1.7958
20.0	1.0040	1.0981	1.4459	2.1418

TABLE 10. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,\bar{s}_w\bar{D}_z}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar{s}_w$ AND $\bar{D}_z$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,\bar{s}_w\bar{D}_z} = \frac{\Gamma(k + a_{[\eta]} + 1)}{(k+1)^{a_{[\eta]}}\Gamma(k+1)} \qquad [\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{\bar{s}_w\bar{D}_z} q^{(SZ)}_{KMSH,\bar{s}_w\bar{D}_z}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.70	0.90
1.1	0.9891	0.9887	0.9906	0.9960
1.3	0.9725	0.9716	0.9765	0.9900
1.5	0.9605	0.9594	0.9665	0.9858
1.7	0.9515	0.9502	0.9590	0.9827
2.0	0.9414	0.9400	0.9509	0.9793
2.5	0.9301	0.9287	0.9419	0.9755
3.0	0.9228	0.9213	0.9360	0.9731
4.0	0.9137	0.9123	0.9289	0.9701
5.0	0.9083	0.9069	0.9247	0.9684
10.0	0.8977	0.8964	0.9166	0.9650
20.0	0.8924	0.8913	0.9126	0.9634

TABLE 11. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,\bar{s}_w\bar{D}_z}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar{s}_w$ AND $\bar{D}_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,\bar{s}_w\bar{D}_z} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]} - a_{[\eta]})/2} \qquad [\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{\bar{s}_w\bar{D}_z} q^{(LN)}_{KMSH,\bar{s}_w\bar{D}_z}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.70	0.90
1.1	0.9886	0.9882	0.9900	0.9957
1.3	0.9690	0.9677	0.9728	0.9883
1.5	0.9525	0.9506	0.9583	0.9819
1.7	0.9383	0.9358	0.9458	0.9764
2.0	0.9202	0.9170	0.9298	0.9693
2.5	0.8959	0.8918	0.9083	0.9596
3.0	0.8765	0.8717	0.8911	0.9518
4.0	0.8467	0.8409	0.8645	0.9395
5.0	0.8244	0.8178	0.8445	0.9301
6.0	0.8065	0.7993	0.8285	0.9225
8.0	0.7792	0.7711	0.8039	0.9107
10.0	0.7586	0.7499	0.7852	0.9016
20.0	0.6980	0.6877	0.7301	0.8739

TABLE 12. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,\bar{s}_w[\bar{\eta}]_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar{s}_w$ AND $[\eta] \equiv [\bar{\eta}]_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,\bar{s}_w[\bar{\eta}]_w} = \frac{1}{[\Gamma((3k - a_{[\eta]} + 5)/3)]^{1.5a_{[\eta]}}} \frac{\Gamma(k + a_{[\eta]} + 1)]^{1-0.5a_{[\eta]}}}{[\Gamma(k+1)]^{1-2a_{[\eta]}}}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{\bar{s}_w[\bar{\eta}]_w} q^{(SZ)}_{KMSH,\bar{s}_w[\bar{\eta}]_w}$$

TABLE 12. *cont'd*

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50[a]	0.70	0.90
1.1	0.9980	1.0000	1.0056	1.0122
1.5	0.9925	1.0000	1.0211	1.0459
2.0	0.9885	1.0000	1.0323	1.0702
5.0	0.9811	1.0000	1.0530	1.1153
10.0	0.9786	1.0000	1.0600	1.1307
20.0	0.9773	1.0000	1.0635	1.1385

[a] See Ref. 18.

TABLE 13. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,\bar{s}_w[\bar{\eta}]_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $\bar{s}_w$ AND $[\eta] \equiv [\bar{\eta}]_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,\bar{s}_w[\bar{\eta}]_w} = (\bar{M}_w/\bar{M}_n)^{(5a^2_{[\eta]} - 2a^3_{[\eta]} - 2a_{[\eta]})/6}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{\bar{s}_w[\bar{\eta}]_w} q^{(LN)}_{KMSH,\bar{s}_w[\bar{\eta}]_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50[a]	0.70	0.90
1.1	0.9980	1.0000	1.0058	1.0127
1.5	0.9914	1.0000	1.0249	1.0550
2.0	0.9853	1.0000	1.0429	1.0958
5.0	0.9662	1.0000	1.1026	1.2367
10.0	0.9521	1.0000	1.1499	1.3552
20.0	0.9381	1.0000	1.1993	1.4850

[a] See Ref. 18.

TABLE 14. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,[\bar{\eta}]_w\bar{D}_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $[\eta] \equiv [\bar{\eta}]_w$ AND $\bar{D}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,[\bar{\eta}]_w\bar{D}_w} = \frac{[\Gamma(k + a_{[\eta]} + 1)]^{a_{[\eta]}+1}[\Gamma((3k - a_{[\eta]} + 2)/3]^{3a_{[\eta]}}}{[\Gamma(k+1)]^{4a_{[\eta]}+1}}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{[\bar{\eta}]_w\bar{D}_w} q^{(SZ)}_{KMSH,[\bar{\eta}]_w\bar{D}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0234	1.0363	1.0530	1.0741	1.1001	1.1318
1.3	1.0655	1.1025	1.1512	1.2143	1.2949	1.3973
1.5	1.1020	1.1607	1.2395	1.3438	1.4809	1.6611
1.7	1.1338	1.2122	1.3189	1.4629	1.6570	1.9195
2.0	1.1744	1.2787	1.4236	1.6240	1.9022	2.2923
2.5	1.2275	1.3676	1.5672	1.8519	1.2628	2.8666
3.0	1.2680	1.4367	1.6815	2.0391	2.5706	3.3795
4.0	1.3253	1.5365	1.8511	2.3264	3.0620	4.2389
5.0	1.3639	1.6050	1.9705	2.5351	3.4334	4.9193
8.0	1.4286	1.7224	2.1810	2.9160	4.1406	6.2842
10.0	1.4522	1.7661	2.2611	3.0653	4.4280	6.8637
20.0	1.5030	1.8614	2.4394	3.4059	5.1043	8.2812

TABLE 15. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_w}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $[\eta] \equiv [\bar{\eta}]_w$ AND $\bar{D}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_w} = (\bar{M}_w/\bar{M}_n)^{(4a^3_{[\eta]}+5a^2_{[\eta]}+a_{[\eta]})/6}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{[\bar{\eta}]_w \bar{D}_w} q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_w}$$

	$a_{[\eta]}$					
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0234	1.0364	1.0532	1.0745	1.1008	1.1331
1.3	1.0657	1.1034	1.1534	1.2186	1.3027	1.4105
1.5	1.1034	1.1642	1.2468	1.3574	1.5049	1.7016
1.7	1.1374	1.2202	1.3346	1.4917	1.7072	2.0050
2.0	1.1832	1.2968	1.4580	1.6861	2.0111	2.4811
2.5	1.2490	1.4100	1.6462	1.9949	2.5184	3.3243
3.0	1.3055	1.5098	1.8178	2.2887	3.0265	4.2219
4.0	1.3999	1.6818	2.1258	2.8428	4.0446	6.1560
5.0	1.4778	1.8286	2.4002	3.3635	5.0648	8.2480
8.0	1.6563	2.1810	3.0994	4.7932	8.1342	15.27
10.0	1.7485	2.3714	3.4995	5.6711	10.19	20.46
20.0	2.0688	3.0753	5.1022	9.5619	20.49	50.78

TABLE 16. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,[\bar{\eta}]_w \bar{D}_A}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $[\eta] \equiv [\bar{\eta}]_w$ AND $\bar{D}_A$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,[\bar{\eta}]_w \bar{D}_A} = \frac{[\Gamma(k+1)]^{5a_{[\eta]}-1}[\Gamma(k+a_{[\eta]}+1)]^{a_{[\eta]}+1}}{[\Gamma((6k+a_{[\eta]}+7)/6)]^{6a_{[\eta]}}}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{[\bar{\eta}]_w \bar{D}_A} q^{(SZ)}_{KMSH,[\bar{\eta}]_w \bar{D}_A}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	1.0044	1.0088	1.0231	1.0468
1.5	1.0172	1.0344	1.0909	1.1861
2.0	1.0270	1.0538	1.1426	1.2949
3.0	1.0375	1.0747	1.1983	1.4147
5.0	1.0465	1.0924	1.2458	1.5189
10.0	1.0535	1.1061	1.2831	1.6020
20.0	1.0570	1.1132	1.3022	1.6452

TABLE 17. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_A}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $[\eta] \equiv [\bar{\eta}]_w$ AND $\bar{D}_A$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_A} = (\bar{M}_w/\bar{M}_n)^{(5a^3_{[\eta]}+4a^2_{[\eta]}-a_{[\eta]})/12}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{[\bar{\eta}]_w \bar{D}_A} q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_A}$$

	$a_{[\eta]}$					
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.0045	1.0090	1.0154	1.0239	1.0349	1.0487
1.5	1.0191	1.0387	1.0670	1.1057	1.1572	1.2241
2.0	1.0329	1.0671	1.1173	1.1875	1.2834	1.4130

TABLE 17. *cont'd*

	$a_{[\eta]}$					
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.60	0.70	0.80	0.90
3.0	1.0526	1.1085	1.1922	1.3131	1.4851	1.7297
5.0	1.0780	1.1629	1.2937	1.4903	1.7850	2.2316
10.0	1.1134	1.2409	1.4454	1.7698	2.2909	3.1532
20.0	1.1500	1.3243	1.6150	2.1016	2.9402	4.4554

TABLE 18. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{KMSH,[\bar{\eta}]_w \bar{D}_z}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $[\eta] \equiv [\bar{\eta}]_w$ AND $\bar{D}_z$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{KMSH,[\bar{\eta}]_w \bar{D}_z} = \frac{[\Gamma(k+a_{[\eta]}+1)]^{a_{[\eta]}+1}[\Gamma((3k-a_{[\eta]}+5)/3)]^{3a_{[\eta]}}}{(k+1)^{3a_{[\eta]}}[\Gamma(k+1)]^{4a_{[\eta]}+1}}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{[\bar{\eta}]_w \bar{D}_z} q^{(SZ)}_{KMSH,[\bar{\eta}]_w \bar{D}_z}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	0.9715	0.9665	0.9612	0.9644
1.5	0.8997	0.8830	0.8657	0.8756
2.0	0.8538	0.8305	0.8086	0.8200
3.0	0.8108	0.7820	0.7529	0.7684
4.0	0.7904	0.7592	0.7277	0.7442
5.0	0.7784	0.7459	0.7132	0.7301
10.0	0.7553	0.7204	0.6853	0.7029
20.0	0.7442	0.7081	0.6719	0.6899

TABLE 19. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_z}$ FOR $[\eta] = K_{[\eta]}M^{a_{[\eta]}}$ USING MOLECULAR WEIGHT FROM $[\eta] \equiv [\bar{\eta}]_w$ AND $\bar{D}_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_z} = (\bar{M}_w/\bar{M}_n)^{(4a^3_{[\eta]}-a^2_{[\eta]}-5a_{[\eta]})/6}$$

$$[\eta] = K_{[\eta]}\bar{M}^{a_{[\eta]}}_{[\bar{\eta}]_w \bar{D}_z} q^{(LN)}_{KMSH,[\bar{\eta}]_w \bar{D}_z}$$

	$a_{[\eta]}$					
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	0.9702	0.9649	0.9611	0.9593	0.9597	0.9627
1.5	0.8793	0.8589	0.8448	0.8378	0.8393	0.8506
2.0	0.8026	0.7711	0.7495	0.7390	0.7412	0.7584
3.0	0.7057	0.6623	0.6332	0.6192	0.6221	0.6451
4.0	0.6441	0.5946	0.5617	0.5461	0.5494	0.5751
5.0	0.6001	0.5469	0.5120	0.4955	0.4989	0.5262
6.0	0.5663	0.5107	0.4746	0.4576	0.4611	0.4892
8.0	0.5169	0.4585	0.4210	0.4036	0.4073	0.4362
10.0	0.4816	0.4217	0.3837	0.3662	0.3698	0.3990
20.0	0.3865	0.3252	0.2876	0.2706	0.2741	0.3026

D. SEDIMENTATION COEFFICIENT VERSUS MOLECULAR WEIGHT RELATIONSHIP

TABLE 20. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_w}$ FOR $s = K_s M^{a_s}$ USING $\bar{s}_w$ AND $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_w} = \frac{\Gamma(k+1+a_s)}{(k+1)^{a_s}\Gamma(k+1)} = \frac{\Gamma((3k - a_{[\eta]} + 5)/3)}{(k+1)^{(2-a_{[\eta]})/3}\Gamma(k+1)}$$

$$\bar{s}_w = K_s \bar{M}_w^{a_s} q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_s)			
	0.40 (0.53)	0.50 (0.50)	0.70 (0.43)	0.90 (0.37)
1.1	0.9888	0.9887	0.9889	0.9895
1.5	0.9597	0.9594	0.9598	0.9616
2.0	0.9406	0.9400	0.9404	0.9429
3.0	0.9222	0.9213	0.9216	0.9246
4.0	0.9133	0.9123	0.9124	0.9157
5.0	0.9080	0.9069	0.9070	0.9104
8.0	0.9003	0.8990	0.8990	0.9025
20.0	0.8927	0.8913	0.8911	0.8947

TABLE 21. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Sed,\bar{s}_w\bar{M}_w}$ FOR $s = K_s M^{a_s}$ USING $\bar{s}_w$ AND $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Sed,\bar{s}_w\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{(a_s^2 - a_s)/2} = (\bar{M}_w/\bar{M}_n)^{(a_{[\eta]}^2 - a_{[\eta]} - 2)/18}$$

$$\bar{s}_w = K_s \bar{M}_w^{a_s} q^{(LN)}_{Sed,\bar{s}_w\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_s)		
	0.40 (0.53)	0.50 (0.50)	0.90 (0.37)
1.1	0.9882	0.9882	0.9890
1.5	0.9508	0.9506	0.9540
2.0	0.9174	0.9170	0.9227
3.0	0.8722	0.8717	0.8802
5.0	0.8185	0.8178	0.8295
7.0	0.7849	0.7841	0.7978
10.0	0.7509	0.7499	0.7654
15.0	0.7139	0.7128	0.7302
20.0	0.6888	0.6877	0.7062

TABLE 22. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_n}$ FOR $s = K_s M^{a_s}$ USING $\bar{s}_w$ AND $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_n} = \frac{\Gamma(k+1+a_s)}{k^{a_s}\Gamma(k+1)} = \frac{\Gamma((3k - a_{[\eta]} + 5)/3)}{k^{(2-a_{[\eta]})/3}\Gamma(k+1)} \qquad \bar{s}_w = K_s \bar{M}_n^{a_s} q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_s)					
	0.40 (0.53)	0.50 (0.50)	0.60 (0.47)	0.70 (0.43)	0.80 (0.40)	0.90 (0.37)
1.1	1.0403	1.0370	1.0337	1.0306	1.0276	1.0247
1.5	1.1914	1.1750	1.1592	1.1441	1.1297	1.1158
2.0	1.3612	1.3293	1.2989	1.2699	1.2422	1.2158
3.0	1.6568	1.5958	1.5381	1.4835	1.4320	1.3833
4.0	1.9129	1.8245	1.7416	1.6638	1.5908	1.5223
5.0	2.1423	2.0279	1.9213	1.8218	1.7290	1.6425
6.0	2.3521	2.2129	2.0837	1.9638	1.8525	1.7493
8.0	2.7292	2.5429	2.3714	2.2136	2.0683	1.9345
10.0	3.0654	2.8348	2.6240	2.4312	2.2548	2.0934
20.0	4.4117	3.9860	3.6050	3.2638	2.9579	2.6836

TABLE 23. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Sed,\bar{s}_w\bar{M}_n}$ FOR $s = K_s M^{a_s}$ USING $\bar{s}_w$ AND $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Sed,\bar{s}_w\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{(a_s^2 + a_s)/2} = (\bar{M}_w/\bar{M}_n)^{(a_{[\eta]}^2 - 7a_{[\eta]} + 10)/18} \qquad \bar{s}_w = K_s \bar{M}_n^{a_s} q^{(LN)}_{Sed,\bar{s}_w\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_s)					
	0.40 (0.53)	0.50 (0.50)	0.60 (0.47)	0.70 (0.43)	0.80 (0.40)	0.90 (0.37)
1.1	1.0397	1.0364	1.0332	1.0300	1.0270	1.0242
1.5	1.1803	1.1642	1.1488	1.1342	1.1202	1.1069
2.0	1.3277	1.2968	1.2677	1.2402	1.2142	1.1897
3.0	1.5671	1.5098	1.4564	1.4066	1.3602	1.3169
4.0	1.7627	1.6818	1.6071	1.5381	1.4743	1.4153
5.0	1.9311	1.8286	1.7346	1.6484	1.5693	1.4967
6.0	2.0805	1.9580	1.8463	1.7445	1.6515	1.5666
8.0	2.3403	2.1810	2.0373	1.9075	1.7901	1.6837
10.0	2.5638	2.3714	2.1990	2.0444	1.9055	1.7806
20.0	3.4039	3.0753	2.7877	2.5354	2.3136	2.1183

TABLE 24. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_{\bar{s}_w\bar{D}_w}}$ FOR $s = K_sM^{a_s}$ USING $\bar{s}_w$ AND $\bar{M}_{\bar{s}_w\bar{D}_w}$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_{\bar{s}_w\bar{D}_w}} = \frac{[\Gamma((3k+5-a_{[\eta]})/3)]^{(a_{[\eta]}+1)/3}[\Gamma((3k+2-a_{[\eta]})/3)]^{(2-a_{[\eta]})/3}}{\Gamma(k+1)} \qquad \bar{s}_w = K_s\bar{M}^{a_s}_{\bar{s}_w\bar{D}_w} q^{(SZ)}_{Sed,\bar{s}_w\bar{M}_{\bar{s}_w\bar{D}_w}}$$

	$a_{[\eta]}$ and (a_s)					
$\bar{M}_w/\bar{M}_n$	0.40 (0.53)	0.50 (0.50)	0.60 (0.47)	0.70 (0.43)	0.80 (0.40)	0.90 (0.37)
1.1	1.0119	1.0120	1.0119	1.0118	1.0116	1.0112
1.5	1.0503	1.0509	1.0512	1.0509	1.0502	1.0490
2.0	1.0837	1.0854	1.0863	1.0864	1.0857	1.0842
3.0	1.1250	1.1284	1.1307	1.1320	1.1319	1.1306
5.0	1.1648	1.1704	1.1746	1.1773	1.1783	1.1774
8.0	1.1897	1.1966	1.2018	1.2053	1.2066	1.2057
10.0	1.1982	1.2055	1.2111	1.2147	1.2161	1.2151
20.0	1.2153	1.2234	1.2295	1.2334	1.2348	1.2335

TABLE 25. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Sed,\bar{s}_w\bar{M}_{\bar{s}_w\bar{D}_w}}$ FOR $s = K_sM^{a_s}$ USING $\bar{s}_w$ AND $\bar{M}_{\bar{s}_w\bar{D}_w}$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT[a]

$$q^{(LN)}_{Sed,\bar{s}_w\bar{M}_{\bar{s}_w\bar{D}_w}} = (\bar{M}_w/\bar{M}_n)^{(a_{[\eta]}-a^2_{[\eta]}+2)/18} \qquad \bar{s}_w = K_s\bar{M}^{a_s}_{\bar{s}_w\bar{D}_w} q^{(LN)}_{Sed,\bar{s}_w\bar{M}_{\bar{s}_w\bar{D}_w}}$$

	$a_{[\eta]}$ and (a_s)					
$\bar{M}_w/\bar{M}_n$	0.40 (0.53)	0.50 (0.50)	0.60 (0.47)	0.70 (0.43)	0.80 (0.40)	0.90 (0.37)
1.1	1.0119	1.0120	1.0119	1.0118	1.0115	1.0111
1.5	1.0518	1.0520	1.0518	1.0510	1.0499	1.0482
2.0	1.0901	1.0905	1.0901	1.0888	1.0867	1.0838
3.0	1.1465	1.1472	1.1465	1.1444	1.1409	1.1361
5.0	1.2218	1.2228	1.2218	1.2185	1.2130	1.2055
6.0	1.2498	1.2510	1.2498	1.2461	1.2399	1.2313
8.0	1.2953	1.2968	1.2953	1.2909	1.2834	1.2731
10.0	1.3318	1.3335	1.3318	1.3267	1.3183	1.3065
20.0	1.4518	1.4542	1.4518	1.4446	1.4326	1.4160

[a] Unfortunately there is a printing error in Ref. 20. The exponent $(a_{[\eta]} - a^2_{[\eta]} + 2)/18$ given here is correct.

TABLE 26. VALUES OF $\bar{s}_w/\bar{s}_{max}$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT, CALCULATED ACCORDING TO

$$\left(\frac{\bar{s}_w}{\bar{s}_{max}}\right)_{SZ} = \frac{\Gamma(k+a_s+1)}{(k+1-a_s)^{a_s}\Gamma(k+1)} = \frac{\Gamma(k-a_{[\eta]}/3+5/3)}{(k+1/3+a_{[\eta]}/3)^{(2-a_{[\eta]})/3}\Gamma(k+1)}$$

	$a_{[\eta]}$ and (a_s)					
$\bar{M}_w/\bar{M}_n$	0.40 (0.53)	0.50 (0.50)	0.60 (0.47)	0.70 (0.43)	0.80 (0.40)	0.90 (0.37)
1.1	1.0153	1.0120	1.0090	1.0063	1.0039	1.0018
1.2	1.0294	1.0230	1.0172	1.0120	1.0075	1.0037
1.5	1.0653	1.0509	1.0382	1.0269	1.0171	1.0087
2.0	1.1097	1.0854	1.0640	1.0454	1.0293	1.0156
3.0	1.1657	1.1284	1.0961	1.0683	1.0446	1.0247
5.0	1.2217	1.1708	1.1275	1.0907	1.0598	1.0340
10.0	1.2724	1.2088	1.1553	1.1105	1.0731	1.0422
20.0	1.3013	1.2301	1.1708	1.1214	1.0805	1.0468

TABLE 27. VALUES OF $\bar{s}_w/\bar{s}_{max}$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT, CALCULATED ACCORDING TO

$$\left(\frac{\bar{s}_w}{\bar{s}_{max}}\right)_{LN} = \frac{\bar{M}_w^{1.5a_s^2}}{\bar{M}_n} = \frac{\bar{M}^{(a_{[\eta]}^2-4a_{[\eta]}+4)/6}}{\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_s)					
	0.40 (0.53)	0.50 (0.50)	0.60 (0.47)	0.70 (0.43)	0.80 (0.40)	0.90 (0.37)
1.1	1.0415	1.0364	1.0316	1.0272	1.0231	1.0194
1.2	1.0809	1.0708	1.0614	1.0527	1.0447	1.0375
1.5	1.1887	1.1642	1.1416	1.1210	1.1022	1.0852
2.0	1.3441	1.2968	1.2541	1.2156	1.1810	1.1500
3.0	1.5980	1.5098	1.4317	1.3626	1.3017	1.2480
5.0	1.9871	1.8286	1.6917	1.5735	1.4715	1.3834
10.0	2.6710	2.3714	2.1216	1.9128	1.7378	1.5910
20.0	3.5901	3.0753	2.6607	2.3252	2.0523	1.8297

E. DIFFUSION COEFFICIENT VERSUS MOLECULAR WEIGHT RELATIONSHIP

TABLE 28. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Diff,\bar{D}_A\bar{M}_n}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_A$ AND $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Diff,\bar{D}_A\bar{M}_n} = \frac{1}{k^{a_D}}\left(\frac{\Gamma(k+1)}{\Gamma((2k-a_D+2)/2)}\right)^2 = \frac{1}{k^{-(a_{[\eta]}+1)/3}}\left(\frac{\Gamma(k+1)}{\Gamma((6k+a_{[\eta]}+7)/6)}\right)^2$$

$$\bar{D}_A = K_D \bar{M}_n^{a_D} q^{(SZ)}_{Diff,\bar{D}_A\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_D)		
	0.40 (−0.47)	0.50 (−0.50)	0.90 (−0.63)
1.1	0.9723	0.9700	0.9602
1.5	0.8798	0.8705	0.8324
2.0	0.7939	0.7790	0.7200
2.5	0.7291	0.7107	0.6392
3.0	0.6783	0.6575	0.5781
4.0	0.6026	0.5789	0.4908
5.0	0.5483	0.5230	0.4309
6.0	0.5068	0.4806	0.3868
8.0	0.4467	0.4197	03253
10.0	0.4045	0.3773	0.2840
20.0	0.2955	0.2695	0.1851

TABLE 29. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Diff,\bar{D}_A\bar{M}_n}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_A$ AND $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Diff,\bar{D}_A\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{-(a_D^2-2a_D)/4} = (\bar{M}_w/\bar{M}_n)^{-(a_{[\eta]}^2+8a_{[\eta]}+7)/36}$$

$$\bar{D}_A = K_D \bar{M}_n^{a_D} q^{(LN)}_{Diff,\bar{D}_A\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_D)		
	0.40 (−0.47)	0.50 (−0.50)	0.90 (−0.63)
1.1	0.9729	0.9707	0.9610
1.5	0.8899	0.8810	0.8445
2.0	0.8192	0.8052	0.7490
3.0	0.7289	0.7094	0.6325
5.0	0.6293	0.6047	0.5112
10.0	0.5155	0.4870	0.3829
20.0	0.4223	0.3921	0.2868

TABLE 30. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Diff,\bar{D}_A\bar{M}_{\bar{s}_w\bar{D}_A}}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_A$ AND $\bar{M}_{\bar{s}_w\bar{D}_A}$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Diff,\bar{D}_A\bar{M}_{\bar{s}_w\bar{D}_A}} = \frac{[\Gamma((3k+5-a_{[\eta]})/3)]^{(a_{[\eta]}+1)/3}[\Gamma((6k+7+a_{[\eta]})/6)]^{(2a_{[\eta]}-4)/3}}{[\Gamma(k+1)]^{a_{[\eta]}-1}} \qquad \bar{D}_A = K_D \bar{M}_{\bar{s}_w\bar{D}_A}^{a_D} q^{(SZ)}_{Diff,\bar{D}_A\bar{M}_{\bar{s}_w\bar{D}_A}}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_D)					
	0.40 (−0.47)	0.50 (−0.50)	0.60 (−0.53)	0.70 (−0.57)	0.80 (−0.60)	0.90 (−0.63)
1.1	1.0035	1.0029	1.0023	1.0017	1.0011	1.0005
2.0	1.0210	1.0176	1.0140	1.0104	1.0068	1.0033
4.0	1.0331	1.0278	1.0221	1.0164	1.0107	1.0052
8.0	1.0395	1.0318	1.0264	1.0196	1.0128	1.0062
20.0	1.0434	1.0364	1.0290	1.0215	1.0140	1.0068

TABLE 31. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\mathrm{Diff},\bar{D}_A\bar{M}_{\bar{s}_w\bar{D}_A}}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_A$ AND $\bar{M}_{\bar{s}_w\bar{D}_A}$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\mathrm{Diff},\bar{D}_A\bar{M}_{\bar{s}_w\bar{D}_A}} = (\bar{M}_w/\bar{M}_n)^{(a^3_{[\eta]}-2a^2_{[\eta]}-a_{[\eta]}+2)/36} \qquad \bar{D}_A = K_D \bar{M}^{a_D}_{\bar{s}_w\bar{D}_A} q^{(LN)}_{\mathrm{Diff},\bar{D}_A\bar{M}_{\bar{s}_w\bar{D}_A}}$$

	$a_{[\eta]}$ and (a_D)					
$\bar{M}_w/\bar{M}_n$	0.40 (−0.47)	0.50 (−0.50)	0.60 (−0.53)	0.70 (−0.57)	0.80 (−0.60)	0.90 (−0.63)
1.1	1.0036	1.0030	1.0024	1.0018	1.0011	1.0006
1.5	1.0153	1.0128	1.0101	1.0075	1.0049	1.0024
2.0	1.0262	1.0219	1.0174	1.0128	1.0084	1.0040
3.0	1.0419	1.0349	1.0277	1.0204	1.0133	1.0064
5.0	1.0619	1.0516	1.0409	1.0301	1.0195	1.0094
8.0	1.0807	1.0671	1.0531	1.0390	1.0253	1.0121
20.0	1.1183	1.0981	1.0774	1.0567	1.0366	1.0175

TABLE 32. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\mathrm{Diff},\bar{D}_w\bar{M}_n}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_w$ AND $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\mathrm{Diff},\bar{D}_w\bar{M}_n} = \frac{1}{k^{a_D}}\frac{\Gamma(k+a_D+1)}{\Gamma(k+1)} = \frac{1}{k^{-(a_{[\eta]}+1)/3}}\frac{\Gamma((3k-a_{[\eta]}+2)/3)}{\Gamma(k+1)}$$

$$\bar{D}_w = K_D \bar{M}_n^{a_D} q^{(SZ)}_{\mathrm{Diff},\bar{D}_w\bar{M}_n}$$

	$a_{[\eta]}$ and (a_D)		
$\bar{M}_w/\bar{M}_n$	0.40 (−0.47)	0.50 (−0.50)	0.90 (−0.63)
1.1	0.9877	0.9876	0.9884
1.5	0.9406	0.9400	0.9429
2.0	0.8878	0.8862	0.8896
3.0	0.8017	0.7979	0.7981
5.0	0.6837	0.6760	0.6659
7.0	0.6064	0.5959	0.5768
10.0	0.5285	0.5154	0.4868
15.0	0.4478	0.4323	0.3945
20.0	0.3963	0.3796	0.3369

TABLE 33. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\mathrm{Diff},\bar{D}_w\bar{M}_n}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_w$ AND $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\mathrm{Diff},\bar{D}_w\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{(a_D^2+a_D)/2} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]}-a_{[\eta]}-2)/18}$$

$$\bar{D}_w = K_D \bar{M}_n^{a_D} q^{(LN)}_{\mathrm{Diff},\bar{D}_w\bar{M}_n}$$

	$a_{[\eta]}$ and (a_D)		
$\bar{M}_w/\bar{M}_n$	0.40 (−0.47)	0.50 (−0.50)	0.90 (−0.63)
1.1	0.9882	0.9882	0.9890
1.5	0.9508	0.9506	0.9540
2.0	0.9174	0.9170	0.9227
3.0	0.8722	0.8717	0.8802
5.0	0.8185	0.8178	0.8295
7.0	0.7849	0.7841	0.7978
10.0	0.7509	0.7499	0.7654
15.0	0.7139	0.7128	0.7302
20.0	0.6888	0.6877	0.7062

TABLE 34. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\mathrm{Diff},\bar{D}_z\bar{M}_n}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_z$ AND $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\mathrm{Diff},\bar{D}_z\bar{M}_n} = \frac{1}{k^{a_D}(k+1)}\frac{\Gamma(k+a_D+2)}{\Gamma(k+1)} = \frac{k^{(a_{[\eta]}+1)/3}}{k+1}\frac{\Gamma((3k-a_{[\eta]}+5)/3)}{\Gamma(k+1)}$$

$$\bar{D}_z = K_D \bar{M}_n^{a_D} q^{(SZ)}_{\mathrm{Diff},\bar{D}_z\bar{M}_n}$$

	$a_{[\eta]}$ and (a_D)			
$\bar{M}_w/\bar{M}_n$	0.40 (−0.47)	0.50 (−0.50)	0.70 (−0.57)	0.90 (−0.63)
1.1	0.9458	0.9427	0.9369	0.9315
1.5	0.7942	0.7833	0.7628	0.7439
2.0	0.6806	0.6647	0.6349	0.6079
3.0	0.5523	0.5319	0.4945	0.4611
4.0	0.4782	0.4561	0.4159	0.3806
5.0	0.4285	0.4056	0.3644	0.3285
6.0	0.3920	0.3688	0.3273	0.2915
8.0	0.3412	0.3179	0.2767	0.2418
10.0	0.3065	0.2835	0.2431	0.2093
20.0	0.2206	0.1993	0.1632	0.1342

TABLE 35. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\mathrm{Diff},\bar{D}_z\bar{M}_n}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_z$ AND $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\mathrm{Diff},\bar{D}_z\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{(a_D^2+3a_D)/2} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]}-7a_{[\eta]}-8)/18}$$

$$\bar{D}_z = K_D \bar{M}_n^{a_D} q^{(LN)}_{\mathrm{Diff},\bar{D}_z\bar{M}_n}$$

	$a_{[\eta]}$ and (a_D)			
$\bar{M}_w/\bar{M}_n$	0.40 (−0.47)	0.50 (−0.50)	0.70 (−0.57)	0.90 (−0.63)
1.1	0.9452	0.9422	0.9364	0.9311
1.5	0.7869	0.7761	0.7561	0.7380
2.0	0.6638	0.6484	0.6201	0.5948
3.0	0.5224	0.5033	0.4689	0.4390
4.0	0.4407	0.4204	0.3845	0.3538
5.0	0.3862	0.3657	0.3297	0.2993
6.0	0.3468	0.3263	0.2907	0.2611
8.0	0.2925	0.2726	0.2384	0.2105
10.0	0.2564	0.2371	0.2044	0.1781
20.0	0.1702	0.1538	0.1268	0.1059

TABLE 36. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\mathrm{Diff},\bar{D}_A\bar{M}_w}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_A$ AND $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\mathrm{Diff},\bar{D}_A\bar{M}_w} = \frac{[\Gamma(k+1)]^2(k+1)^{-a_D}}{[\Gamma(k-a_D/2+1)]^2} = \frac{[\Gamma(k+1)]^2(k+1)^{(a_{[\eta]}+1)/3}}{[\Gamma((6k+a_{[\eta]}+7)/6)]^2}$$

$$\bar{D}_A = K_D\bar{M}_w^{a_D} q^{(SZ)}_{\mathrm{Diff},\bar{D}_A\bar{M}_w}$$

	$a_{[\eta]}$ and (a_D)		
$\bar{M}_w/\bar{M}_n$	0.40 (− 0.47)	0.50 (− 0.50)	0.90 (− 0.63)
1.1	1.0165	1.0173	1.0200
1.5	1.0631	1.0661	1.0760
2.0	1.0971	1.1017	1.1168
3.0	1.1326	1.1388	1.1592
5.0	1.1620	1.1695	1.1941
10.0	1.1846	1.1931	1.2209
20.0	1.1960	1.2051	1.2345

TABLE 37. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\mathrm{Diff},\bar{D}_A\bar{M}_w}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_A$ AND $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\mathrm{Diff},\bar{D}_A\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{-(a_D^2+2a_D)/4} = (\bar{M}_w/\bar{M}_n)^{-(a_{[\eta]}^2-4a_{[\eta]}-5)/36}$$

$$\bar{D}_A = K_D\bar{M}_w^{a_D} q^{(LN)}_{\mathrm{Diff},\bar{D}_A\bar{M}_w}$$

	$a_{[\eta]}$ and (a_D)			
$\bar{M}_w/\bar{M}_n$	0.40 (− 0.47)	0.50 (− 0.50)	0.70 (− 0.57)	0.90 (− 0.63)
1.1	1.0172	1.0180	1.0195	1.0208
1.3	1.0481	1.0504	1.0547	1.0584
1.5	1.0752	1.0790	1.0858	1.0917
1.7	1.0996	1.1046	1.1138	1.1217
2.0	1.1320	1.1388	1.1511	1.1618
2.5	1.1781	1.1874	1.2045	1.2193
3.0	1.2172	1.2287	1.2499	1.2684
4.0	1.2815	1.2968	1.3251	1.3498
5.0	1.3336	1.3522	1.3865	1.4166
8.0	1.4506	1.4768	1.5254	1.5683
10.0	1.5097	1.5399	1.5961	1.6458
20.0	1.7090	1.7537	1.8373	1.9122

TABLE 38. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\mathrm{Diff},\bar{D}_w\bar{M}_w}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_w$ AND $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\mathrm{Diff},\bar{D}_w\bar{M}_w} = \frac{(k+1)^{-a_D}\Gamma(k+a_D+1)}{\Gamma(k+1)} = \frac{(k+1)^{(a_{[\eta]}+1)/3}\Gamma((3k-a_{[\eta]}+2)/3)}{\Gamma(k+1)} \qquad \bar{D}_w = K_D\bar{M}_w^{a_D} q^{(SZ)}_{\mathrm{Diff},\bar{D}_w\bar{M}_w}$$

	$a_{[\eta]}$ and (a_D)					
$\bar{M}_w/\bar{M}_n$	0.40 (− 0.47)	0.50 (− 0.50)	0.60 (− 0.53)	0.70 (− 0.57)	0.80 (− 0.60)	0.90 (− 0.63)
1.1	1.0326	1.0358	1.0391	1.0426	1.0462	1.0499
1.3	1.0891	1.0984	1.1081	1.1182	1.1288	1.1400
1.5	1.1365	1.1512	1.1668	1.1833	1.2007	1.2190
1.7	1.1767	1.1965	1.2175	1.2399	1.2637	1.2889
2.0	1.2268	1.2533	1.2817	1.3122	1.3448	1.3799
2.5	1.2909	1.3267	1.3655	1.4076	1.4533	1.5031
3.0	1.3386	1.3820	1.4293	1.4811	1.5379	1.6003
4.0	1.4050	1.4596	1.5200	1.5868	1.6612	1.7441
5.0	1.4490	1.5115	1.5812	1.6592	1.7467	1.8453
8.0	1.5216	1.5983	1.6849	1.7831	1.8953	2.0242
10.0	1.5479	1.6299	1.7230	1.8293	1.9514	2.0927
20.0	1.6037	1.6977	1.8056	1.9302	2.0754	2.2461

TABLE 39. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\mathrm{Diff},\bar{D}_w\bar{M}_w}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_w$ AND $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\mathrm{Diff},\bar{D}_w\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{(a_D^2-a_D)/2} = (\bar{M}_w/\bar{M}_n)^{(a_{[\eta]}^2+5a_{[\eta]}+4)/18} \qquad \bar{D}_w = K_D\bar{M}_w^{a_D} q^{(LN)}_{\mathrm{Diff},\bar{D}_w\bar{M}_w}$$

	$a_{[\eta]}$ and (a_D)					
$\bar{M}_w/\bar{M}_n$	0.40 (− 0.47)	0.50 (− 0.50)	0.60 (− 0.53)	0.70 (− 0.57)	0.80 (− 0.60)	0.90 (− 0.63)
1.1	1.0332	1.0364	1.0397	1.0432	1.0468	1.0505
1.3	1.0939	1.1034	1.1132	1.1235	1.1342	1.1453
1.5	1.1488	1.1642	1.1803	1.1972	1.2149	1.2333
1.7	1.1991	1.2202	1.2423	1.2656	1.2901	1.3158
2.0	1.2677	1.2968	1.3277	1.3603	1.3947	1.4312
2.5	1.3683	1.4100	1.4545	1.5019	1.5524	1.6063
3.0	1.4564	1.5098	1.5671	1.6285	1.6944	1.7651

TABLE 39. *cont'd*

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_D) 0.40 (−0.47)	0.50 (−0.50)	0.60 (−0.53)	0.70 (−0.57)	0.80 (−0.60)	0.90 (−0.63)
4.0	1.6071	1.6818	1.7627	1.8503	1.9453	2.0483
5.0	1.7346	1.8286	1.9311	2.0430	2.1652	2.2989
8.0	2.0373	2.1810	2.3403	2.5169	2.7132	2.9316
10.0	2.1990	2.3714	2.5638	2.7790	3.0200	3.2902
20.0	2.7877	3.0753	3.4039	3.7802	4.2121	4.7089

TABLE 40. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Diff,\bar{D}_z\bar{M}_w}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_z$ AND $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Diff,\bar{D}_z\bar{M}_w} = \frac{1}{(k+1)^{1+a_D}}\frac{\Gamma(k+a_D+2)}{\Gamma(k+1)} = \frac{1}{(k+1)^{(2-a_{[\eta]})/3}}\frac{\Gamma((3k-a_{[\eta]}+5)/3)}{\Gamma(k+1)}$$

$$\bar{D}_z = K_D \bar{M}_w^{a_D} q^{(SZ)}_{Diff,\bar{D}_z\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_D) 0.40 (−0.47)	0.50 (−0.50)	0.60 (−0.53)	0.90 (−0.63)
1.1	0.9888	0.9887	0.9887	0.9895
1.5	0.9597	0.9594	0.9594	0.9616
2.0	0.9406	0.9400	0.9399	0.9429
3.0	0.9222	0.9213	0.9211	0.9246
4.0	0.9133	0.9123	0.9120	0.9157
5.0	0.9080	0.9069	0.9066	0.9104
6.0	0.9046	0.9034	0.9030	0.9068
8.0	0.9003	0.8990	0.8986	0.9025
10.0	0.8978	0.8964	0.8960	0.8999
20.0	0.8927	0.8913	0.8908	0.8947

TABLE 41. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Diff,\bar{D}_z\bar{M}_w}$ FOR $D = K_D M^{a_D}$ USING $\bar{D}_z$ AND $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Diff,\bar{D}_z\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{(a_D^2+a_D)/2} = (\bar{M}_w/\bar{M}_n)^{(a_{[\eta]}^2-a_{[\eta]}-2)/18}$$

$$\bar{D}_z = K_D \bar{M}_w^{a_D} q^{(LN)}_{Diff,\bar{D}_z\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (a_D) 0.40 (−0.47)	0.50 (−0.50)	0.70 (−0.57)	0.90 (−0.63)
1.1	0.9882	0.9882	0.9884	0.9890
1.5	0.9508	0.9506	0.9514	0.9540
2.0	0.9174	0.9170	0.9184	0.9227
3.0	0.8722	0.8717	0.8738	0.8802
4.0	0.8415	0.8409	0.8435	0.8513
5.0	0.8185	0.8178	0.8207	0.8295
6.0	0.8001	0.7993	0.8025	0.8122
8.0	0.7720	0.7711	0.7747	0.7855
10.0	0.7509	0.7499	0.7537	0.7654
20.0	0.6888	0.6877	0.6922	0.7062

F. MEAN-SQUARE RADIUS OF GYRATION VERSUS MOLECULAR WEIGHT RELATIONSHIP

TABLE 42. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Gyr,\langle S^2\rangle_z\bar{M}_w}$ FOR $\langle S^2\rangle = K_{\langle S^2\rangle} M^{1+\varepsilon}$ USING $\langle S^2\rangle_z$ AND $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (57)

$$q^{(SZ)}_{Gyr,\langle S^2\rangle_z\bar{M}_w} = \frac{\Gamma(k+\varepsilon+3)}{(k+1)^{\varepsilon+2}\Gamma(k+1)} = \frac{\Gamma((3k+2a_{[\eta]}+8)/3)}{(k+1)^{(2a_{[\eta]}+5)/3}\Gamma(k+1)} \qquad \langle S^2\rangle_z = K_{\langle S^2\rangle}\bar{M}_w^{1+\varepsilon} q^{(SZ)}_{Gyr,\langle S^2\rangle_z\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε) 0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	1.0818	1.0909	1.1005	1.1105	1.1210	1.1320
1.5	1.2982	1.3333	1.3707	1.4105	1.4529	1.4979
2.0	1.4457	1.5000	1.5583	1.6210	1.6881	1.7602
3.0	1.5921	1.6667	1.7473	1.8345	1.9287	2.0305
4.0	1.6650	1.7500	1.8422	1.9423	2.0508	2.1685
5.0	1.7086	1.8000	1.8993	2.0073	2.1246	2.2521
6.0	1.7376	1.8333	1.9375	2.0508	2.1741	2.3083
8.0	1.7739	1.8750	1.9852	2.1053	2.2361	2.3788
10.0	1.7956	1.9000	2.0138	2.1380	2.2735	2.4213
20.0	1.8390	1.9500	2.0713	2.2037	2.6291	2.5069

TABLE 43. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Gyr,\langle S^2\rangle_z\bar{M}_w}$ FOR $\langle S^2\rangle = K_{\langle S^2\rangle}M^{1+\varepsilon}$ USING $\langle S^2\rangle_z$ AND $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Gyr,\langle S^2\rangle_z\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{(\varepsilon^2+3\varepsilon+2)/2} = (\bar{M}_w/\bar{M}_n)^{(2a^2_{[\eta]}+7a_{[\eta]}+5)/9} \qquad \langle S^2\rangle_z = K_{\langle S^2\rangle}\bar{M}_w^{1+\varepsilon}q^{(LN)}_{Gyr,\langle S^2\rangle_z\bar{M}_w}$$

	$a_{[\eta]}$ and (ε)					
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	1.0898	1.1000	1.1108	1.1221	1.1341	1.1466
1.5	1.4417	1.5000	1.5635	1.6326	1.7078	1.7897
2.0	1.8689	2.0000	2.1469	2.3116	2.4967	2.7049
3.0	2.6944	3.0000	3.3566	3.7739	4.2638	4.8410
4.0	3.4929	4.0000	4.6090	5.3435	6.2333	7.3163
5.0	4.2720	5.0000	5.8941	6.9981	8.3684	10.08
6.0	5.0358	6.0000	7.2060	8.7237	10.65	13.09
8.0	6.5281	8.0000	9.8948	12.35	15.56	19.79
10.0	7.9840	10.00	12.65	16.18	20.89	27.26
20.0	14.92	20.00	27.17	37.39	52.16	73.74

TABLE 44. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Gyr,\langle S^2\rangle_z\bar{M}_z}$ FOR $\langle S^2\rangle = K_{\langle S^2\rangle}M^{1+\varepsilon}$ USING $\langle S^2\rangle_z$ AND $\bar{M}_z$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Gyr,\langle S^2\rangle_z\bar{M}_z} = \frac{\Gamma(k+\varepsilon+3)}{(k+1)(k+2)^{\varepsilon+1}\Gamma(k+1)} = \frac{\Gamma((3k+2a_{[\eta]}+8)/3)}{(k+1)(k+2)^{(2a_{[\eta]}+2)/3}\Gamma(k+1)} \qquad \langle S^2\rangle_z = K_{\langle S^2\rangle}\bar{M}_z^{1+\varepsilon}q^{(SZ)}_{Gyr,\langle S^2\rangle_z\bar{M}_z}$$

	$a_{[\eta]}$ and (ε)					
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	0.9974	1.0000	1.0029	1.0062	1.0099	1.0139
1.5	0.9925	1.0000	1.0085	1.0181	1.0287	1.0405
2.0	0.9902	1.0000	1.0112	1.0238	1.0378	1.0532
3.0	0.9883	1.0000	1.0133	1.0282	1.0448	1.0632
5.0	0.9872	1.0000	1.0146	1.0311	1.0494	1.0697
20.0	0.9860	1.0000	1.0159	1.0338	1.0538	1.0758

TABLE 45. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Gyr,\langle S^2\rangle_z\bar{M}_z}$ FOR $\langle S^2\rangle = K_{\langle S^2\rangle}M^{1+\varepsilon}$ USING $\langle S^2\rangle_z$ AND $\bar{M}_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Gyr,\langle S^2\rangle_z\bar{M}_z} = (\bar{M}_w/\bar{M}_n)^{(\varepsilon^2+\varepsilon)/2} = (\bar{M}_w/\bar{M}_n)^{(2a^2_{[\eta]}+a_{[\eta]}-1)/9} \qquad \langle S^2\rangle_z = K_{\langle S^2\rangle}\bar{M}_z^{1+\varepsilon}q^{(LN)}_{Gyr,\langle S^2\rangle_z\bar{M}_z}$$

	$a_{[\eta]}$ and (ε)					
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	0.9970	1.0000	1.0034	1.0072	1.0115	1.0162
1.3	0.9919	1.0000	1.0094	1.0200	1.0320	1.0453
1.5	0.9875	1.0000	1.0145	1.0311	1.0499	1.0709
1.7	0.9836	1.0000	1.0190	1.0409	1.0657	1.0938
2.0	0.9787	1.0000	1.0250	1.0538	1.0867	1.1242
2.5	0.9719	1.0000	1.0331	1.0717	1.1162	1.1674
3.0	0.9664	1.0000	1.0398	1.0865	1.1409	1.2039
4.0	0.9578	1.0000	1.0505	1.1104	1.1810	1.2638
5.0	0.9512	1.0000	1.0589	1.1293	1.2130	1.3123
6.0	0.9458	1.0000	1.0658	1.1450	1.2399	1.3534
7.0	0.9413	1.0000	1.0716	1.1584	1.2630	1.3891
10.0	0.9309	1.0000	1.0853	1.1900	1.3183	1.4753
20.0	0.9110	1.0000	1.1124	1.2540	1.4326	1.6586

TABLE 46. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{Gyr,\langle S^2\rangle_z,\bar{M}_n}$ FOR $\langle S^2\rangle = K_{\langle S^2\rangle}M^{1+\varepsilon}$ USING $\langle S^2\rangle_z$ AND $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{Gyr,\langle S^2\rangle_z,\bar{M}_n} = \frac{\Gamma(k+\varepsilon+3)}{k^{\varepsilon+1}(k+1)\Gamma(k+1)} = \frac{\Gamma((3k+2a_{[\eta]}+8)/3)}{k^{(2a_{[\eta]}+2)/3}(k+1)\Gamma(k+1)} \qquad \langle S^2\rangle_z = K_{\langle S^2\rangle}\bar{M}_n^{1+\varepsilon}q^{(SZ)}_{Gyr,\langle S^2\rangle_z,\bar{M}_n}$$

	$a_{[\eta]}$ and (ε)			
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.70 (0.07)	0.90 (0.27)
1.1	1.1825	1.2000	1.2372	1.2773
1.3	1.5419	1.6000	1.7268	1.8693
1.5	1.8954	2.0000	2.2333	2.5034
1.7	2.2444	2.4000	2.7537	3.1732
2.0	2.7608	3.0000	3.5558	4.2352
2.5	3.6069	4.0000	4.9399	6.1333
3.0	4.4390	5.0000	6.3715	8.1651
4.0	6.0720	7.0000	9.3464	12.55
5.0	7.6738	9.0000	12.44	17.30
8.0	12.35	15.00	22.22	33.13
10.0	15.40	19.00	29.06	44.74
20.0	30.12	39.00	65.71	111.46

TABLE 47. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{Gyr,\langle S^2\rangle_z,\bar{M}_n}$ FOR $\langle S^2\rangle = K_{\langle S^2\rangle}M^{1+\varepsilon}$ USING $\langle S^2\rangle_z$ AND $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{Gyr,\langle S^2\rangle_z,\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{(\varepsilon^2+5\varepsilon+4)/2} = (\bar{M}_w/\bar{M}_n)^{(2a^2_{[\eta]}+13a_{[\eta]}+11)/9} \qquad \langle S^2\rangle_z = K_{\langle S^2\rangle}\bar{M}_n^{1+\varepsilon}q^{(LN)}_{Gyr,\langle S^2\rangle_z,\bar{M}_n}$$

	$a_{[\eta]}$ and (ε)					
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	1.1912	1.2100	1.2296	1.2501	1.2715	1.2938
1.3	1.6186	1.6900	1.7666	1.8488	1.9370	2.0319
1.5	2.1049	2.2500	2.4095	2.5849	2.7781	2.9911
1.7	2.6485	2.8900	3.1610	3.4655	3.8083	4.1949
2.0	3.5691	4.0000	4.4968	5.0708	5.7358	6.5080
2.5	5.3758	6.2500	7.2960	8.5519	10.06	11.89
3.0	7.5125	9.0000	10.83	13.11	15.93	19.47
4.0	12.74	16.00	20.22	25.71	32.90	42.35
5.0	19.19	25.00	32.81	43.37	57.73	77.41
8.0	45.46	64.00	90.93	130.39	188.71	275.64
10.0	68.48	100.00	147.53	219.90	331.13	503.76

G. SECOND VIRIAL COEFFICIENT VERSUS MOLECULAR WEIGHT RELATIONSHIP

TABLE 48. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\bar{M}_n,\bar{A}_2^{(OP)}}$ FOR $\bar{A}_2^{(OP)} = K_{A_2}M^{a_{A_2}}$ USING $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\bar{M}_n,\bar{A}_2^{(OP)}} = (\bar{M}_{av,\bar{A}_2^{(OP)}}/\bar{M}_n)^{a_{A_2}} = (\bar{M}_{av,\bar{A}_2^{(OP)}}/\bar{M}_n)^{a_{[\eta]}-1}$$

	$a_{[\eta]}$ and (a_{A_2})		
$\bar{M}_w/\bar{M}_n$	0.65 (−0.35)	0.80 (−0.20)	0.95 (−0.05)
1.1	1.0492	1.0267	1.0063
1.2	1.0606	1.0318	1.0073

TABLE 48. *cont'd*

	$a_{[\eta]}$ and (a_{A_2})		
$\bar{M}_w/\bar{M}_n$	0.65 (−0.35)	0.80 (−0.20)	0.95 (−0.05)
1.3	1.0653	1.0333	1.0074
1.4	1.0666	1.0329	1.0070
1.5	1.0658	1.0314	1.0064
1.7	1.0603	1.0264	1.0048
2.0	1.0469	1.0164	1.0018
3.0	0.9886	0.9775	0.9907
5.0	0.8949	0.9167	0.9735

TABLE 49. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\bar{M}_n,\bar{A}_2^{(OP)}}$ FOR $\bar{A}_2^{(OP)} = K_{A_2}M^{a_{A_2}}$ USING $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\bar{M}_n,\bar{A}_2^{(OP)}} = (\bar{M}_{av,\bar{A}_2^{(OP)}}/\bar{M}_n)^{a_{A_2}} = (\bar{M}_{av,\bar{A}_2^{(OP)}}/\bar{M}_n)^{a_{[\eta]}-1}$$

	$a_{[\eta]}$ and (a_{A_2})		
$\bar{M}_w/\bar{M}_n$	0.65 (−0.35)	0.80 (−0.20)	0.95 (−0.05)
1.1	1.0495	1.0270	1.0064
1.2	1.0619	1.0330	1.0077
1.3	1.0685	1.0358	1.0081
1.4	1.0723	1.0371	1.0083
1.5	1.0745	1.0375	1.0082
1.7	1.0761	1.0371	1.0078
2.0	1.0750	1.0347	1.0068
3.0	1.0630	1.0237	1.0030
5.0	1.0378	1.0042	0.9969
10.0	0.9924	0.9713	0.9867
20.0	0.9318	0.9280	0.9733

TABLE 50. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\bar{M}_w,\bar{A}_2^{(LS)}}$ FOR $\bar{A}_2^{(LS)} = K_{A_2}M^{a_{A_2}}$ USING $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ–ZIMM DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\bar{M}_w,\bar{A}_2^{(LS)}} = (\bar{M}_{av,\bar{A}_2^{(LS)}}/\bar{M}_w)^{a_{A_2}} = (\bar{M}_{av,\bar{A}_2^{(LS)}}/\bar{M}_w)^{a_{[\eta]}-1}$$

	$a_{[\eta]}$ and (a_{A_2})		
$\bar{M}_w/\bar{M}_n$	0.65 (−0.35)	0.80 (−0.20)	0.95 (−0.05)
1.1	1.0477	1.0260	1.0063
1.2	1.0579	1.0308	1.0072
1.3	1.0626	1.0326	1.0075

TABLE 50. *cont'd*

	$a_{[\eta]}$ and (a_{A_2})		
$\bar{M}_w/\bar{M}_n$	0.65 (−0.35)	0.80 (−0.20)	0.95 (−0.05)
1.4	1.0649	1.0333	1.0075
1.5	1.0661	1.0334	1.0074
1.7	1.0667	1.0329	1.0071
2.0	1.0657	1.0314	1.0065
3.0	1.0600	1.0267	1.0050
5.0	1.0531	1.0217	0.0035

TABLE 51. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\bar{M}_w,\bar{A}_2^{(LS)}}$ FOR $\bar{A}_2^{(LS)} = K_{A_2}M^{a_{A_2}}$ USING $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\bar{M}_w,\bar{A}_2^{(LS)}} = (\bar{M}_{av,\bar{A}_2^{(LS)}}/\bar{M}_w)^{a_{A_2}} = (\bar{M}_{av,\bar{A}_2^{(LS)}}/\bar{M}_n)^{a_{[\eta]}-1}$$

	$a_{[\eta]}$ and (a_{A_2})		
$\bar{M}_w/\bar{M}_n$	0.65 (−0.35)	0.80 (−0.20)	0.95 (−0.05)
1.1	1.0496	1.0271	1.0065
1.2	1.0620	1.0331	1.0078
1.3	1.0686	1.0359	1.0082
1.4	1.0723	1.0371	1.0084
1.5	1.0742	1.0375	1.0083
1.7	1.0764	1.0374	1.0082
2.0	1.0753	1.0350	1.0071
3.0	1.0634	1.0241	1.0035
5.0	1.0391	1.0057	0.9985
10.0	0.9968	0.9752	0.9887
20.0	0.9604	0.9513	0.9816

H. DETERMINATION OF THE DIMENSIONS OF MACROMOLECULES

1. Fox–Flory Relationship

TABLE 52. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{FF,\langle r^2\rangle_z,\bar{M}_n}$ FOR FOX–FLORY RELATIONSHIP $[\eta] = \Phi(\varepsilon)\langle r^2\rangle^{3/2}/M$ USING $\langle r^2\rangle_z$ AND $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{FF,\langle r^2\rangle_z,\bar{M}_n} = k(k+1)^{3/2}[\Gamma(k+1)]^{1/2}\frac{\Gamma((2k+3\varepsilon+3)/2)}{[\Gamma(k+\varepsilon+3)]^{3/2}} = k(k+1)^{3/2}[\Gamma(k+1)]^{1/2}\frac{\Gamma(k+a_{[\eta]}+1)}{[\Gamma((3k+2a_{[\eta]}+8)/3)]^{3/2}} \qquad [\eta] = \Phi(\varepsilon)\frac{\langle r^2\rangle_z^{3/2}}{\bar{M}_n}q^{(SZ)}_{FF,\langle r^2\rangle_z,\bar{M}_n}$$

	$a_{[\eta]}$ and (ε)					
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	0.7991	0.7888	0.7790	0.7695	0.7604	0.7518
1.3	0.5642	0.5474	0.5317	0.5171	0.5034	0.4905
1.5	0.4329	0.4154	0.3994	0.3846	0.3710	0.3585
2.0	0.2708	0.2558	0.2424	0.2304	0.2195	0.2097
3.0	0.1531	0.1427	0.1336	0.1256	0.1185	0.1121
4.0	0.1063	0.0985	0.0917	0.0858	0.0806	0.0760
5.0	0.0813	0.0751	0.0697	0.0650	0.0609	0.0573
10.0	0.0373	0.0342	0.0316	0.0293	0.0273	0.0256
20.0	0.0179	0.0164	0.0151	0.0139	0.0130	0.0121

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TABLE 53. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{FF,\langle r^2\rangle_z,\bar{M}_n}$ FOR FOX-FLORY RELATIONSHIP $[\eta] = \Phi(\varepsilon)\langle r^2\rangle^{3/2}/M$ USING $\langle r^2\rangle_z$ AND $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{FF,\langle r^2\rangle_z,\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{(3\varepsilon^2-18\varepsilon-21)/8} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]}-10a_{[\eta]}-11)/6} \qquad [\eta] = \Phi(\varepsilon)\frac{\langle r^2\rangle_z^{3/2}}{\bar{M}_n}q^{(LN)}_{FF,\langle r^2\rangle_z,\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε)					
	0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	0.7900	0.7787	0.7677	0.7572	0.7470	0.7372
1.5	0.3668	0.3450	0.3248	0.3063	0.2892	0.2734
2.0	0.1801	0.1621	0.1463	0.1323	0.1199	0.1089
3.0	0.0661	0.0559	0.0475	0.0405	0.0347	0.0298
4.0	0.0324	0.0263	0.0214	0.0175	0.0144	0.0119
5.0	0.0187	0.0146	0.0115	0.0091	0.0073	0.0058
6.0	0.0119	0.0091	0.0069	0.0054	0.0042	0.0032
8.0	0.0058	0.0043	0.0031	0.0023	0.0017	0.0013
10.0	0.0034	0.0024	0.0017	0.0012	0.0009	0.0006

TABLE 54. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{FF,\langle r^2\rangle_z,\bar{M}_w}$ FOR FOX-FLORY RELATIONSHIP $[\eta] = \Phi(\varepsilon)\langle r^2\rangle^{3/2}/M$ USING $\langle r^2\rangle_z$ AND $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{FF,\langle r^2\rangle_z,\bar{M}_w} = (k+1)^{5/2}[\Gamma(k+1)]^{1/2}\frac{\Gamma((2k+3\varepsilon+3)/2)}{[\Gamma(k+\varepsilon+3)]^{3/2}} = (k+1)^{5/2}[\Gamma(k+1)]^{1/2}\frac{\Gamma(k+a_{[\eta]}+1)}{[\Gamma((3k+2a_{[\eta]}+8)/3)]^{3/2}}$$

$$[\eta] = \Phi(\varepsilon)\frac{\langle r^2\rangle_z^{3/2}}{\bar{M}_w}q^{(SZ)}_{FF,\langle r^2\rangle_z,\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε)			
	0.40 (−0.07)	0.50 (0.00)	0.70 (0.13)	0.90 (0.27)
1.1	0.8791	0.8677	0.8465	0.8269
1.5	0.6494	0.6231	0.5769	0.5377
2.0	0.5416	0.5117	0.4607	0.4193
3.0	0.4593	0.4282	0.3767	0.3363
4.0	0.4253	0.3941	0.3432	0.3038
5.0	0.4067	0.3755	0.3252	0.2865
20.0	0.3578	0.3273	0.2789	0.2427

TABLE 55. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{FF,\langle r^2\rangle_z,\bar{M}_w}$ FOR FOX-FLORY RELATIONSHIP $[\eta] = \Phi(\varepsilon)\langle r^2\rangle^{3/2}/M$ USING $\langle r^2\rangle_z$ AND $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{FF,\langle r^2\rangle_z,\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{(3\varepsilon^2-18\varepsilon-13)/8} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]}-10a_{[\eta]}-5)/6}$$

$$[\eta] = \Phi(\varepsilon)\frac{\langle r^2\rangle_z^{3/2}}{\bar{M}_w}q^{(LN)}_{FF,\langle r^2\rangle_z,\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε)			
	0.40 (−0.07)	0.50 (0.00)	0.70 (0.13)	0.90 (0.27)
1.1	0.8690	0.8565	0.8329	0.8110
1.5	0.5502	0.5174	0.4594	0.4101
2.0	0.3601	0.3242	0.2646	0.2179
3.0	0.1982	0.1678	0.1215	0.0894
4.0	0.1297	0.1051	0.0700	0.0475
5.0	0.0934	0.0731	0.0456	0.0291
10.0	0.0336	0.0237	0.0121	0.0063
20.0	0.0121	0.0077	0.0032	0.0014

2. Interconversion of Different Averages of the Mean-Square Radius of Gyration

TABLE 56. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\langle S^2\rangle_w}$ FOR THE CALCULATION OF $\langle S^2\rangle_w$ FROM $\langle S^2\rangle_z$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\langle S^2\rangle_w} = \frac{k+1}{(3k+2a_{[\eta]}+5)/3} \qquad \langle S^2\rangle_w = q^{(SZ)}_{\langle S^2\rangle_w}\langle S^2\rangle_z$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$					
	0.40	0.50	0.60	0.70	0.80	0.90
1.1	0.9218	0.9167	0.9116	0.9066	0.9016	0.8967
1.2	0.8654	0.8571	0.8491	0.8411	0.8333	0.8257
1.3	0.8228	0.8125	0.8025	0.7927	0.7831	0.7738
1.4	0.7895	0.7778	0.7664	0.7554	0.7447	0.7343
1.5	0.7627	0.7500	0.7377	0.7258	0.7143	0.7031
1.7	0.7224	0.7083	0.6948	0.6818	0.6693	0.6572

TABLE 56. *cont'd*

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.60	0.70	0.80	0.90
1.9	0.6934	0.6786	0.6643	0.6507	0.6376	0.6250
2.0	0.6818	0.6667	0.6522	0.6383	0.6250	0.6122
2.5	0.6410	0.6250	0.6098	0.5952	0.5814	0.5682
3.0	0.6164	0.6000	0.5844	0.5696	0.5556	0.5422
4.0	0.5882	0.5714	0.5556	0.5405	0.5263	0.5128
6.0	0.5625	0.5455	0.5294	0.5143	0.5000	0.4865
10.0	0.5435	0.5263	0.5102	0.4950	0.4808	0.4673
20.0	0.5300	0.5128	0.4967	0.4815	0.4673	0.4539

TABLE 57. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\langle S^2\rangle_w}$ FOR THE CALCULATION OF $\langle S^2\rangle_w$ FROM $\langle S^2\rangle_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\langle S^2\rangle_w} = (\bar{M}_w/\bar{M}_n)^{-(2a_{[\eta]}+2)/3} \qquad \langle S^2\rangle_w = q^{(LN)}_{\langle S^2\rangle_w}\langle S^2\rangle_z$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.60	0.70	0.80	0.90
1.1	0.9149	0.9091	0.9033	0.8976	0.8919	0.8863
1.2	0.8435	0.8333	0.8233	0.8133	0.8035	0.7938
1.3	0.7828	0.7692	0.7559	0.7428	0.7299	0.7173
1.4	0.7305	0.7143	0.6984	0.6829	0.6678	0.6530
1.5	0.6849	0.6667	0.6489	0.6316	0.6147	0.5983
1.7	0.6094	0.5882	0.5678	0.5481	0.5290	0.5106
1.9	0.5493	0.5263	0.5043	0.4831	0.4629	0.4435
2.0	0.5236	0.5000	0.4774	0.4559	0.4353	0.4156
2.5	0.4252	0.4000	0.3763	0.3540	0.3330	0.3133
3.0	0.3587	0.3333	0.3098	0.2879	0.2676	0.2487
4.0	0.2742	0.2500	0.2279	0.2078	0.1895	0.1727
5.0	0.2227	0.2000	0.1797	0.1614	0.1450	0.1302
6.0	0.1878	0.1667	0.1479	0.1312	0.1165	0.1034
8.0	0.1436	0.1250	0.1088	0.0947	0.0825	0.0718
10.0	0.1166	0.1000	0.0858	0.0736	0.0631	0.0541
20.0	0.0611	0.0500	0.0409	0.0335	0.0275	0.0225

TABLE 58. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\langle S^2\rangle_n}$ FOR THE CALCULATION OF $\langle S^2\rangle_n$ FROM $\langle S^2\rangle_z$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\langle S^2\rangle_n} = \frac{k(k+1)}{[(3k+2a_{[\eta]}+2)/3](3k+2a_{[\eta]}+5)/3)} \qquad \langle S^2\rangle_n = q^{(SZ)}_{\langle S^2\rangle_n}\langle S^2\rangle_z$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ 0.40	0.50	0.60	0.70	0.80	0.90
1.1	0.8431	0.8333	0.8237	0.8143	0.8050	0.7959
1.2	0.7293	0.7143	0.6998	0.6857	0.6720	0.6588
1.3	0.6428	0.6250	0.6079	0.5916	0.5758	0.5607
1.4	0.5749	0.5556	0.5372	0.5198	0.5032	0.4873
1.5	0.5200	0.5000	0.4811	0.4633	0.4464	0.4305
1.7	0.4369	0.4167	0.3978	0.3802	0.3637	0.3483
1.9	0.3769	0.3571	0.3389	0.3221	0.3065	0.2921
2.0	0.3527	0.3333	0.3156	0.2992	0.2841	0.2701
2.5	0.2671	0.2500	0.2345	0.2205	0.2076	0.1959
3.0	0.2150	0.2000	0.1865	0.1744	0.1634	0.1534
4.0	0.1548	0.1429	0.1323	0.1229	0.1144	0.1068
5.0	0.1210	0.1111	0.1024	0.0948	0.0880	0.0819
6.0	0.0993	0.0909	0.0836	0.0771	0.0714	0.0663
10.0	0.0578	0.0526	0.0481	0.0442	0.0407	0.0377
20.0	0.0283	0.0256	0.0234	0.0214	0.0196	0.0181

TABLE 59. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\langle S^2\rangle_n}$ FOR THE CALCULATION OF $\langle S^2\rangle_n$ FROM $\langle S^2\rangle_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\langle S^2\rangle_n} = (\bar{M}_w/\bar{M}_n)^{-(4a_{[\eta]}+4)/3} \qquad \langle S^2\rangle_n = q^{(LN)}_{\langle S^2\rangle_n}\langle S^2\rangle_z$$

	$a_{[\eta]}$					
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	0.8370	0.8264	0.8160	0.8057	0.7955	0.7855
1.2	0.7115	0.6944	0.6778	0.6615	0.6456	0.6301
1.3	0.6128	0.5917	0.5714	0.5517	0.5328	0.5145
1.4	0.5336	0.5102	0.4878	0.4664	0.4460	0.4264
1.5	0.4691	0.4444	0.4211	0.3989	0.3779	0.3580
1.7	0.3714	0.3460	0.3224	0.3004	0.2798	0.2607
1.9	0.3018	0.2770	0.2543	0.2334	0.2143	0.1967
2.0	0.2742	0.2500	0.2279	0.2078	0.1895	0.1727
2.5	0.1808	0.1600	0.1416	0.1253	0.1109	0.0981
3.0	0.1286	0.1111	0.0960	0.0829	0.0716	0.0618
4.0	0.0752	0.0625	0.0520	0.0432	0.0359	0.0298
5.0	0.0496	0.0400	0.0323	0.0260	0.0210	0.0170
6.0	0.0353	0.0278	0.0219	0.0172	0.0136	0.0107
10.0	0.136	0.0100	0.0074	0.0054	0.0040	0.0029

3. Interconversion of Different Averages of the Mean-Square End-to-End Distance

TABLE 60. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\langle r^2\rangle_n}$ FOR THE CALCULATION OF $\langle r^2\rangle_n$ FROM $[\langle r^2\rangle^{3/2}]_n \equiv \sum_i n_i\langle r_i^2\rangle^{3/2}$ AS OBTAINED FROM FOX-FLORY RELATIONSHIP WITH $\bar{M}_n$ ACCORDING TO EQ. (B40) FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\langle r^2\rangle_n} = \left(\frac{k}{\Gamma(k+1)}\right)^{1/3}\frac{\Gamma((3k+2a_{[\eta]}+2)/3)}{[\Gamma(k+1+a_{[\eta]})]^{2/3}}$$

$$\langle r^2\rangle_n = q^{(SZ)}_{\langle r^2\rangle_n}[\langle r^2\rangle^{3/2}]_n^{2/3}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	0.9790	0.9761	0.9697	0.9627
1.5	0.9087	0.8981	0.8760	0.8531
2.0	0.8426	0.8271	0.7962	0.7654
3.0	0.7513	0.7323	0.6954	0.6600
4.0	0.6898	0.6697	0.6315	0.5957
5.0	0.6443	0.6242	0.5861	0.5508
6.0	0.6089	0.5889	0.5514	0.5170
8.0	0.5561	0.5368	0.5009	0.4681
10.0	0.5178	0.4993	0.4649	0.4337
20.0	0.4136	0.3978	0.3688	0.3429

TABLE 61. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\langle r^2\rangle_n}$ FOR THE CALCULATION OF $\langle r^2\rangle_n$ FROM $[\langle r^2\rangle^{3/2}]_n \equiv \sum_i n_i\langle r_i^2\rangle^{3/2}$ AS OBTAINED FROM FOX-FLORY RELATIONSHIP WITH $\bar{M}_n$ ACCORDING TO EQ. (B40) FOR POLYMERS WITH A LOGARITHMIC NORMAL DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\langle r^2\rangle_n} = (\bar{M}_w/\bar{M}_n)^{-(a^2_{[\eta]}+2a_{[\eta]}+1)/9} \qquad \langle r^2\rangle_n = q^{(LN)}_{\langle r^2\rangle_n}[\langle r^2\rangle^{3/2}]_n^{2/3}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	0.9795	0.9765	0.9699	0.9625
1.5	0.9155	0.9036	0.8779	0.8499
2.0	0.8599	0.8409	0.8005	0.7573
3.0	0.7872	0.7598	0.7027	0.6436
4.0	0.7394	0.7071	0.6407	0.5735
5.0	0.7043	0.6687	0.5964	0.5244
6.0	0.6769	0.6389	0.5625	0.4874
8.0	0.6358	0.5946	0.5129	0.4343
10.0	0.6057	0.5623	0.4774	0.3971
20.0	0.5208	0.4729	0.3821	0.3007

TABLE 62. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\langle r^2\rangle_w}$ FOR THE CALCULATION OF $\langle r^2\rangle_w$ FROM $[\overline{\langle r^2\rangle^{3/2}}]_n \equiv \sum_i n_i\langle r_i^2\rangle^{3/2}$ AS OBTAINED FROM FOX-FLORY RELATIONSHIP WITH $\bar{M}_n$ ACCORDING TO EQ. (B40) FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\langle r^2\rangle_w} = \frac{\Gamma((3k+2a_{[\eta]}+5)/3)}{k^{2/3}[\Gamma(k+1)]^{1/3}[\Gamma(k+a_{[\eta]}+1)]^{2/3}}$$

$$\langle r^2\rangle_w = q^{(SZ)}_{\langle r^2\rangle_w}[\overline{\langle r^2\rangle^{3/2}}]_n^{2/3}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	1.0704	1.0737	1.0796	1.0846
1.3	1.2051	1.2142	1.2305	1.2441
1.5	1.3328	1.3471	1.3724	1.3933
1.7	1.4548	1.4738	1.5071	1.5346
2.0	1.6290	1.6543	1.6985	1.7348
2.5	1.9005	1.9351	1.9954	2.0445
3.0	2.1538	2.1969	2.2715	2.3320
4.0	2.6211	2.6789	2.7788	2.8594
5.0	3.0498	3.1208	3.2432	3.3416
8.0	4.1891	4.2941	4.4744	4.6189
10.0	4.8677	4.9925	5.2066	5.3779
20.0	7.7480	7.9556	8.3107	8.5941

TABLE 63. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\langle r^2\rangle_w}$ FOR THE CALCULATION OF $\langle r^2\rangle_w$ FROM $[\overline{\langle r^2\rangle^{3/2}}]_n \equiv \sum_i n_i\langle r_i^2\rangle^{3/2}$ AS OBTAINED FROM FOX-FLORY RELATIONSHIP WITH $\bar{M}_n$ ACCORDING TO EQ. (B40) FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\langle r^2\rangle_w} = (\bar{M}_w/\bar{M}_n)^{-(a^2_{[\eta]}-4a_{[\eta]}-5)/9} \quad \langle r^2\rangle_w = q^{(LN)}_{\langle r^2\rangle_w}[\overline{\langle r^2\rangle^{3/2}}]_n^{2/3}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	1.0706	1.0741	1.0805	1.0860
1.3	1.2065	1.2175	1.2375	1.2549
1.5	1.3366	1.3554	1.3900	1.4204
1.7	1.4618	1.4888	1.5388	1.5829
2.0	1.6421	1.6818	1.7559	1.8220
2.5	1.9264	1.9882	2.1048	2.2102
3.0	2.1949	2.2795	2.4408	2.5881
4.0	2.6965	2.8284	3.0832	3.3198
5.0	3.1634	3.3437	3.6959	4.0271
6.0	3.6042	3.8337	4.2858	4.7156
7.0	4.0245	4.3035	4.8574	5.3886
8.0	4.4280	4.7568	5.4139	6.0489
9.0	4.8174	5.1962	5.9574	6.6981
10.0	5.1946	5.6234	6.4897	7.3376
15.0	6.9432	7.6220	9.0208	10.423
20.0	8.5302	9.4574	11.395	13.369

TABLE 64. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{\langle r^2\rangle_z}$ FOR THE CALCULATION OF $\langle r^2\rangle_z$ FROM $[\overline{\langle r^2\rangle^{3/2}}]_n \equiv \sum_i n_i\langle r_i^2\rangle^{3/2}$ AS OBTAINED FROM FOX-FLORY RELATIONSHIP WITH $\bar{M}_n$ ACCORDING TO EQ. (B40) FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{\langle r^2\rangle_z} = \frac{\Gamma((3k+2a_{[\eta]}+8)/3)}{k^{2/3}(k+1)[\Gamma(k+1)]^{1/3}[\Gamma(k+a_{[\eta]}+1)]^{2/3}}$$

$$\langle r^2\rangle_z = q^{(SZ)}_{\langle r^2\rangle_z}[\overline{\langle r^2\rangle^{3/2}}]_n^{2/3}$$

	$a_{[\eta]}$			
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.70	0.90
1.1	1.1612	1.1713	1.1908	1.2095
1.3	1.4646	1.4944	1.5523	1.6078
1.5	1.7475	1.7961	1.8908	1.9816
1.7	2.0139	2.0806	2.2104	2.3350
2.0	2.3891	2.4814	2.6610	2.8335
2.5	2.9647	3.0962	3.3523	3.5984
3.0	3.4940	3.6615	3.9877	4.3012
4.0	4.4558	4.6881	5.1408	5.5758
5.0	5.3269	5.6175	6.1837	6.7278
8.0	7.6102	8.0515	8.9116	9.7381
10.0	8.9565	9.4858	10.52	11.51
20.0	14.62	15.51	17.26	18.94

TABLE 65. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{\langle r^2\rangle_z}$ FOR THE CALCULATION OF $\langle r^2\rangle_z$ FROM $[\overline{\langle r^2\rangle^{3/2}}]_n \equiv \sum_i n_i\langle r_i^2\rangle^{3/2}$ AS OBTAINED FROM FOX-FLORY RELATIONSHIP WITH $\bar{M}_n$ ACCORDING TO EQ. (B40) FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(LN)}_{\langle r^2\rangle_z} = (\bar{M}_w/\bar{M}_n)^{-(a^2_{[\eta]}-10a_{[\eta]}-11)/9} \quad \langle r^2\rangle_z = q^{(LN)}_{\langle r^2\rangle_z}[\overline{\langle r^2\rangle^{3/2}}]_n^{2/3}$$

	$a_{[\eta]}$					
$\bar{M}_w/\bar{M}_n$	0.40	0.50	0.60	0.70	0.80	0.90
1.1	1.1702	1.1815	1.1927	1.2037	1.2146	1.2253
1.3	1.5413	1.5827	1.6243	1.6660	1.7078	1.7497
1.5	1.9514	2.0331	2.1163	2.2009	2.2868	2.3739
1.7	2.3987	2.5310	2.6673	2.8077	2.9520	3.1000
2.0	3.1359	3.3636	3.6022	3.8519	4.1125	4.3839
2.5	4.5306	4.9704	5.4419	5.9459	6.4833	7.0550
3.0	6.1196	6.8385	7.6233	8.4775	9.4043	10.41
4.0	9.8340	11.31	12.98	14.84	16.91	19.22
5.0	14.21	16.72	19.60	22.90	26.66	30.93
6.0	19.19	23.00	27.46	32.65	38.67	45.62
7.0	24.74	30.12	36.52	44.07	52.97	63.38
8.0	30.84	38.05	46.74	57.15	69.55	84.25
10.0	44.55	56.23	70.61	88.22	109.65	135.59
15.0	86.94	114.33	149.44	194.16	250.74	321.88

4. The Effect of Polymolecularity on the Radius of Gyration of Stiff Polymer Chains

TABLE 66. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}(\bar{L}_w)$ FOR STIFF POLYMER CHAINS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF CHAIN LENGTHS L

	$q^{(SZ)}(\bar{L}_w)$ for $\bar{L}_w$						
$\bar{L}_w/\bar{L}_n^{\dagger}$	1.5	2	4	10	20	40	100
1.1	0.8986	0.8720	0.8901	0.9523	0.9759	0.9879	0.9952
1.2	0.7714	0.8335	0.8902	0.9537	0.9768	0.9883	0.9953
1.5	0.8098	0.8669	0.9100	0.9626	0.9812	0.9905	0.9962
2	0.7592	0.8227	0.8838	0.9507	0.9751	0.9875	0.9950
3	0.7720	0.7899	0.8637	0.9414	0.9703	0.9851	0.9940
5	0.6985	0.7692	0.8509	0.9355	0.9671	0.9835	0.9933
10	0.6836	0.7558	0.8425	0.9316	0.9651	0.9824	0.9928

$^{\dagger}\bar{L}_w/\bar{L}_n = \bar{M}_w/\bar{M}_n$.

TABLE 67. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}(\bar{L}_w)$ FOR STIFF POLYMER CHAINS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF CHAIN LENGTHS L

	$q^{(LN)}(\bar{L}_w)$ for $\bar{L}_w$						
$\bar{L}_w/\bar{L}_n^{\dagger}$	1.5	2	4	10	20	40	100
1.1	0.919	0.9636	0.9651	0.9861	0.9932	0.9966	0.9986
1.2	0.864	0.913	0.9377	0.9746	0.9875	0.9937	0.9975
1.5	0.749	0.817	0.8822	0.9505	0.9751	0.9875	0.9950
2	0.663	0.737	0.8325	0.9276	0.9631	0.9814	0.9924
3	0.57	0.665	0.7876	0.9056	0.9513	0.9753	0.9900
5	0.52	0.612	0.7537	0.8887	0.9422	0.9705	0.9881
10	0.51	0.589	0.7303	0.8764	0.9354	0.9670	0.9866

$^{\dagger}\bar{L}_w/\bar{L}_n = \bar{M}_w/\bar{M}_n$.

I. DETERMINATION OF UNPERTURBED DIMENSIONS OF MACROMOLECULES

1. Burchard–Stockmayer–Fixman Procedure

TABLE 68. POLYMOLECULARITY CORRECTION FACTORS $q_{BSF,\bar{M}_w}$ FOR BURCHARD–STOCKMAYER–FIXMAN PROCEDURE (EQ. B55) USING $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT AND FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$$q^{(SZ)}_{BSF,\bar{M}_w} = \frac{1}{(k+1)^{1/2}}\frac{\Gamma(k+1.5)}{\Gamma(k+1)} \qquad [\eta]/(\bar{M}_w^{1/2} q^{(SZ)}_{BSF,\bar{M}_w}) = K_0 + B'\bar{M}_w^{1/2}/q^{(SZ)}_{BSF,\bar{M}_w}$$

$$q^{(LN)}_{BSF,\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{-1/8} \qquad [\eta]/(\bar{M}_w^{1/2} q^{(LN)}_{BSF,\bar{M}_w}) = K_0 + B'\bar{M}_w^{1/2}/q^{(LN)}_{BSF,\bar{M}_w}$$

$\bar{M}_w/\bar{M}_n$	1.1	1.5	2.0	3.0	5.0	10.0	20.0
$q^{(SZ)}_{BSF,\bar{M}_w}$	0.9887	0.9594	0.9400	0.9213	0.9069	0.8964	0.8913
$q^{(LN)}_{BSF,\bar{M}_w}$	0.9882	0.9506	0.9170	0.8717	0.8178	0.7499	0.6877

TABLE 69. POLYMOLECULARITY CORRECTION FACTORS ${}^1q^{(SZ)}_{BSF,\bar{M}_n}$ AND ${}^2q^{(SZ)}_{BSF,\bar{M}_n}$ FOR BURCHARD–STOCKMAYER–FIXMAN PROCEDURE (EQ. B56) USING $\bar{M}_n$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT

$${}^1q^{(SZ)}_{BSF,\bar{M}_n} = \frac{\Gamma(k+1.5)}{k^{0.5}\Gamma(k+1)} \qquad {}^2q^{(SZ)}_{BSF,\bar{M}_n} = \frac{k^{0.5}\Gamma(k+1.5)}{(k+1)\Gamma(k+1)} \qquad [\eta]/({}^1q^{(SZ)}_{BSF,\bar{M}_n}\bar{M}_n^{1/2}) = K_0 + B'\bar{M}_n^{1/2}/{}^2q^{(SZ)}_{BSF,\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	1.1	1.3	1.5	1.7	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	15.0	20.0
${}^1q^{(SZ)}_{BSF,\bar{M}_n}$	1.0370	1.1078	1.1750	1.2389	1.3293	1.4684	1.5958	1.8245	2.0279	2.2129	2.5429	2.8348	3.4586	3.9860
${}^2q^{(SZ)}_{BSF,\bar{M}_n}$	0.9427	0.8522	0.7833	0.7287	0.6647	0.5874	0.5319	0.4561	0.4056	0.3688	0.3179	0.2835	0.2306	0.1993

TABLE 70. POLYMOLECULARITY CORRECTION FACTORS ${}^1q^{(LN)}_{BSF,\bar{M}_n}$ AND ${}^2q^{(LN)}_{BSF,\bar{M}_n}$ FOR BURCHARD-STOCKMAYER-FIXMAN PROCEDURE (EQ. B56) USING $\bar{M}_n$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT

$${}^1q^{(LN)}_{BSF,\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{3/8} \quad {}^2q^{(LN)}_{BSF,\bar{M}_n} = (\bar{M}_w/\bar{M}_n)^{-5/8} \quad [\eta]/({}^1q^{(LN)}_{BSF,\bar{M}_n}\bar{M}_n^{1/2}) = K_0 + B'\bar{M}_n^{1/2}/{}^2q^{(LN)}_{BSF,\bar{M}_n}$$

$\bar{M}_w/\bar{M}_n$	1.1	1.3	1.5	1.7	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	15.0	20.0
${}^1q^{(LN)}_{BSF,\bar{M}_n}$	1.0364	1.1034	1.1642	1.2202	1.2968	1.4100	1.5098	1.6818	1.8286	1.9580	2.1810	2.3714	2.7608	3.0753
${}^2q^{(LN)}_{BSF,\bar{M}_n}$	0.9422	0.8488	0.7761	0.7177	0.6484	0.5640	0.5033	0.4204	0.3657	0.3263	0.2726	0.2371	0.1841	0.1538

2. Cowie–Bywater Procedure

TABLE 71. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{CB,1}$ FOR THE COWIE–BYWATER PROCEDURE (EQ. B60) USING $\bar{M}_w$ AND $\bar{s}_w$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 72)

$$q^{(SZ)}_{CB,1} = \frac{\Gamma(k-0.5\varepsilon+2)}{(k+1)^{0.5}\Gamma(k-0.5\varepsilon+1.5)}$$

$$(\bar{M}_w^{1/2}/\bar{s}_w)(1-\bar{v}_2\rho_1)/(\eta_1 N_L) = P_0 q^{(SZ)}_{CB,1} + B''\bar{M}_w^{1/2} q^{(SZ)}_{CB,2}$$

	$a_{[\eta]}$ and (ε)		
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.90 (0.27)
1.1	1.0129	1.0114	1.0054
1.5	1.0477	1.0424	1.0209
2.0	1.0716	1.0638	1.0322
3.0	1.0955	1.0854	1.0441
5.0	1.1145	1.1026	1.0538
10.0	1.1287	1.1155	1.0612
20.0	1.1358	1.1220	1.0650

TABLE 72. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{CB,2}$ FOR THE COWIE–BYWATER PROCEDURE (EQ. B60) USING $\bar{M}_w$ AND $\bar{s}_w$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 71)

$$q^{(SZ)}_{CB,2} = \frac{k-0.5\varepsilon+1.5}{k+1}$$

$$(\bar{M}_w^{1/2}/\bar{s}_w)(1-\bar{v}_2\rho_1)/(\eta_1 N_L) = P_0 q^{(SZ)}_{CB,1} + B''\bar{M}_w^{1/2} q^{(SZ)}_{CB,2}$$

	$a_{[\eta]}$ and (ε)		
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.90 (0.27)
1.1	1.0485	1.0455	1.0333
1.5	1.1778	1.1667	1.1222
2.0	1.2667	1.2500	1.1833
3.0	1.3556	1.3333	1.2444
5.0	1.4267	1.4000	1.2933
10.0	1.4800	1.4500	1.3300
20.0	1.5067	1.4750	1.3483

TABLE 73. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{CB,1}$ FOR THE COWIE–BYWATER PROCEDURE (EQ. B60) USING $\bar{M}_w$ AND $\bar{s}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 74)

$$q^{(LN)}_{CB,1} = (\bar{M}_w/\bar{M}_n)^{(1-2\varepsilon)/8}$$

$$(\bar{M}_w^{1/2}/\bar{s}_w)(1-\bar{v}_2\rho_1)/(\eta_1 N_L) = P_0 q^{(LN)}_{CB,1} + B''\bar{M}_w^{1/2} q^{(LN)}_{CB,2}$$

	$a_{[\eta]}$ and (ε)		
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.90 (0.27)
1.1	1.0136	1.0120	1.0056
1.5	1.0591	1.0520	1.0239
2.0	1.1032	1.0905	1.0413
3.0	1.1684	1.1472	1.0662
5.0	1.2561	1.2228	1.0984
10.0	1.3857	1.3335	1.1438
15.0	1.4676	1.4029	1.1711
20.0	1.5287	1.4542	1.1909

TABLE 74. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{CB,2}$ FOR THE COWIE–BYWATER PROCEDURE (EQ. B60) USING $\bar{M}_w$ AND $\bar{s}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 73)

$$q^{(LN)}_{CB,2} = (\bar{M}_w/\bar{M}_n)^{(1-\varepsilon)/2}$$

$$(\bar{M}_w^{1/2}/\bar{s}_w)(1-\bar{v}_2\rho_1)/(\eta_1 N_L) = P_0 q^{(LN)}_{CB,1} + B''\bar{M}_w^{1/2} q^{(LN)}_{CB,2}$$

	$a_{[\eta]}$ and (ε)		
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.90 (0.27)
1.1	1.0521	1.0488	1.0356
1.5	1.2414	1.2247	1.1603
2.0	1.4473	1.4142	1.2894
3.0	1.7967	1.7321	1.4960
5.0	2.3593	2.2361	1.8042
10.0	3.4145	3.1623	2.3263
12.0	3.7633	3.4641	2.4871
16.0	4.3873	4.0000	2.7638
20.0	4.9418	4.4721	2.9995

3. Baumann–Stockmayer–Fixman Procedure

TABLE 75. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{B,\bar{M}_w}$ FOR THE BAUMANN–STOCKMAYER–FIXMAN PROCEDURE (EQ. B63) USING $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 76)

$$q^{(SZ)}_{B,\bar{M}_w} = (k+1)(k+2)^2(k+3)^2 \frac{[\Gamma(k+1)]^2}{[\Gamma(k+3.5)]^2}$$

$$[\langle S^2\rangle_{av} q^{(SZ)}_{B,\langle S^2\rangle_{av}}/(\bar{M}_w q^{(SZ)}_{B,\bar{M}_w})]^{3/2} = K_0^{3/2} + B_{BSF}(\bar{M}_w q^{(SZ)}_{B,\bar{M}_w})^{1/2}$$

$\bar{M}_w/\bar{M}_n$	$q^{(SZ)}_{B,\bar{M}_w}$
1.1	1.2048
1.3	1.5203
1.5	1.7520
1.7	1.9292
2.0	2.1286
2.5	2.3547
3.0	2.5055
5.0	2.8071
10.0	3.0333
20.0	3.1464

TABLE 76. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{B,\langle S^2\rangle_z}$ FOR THE BAUMANN–STOCKMAYER–FIXMAN PROCEDURE (EQ. B63) USING $\langle S^2\rangle_z$ FOR POLYMERS WITH A SCHULZ–ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 75)

$$q^{(SZ)}_{B,\langle S^2\rangle_z} = (k+1)^3(k+2)^2(k+3)^2 \times \frac{[\Gamma(k+1)]^3}{[\Gamma(k+3.5)]^{8/3}} \frac{[\Gamma(k+1.5\varepsilon+3.5)]^{2/3}}{\Gamma(k+\varepsilon+3)}$$

$$[\langle S^2\rangle_z q^{(SZ)}_{B,\langle S^2\rangle_z}/(\bar{M}_{av} q^{(SZ)}_{B,\bar{M}_{av}})]^{3/2} = K_0^{3/2} + B_{BSF}(\bar{M}_{av} q^{(SZ)}_{B,\bar{M}_{av}})^{1/2}$$

	$a_{[\eta]}$ and (ε)			
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.70 (0.13)	0.90 (0.27)
1.1	1.1016	1.1044	1.1105	1.1173
1.3	1.2287	1.2353	1.2496	1.2654
1.5	1.3050	1.3140	1.3334	1.3549
1.7	1.3560	1.3665	1.3894	1.4147
2.0	1.4069	1.4191	1.4456	1.4747
3.0	1.4884	1.5033	1.5355	1.5709
5.0	1.5427	1.5595	1.5956	1.6352
10.0	1.5785	1.5965	1.6352	1.6776
20.0	1.5950	1.6135	1.6535	1.6971

TABLE 77. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{B,\bar{M}_w}$ FOR THE BAUMANN–STOCKMAYER–FIXMAN PROCEDURE (EQ. B63) USING $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 78)

$$q^{(LN)}_{B,\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{2.25}$$

$$[\langle S^2\rangle_{av} q^{(LN)}_{B,\langle S^2\rangle_{av}}/(\bar{M}_w q^{(LN)}_{B,\bar{M}_w})]^{3/2} = K_0^{3/2} + B_{BSF}(\bar{M}_w q^{(LN)}_{B,\bar{M}_w})^{1/2}$$

$\bar{M}_w/\bar{M}_n$	$q^{(LN)}_{B,\bar{M}_w}$
1.1	1.2392
1.3	1.8046
1.5	2.4900
1.7	3.3000
2.0	4.7568
2.5	7.8590
3.0	11.845
4.0	22.627
5.0	37.384
6.0	56.343
7.0	79.702
8.0	107.63
9.0	140.30
10.0	177.83

TABLE 78. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{B,\langle S^2\rangle_z}$ FOR THE BAUMANN–STOCKMAYER–FIXMAN PROCEDURE (EQ. B63) USING $\langle S^2\rangle_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 77)

$$q^{(LN)}_{B,\langle S^2\rangle_z} = (\bar{M}_w/\bar{M}_n)^{0.25\varepsilon^2+0.5\varepsilon+1.25}$$

$$[\langle S^2\rangle_z q^{(LN)}_{B,\langle S^2\rangle_z}/(\bar{M}_{av} q^{(LN)}_{B,\bar{M}_{av}})]^{3/2} = K_0^{3/2} + B_{BSF}(\bar{M}_{av} q^{(LN)}_{B,\bar{M}_{av}})^{1/2}$$

	$a_{[\eta]}$ and (ε)			
$\bar{M}_w/\bar{M}_n$	0.40 (−0.07)	0.50 (0.00)	0.70 (0.13)	0.90 (0.27)
1.1	1.1231	1.1265	1.1342	1.1429
1.3	1.3764	1.3881	1.4143	1.4443
1.5	1.6385	1.6600	1.7086	1.7649
1.7	1.9083	1.9412	2.0158	2.1032
2.0	2.3259	2.3784	2.4986	2.6410
3.0	3.8109	3.9482	4.2690	4.6612
4.0	5.4097	5.6569	6.2429	6.9751
5.0	7.0989	7.4767	8.3833	9.5353
6.0	8.8637	9.3905	10.67	12.31
8.0	12.58	13.45	15.60	18.42
10.0	16.51	17.78	20.95	25.18
12.0	20.62	22.33	26.65	32.51
14.0	24.87	27.08	32.67	40.35
16.0	29.27	32.00	38.97	48.65
20.0	38.40	42.29	52.34	66.51

4. Baumann–Kurata–Stockmayer Procedure

TABLE 79. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{BKS,\bar{M}_w}$ FOR THE BAUMANN-KURATA-STOCKMAYER PROCEDURE (EQ. B66) USING $\bar{M}_w$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 80)

$$q^{(SZ)}_{BKS,\bar{M}_w} = \frac{\Gamma(k+\varepsilon+3)[\Gamma(k-0.5\varepsilon+3.5)]^2}{(k+1)^4(k+2)^3[\Gamma(k+1)]^3} = \frac{\Gamma((3k+2a_{[\eta]}+8)/3)[\Gamma((3k-a_{[\eta]}+11)/3)]^2}{(k+1)^4(k+2)^3[\Gamma(k+1)]^3}$$

$$\langle S^2\rangle_{av} q^{(SZ)}_{BKS,\langle S^2\rangle_{av}}/(\bar{M}_w q^{(SZ)}_{BKS,\bar{M}_w}) = K_0 + B_{BKS}\bar{M}_w q^{(SZ)}_{BKS,\bar{M}_w}/(\langle S^2\rangle_{av} q^{(SZ)}_{BKS,\langle S^2\rangle_{av}})^{1/2}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε): 0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.90 (0.27)
1.1	1.1627	1.1593	1.1566	1.1521
1.3	1.4135	1.4050	1.3981	1.3868
1.5	1.5978	1.5855	1.5756	1.5593
1.7	1.7388	1.7236	1.7114	1.6913
2.0	1.8976	1.8791	1.8643	1.8399
2.5	2.0776	2.0554	2.0376	2.0085
3.0	2.1976	2.1730	2.1532	2.1209
5.0	2.4377	2.4082	2.3845	2.3458
10.0	2.6179	2.5847	2.5580	2.5146
20.0	2.7080	2.6729	2.6448	2.5990

TABLE 80. POLYMOLECULARITY CORRECTION FACTORS $q^{(SZ)}_{BKS,\langle S^2\rangle_z}$ FOR THE BAUMANN-KURATA-STOCKMAYER PROCEDURE (EQ. B66) USING $\langle S^2\rangle_z$ FOR POLYMERS WITH A SCHULZ-ZIMM (SZ) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 79)

$$q^{(SZ)}_{BKS,\langle S^2\rangle_z} = \frac{\Gamma(k+\varepsilon+3)[\Gamma(k-0.5\varepsilon+3.5)]^2}{(k+1)^3(k+2)^4[\Gamma(k+1)]^3} = \frac{\Gamma((3k+2a_{[\eta]}+8)/3)[\Gamma((3k-a_{[\eta]}+11)/3)]^2}{(k+1)^3(k+2)^4[\Gamma(k+1)]^3}$$

$$\langle S^2\rangle_z q^{(SZ)}_{BKS,\langle S^2\rangle_z}/(\bar{M}_{av} q^{(SZ)}_{BKS,\bar{M}_{av}}) = K_0 + B_{BKS}\bar{M}_{av} q^{(SZ)}_{BKS,\bar{M}_{av}}/(\langle S^2\rangle_z q^{(SZ)}_{BKS,\langle S^2\rangle_z})^{1/2}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε): 0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.90 (0.27)
1.1	1.0658	1.0627	1.0602	1.0561
1.3	1.1485	1.1416	1.1360	1.1268
1.5	1.1983	1.1891	1.1817	1.1694
1.7	1.2317	1.2209	1.2122	1.1980
2.0	1.2650	1.2528	1.2428	1.2266
2.5	1.2985	1.2846	1.2735	1.2553
3.0	1.3185	1.3038	1.2919	1.2725
5.0	1.3543	1.3379	1.3247	1.3032
10.0	1.3778	1.3604	1.3463	1.3235
20.0	1.3887	1.3707	1.3563	1.3328

TABLE 81. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{BKS,\bar{M}_w}$ FOR THE BAUMANN-KURATA-STOCKMAYER PROCEDURE (EQ. B66) USING $\bar{M}_w$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 82)

$$q^{(LN)}_{BKS,\bar{M}_w} = (\bar{M}_w/\bar{M}_n)^{0.75\varepsilon^2-0.5\varepsilon+1.75} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]}-2a_{[\eta]}+6)/3} \qquad \langle S^2\rangle_{av} q^{(LN)}_{BKS,\langle S^2\rangle_{av}}/(\bar{M}_w q^{(LN)}_{BKS,\bar{M}_w}) = K_0 + B_{BKS}\bar{M}_w q^{(LN)}_{BKS,\bar{M}_w}/(\langle S^2\rangle_{av} q^{(LN)}_{BKS,\langle S^2\rangle_{av}})^{1/2}$$

$\bar{M}_w/\bar{M}_n$	$a_{[\eta]}$ and (ε): 0.40 (−0.07)	0.50 (0.00)	0.60 (0.07)	0.70 (0.13)	0.80 (0.20)	0.90 (0.27)
1.1	1.1856	1.1815	1.1781	1.1755	1.1737	1.1725
1.3	1.5980	1.5827	1.5703	1.5607	1.5539	1.5498
1.5	2.0636	2.0331	2.0085	1.9896	1.9762	1.9682
1.7	2.5807	2.5310	2.4910	2.4603	2.4387	2.4258
2.0	3.4502	3.3636	3.2944	3.2415	3.2043	3.1821
2.5	5.1403	4.9704	4.8357	4.7334	4.6616	4.6191
3.0	7.1196	6.8385	6.6168	6.4493	6.3323	6.2631
4.0	11.90	11.31	10.85	10.51	10.27	10.13
5.0	17.73	16.72	15.93	15.34	14.94	14.70
8.0	41.07	38.05	35.75	34.06	32.90	32.22
10.0	61.19	56.23	52.48	49.74	47.86	46.77
20.0	211.11	189.15	172.89	161.22	153.37	148.84

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TABLE 82. POLYMOLECULARITY CORRECTION FACTORS $q^{(LN)}_{BKS,\langle S^2\rangle_z}$ FOR THE BAUMANN-KURATA-STOCKMAYER PROCEDURE (EQ. B66) USING $\langle S^2\rangle_z$ FOR POLYMERS WITH A LOGARITHMIC NORMAL (LN) DISTRIBUTION OF THE MOLECULAR WEIGHT (SEE ALSO TABLE 81)

$q^{(LN)}_{BKS,\langle S^2\rangle_z} = (\bar{M}_w/\bar{M}_n)^{0.75\varepsilon^2-0.5\varepsilon+0.75} = (\bar{M}_w/\bar{M}_n)^{(a^2_{[\eta]}-2a_{[\eta]}+3)/3}$ $\langle S^2\rangle_z q^{(LN)}_{BKS,\langle S^2\rangle_z}/(\bar{M}_{av} q^{(LN)}_{BKS,\bar{M}_{av}}) = K_0 + B_{BKS}\bar{M}_{av} q^{(LN)}_{BKS,\bar{M}_{av}}/(\langle S^2\rangle_z q^{(LN)}_{BKS,\langle S^2\rangle_z})^{1/2}$

	$a_{[\eta]}$ and (ε)					
$\bar{M}_w/\bar{M}_n$	**0.40 (−0.07)**	**0.50 (0.00)**	**0.60 (0.07)**	**0.70 (0.13)**	**0.80 (0.20)**	**0.90 (0.27)**
1.1	1.0779	1.0741	1.0710	1.0687	1.0670	1.0659
1.3	1.2292	1.2175	1.2079	1.2006	1.1953	1.1922
1.5	1.3757	1.3554	1.3390	1.3264	1.3175	1.3121
1.7	1.5181	1.4888	1.4653	1.4473	1.4345	1.4269
2.0	1.7251	1.6818	1.6472	1.6208	1.6021	1.5911
2.5	2.0561	1.9882	1.9343	1.8934	1.8647	1.8477
3.0	2.3732	2.2795	2.2056	2.1498	2.1108	2.0877
4.0	2.9759	2.8284	2.7132	2.6268	2.5669	2.5315
5.0	3.5470	3.3437	3.1861	3.0687	2.9874	2.9397
8.0	5.1337	4.7568	4.4691	4.2575	4.1125	4.0278
10.0	6.1188	5.6234	5.2481	4.9736	4.7863	4.6774
20.0	10.5555	9.4574	8.6445	8.0609	7.6683	7.4420

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Polymer–Solvent Interaction Parameters

N. Schuld, B.A. Wolf
Institut für Physikalische Chemie Universität Mainz Mainz, FR Germany

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A. INTRODUCTION

The classical thermodynamics of binary polymer–solvent systems was developed independently by P. J. Flory (1–3) and M. L. Huggins (4–6). It is based on the well-known lattice model qualitatively formulated by K. H. Meyer (7), who pointed out the effect of the differences in molecular size of polymer and solvent molecules on the entropy of mixing. The quantitative calculation of the entropy of mixing led to the introduction of a dimensionless quantity, the so-called Flory–Huggins interaction parameter χ, for the thermodynamic description of polymer solutions.

It was evident from the beginning that χ is a function of T; however, at first χ was considered to be independent of the concentration of the polymer. Subsequent experiments have shown the necessity of treating χ as a function of composition (8,9). Furthermore, χ also depends on M_2 (the molecular weight of the polymer), not only at high dilution, but – according to recent experiments (10) – even at high concentrations of polymers.

B. CONCENTRATION VARIABLES

Since the numerical value of the interaction parameter depends on the concentration variable chosen, one has to specify it in each case. The following three quantities are most frequently used, where the subscript 1 stands for the solvent and the subscript 2 for the polymer:

1. Volume fractions φ_i:

$$\varphi_2 = \frac{n_2 V_2}{n_1 V_1 + n_2 V_2} \tag{B1}$$

n_i moles of component i
V_i molar volume of component i

2. Weight fractions w_i:

$$w_2 = \frac{m_2}{m_1 + m_2} \tag{B2}$$

m_i weight of component i

3. Segment fractions s_i (hard core volume fractions):

$$s_2 = \frac{n_2 V_2^*}{n_1 V_1^* + n_2 V_2^*} \tag{B3}$$

V_i^* molar hard core volume (characteristic volumes) of components related to reduced volumes $\tilde{V}_i$ by $\tilde{V}_i = V_i/V_i^*$ (11).

C. CONVERSION OF CONCENTRATION VARIABLES

	φ_2	w_2	s_2
φ_2	–	$w_2 \frac{\rho}{\rho_2}$	$s_2 \frac{\tilde{V}_2}{\tilde{V}}$
w_2	$\varphi_2 \frac{\rho_2}{\rho}$	–	$s_2 \frac{\rho_2^*}{\rho^*}$
s_2	$\varphi_2 \frac{\tilde{V}}{\tilde{V}_2}$	$w_2 \frac{\rho^*}{\rho_2^*}$	–

ρ, ρ_i are the densities of the solution and of the pure component i, $1/\rho = w_1/\rho_1 + w_2/\rho_2$;
ρ^*, ρ_i^* are the hard core (characteristic) densities of the solution and of the component i, $\rho_i^* = M_i/V_i^*$ where M_i is the molar mass, $1/\rho^* = w_1/\rho_1^* + w_2/\rho_2^*$;
$\tilde{V}$, $\tilde{V}_i$ are the reduced volumes of the solution and of the component i.

D. BASIC EQUATIONS

The reduced molar Gibbs energy of mixing, $\Delta G_M/RT$, is given by the following equation:

$$\frac{\Delta G_M}{RT} = x_1 \ln \varphi_1 + x_2 \ln \varphi_2 + g x_1 \varphi_2 \tag{D1}$$

where x_i is the mole fraction of component i, R is the gas constant, T is the absolute temperature and g stands for the integral polymer–solvent interaction parameter; g refers to the interaction (mixing of the pure liquid compounds) of a solvent molecule with a polymer segment, the size of which is defined by the molar volume of the solvent. This definition implies some difficulties as soon as mixed solvents or solvents with more than one segment are considered.

Alternatively, the Gibbs energy of mixing can be normalized to the volume, so that it reads

$$\frac{\Delta G_M}{V} = \frac{RT}{V_1}\varphi_1 \ln \varphi_1 + \frac{RT}{V_2}\varphi_2 \ln \varphi_2 + B\varphi_1\varphi_2 \qquad \text{(D2)}$$

where B is an interaction energy–density parameter that no longer depends on the definition of a segment, and relates to g and molar volume of the segment V_{seg} by

$$B = RT\frac{g}{V_{seg}} \qquad \text{(D3)}$$

The sum

$$x_1 \ln \varphi_1 + x_2 \ln \varphi_2 = \frac{\Delta G_M^{comb}}{RT} \qquad \text{(D4)}$$

of Eq. (D1) is the combinatorial part of ΔG_M. The remaining term

$$g x_1 \varphi_2 = \frac{\Delta G_M^R}{RT} \qquad \text{(D5)}$$

is the so-called reduced residual Gibbs energy of mixing.

Partial differentiation of $\Delta G/RT$ with respect to n_1, the number of moles of solvent, or n_2, the number of moles of polymer, respectively, yields the reduced partial molar Gibbs energy of mixing of the solvent $\Delta G_1/RT = \Delta\mu_1/RT$, or the reduced partial molar Gibbs energy of mixing of the polymer, $\Delta G_2/RT = \Delta\mu_2/RT$:

$$\frac{\Delta G_1}{RT} = \frac{\Delta\mu_1}{RT} = \ln(1-\varphi_2) + \left(1 - \frac{1}{N}\right)\varphi_2 + \chi\varphi_2^2 \qquad \text{(D6)}$$

$$\frac{\Delta G_2}{RT} = \frac{\Delta\mu_2}{RT} = \ln(1-\varphi_1) + (1-N)\varphi_1 + \xi N\varphi_1^2 \qquad \text{(D7)}$$

$N = V_2/V_1$ (where $V_1 = V_{seg}$), the ratio of the molar volumes of the components is, in general, different from the degree of polymerization but proportional to it; χ and ξ are the Flory–Huggins interaction parameters in the differential equation for the solvent and for the polymer, respectively.

Separating ΔG_1 and ΔG_2 like ΔG_M (Eqs. D1–D5) into a combinatorial and a residual contribution yields the following expressions for the different interaction parameters, which demonstrates that they measure the deviation of a real polymer solution from purely combinatorial behavior:

$$g = \frac{\Delta G_M^R}{RTx_1\varphi_2} \qquad \text{(D8)}$$

$$\chi = \frac{\Delta G_1^R}{RT\varphi_2^2} \qquad \text{(D9)}$$

$$\xi = \frac{\Delta G_2^R}{RTN\varphi_1^2} \qquad \text{(D10)}$$

From phenomenological thermodynamics, one obtains the interrelations between these parameters, given in Eqs. (D11–D13):

$$g = \varphi_2\chi + (1-\varphi_2)\xi = \frac{1}{\varphi_1}\int_0^{\varphi_1} \chi d\varphi_1 \qquad \text{(D11)}$$

$$\chi = g + \varphi_1\frac{\partial g}{\partial \varphi_1} = g - (1-\varphi_2)\frac{\partial g}{\partial \varphi_2} \qquad \text{(D12)}$$

$$\xi = g + \varphi_2\frac{\partial g}{\partial \varphi_2} \qquad \text{(D13)}$$

Since it is the chemical potential of the solvent that is normally measured, χ is practically the only interaction parameter that can be directly obtained. In the following text, the term polymer–solvent interaction parameter (Flory–Huggins parameter) is, therefore, exclusively applied to χ.

E. METHODS OF DETERMINATION

Rearrangement of Eq. (D6) yields

$$\chi = \frac{\Delta G_1^R}{RT\varphi_2^2} = \frac{\Delta G_1}{RT\varphi_2^2} - \frac{1}{\varphi_2^2}\left(\ln(1-\varphi_2) + \left(1-\frac{1}{N}\right)\varphi_2\right) \qquad \text{(E1)}$$

METHODS FOR THE DETERMINATION OF POLYMER–SOLVENT INTERACTION PARAMETERS

Typical range of concentration	Methods	Abbreviation in text	Refs.
$\varphi_2 \to 0$	Scattering methods	LS	20
		SAXS	129
		SANS	
$0 < \varphi_2 < 0.3$	Osmosis	OS	21–25
	Light scattering	LS	
	Critical miscibility (only applicable with poor solvents)	CM	
	Differential vapor–pressure methods	ΔVP	26
$0.3 < \varphi_2 < 0.8$	Vapor–pressure methods	VP	3
$\varphi_2 \to 1$	Inverse gas chromatography (gas liquid chromatography)	IGC	27–30

Since $\Delta G_1 = RT \ln a_1$, the interaction parameter χ is accessible from the measured activity of the solvent. In order to get the information for the entire range of concentrations, a combination of several methods is necessary. The table given on the previous page shows the concentration ranges for the applicability of the most commonly used methods, the abbreviations used in the text to specify the method, and some pertinent references. Information stemming from the following sources is not incorporated in the tables: melting point depression of polymer (3,12,13), freezing point depression of solvents (8), swelling equilibria (3,14–17), and intrinsic viscosities (18,19).

F. TEMPERATURE DEPENDENCE

The temperature dependence of χ can be described for most systems exhibiting UCSTs by means of the following equation:

$$\chi(T) = a + \frac{b}{T} \quad \text{(F1)}$$

Knowing the temperature dependence of χ, it is possible to split this quantity in its enthalpic and entropic part (χ_H and χ_S).

$$\chi = \chi_H + \chi_S \quad \text{(F2)}$$

where

$$\chi_H = -T\left(\frac{\partial \chi}{\partial T}\right)_{p,\varphi_2} = \frac{\Delta H_1^R}{RT\varphi_2^2} \quad \text{(F3)}$$

$$\chi_S = \left(\frac{\partial (T\chi)}{\partial T}\right)_{p,\varphi_2} = \frac{\Delta S_1^R}{R\varphi_2^2} \quad \text{(F4)}$$

G. CONCENTRATION DEPENDENCE

The following expression for the Flory–Huggins parameter was deduced on the basis of the lattice theory (25):

$$\chi = \alpha + \frac{\beta(1-\gamma)}{(1-\gamma\varphi_2)^2} \quad \text{(G1)}$$

where α and γ are constants within a certain temperature range and β varies with T ($\beta = \beta_0 + \beta_1/T$).

For the integral interaction parameter, g, the equation reads:

$$g = \alpha + \frac{\beta}{(1-\gamma\varphi_2)} \quad \text{(G2)}$$

For an analytical representation of the experimentally found concentration dependence, the following power series with $n = 2$ is normally adequate:

$$\chi = \sum_{i=0}^{n} \chi_i \varphi_2^i \quad \text{(G3)}$$

$$g = \sum_{i=0}^{n} \frac{\chi_i}{i+1} \frac{1-\varphi_2^{i+1}}{1-\varphi_2} \quad \text{(G4)}$$

According to experimental information, three characteristic behaviors can be distinguished:

1. Very often, χ increases greatly with polymer concentration, particularly in the case of poor solvents. The systems benzene/polyisobutylene (PIB) (21,31,32), n-pentane/polyisobutylene (33,34), and cyclohexane/polystyrene (22) (Figs. 1 and 2) constitute examples.

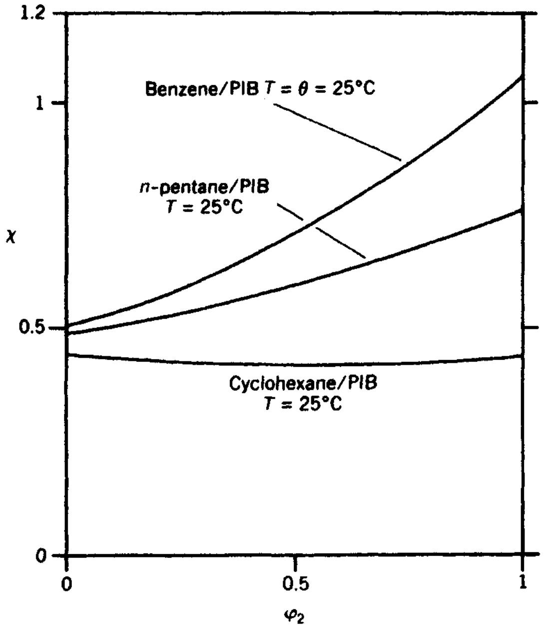

Figure 1. Examples for the variation of the Flory–Huggins interaction parameter, χ (Eq. D14), with the volume fraction φ_2 of polymer for the systems benzene/poly(isobutylene) (PIB), n-pentane/PIB and cyclohexane/PIB at the indicated temperatures.

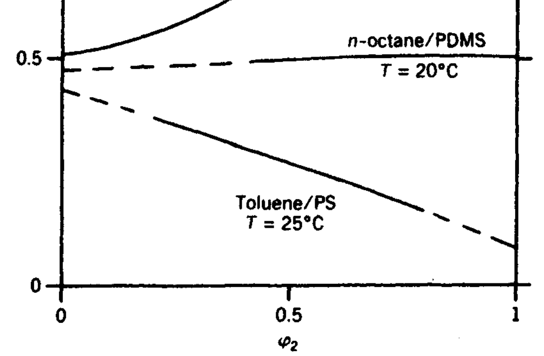

Figure 2. Examples for the variation of the Flory–Huggins interaction parameter, χ (Eq. D14), with the volume fraction φ_2 of polymer for the systems cyclohexane/polystyrene (PS), n-octane/poly(dimethyl siloxane) (PDMS) and toluene/PS at the indicated temperatures.

COEFFICIENTS χ_0, χ_1, χ_2 (Eq. G3) OF SYSTEMS SELECTED FOR GRAPHICAL REPRESENTATION (Figs. 1 AND 2)

System	T/(°C)	χ_0	χ_1	χ_2	Refs.
Benzene/PIB	25	0.506	0.229	0.317	21,31,32
n-Pentane/PIB	25	0.484	0.184	0.080	33,34
Cyclohexane/PIB	25	0.440	−0.083	0.068	30,31,35
Cyclohexane/PS	34	0.507	0.149	0.464	22
n-Octane/PDMS	20	0.501	−0.035	0.042	36
Toluene/PS	25	0.431	−0.311	−0.036	37

2. In some cases, χ seems to be independent of composition, as proposed by the original Flory–Huggins theory. These findings mainly concern good solvents; examples are the systems cyclohexane/polyisobutylene (30,31,35) and *n*-octane/poly(dimethyl siloxane) (PDMS) (36) (Figs. 1 and 2).
3. In a few cases, mostly with highly exothermal systems, χ decreases with concentration, as with toluene/polystyrene (37) (Fig. 2).

The lines drawn in Figs. 1 and 2 have been calculated by means of Eq. (G3) and the coefficients χ_i, collected in the table given above.

H. MOLECULAR WEIGHT DEPENDENCE

Second osmotic virial coefficients, as obtained from osmotic pressure or light scattering measurements with dilute polymer solutions, depend markedly on M_2; since this quantity is closely related (cf. Eq. I1) to χ, its dependence on chain length in this concentration regime is obvious. Recent experiments (10) have shown that χ may depend on the molar mass of the polymer even for concentrated solutions. Furthermore, there is some evidence (given in Ref. 60, resulting from a common valuation of the data given in Refs. 83,58,33,30 and 90, and from a comparison of the results reported in Refs. 99 and 110) that even χ_∞, the χ parameter for an infinitely large excess of polymer, may depend on chain length. According to the few presently available experimental data, a reduction of χ upon an increase of M_2 according to some scaling law seems to be the normal case.

I. POLYMER-SOLVENT INTERACTION PARAMETERS, χ

Values of the polymer–solvent interaction parameters, defined by Eq. (E1) in terms of volume fractions, have been collected. They are tabulated as a function of polymer concentration for various temperatures. Data given on the basis of segment fractions, s_2, or weight fractions, w_2, were converted into volume fractions φ_2.

If needed, χ_0 can be calculated from the second osmotic virial coefficient A_2 (see corresponding chapter in this Handbook by means of the following equation:

$$\chi_0 = 0.5 - \rho_2^2 V_1 A_2 \qquad \text{(I1)}$$

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Cellulose acetate 2.5										
Acetone	30	104		0.30	0.51				VP	38
Dioxane	30	104		0.31	0.51				VP	38
Methyl acetate	30	104		0.43	0.59				VP	38
Pyridine	30	104		0.07	0.09				VP	38
Cellulose acetate 3.0										
Dichloromethane	25	157		0.38	0.45	0.49			VP	39
Trichloromethane	30	157		0.36	0.45	0.51			VP	39
Cellulose acetate *x*										
Dimethylformamide	50	36				0.67	0.55		VP	40
Dimethylformamide	70	36				0.39	0.31		VP	40
Cellulose nitrate 2.6										
Acetone	20	100		0.14	0.06	−0.37	−1.24		VP	41
Acetonitrile	20	100			0.59	0.42	0.12	−0.1	VP	41
Cyclopentanone	20	100		0.42	0.07	−0.71	−2.4		VP	41
Dioxane	20	100			1.2	−0.25	−1.7		VP	41
Ethyl acetate	20	130		0.04	−0.43	−1.35			VP	42
Ethyl formate	20	130		−0.08	−0.14	−0.42	−3.2		VP	42
Isopentyl acetate	20	130		−0.89	−1.8	−3.3			VP	42
Isopropyl ketone	20	100		0.62	−0.08	−1.7			VP	41
Methyl isopropyl ketone	20	100		−0.5	−0.52	−1.6			VP	41
Methyl *tert*-butyl ketone	20	100		0.16	−1.5	−2.8	−3.7		VP	41
Nitromethane	20	100		0.66	0.64	0.6	0.45		VP	41
n-Propyl acetate	20	130		−0.38	−0.83	−2.0	−4.1		VP	42

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Cellulose, hydroxypropyl										
Acetone	25	100				0.52	0.67		VP	43
Ethanol	25	100				0.35	0.44		VP	43
Tetrahydrofuran	25	100				0.55	0.51		VP	43
Water	25	100				0.74	1.02		VP	44
Poly(acrylonitrile)										
Dimethylformamide	70	30.6					1.28		VP	40
Poly(α-methyl styrene)										
Cumene	65	17		0.49	0.47	0.51	0.6		VP	45
α-Methylstyrene	65	17			0.46	0.47	0.47		VP	45
Toluene	25				0.51	0.6				46
	25	53		0.41					VP	47
Poly(arylate)										
Chlorobenzene	140–200	7						0.54–0.30	IGC	48
o-Dichlorobenzene	140–200	7						0.59–0.27	IGC	48
Diethylene glycol diethyl ether	140–200	7						0.08–0.56	IGC	48
n-Dodecane	140–200	7						1.34–1.24	IGC	48
Ethylbenzene	140–200	7						0.82–0.48	IGC	48
Tetralin	140–200	7						0.75–0.57	IGC	48
p-Xylene	140–200	7						0.84–0.39	IGC	48
Poly(butadiene)										
Acetone	40–100	13.1						1.64–1.32	IGC	49
Acetonitrile	40–100	13.1						2.86–2.36	IGC	49
Benzene	23.5	65.2				0.06	0.02		VP	50
	40–100	13.1						0.26–0.19	IGC	49
1-Butanol	40–100	13.1						2.76–1.64	IGC	49
Butyl acetate	40–100	13.1						0.52–0.45	IGC	49
Butyronitrile	40–100	13.1						1.90–1.57	IGC	49
1-Chlorobutane	40–100	13.1						0.33–0.25	IGC	49
1-Chloropentane	40–100	13.1						0.37–0.32	IGC	49
1-Chloropropane	40–100	13.1						0.36–0.30	IGC	49
Cyclohexane	23.5	65.2					0.26		VP	50
	40–100	13.1						0.22–0.15	IGC	49
Dibutylether	40–100	12.2						0.37–0.34	IGC	49
Dichloromethane	23.5	65.2				0.27	0.12		VP	50
Diethylether	40–100	13.1						0.43–0.40	IGC	49
Diethylketone	40–100	13.1						0.82–0.67	IGC	49
Dipropylether	40–100	13.1						0.51–2.26	IGC	49
Ethanol	40–100	13.1						3.41–2.30	IGC	49
Ethyl acetate	40–100	13.1						0.86–0.69	IGC	49
Ethylbenzene	80	200				0.31	0.37		VP	51
Ethylcyclohexane	40–100	13.1						0.09–0.04	IGC	49
n-Heptane	40–100	13.1						0.36–0.31	IGC	49
1-Heptene	40–100	13.1						0.25–0.23	IGC	49
n-Hexane	40–100	13.1						0.37–0.38	IGC	49
1-Hexene	40–100	13.1						0.32–0.28	IGC	49
Methanol	40–100	13.1						3.85–2.70	IGC	49
Methyl acetate	40–100	13.1						1.14–0.92	IGC	49
Methyl cyclohexane	40–100	13.1						0.17–0.13	IGC	49
Methyl ethyl ketone	40–100	13.1						1.19–0.97	IGC	49
Methyl isobutyl ketone	40–100	13.1						0.95–0.72	IGC	49
n-Octane	40–100	13.1						0.34–0.28	IGC	49
1-Octene	40–100	13.1						0.23–0.20	IGC	49
n-Pentane	40–100	13.1						0.44–0.36	IGC	49
1-Propanol	40–100	13.1						2.97–1.97	IGC	49
2-Propanol	40–100	13.1						2.94–1.86	IGC	49
Propionitrile	40–100	13.1						2.25–1.82	IGC	49
Propyl acetate	40–100	13.1						0.67–0.55	IGC	49
Tetrachloromethane	23.5	65.2				−0.04	−0.12		VP	50
Tetrachloromethane	40–100	13.1						0.10–0.15	IGC	49
Tetrahydrofuran	40–100	13.1						0.35–0.29	IGC	49

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Toluene	40–100	13.1						0.14–0.12	IGC	49
Trichloromethane	23.5	65.2				–0.2	–0.34		VP	50
Trichloromethane	40–100	13.1						0.05–0.07	IGC	49
Poly(butene-1)										
n-Decane	115–135	10						0.30	IGC	52
n-Heptane	115–135	10						0.38	IGC	52
n-Nonane	115–135	10						0.32	IGC	52
n-Octane	115–135	10						0.36	IGC	52
Poly(decene)										
Toluene	30	213.9		0.49	0.44	0.39	0.35	0.32	VP	53
Poly(dimethyl siloxane)										
Acetone	100							1.33	IGC	54
Benzene	20	50			0.64	0.71	0.77	0.85	VP	36
	25	1.54			0.56	0.65	0.72	(0.76)	VP	55
	25	4.17				0.66	0.8		VP	55
	25	10				0.66	0.73	0.79	OS, VP	56
	25	15.7		0.56	0.63	0.76	0.82		VP	57
	25	50				0.66	0.73	0.79	VP, IGC	58
	25	50						0.81	IGC	59
	25–70	50						0.79–0.74	VP, IGC	58
	25–70	50						0.81–0.75	IGC	59
	30	6.65					0.71	0.74	VP	60
	30	15.65					0.71	0.75	VP	60
	30	26					0.72	0.74	VP	60
	30	89					0.45		VP	61
	30	89					0.74	0.77	VP	60
	40	1.54				0.85	0.81	(0.72)	VP	55
	40	4.17				0.75	0.73	(0.83)	VP	55
Cycloheptane	25–70	50						0.56–0.53	VP, IGC	58
Cyclohexane	20	50	0.41	0.44					OS	62
	25	10		0.46	0.48	0.50		0.47	OS, VP	56
	25	50				0.50		0.47	VP, IGC	58
	25–70	50						0.47–0.48	VP, IGC	58
	30				0.43	0.43	0.42	0.42	VP	63
	30	89					0.46	0.45	VP	64
Cyclooctane	25–70	50						0.66–0.61	VP, IGC	58
Cyclopentane	25–70	50						0.42–0.46	VP, IGC	58
n-Decane	20	30						0.64		65
Diisobutyl ketone	35	80		0.49					OS	66
1,4-Dioxane	25–70	50						1.32–1.18	VP, IGC	58
	100							1.06	IGC	54
Ethyl *n*-butyl ketone	35	80		0.52					OS	66
Ethylbenzene	23.5	50			0.54	0.63	0.7		VP	36
	25–70	50						0.77–0.73	VP, IGC	58
	25–70	50						0.83–0.78	IGC	59
n-Heptane	20	30						0.50		65
	20	50			0.45	0.45	0.46	0.48	VP	36
	25–70	50						0.48–0.50	VP,IGC	58
	25–70	50						0.50–0.49	IGC	59
	30	89					0.43	0.45	VP	64
Hexamethyl disiloxane	23.2	50			0.3	0.28	0.26	0.25	VP	36
	25	1.54			0.27	0.25	0.24		VP	55
	25	4.17			0.21	0.22	0.25		VP	55
	25	50						0.28	VP, IGC	58
	25–70	50						0.28–0.34	VP, IGC	58
n-Hexane	20		0.40	0.40				0.45	VP	40
	20	30						0.50		65
	25	89					0.41	0.43	VP	61
	25–70	50						0.46–0.47	VP, IGC	58
	25–70	50						0.45	IGC	59
	30	6.65					0.37	0.39	VP	67
	30	15.65					0.38	0.40	VP	67
	30	26					0.38	0.41	VP	67

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
	30	89					0.41	0.43	VP	61
	30	89					0.38	0.40	VP	64
	30	89					0.40	0.41	VP	67
	35	89					0.41	0.42	VP	61
Mesitylene	25–70	50						0.95–0.86	VP, IGC	58
Methyl ethyl ketone	20	80		0.57					OS	66
	25	280	0.50						OS	68
	30	50			0.51	0.64	0.79		VP	69
	35	80		0.57					OS	66
	50	80		0.56					OS	66
Methyl isobutyl ketone	20	80		0.54					OS	66
2-Methylbutane	25	50						0.39	IGC	59
	100							1.10	IGC	54
2-Methylheptane	25–70	50						0.49–0.47	VP, IGC	58
	25–70	50						0.52–0.50	IGC	59
2-Methylhexane	25–70	50						0.45–0.46	VP, IGC	58
	25–70	50						0.46	IGC	59
3-Methylhexane	25–70	50						0.45–0.43	VP, IGC	58
2-Methylpentane	25–70	50						0.45–0.43	IGC	59
Octamethylcyclo-tetra siloxane	140	10.1			0.51	0.38	0.25		VP	70
Octamethyltrisiloxane	23.2	50			0.22	0.19	0.17	0.14	VP	36
n-Octane	20	30						0.53		65
	20	50			0.50	0.51	0.52	0.55	VP	36
	20	50		0.42	0.50	0.49	0.50	0.51	OS	62
	25	4.17			0.36	0.40	0.44		VP	55
	25	50						0.52	VP, IGC	58
	25–70	50						0.56–0.52	IGC	59
	35	50						0.54	IGC	59
	35	144		0.42					OS	71
	40	4.17				0.40	0.40	(0.44)	VP	55
n-Pentane	25–70	50						0.45–0.49	VP, IGC	58
	25–70	50						0.41–0.43	IGC	59
	20	30						0.48		65
	20	50			0.43	0.41	0.40	0.40	VP	36
	25	50						0.45	VP, IGC	58
	100							0.31	IGC	54
Tetrachloromethane	100							0.36	IGC	54
Toluene	20	50	0.45	0.50	0.59	0.64	0.72	0.82	VP	36
	25	1.54			0.53	0.58	0.65	(0.74)	VP	55
	25	4.17				0.59	0.65		VP	55
	25	50						0.75	VP, IGC	58
	25–70	50						0.75–0.71	VP, IGC	58
	25–70	50						0.80–0.75	IGC	59
	40	4.17				0.63	0.68	(0.69)	VP	55
	100							0.59	IGC	54
Trichloromethane	30	89					0.64	0.65	VP	72
	100							0.60	IGC	54
2,2,4-Trimethylpentane	20	30						0.43		65
	25	4.17			0.35	0.35	0.38		VP	55
	25–70	50						0.45–0.43	VP, IGC	58
p-Xylene	25	50				0.58	0.67	0.78	VP	36
	25	50						0.75	VP, IGC	58
	25–70	50						0.80–0.77	IGC	59
m-Xylene	25–70	50						0.82–0.76	VP, IGC	58
o-Xylene	25–70	50						0.86–0.80	VP, IGC	58
Poly(dodecene)										
Toluene	30	94.9			0.34	0.47	0.61	0.74	VP	53
Poly(ε-caprolactam)										
Tetrachloromethane	65	10.7			0.54	0.46	0.39		VP	73
Poly(epichlorohydrin)										
Acetone	100							0.28	IGC	54
Benzene	100							0.25	IGC	54

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
n-Butane	100							1.65	IGC	54
1-Butanol	100							1.12	IGC	54
Butyl acetate	100							0.36	IGC	54
Chlorobenzene	100							0.24	IGC	54
1-Chlorobutane	100							0.62	IGC	54
Chloromethane	100							0.36	IGC	54
1-Chloropentane	100							0.65	IGC	54
Cycloheptane	100							1.19	IGC	54
Cyclohexane	100							1.25	IGC	54
Cyclohexene	100							0.84	IGC	54
Cyclooctane	100							1.20	IGC	54
Cyclopentane	100							1.16	IGC	54
n-Decane	100							2.12	IGC	54
1,1-Dichloroethane	100							0.33	IGC	54
1,2-Dichloroethane	100							0.20	IGC	54
Dichloromethane	100							0.18	IGC	54
1,4-Dioxane	100							0.04	IGC	54
Ethanol	100							1.58	IGC	54
Ethyl acetate	100							0.35	IGC	54
Ethyl benzene	100							0.44	IGC	54
n-Heptane	100							1.79	IGC	54
n-Hexane	100							1.72	IGC	54
Methyl acetate	100							0.39	IGC	54
Methyl ethyl ketone	100							0.20	IGC	54
n-Nonane	100							1.99	IGC	54
n-Octane	100							1.89	IGC	54
n-Pentane	100							1.64	IGC	54
1-Pentanol	100							1.03	IGC	54
Propane	100							1.71	IGC	54
1-Propanol	100							1.22	IGC	54
Propyl acetate	100							0.33	IGC	54
Tetrachloromethane	100							0.69	IGC	54
Tetrahydrofuran	100							0.01	IGC	54
Toluene	100							0.31	IGC	54
1,1,1-Trichloroethane	100							0.46	IGC	54
Trichloroethylene	100							0.53	IGC	54
Trichloromethane	100							0.25	IGC	54
n-Undecane	100							2.24	IGC	54
Poly(ethyl methacrylate)										
Dichloromethane	23.5	144				−0.52	−0.66		VP	74
Tetrachloromethane	23.5	144.4				−0.01	−0.12		VP	74
Toluene	23.5	144				0.19	0.15		VP	74
Trichloromethane	23.5	144			−0.94	−1.05			VP	74
Poly(ethylene glycol)										
Ethylbenzene	70	2				0.87	0.83		VP	75
	70	3.272			0.38	0.42	0.45		VP	40
	70	4				0.85	0.82		VP	75
	70	6				0.71	0.69		VP	75
Poly(ethylene oxide)										
Benzene	50.3	6.1		0.18	0.14	0.1			VP	76
	70	100				0.23	0.22		VP	73
	70	6.1		0.19	0.14	0.12	0.09		VP	76
	100							0.13	IGC	54
Cyclohexane	100							1.23	IGC	54
n-Decane	100							2.10	IGC	54
Ethanol	100							0.70	IGC	54
n-Octane	100							1.85	IGC	54
Toluene	99.8	5.2			0.41	0.3			VP	40
	100							0.26	IGC	54
Trichloromethane	100							−0.55	IGC	54
Poly(ethylene)HD										
cis-Decalin	149	105						0.07	IGC	77

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
trans-Decalin	149	105						0.05	IGC	77
n-Decane	145–190							0.18	IGC	28
	149	105						0.31	IGC	77
	185	105						0.12	IGC	78
2,4-Dimethyl hexane	149	105						0.38	IGC	77
3,4-Dimethyl hexane	149	105						0.31	IGC	77
n-Dodecane	149							0.28	IGC	77
Ethylbenzene	149	105						0.37	IGC	77
Mesitylene	149	105						0.28	IGC	77
2-Methylheptane	149	105						0.39	IGC	77
3-Methylhexane	149	105						0.40	IGC	77
n-Nonane	149	105						0.34	IGC	77
n-Octane	149	105						0.36	IGC	77
Tetralin	149	105						0.32	IGC	77
Toluene	149	105						0.39	IGC	77
2,2,4-Trimethyl hexane	149	105						0.35	IGC	77
2,2,4-Trimethyl pentane	149	105						0.40	IGC	77
m-Xylene	149	105						0.34	IGC	77
p-Xylene	149	105						0.32	IGC	77
Poly(ethylene)L D										
Benzene	125–135							0.43–0.36	IGC	79
1-Butanol	135							1.38	IGC	79
Chlorobenzene	135							0.34	IGC	79
Cyclohexane	125–135							0.18	IGC	79
Cyclohexanol	135							1.22	IGC	79
cis-Decalin	120–145	82						0.03		77
trans-Decalin	120–145	82						0.02–0.00		77
n-Decane	120–145	82						0.25–0.26		77
2,4-Dimethyl hexane	120–145	82						0.34–0.32		77
2,5-Dimethyl hexane	120–145	82						0.35		77
3,4-Dimethyl hexane	120–145	82						0.25		77
n-Dodecane	110–145							0.18		28
	120–145	82						0.23–0.24		77
Ethylbenzene	120–145	82						0.33		77
n-Heptane	108.9	0.45		0.29	0.31	0.34	0.2		VP	80
Mesitylene	120–145	82						0.24–0.25		77
3-Methyl heptane	120–145	82						0.31–0.30		77
3-Methyl hexane	120–145	82						0.33–0.34		77
n-Nonane	120–145	82						0.28		77
n-Octane	120–145	82						0.31–0.30		77
Phenol	135							1.5	IGC	79
Tetrachloromethane	135							0.24	IGC	79
Tetralin	120–145	82						0.29–0.28		77
Toluene	120–145	82						0.34		77
Trichloromethane	135							0.41	IGC	79
2,2,4-Trimethyl hexane	120–145	82						0.29–0.28		77
2,2,4-Trimethyl pentane	120–145	82						0.34		77
m-Xylene	120–145	82						0.29		77
p-Xylene	120–145	82						0.27–0.28		77
Poly(heptene)										
Toluene	30	224.1			0.48	0.45	0.43		VP	53
Poly(isobutylene)										
Benzene	10	40			0.67	0.78	0.92		VP	32
	25							0.91	IGC	30
	25	40		0.57	0.66	0.75	0.88	1.06	VP	32
	25	40						0.87	IGC	81
	25	40						0.86	IGC	83
	25	50				0.76	0.82		VP	82
	25	90	0.50	0.57					OS	21
	25–50	66						0.91–0.79	IGC	30
	25–65	40						0.86–0.61	IGC	83
	26.9					0.73	0.82	1.07	VP	84
	39.6	40				0.70	0.80		VP	32

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Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
	40	50				0.69	0.75		VP	82
	40	50				0.65	0.74	0.83	VP	85
	40–65	53						0.87–0.77		86
	60	50				0.52	0.60	0.69	VP	82
	65	50				0.73	0.74	0.75	VP	82
	65	100				0.73	0.74	0.74	VP	82
	80	50				0.4	0.49	0.58	VP	85
n-Butane	100							0.65	IGC	87
Chlorobenzene	100							0.70	IGC	87
Cyclohexane	25	26.1	0.403						OS	88
	25	40			0.42	0.42	0.41	0.43	VP	35
	25	40						0.56	IGC	81
	25	40						0.54	IGC	83
	25	50				0.33	0.37		VP	82
	25	50	0.44						OS	89
	25	66						0.43	IGC	30
	25–65	40						0.54–0.42	IGC	83
	25–50	66						0.43–0.40	IGC	30
	40–65	53						0.47–0.42		86
	40	50				0.30	0.38		VP	82
	40	50					0.45	0.52	VP	82
	60	50					0.41	0.48	VP	85
	65	50				0.33	0.38		VP	82
	100							0.39	IGC	87
2,2-Dimethylpropane	25–46	1000						0.82–0.87	VP	90
	35	1000					0.82		VP	90
Ethylbenzene	25	50				0.34	0.55		VP	82
	40	50				0.4	0.5		VP	82
n-Heptane	25	40						0.57	IGC	81
	25–65	40						0.57–0.47	IGC	83
n-Hexane	25	40						0.65	IGC	81
	25	50				0.4	0.4		VP	82
	25–65	40						0.63–0.50	IGC	83
Methyl ethyl ketone	100							1.55	IGC	87
2-Methylbutane	25–35	1000					0.65		VP	90
	35–46	1000						0.65–0.68	VP	90
n-Nonane	25	40						0.49	IGC	81
n-Octane	25	40						0.52	IGC	81
	25	40		0.44	0.48				OS	91
	25–65	40						0.52–0.43	IGC	83
n-Pentane	25	40			0.57	0.62	0.68	0.75	VP	34
	25	40						0.73	IGC	81
	25	40						0.72	IGC	83
	25	50						0.28	VP, IGC	58
	25	62	0.48	0.53	0.57	0.62	0.63	0.68	VP	33
	25	66						0.70	IGC	30
	25	1000	0.48	0.53	0.57	0.62	0.63	0.68	VP	90
	25–50	66						0.70–0.60	IGC	30
	25–65	40						0.72–0.57	IGC	83
	35	62			0.58	0.63	0.63		VP	33
	35	1000			0.62	0.62	0.62	0.62	VP	90
	40	62		0.53	0.57				VP	33
	45	62			0.56	0.62	0.63		VP	33
	55	62				0.63	0.63		VP	33
Tetrachloromethane	100							0.48	IGC	87
Toluene	100							0.60	IGC	87
Trichloromethane	100							0.78	IGC	87
Poly(isoprene)										
Acetone	25						1.27	1.8	VP	92
Benzene	10	100				0.42	0.43		VP	93
	25		0.40	0.41	0.41	0.41	0.41	0.41	OS, VP	94
	25							0.46	IGC	96
	25					0.43	0.43		VP	95
	25	100	0.39	0.40	0.41	0.41	0.42	0.43	VP	93

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
	25–55							0.46–0.43	IGC	96
	40						0.41	0.44	IGC	96
	40	100					0.41	0.44	VP	93
Ethyl acetate	25					0.82	0.96	1.24	VP	97
	25				0.69	0.81	0.96	1.23	VP	92
	50				0.68	0.77	0.91		VP	97
	50				0.68	0.79	0.92		VP	92
Ethylbenzene	25–55							0.34–0.30	IGC	96
n-Heptane	25–55							0.51–0.49	IGC	96
n-Hexane	25–55							0.54–0.50	IGC	96
Methyl ethyl ketone	25					0.86	1.05	1.43	VP	92
	45					0.83	0.99	1.20	VP	92
2-Methylheptane	25–55							0.50–0.47	IGC	96
2-Methylhexane	25–55							0.52–0.50	IGC	96
2-Methylpentane	25–55							0.56–0.52	IGC	96
n-Octane	25–55							0.49–0.46	IGC	96
n-Pentane	25–55							0.61–0.53	IGC	96
Tetrachloromethane	23.5	100				0.20	0.10		VP	50
Toluene	25–55							0.36–0.32	IGC	96
	30	270			0.46	0.42	0.38		VP	98
Trichloromethane	23.5	100				0.25	0.16		VP	50
2,2,4-Trimethylpentane	25–55							0.49–0.46	IGC	96
p-Xylene	25–55							0.28–0.26	IGC	96
Poly(methyl acrylate)										
Acetone	100							0.4	IGC	54
Benzene	90–110	200						0.51–0.46	IGC	99
n-Butane	100							1.86	IGC	54
1-Butanol	100							0.79	IGC	54
n-Butylbenzene	90–110	200						1.15–1.05	IGC	99
tert-Butylbenzene	90–110	200						1.03–0.95	IGC	99
n-Butylcyclohexane	90–110	200						2.34–2.13	IGC	99
Cyclohexane	90–110	200						1.72–1.51	IGC	99
cis-Decalin	90–110	200						2.07–1.84	IGC	99
trans-Decalin	90–110	200						2.13–1.90	IGC	99
n-Decane	88–110	200						2.68–2.43	IGC	99
Dichloromethane	23.5	63.2				−0.22	−0.43		VP	74
1,4-Dioxane	100							0.20	IGC	54
n-Dodecane	90–110	200						3.00–2.75	IGC	99
Ethanol	100							1.01	IGC	54
Ethyl acetate	100							0.43	IGC	54
Ethylbenzene	90–110	200						0.83–0.75	IGC	99
n-Heptane	100							2.10	IGC	54
n-Hexane	100							2.08	IGC	54
Methyl ethyl ketone	100							0.40	IGC	54
Naphthalene	100–110	200						0.49–0.47	IGC	99
n-Nonane	100							2.4	IGC	54
n-Octane	90–110	200						2.38–2.19	IGC	99
n-Pentane	100							1.92	IGC	54
Propane	100							2.5	IGC	54
n-Tetradecane	90–110	200						3.36–3.06	IGC	99
Tetrahydrofuran	100							0.34	IGC	54
Tetralin	90–110	200						1.04–0.95	IGC	99
3,3,4,4-Tetramethylhexane	90–110	200						2.17–1.95	IGC	99
Toluene	90–110	200						0.67–0.62	IGC	99
Trichloromethane	23.5	63.2				−0.53	−0.58		VP	74
3,4,5-Trimethylheptane	90–110	200						2.44–2.20	IGC	99
2,2,5-Trimethylhexane	90–110	200						2.48–2.21	IGC	99
2,2,4-Trimethylpentane	90–110	200						2.35–2.07	IGC	99
Poly(methyl methacrylate)										
1,2-Dichloroethane	23.5	33.2			−0.63	−0.7	−0.74		VP	74
	50	5.5			0.25	0.17	0.32		VP	40
	50	8.43			0.14	0.21	0.33		VP	40

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
	70	5.5			0.06	0.21	0.33		VP	40
	70	8.43				0.31	0.28		VP	40
3,3-Dimethyl-2-butanone	50	3.15			0.59	0.45	0.34		VP	100
	50.2	8.56			0.55	0.55	0.6		VP	100
	69.3	3.15				0.63	0.46		VP	100
	70.3	8.56				0.57	0.74		VP	100
Mesitylene	130	8.43				0.85	0.99		VP	40
Tetrachloromethane	50	3.16			0.56	0.56			VP	100
	50.2	8.56				0.6	0.65		VP	100
	69.7	3.15				0.57	0.62		VP	100
	70.7	8.56				0.53	0.66		VP	100
Toluene	23.5	33.2					0.45		VP	74
	48.5	19.77			0.62	0.53	0.45		VP	101
	49.8	3.16				0.60	0.69		VP	100
	50	36.41				0.50	0.51		VP	40
	50	72				0.51	0.53		VP	40
	50.1	8.56				0.58	0.73		VP	100
	69.6	3.16			0.53	0.53	0.63		VP	100
	70	36.41				0.45	0.51		VP	40
	70	72				0.44	0.50		VP	100
	70.4	8.56				0.51	0.71		VP	100
	160	110						0.89	VP	102
p-Xylene	50	8.43			0.71	0.67	0.89		VP	100
	70	8.43				0.89	0.84		VP	100
	100	8.46				0.77	0.73		VP	100
	136.2	8.46				0.46	0.63		VP	100
Poly(*n*-butyl acrylate)										
Benzene	23.5	33				0.17	0.02		VP	74
Toluene	23.5	33			0.12	0.05			VP	74
Trichloromethane	23.5	33			−0.32	−0.39			VP	74
Poly(*n*-butyl methacrylate)										
Acetone	120	35						0.93	IGC	103
Acetonitrile	120	35						1.40	IGC	103
Benzene	50.5	36.8			0.21	0.14			VP	40
1,2-Dichloroethane	50.8	36.8			0.41	0.37			VP	40
Ethanol	40	8.9	0.509	0.57	0.68	0.86	1.09	1.38	VP	104
	60	8.9	0.484	0.55	0.66	0.8	0.99	1.19	VP	104
	80	8.9	0.477	0.53	0.63	0.76	0.89	1.01	VP	104
Ethyl acetate	120	35						0.67	IGC	103
n-Hexane	120	35						0.78	IGC	103
Mesitylene	100	36.8				0.41			VP	40
Methyl ethyl ketone	50.5	36.8				0.3	0.44		VP	40
	120	35						0.62	IGC	103
1-Propanol	120	35						1.01	IGC	103
2-Propanol	27	8.9	0.492	0.54	0.65	0.82	1.03	1.29	VP	104
	56	8.9	0.432	0.49	0.59	0.72	0.88	1.11	VP	104
	86	8.9	0.399	0.46	0.54	0.64	0.77	0.95	VP	104
Toluene	50.2	36.8			0.24	0.17			VP	40
Trichloromethane	50.5	36.8			0.01				VP	40
	120	35						0.10	IGC	103
m-Xylene	70.8	36.8				0.48	0.4		VP	40
o-Xylene	71.3	36.8				0.26	0.27		VP	40
Poly(*o*-chlorostyrene)										
Benzene	25	607			0.56	0.58	0.60	0.62	VP	105
	40	607				0.56	0.62	0.67	VP	105
Methyl ethyl ketone	40	607					0.83	1.02	VP	105
Poly(octadecene)										
Toluene	30	193.5		0.50	0.51	0.74			VP	53
Poly(*p*-bromostyrene)										
Toluene	20	10			0.64	0.65			VP	106

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Poly(*p*-chlorostyrene)										
Toluene	22	10		0.53	0.58	0.55			VP	106
Poly(*p*-methyl styrene)										
Toluene	20	10		0.41	0.4	0.35			VP	106
Poly(propylene glycol)										
Benzene	47.2	500		0.16	0.03	− 0.03	− 0.07		VP	107
	74.7	500		0.15	0.08	0.02	− 0.02		VP	107
Methanol	25	3.35		0.45	0.48				VP	108
Poly(propylene)										
Acetone	100							1.72	IGC	87
Benzene	100							0.51	IGC	87
Cyclohexane	100							0.22	IGC	87
2,4-Dimethyl-3-pentanone	25	20		0.55	0.61	0.7	0.86	1.11	VP	109
	45	20		0.57	0.57	0.64	0.79	1.01	VP	109
n-Hexane	80							0.18		29
n-Octane	100							0.22	IGC	87
3-Pentanone	25	20			0.70	0.82	1.08	1.66	VP	109
	45	20			0.70	0.71	0.97	1.55	VP	109
Tetrachloromethane	100							0.29	IGC	87
Tetrahydrofuran	100							0.55	IGC	87
Toluene	100							0.43	IGC	87
Trichloromethane	100							0.61	IGC	87
Poly(styrene)										
Acetic acid	162–229	20						3.00–2.15	IGC	110
Acetone	25	15.7				0.81	0.94	1.1	VP	111
	50	15.7				0.80	0.92		VP	111
	150	17.5						0.65	IGC	112
	162–229	20						1.30–0.56	IGC	110
Acetonitrile	162–229	20						2.02–0.93	IGC	110
Aniline	162–229	20						1.11–0.68	IGC	110
Benzaldehyde	162–229	20						1.22–0.80	IGC	110
Benzene	20	20			0.57	0.39	0.21		VP	113
	20	500			0.49	0.46	0.44		VP	113
	23.5	600				0.30	0.19		VP	114
	25	90		0.42	0.37	0.32	0.26		VP	37
	30	19.2				0.41	0.3		VP	115
	30	103.8				0.54	0.35		VP	115
	40	218				0.26	0.28		VP	116
	50	19.2				0.45	0.26		VP	115
	50	103.8				0.53	0.21		VP	115
	60	218				0.25	0.31		VP	116
	70	19.2				0.32	0.27		VP	115
	70	103.8				0.40	0.35		VP	115
	80	218				0.14	0.23		VP	116
	120							0.33	IGC	78
	133–210	200						0.32–0.20	IGC	117
	162–229	20						0.66–0.13	IGC	110
	140–200	76						0.59–0.60	IGC	118
	150–200	97						0.38	IGC	30
	130–155	275						0.31–0.28	VP	102
	160–180	120						0.29–0.24	IGC	99
Benzyl alcohol	162–229	20						1.42–0.65	IGC	110
1-Butanol	162–229	20						1.47–0.82	IGC	110
2-Butanol	162–229	20						1.71–0.81	IGC	110
n-Butyl acetate	162–229	20						1.01–0.45	IGC	110
tert-Butyl acetate	10	11	0.50	0.54	0.64				CM, LS	120
	30	11	0.50	0.54	0.64				LS, CM	119
	50	11	0.49	0.53	0.63				CM, LS	120
	143–183	11						0.73–0.52	CM	120
n-Butylbenzene	183–203	120						0.38–0.35	IGC	99
n-Butylcyclohexane	160–180	120						0.77–0.71	IGC	99

Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Chlorobenzene	162–229	20						0.68–0.28	IGC	110
Cyclohexane	20	500				0.68	0.92		VP	113
	30			0.57					CM	25
	30	19.2				0.78	0.77		VP	115
	30	100				0.79	0.98		VP	121
	30	103.8				0.87	0.89		VP	115
	30	150		0.47	0.65	0.71			VP	122
	30	218				0.69	0.92	1.14	VP	123
	34	25.1	0.50	0.57	0.64	0.75	0.93		OS, VP	22
	35	51		0.56					LS	23
	35	233	0.50	0.56	0.64	0.75	0.91	(1.15)	HSGC	124
	40	100				0.75	0.92		VP	121
	40	218				0.76	0.92		VP	116
	44	25.1	0.49	0.57	0.63	0.72	0.93		OS, VP	22
	45	51		0.55					LS	23
	45	233	0.49	0.55	0.63	0.73	0.85	(1.02)	HSGC	124
	50	100				0.66	0.82		VP	121
	50	103.8				0.52	0.73		VP	115
	50	150		0.34	0.55	0.72			VP	122
	55	233	0.48	0.53	0.59	0.66	0.73	(0.82)	HSGC	124
	60	100				0.62	0.78		VP	121
	60	218				0.72	0.89		VP	116
	65	51		0.53					LS	23
	65	233	0.48	0.51	0.55	0.60	0.65	(0.70)	HSGC	124
	70	19.2				0.65	0.65		VP	115
	70	103.8				0.57	0.71		VP	115
	80	218				0.68	0.8	0.92	VP	116
	150	17.5						0.47	IGC	112
	140–200	76						1.05–0.85	IGC	118
	162–229	20						1.11–0.46	IGC	110
	160–180	120						0.62–0.53	IGC	99
Cyclohexanone	162–229	20						1.08–0.49	IGC	110
cis-Decalin	183–203	120						0.47–0.42	IGC	99
trans-Decalin	183–203	120						0.52–0.46	IGC	99
n-Decane	140–200	76						1.51–1.13	IGC	118
	183–203	120						1.01–0.94	IGC	99
Di(*n*-propyl)ether	20	500			0.71	0.81	0.91		VP	113
o-Dichlorobenzene	133–210	200						0.59–0.30	IGC	117
1,2-Dichloroethane	162–229	20						0.85–0.22	IGC	110
Dichloromethane	23.5	600				0.24	0.10		VP	114
	162–229	20						0.62–0.21	IGC	110
Diethyl ether	162–229	20						0.78–0.71	IGC	110
Diisopropyl ether	162–229	20						1.42–0.41	IGC	110
Dimethylformamide	140–200	76						1.29–1.16	IGC	118
1,4-Dioxane	20	200				0.35	0.35		VP	113
	20	500				0.44	0.44		VP	113
	50	10.3			0.67	0.61	0.78	1.10	VP	101
	133–171	200						0.52–0.39	IGC	117
	162–229	20						0.95–0.42	IGC	110
n-Dodecane	183–203	120						1.09–1.00	IGC	99
Ethanol	162–229	20						1.80–0.43	IGC	110
Ethyl acetate	150	17.5						0.46	IGC	112
	162–229	20						1.14–0.35	IGC	110
Ethylbenzene	30	230			0.40	0.40			VP	123
	50	19.2			0.88	0.66	0.43		VP	125
	50	103.8				0.75	0.91		VP	125
	70	19.2				0.74	0.65		VP	125
	70	103.8				0.71	0.83		VP	125
	130	275		0.23	0.28	0.33	0.39	0.43	VP	102
	140	275						0.46	VP	102
	150	17.5						0.27	IGC	112
	120–185							0.22–0.14	IGC	29
	133–210	200						0.40–0.23	IGC	117
	140–200	76						0.57–0.58	IGC	118
	160–180	275						0.32–0.25	VP	102
Ethylene glycol	162–229	20						3.77–2.23	IGC	110

Solvent	*T* (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Formamide	162–229	20						4.11–3.16	IGC	110
n-Heptane	140–200	76						1.49–1.14	IGC	118
	162–229	20						1.33–0.25	IGC	110
n-Hexadecane	183–203	120						1.22–1.14	IGC	99
n-Hexane	162–229	20						1.35–0.03	IGC	110
Methanol	162–229	20						2.19–0.44	IGC	110
Methyl cyclohexane	72	110	0.49	0.58	0.67				OS	126
Methyl ethyl ketone	25	290			0.63	0.69	0.77		VP	127
	48.5	10.3			0.63	0.67	0.73		VP	101
	70	290				0.63	0.72		VP	127
	120–200	35						1.13–0.9	IGC	128
	133–171	200						0.80–0.67	IGC	117
	162–229	20						1.16–0.36	IGC	110
Naphthalene	183–203	120						0.13–0.11	IGC	99
Nitrobenzene	162–229	20						1.18–0.72	IGC	110
n-Nonane	130–175	53.7						1.00–0.97	VP	51
n-Octane	150	17.5						1.24	IGC	112
n-Octane	162–229	20						2.19–0.80	IGC	110
i-Octane	162–229	20						1.72–0.35	IGC	110
1-Octanol	162–229	20						1.14–0.55	IGC	110
n-Pentane	162–229	20						1.12–0.83	IGC	110
1-Pentanol	162–229	20						1.75–0.86	IGC	110
3-Pentanone	20	200			0.63	0.65	0.95		VP	113
	20	500				0.65	0.87		VP	113
1-Propanol	120–200	9						1.54/1.38/1.4	IGC	128
	162–229	20						1.71–0.27	IGC	110
2-Propanol	162–229	20						1.74–0.15	IGC	110
Propyl acetate	25	290			0.66	0.66	0.66		VP	111
	70	290			0.61	0.6	0.59		VP	111
Pyridine	162–229	20						1.02–0.23	IGC	110
Styrene	133–210	200						0.23/0.28/0.23	IGC	117
Tetrachloromethane	20	500				0.37	0.37		VP	113
	23.5	600					0.31		VP	114
	133–171	200						0.49–0.19	IGC	117
	162–229	20						0.90–0.26	IGC	110
n-Tetradecane	183–203	120						1.14–1.08	IGC	99
Tetrahydrofuran	162–229	20						0.70–0.16	IGC	110
Tetralin	183–203	120						0.20–0.11	IGC	99
3,3,4,4-Tetramethyl-hexane	160–180	120						0.90–0.76	IGC	99
Toluene	20	200				0.52	0.34		VP	113
	20	500				0.41	0.33		VP	113
	22	10		0.40	0.42	0.39			VP	106
	23.5	600				0.39	0.25		VP	114
	25	51		0.37					LS	23
	25	90		0.37	0.30	0.23	0.16		VP	37
	25	100	0.44	0.41	0.40				SAXS	129
	25	170	0.43						OS	130
	25	290			0.42	0.37	0.31		VP	127
	40	218				0.36	0.37		VP	116
	45	51		0.37					LS	23
	48.5	10.3		0.35	0.34	0.33	0.32		VP	101
	49.8	45				0.45	0.53		VP	40
	60	218				0.35	0.37		VP	116
	65	51		0.37					LS	23
	69.5	45				0.57	0.57		VP	40
	80	290			0.40	0.35			VP	127
	100	103.8				0.48	0.3		VP	131
	110	275		0.52	0.40	0.37	0.35		VP	102
	130	275					0.21	0.18	VP	102
	133–210	200						0.32–0.21	IGC	117
	162–229	20						0.67–0.04	IGC	110
	140–200	76						0.57–0.56	IGC	118
Trichloroethane	23.5	600				0.07	−0.1		VP	114
Trichloroethylene	162–229	20						0.69–0.12	IGC	110

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Solvent	T (°C)	M_2 (kg/mol)	χ (0.0)	χ (0.2)	χ (0.4)	χ (0.6)	χ (0.8)	χ (1.0)	Method	Refs.
Trichloromethane	25	290		0.52	0.32	0.23	0.17		VP	111
	50	290		0.45	0.34	0.23	0.14		VP	111
	120–200	9						1.4–1.48	IGC	128
	162–229	20						0.43–0.01	IGC	110
Water	162–229	20						4.40–3.10	IGC	110
m-Xylene	100	19.2				0.61	0.52		VP	40
o-Xylene	100	19.2				0.48	0.43		VP	40
	100	103.8				0.53	0.43		VP	40
	100	1538				0.52	0.39		VP	40
	133–210	200						0.38–0.25	IGC	117
	162–229	20						0.72–0.26	IGC	110
m-Xylene	130–175	53.7						0.39–0.35	VP	51
Poly(*tert*-butyl methacrylate)										
Benzene	50	12				0.39	0.36		VP	40
	69.5	12				0.31	0.36		VP	40
Ethylbenzene	69.5	12				0.62	0.69		VP	40
Mesitylene	100	12				0.70	0.71		VP	40
Methyl ethyl ketone	50	12				0.33	0.52		VP	40
	69.5	12				0.43	0.62		VP	40
3-Pentanone	50	12				0.63	0.58		VP	40
Tetrachloromethane	50	12				0.42	0.42		VP	40
Toluene	100	12				0.47	0.44		VP	40
	50	12				0.44	0.44		VP	40
	69.6	12				0.37	0.44		VP	40
Trichloromethane	50	12			0.25	0.03			VP	40
m-Xylene	69.5	12				0.67	0.62		VP	40
o-Xylene	69.5	12				0.55	0.63		VP	40
p-Xylene	69.5	12				0.42	0.57		VP	40
Poly(vinyl acetate)										
Acetone	25		0.454						SAXS	132
	30	8.6				0.38	0.48		VP	133
	30	109.1			0.31	0.38	0.55		VP	133
	30	170					0.33	0.31	VP	134
	30	1041				0.41	0.55		VP	133
	40	170					0.34	0.35	VP	134
Vinyl acetate	30	110			0.41	0.29	0.22		VP	135
Poly (vinyl methyl ether)										
Acetone	150	68.5						0.54	IGC	112
Cyclohexane	150	68.5						0.47	IGC	112
Ethyl acetate	150	68.5						0.21	IGC	112
Ethylbenzene	150	68.5						0.10	IGC	112
n-Octane	150	68.5						0.97	IGC	112
Poly (vinyl methyl ketone)										
n-Decane	83–163	500						3.91–3.54	IGC	136
n-Dodecane	113–173	500						3.89–3.16	IGC	136
n-Heptane	73–163	500						3.56–3.05	IGC	136
n-Nonane	73–163	500						3.48–3.20	IGC	136
n-Octane	73–163	500						3.55–3.11	IGC	136
n-Undecane	83–163	500						3.86–3.68	IGC	136

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Concentration Dependence of the Viscosity of Dilute Polymer Solutions: Huggins and Schulz–Blaschke Constants

Clifford K. Schoff
PPG Industries, Inc. Allison Park, PA, USA

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A. INTRODUCTION

The dependence of the viscosity of dilute polymer solutions on concentration can be described by a power series:

$$\eta = \eta_0(1 + a_1c + a_2c^2 + a_3c^3 + \cdots) \qquad \text{(A1)}$$

where η is the viscosity of the solution and η_0 is the viscosity of the solvent. This equation is usually presented in another form:

$$\eta = \eta_0(1 + [\eta]c + k_1[\eta]^2c^2 + k_2[\eta]^3c^3 + \cdots) \qquad \text{(A2)}$$

where $[\eta]$ is the limiting viscosity number and $k_i(k_1, k_2, \cdots)$ is a dimensionless constant. If terms with the third and higher powers of concentration are neglected, then Eq. (A2) becomes

$$\eta = \eta_0(1 + [\eta]c + k_1[\eta]^2c^2) \qquad \text{(A3)}$$

which, since $\eta/\eta_0 = \eta_{\rm rel}$ (viscosity ratio) and $\eta_{\rm rel} - 1 = \eta_{\rm sp}$ (specific viscosity), can be put in the form

$$\eta_{\rm sp} = [\eta]c + k_1[\eta]^2c^2 \qquad \text{(A4)}$$

which becomes the Huggins equation (1)

$$\eta_{\rm sp}/c = [\eta](1 + k_{\rm h}[\eta]c) \qquad \text{(A5)}$$

where $k_{\rm h}$ is the Huggins viscosity constant that is the most commonly used dilute solution viscosity number or index. It is easily determined from the slope of a plot of $\eta_{\rm sp}/c$ versus c.

The Huggins constant can be thought of as a measure of the "goodness" of the solvent for the polymer with values around 0.3 in good solvents and 0.5–1 in theta solvents. It should be noted that these generalizations break down with extremely dilute solutions (2) and with chain aggregation (3). In both cases, values tend to be higher. The Huggins constant is independent of molecular weight for many polymers, but is dependent on molecular weight for polymers that associate easily in solution (3).

The Huggins equation and Huggins constants can be used to determine values for the limiting viscosity number, $[\eta]$. For extrapolation procedures related to $[\eta]$ and $k_{\rm h}$, see (Ref. 4). Applications of the Huggins equation to measure $[\eta]$ are given in Refs. (5,6). The latter gives an equation for $[\eta]$:

$$[\eta] = \frac{(1 + 4k_{\rm h}\eta_{\rm sp})^{1/2} - 1}{2k_{\rm h}c} \qquad \text{(A6)}$$

which can be used for single point determinations, i.e., calculating $[\eta]$ from a single viscosity measurement at a known concentration. Computer programs relating solution viscosity and molecular parameters are found in Refs. (7,8).

Other semiempirical equations, such as those of Kraemer and Schulz and Blaschke, also are used for processing viscosity data. The Kraemer equation (Ref. 9) is

$$\ln \eta_{\rm rel}/c = [\eta](1 - k_{\rm k}[\eta]c) \qquad \text{(A7)}$$

where k_k is the Kraemer constant. Sometimes, the term $k_k[\eta]c$ is written as positive and the constants are listed as negative numbers. The result is the same. The Schulz–Blaschke equation (10) is

$$\eta_{sp}/c = [\eta](1 + k_{sb}\eta_{sp}) \qquad \text{(A8)}$$

Although few Schulz–Blaschke constants have been published, some investigators contend that the Schulz–Blaschke equation is superior because it works with a wider range of concentrations and is not bound to a constant specific viscosity region (11). On the other hand, it is not recommended for single point determinations because of large errors (6). Huggins' and Kraemer's equations, used singly or in combined form, are better (6).

In addition to the polymer–solvent system, k_h and k_{sb} depend on concentration (whether semidilute, dilute, or extremely dilute), molecular weight, degree of branching, shear rate of measurement, and whether there can be preferential solvation (copolymers and mixed solvents). With polymers in good solvents, measured values for the Huggins constant are between 0.3 and 0.4. In some cases, they are even lower (2). With decreasing goodness of the solvent, the Huggins constant increases steadily, reaching 0.55 or more for theta conditions.

Regarding concentration, deGennes (12) has defined a critical concentration, c^*, above which solutions are semidilute and below which they are dilute. Most k_h and k_{sb} values have been measured in the dilute region. Dondos (2) has defined another critical concentration, c^{**}, below which the solution is called extremely dilute. Values for k_h measured below c^{**} tend to be higher than those measured between c^* and c^{**}. It is interesting that Peterson and Fixman (13) predicted higher values for Huggins constants except for those below c^{**}. It may be that the low values in the dilute region are due to polymer coil compression because of lack of sufficient volume (2).

The Huggins constant is not supposed to be dependent on the molecular weight of the polymer. In many cases, it is not (14–18), or the dependence is small (14,19,20), but other results show definite molecular weight dependence (3,21). It appears that the Huggins constant is related to molecular weight in polymers that associate in solution, either by the effect of strong ionic or polar interactions, or by the effect of hydrogen bonds (3).

There is a relationship between k_h and the coil expansion factor or coefficient of expansion, α, which is a measure of the extent of the expansion of the polymer coil in a particular solvent. In good solvents, the coil is more extended than in poor solvents and α is correspondingly larger. The Huggins constant seems to vary with α^3 (3,14,22,23). One expression for this is (Ref. 23)

$$k_h = a + b\alpha^3 + c \qquad \text{(A9)}$$

Although there is no agreement in the literature as regards the influence of branching on viscosity constants, most results indicate that k_h and k_{sb} increase with higher degrees of branching (24–26). There is no agreement on the effect of shearing on viscosity constants either, the literature indicating both increases (27) and decreases (28) with increasing shear rate. Shearing that produced chain scission lowered the limiting viscosity number $[\eta]$ and raised k_h, and did so more at higher shear rates, although there was a tendency toward stabilization at the highest shear rates (29). The influence of shear rate is usually neglected below 1500 sec^{-1} (11).

Huggins constants also can be determined for dilute suspensions. The k_h value for such a suspension is sensitive to the degree and nature of the polydispersity of the specimen (30).

The following tables contain Huggins and Schulz–Blaschke constants taken from the literature, along with the relevant references. The values are listed by limiting viscosity number $[\eta]$, the units of which are ml/g. Values marked with an asterisk (*) are interpolated values from the literature (mostly mean values calculated by Stickler and Sutterlin (11)). For information on molecular weight and other factors, as well as conditions of measurement not given in the tables, the reader may refer to the original publications.

B. TABLES

TABLE 1. HUGGINS CONSTANTS

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
1.1. POLY(DIENES) AND POLY(ALKENES)						
Poly(1,3-butadiene), *cis*	Toluene	25				31
	Phenyloctane	25		451	0.46	32
		50		447	0.46	
	Dioctyl phthalate	16.5		147	0.95	
		21.5		162	0.77	
Poly(isoprene) *cis*	Toluene	25				31
Poly(isoprene) stars	Cyclohexane	25	Three-armed stars	35.4	0.33	33
			Four-armed stars	37.6	0.35	
			Three-armed stars	185	0.4	
			Four-armed stars	195	0.46	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
	Toluene	34	Chlorosilane-linked stars	14–780	0.35–0.88	33
	1,4-Dioxane	34		14–164	0.63–9.2	
	Toluene	34	Divinylbenzene-linked stars	82–195	0.50–1.02	33
	1,4-Dioxane	34		30–70.5	0.71–1.19	
Natural rubber	Benzene	30		354	0.32	34
	n-Hexane	30		170	0.35	34
Natural rubber (epoxidized)	Tetrahydrofuran	25 ?	1% Epoxy	415	0.84	35
			9.5% Epoxy	218	0.43	
			18% Epoxy	30	4.27	
Gutta percha	Toluene	25				31
Poly(chloroprene)	Benzene	25		10	0.58*	36
				30–120	0.34 ± 0.06*	
				150	0.43	
				200	0.52*	
Poly(ethylene)	Tetralin	80				37
	p-Xylene	100	Low pressure	38	0.71	38,39
				97	0.45	
				327	0.69	
	Tetralin	80	Low pressure			40
	p-Xylene	81	Low pressure	35	0.38	38,39
				71	0.27	
				141	0.39	
				153	0.65	
	p-Xylene	81	High pressure	159	0.89	38,39
Poly(isobutene)	Benzene	105	High pressure			39,41
		20		24	0.54	14
				107	0.87	
		24		128	0.49*	42
		25		27	0.49	14
				100	0.59	
				183	0.7	
		30		30	0.49*	14
				100	0.57*	
				240	0.70*	
		40		30–320	0.42* ± 0.02	14
Poly(isobutene)	Carbon tetrachloride	30		14–42	0.36	43
	Chlorobenzene	25		155	0.36	14
	Cyclohexane	25		19	0.38 ± 0.02	44
				54	0.35 ± 0.04	
				384	0.30 ± 0.01	
	Cyclohexane	30		309	0.32	45
				484	0.19	
	Cyclohexane	30	Ref. also includes data for 10 20, 40, 50 C	29	0.41	46
				84	0.34	
				261	0.33	
				389	0.31	
	Dibutyl ether	25		165	0.33	14
	Diisobutylene	25	$M_v = (16–926) \times 10^3$		0.40 ± 0.05	47
	Heptane	25		185	0.3	14
	Isooctane	30	Ref. also includes data for 10, 20, 40, 50 C; only small variation in *k* across range	22	0.57	46
				56	0.43	
				157	0.37	
				219	0.42	
		30	Ref. also includes data for 20, 40 C; only small variation in *k* across range	8.4	0.94	48
				16.7	0.58	
				35.7	0.47	
	Tetrachloroethane	25		276	0.27	14
	Tetradecane	25		189	0.33	14
	Toluene	25		171	0.36	14
Poly(propylene)	Benzene	30	Atactic	30	0.43	49
				95	0.42	50
				150	0.42	49
	Carbon tetrachloride	50	Atactic	253	0.25	50
	Chlorobenzene	30	Atactic	165	0.33	50
	Chloroform	30	Atactic	196	0.31	50

TABLE 1. *cont'd*

Polymer	Solvent	*T* (°C)	Remarks	[η]	k_h	Refs.
	α-Chloronaphthalene	139	Atactic			51
	Cyclohexane	30	Atactic	45–330	0.27 ± 0.02	49
				276	0.24	50
		60–70	Isotactic		0.36	52
	Decalin	30	Atactic	277	0.25	50
		135	Isotactic			51
	2-Ethyl hexyl acetate	30	Atactic	120	0.38	50
	n-Heptane	30	Atactic	205	0.34	50
	Isoamyl acetate	34	Atactic	26	0.45	49
				65	0.65	
				98	0.83	
	Isopropyl ether	30	Atactic	156	0.36	50
	Tetrahydrofuran	30	Atactic	176	0.32	50
	Tetralin	30	Atactic	155	0.36	50
		130	Atactic			51
	Toluene	30	Atactic	30–120	0.36* ± 0.02	49
				190–220	0.40* ± 0.03	
				180	0.35	51
	p-Xylene	125	Atactic			51
1.2. POLY(ACRYLIC ACID) AND POLY(METHACRYLIC ACID) DERIVATIVES						
Poly(acrylic acid)	Water (0.1 M NaCl)	25				53
	Water (0.25 M NaCl)	25	Degree of neutr. = 0	20	0.35	54
			Degree of neutr. = 0.3	150	0.25	
			Degree of neutr. = 0.76; data also for 5, 15, 35, 45 C	240	0.25	
Poly(acrylonitrile)	Dimethyl formamide	25				55
		30		70–190	0.3	56,57
				157	0.4	55,58
				106	0.28	59
				134–296	0.31	
				170–245	0.31*	60
				309–342	0.34 ± 0.1	59
				239–711	0.33	56
				117	0.35	61
		40, 50, 60, 70				60
		60				62
Poly(ethyl acrylate)	Acetone	30		46–177	0.35	63,64
		30	Telomers			65
Poly(decyl methacrylate)	Isooctane	25	Ref. also includes data for 50, 75, 100 C	34	0.55	66
				36	0.45	
				38	0.35	
				40	0.25	
Poly(ethyl methacrylate)	Benzene	35		145	0.29	67
		52		148	0.29	
		60		145	0.36	
	n-Butanol	45		47	0.7	67
		52		55	0.54	
		60		64	0.45	
		70		72	0.4	
	n-Butyl bromide	42		160	0.24	67
		50		149	0.4	
		58		159	0.3	
		65		166	0.25	
	n-Butyl chloride	40		142	0.32	67
		47		144	0.3	
		61		147	0.26	
	Methyl acetate	20–53	Conformational changes occurred in this range	16–50	~0.5 to ~ −0.3	68
	Ethyl acetate	35		133	0.31	67
				120–970	0.25–0.27	69
		45		134	0.28	67
		55				
		65				

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
		20–65	Conformational changes occurred in this range	12–48	~0.45 to ~ −0.1	68
	Isobutyl acetate	20–65	Conformational changes occurred in this range	13–45	~0.5 to ~ −0.15	68
	Isoamyl acetate	50		145	0.39	67
		70		152	0.37	
		80		156	0.32	
	Isopropanol	37		88	1.06	67
		44		129	0.27	
		51		151	0.39	
		60		183	0.43	
	Methyl ethyl ketone	23–45		157–158	0.34–0.35	67
	Methyl *n*-propyl ketone	40		196	0.2	67
		50–70		183–189	0.33 ± 0.01	
	m-Xylene	47		131	0.39	67
		54		134	0.33	
		61		137	0.33	
		70		139	0.29	
Poly(methacrylic acid)	Water (0.1 M NaCl)	25				53
	Water (0.25 M NaCl)	25	Degree of neutr. = 0	30	2.33	54
			Degree of neutr. = 0.1	35	0.65	
			Degree of neutr. = 0.3	240	0.33	
			Degree of neutr. = 0.81; also data for 5, 15, 35, 45 C	575	0.3	
Poly(methacrylonitrile)	Dimethyl formamide	29	Anionic	26	0.4	70
				60–143	0.34* ± 0.03	
Poly(methyl acrylate)	Acetone	30		95–298	0.38	71
				333	0.37	72
		40		314	0.38	72
	Benzene	25		52–343	0.37	71
		30		383	0.31	72
		35		50–335	0.38	71
		40		382	0.38	72
		45, 55		48–330	0.38	71
	Carbon tetrachloride/ methanol	35	Vol. fraction of methanol: 0.33 ([η] maximum, *k* minimum)	25–214	2.94 ± 0.06	73
	Chlorobenzene	25		53–305	0.4	71
	Chloroform	30		220	0.41	74
		35		215	0.39	
		40		222	0.36	
	Ethyl acetate	30, 35, 40		115–120	0.50 ± 0.01	74
	Methyl ethyl ketone	25		45	0.65	75
				85	0.56	
				116	0.39	
		30		108	0.45	73
				302	0.43	72
		35, 40		104	0.44	73
	Toluene	25		34–147	0.59	71
		30		61	0.59	73
				201	0.33	72
		35		34–160	0.52	71
		40		69		73
		45		35–169		71
		55		35–175		71
Poly(methyl methacrylate)	Acetone	25				76
		25?			0.35	82
	Benzene	20		85	0.25	77
		25		4	1.65*	78
				9.5	0.69*	
				14	0.5	
				22	0.35	
				26–40	0.30*	
				68–331	0.25 ± 0.01	
				667	0.18	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
			90% Isotactic	41	0.39	14
				49–61	0.33	
				73–125	0.3* ±0.03	
	Butyl acetate	25		7	0.9	78
				29	0.67	
				64	0.58	
				110	0.47	
			90% Isotactic	22	0.67	14
				39	0.61	
				52	0.57	
	n-Butyl bromide	35		47	0.5	67
		50		63	0.41	
		58		70	0.35	
	Chloroform	25		19	0.32	
				146	0.25	
				223–275	0.38	79
				390	0.22*	
		30, 60		870	0.18	80
	Cyclohexanone	40, 60		138, 152	0.44	67
		50		146	0.45	
		70		136	0.4	
	Dimethyl formamide	25		56	0.48	14
					0.38	82
	Ethyl acetate	25		53	0.41	14
	Isoamyl acetate	50		36	0.71	67
		65		44	0.63	
		80		47	0.5	
	Methyl ethyl ketone	25		7	0.9	78
				27	0.49	
				56	0.4	14
				137	0.33	78
				151	0.4	75
				172	0.49	
		30, 60				80
	Di-*n*-propyl ketone	33.8	Star-branched polymer	11.4	1.66*	81
				17	1.48	
		35–50				78
	Tetrachloroethane	25		101	0.29	14
	Tetrahydrofuran	30	Star-branched polymer	24	0.161*	81
	Toluene	25		40	0.49*	78
				9	0.63	
				24	0.46	
				55	0.41	14
				83	0.33	78
				229	0.25	
				414	0.23	
		30		37	0.43 ± 0.04	44,80
				80	0.41 ± 0.03	
		60				80
	o-Xylene	40		68	0.34	67
		50		72	0.21	
		60		76	0.32	
		70		81	0.27	
	m-Xylene	40		55	0.48	67
		50		62	0.67	
		60		71	0.55	
		70		80	0.35	
	p-Xylene	40		42	1.31	67
		50		48	1.26	
		60		59	0.93	
		70		64	0.47	
Poly(hexyl methacrylate)	*n*-Heptane	30		31	0.5	83
Poly(heptyl methacrylate)	*n*-Heptane	30		45	0.44	83
Poly(octyl methacrylate)	*n*-Heptane	30		64	0.45	83
Poly(tetradecyl methacrylate)	*n*-Heptane	30		58	0.32	83

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
Poly(cyclobutyl methyl methacrylate)	1-Butanol	40		13	1.49	84
				20	1.16	
				36	1.33	
	Tetrahydrofuran	30		22	0.36	84
				57	0.31	
				142	0.3	
Poly(cyclohexyl methyl methacrylate)	1-Butanol	45		10	0.74	84
				17	0.81	
				41	0.62	
	Cyclohexane	30		17	0.18	84
				54	0.43	
				91	0.31	
	Tetrahydrofuran	30		16	0.52	84
				35	0.35	
				105	0.36	
Poly(cyclooctyl methacrylate)	1-Hexanol	38		10	0.94	84
				16	1.46	
				23	1.77	
	Cyclohexane	30		17	0.26	84
				38	0.39	
	Tetrahydrofuran	30		25	0.4	84
				76	0.37	
Poly(cycloundecyl methacrylate)						
	Cyclohexane	30		9	0.69	84
				18	0.49	
				36	0.38	
	Tetrahydrofuran	30		9	0.7	84
				17	0.55	
				36	0.37	
Poly(diphenyl methyl methacrylate)	Toluene	25		19	0.4	85
				95	0.34	
				230	0.35	
	3-Heptanone	45		13	0.76	85
				39	0.73	
				73	0.61	
Poly(2,6-diisopropyl phenyl methacrylate)	Tetrahydrofuran	25		22.6–98.0	0.42	224
	Toluene	25		34.0–88.4	0.41	
	Tetrahydrofuran/water (90.9/9.1, v/v)	25	Theta solvent	33.9–54.1	0.61	
Poly(2,3-epoxypropyl methacrylate)	Tetrahydrofuran	25		11.6	0.79	86
				24.7	0.47	
				28.2	0.52	
	1,4-Dioxane	25		13.5	0.32	86
				16.5	0.55	
				18.5	0.45	
				23	0.41	
				62.7	0.37	
Poly(pentachlorophenyl methacrylate)	Benzene	40		13–42	1.25	87
	Toluene	25		22–87	0.48	
	Ethyl benzene	25		14–23	1.17	
	o-Xylene	25		29–155	0.42	
	Chlorobenzene	25		29–148	0.43	
	o-Dichlorobenzene	25		33–178	0.36	
Poly(2-biphenyl methacrylate)	Chloroform	25		11–111	0.34	88
	Tetrahydrofuran	25		11.0–99	0.33	
	Benzene	25		11.0–98	0.35	
	1,4-Dioxane	25		10.0–91	0.35	
Poly(4-biphenyl methacrylate)	Chloroform	25		11–133	0.29	89
	Tetrahydrofuran	25		11–111	0.3	
	Benzene	25		9.0–64	0.4	
	1,4-Dioxane	25		10.0–87	0.33	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
Poly(di-isobornyl methacrylate)	Tetrahydrofuran	30		25.3–104	0.23 ± 0.01	90
	1-Octanol	39.6		13.1	1.29	
				23	1.13	
Poly(acrylamide)	Water	25		1300–1700	0.35 av.	6
				274	0.16	91
				1353	0.5	
	Water (1 M NaCl)	25		1200–1900	0.33 av.	6
	Water (pH 7)	30		21	0.46	92
1.3. VINYL POLYMERS						
Poly(4-isopropyl styrene)	Toluene	25		44–139	0.34 ± 0.04	93
Poly(4-isopropyl α-methyl styrene)	Toluene	21.5		16.5	0.52	94
				25.5	0.3	
				44	0.42	
				60	0.33	
Poly(styrene)	Benzene	25		105	0.37	95
		25	Atactic	73.5	0.36	96
		25	Atactic	1.7	0.79	109
				5.5	0.71	
				10.2	0.54	
	Benzene/isopropanol	25	Theta temperature, atactic	40.4	0.54	
	Butyl acetate	25		43	0.38	14
				126	0.35	
				150	0.33	
	4-*tert*-Butyltoluene	50	Atactic	7, 13.7	0.57	97
				82.9, 132	0.38	
				187, 432	0.36	
	Carbon tetrachloride	25				98
		30	Ref. also includes data for 10, 20, 40, 50 C	14.5	0.55	46
				43	0.41	
				180	0.33	
				386	0.29	
	Chloroform	30, 60				81
	Cyclohexane	30	Ref. also includes data for	10.7–60.7	0.84 ± 0.03	46
		34.5 = Θ	15, 20, 25, 32, 40, 50 C	10.8–114	0.77 ± 0.06	
		31, 95	Trifunctional star molecule	42	0.6	95
		34		16	0.5	99
				48	0.52	
		34.5	$c > c^{**}$		0.48	2
			$c < c^{**}$		0.78	
		34.5		178	0.61	100
		34.5	$k = 0.5$ for MW > 2.1×10^5; $k > 0.5$ for MW < 2.1×10^5			101
		34.5		1.5	1.3	109
				2.5	0.91	
				3.7	0.96	
				5.4	0.93	
				6.6	0.81	
				9	0.67	
		34	Branched	29–31	0.86* ± 0.02	102
		34.3, 34.8	Trifunctional star molecule	43, 44	0.59	95
		34.5	Atactic	97	0.59	97
		35				103
		36		152	0.51	14
		40		174	0.49	14
		40, 22	Trifunctional star	47	0.53	95
		45	$c < c^{**}$		1.28	2
		50		55	0.50 ± 0.005	99
	cis-Decaline	20		20	0.41* ± 0.02	14
				60	0.43* ± 0.02	
				120	0.45* ± 0.02	
	trans-Decaline	20		38	0.6	14
				80	0.71	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
		25		50	0.49* ± 0.01	14
				130	0.51* ± 0.02	
		30		47	0.4	14
				117	0.42	
	Diethyl malonate	34	Theta temperature	45	0.47	14
				82	0.5	
		40		45	0.5	14
				83	0.47	
	Dimethyl formamide	25		19	0.5	14
				36	0.44	
				76–172	0.39	
		30				57
		35		12.2	0.48	104
				77.2	0.4	
				188	0.41	
		95		20–700	0.48	105
	Dioctyl phthalate	25		49	0.59	14
				89	0.58	
		35		51	0.57	14
				86	0.5	
		45		45	0.56	14
				54–87	0.5	
	1,4-Dioxane	25	$c < c^{**}$		0.81	2
			$c > c^{**}$		0.35	
	Ethyl benzene	25	Ref. also includes data for 10, 40, 55, 65 C	13.4	0.503	46
				26.1	0.423	
				41.7	0.365	
				384	0.291	
	Methyl ethyl ketone	25				98
		30				57,81
		40				64
		40.3		44–151	0.54 ± 0.09	106
		60				81
	1-Methyl naphthalene	25				107
	Toluene	15	Atactic	292	0.34	97
		21		40–125	0.35 ± 0.03	99
				360	0.30 ± 0.05	
				460	0.25 ± 0.08	
		25				98,107
		25	Anionic	8	0.51	39,108
				14	0.44	
				36–272	0.34 ± 0.03	
		25	Thermal	41–123	0.34 ± 0.02	39,108
			Branched	56	0.41	102
				71	0.38	
			Linear	63–84	0.31	102
		30		14	0.46 ± 0.02	39,81,83
				73–234	0.38 ± 0.015	106
				28	0.41 ± 0.02	83
				98	0.39	95
				203	0.34 ± 0.01	83
		30		12.6	0.56	104
				28.1	0.43	
				64	0.38	
				362	0.32	
		60				81
	Toluene/methanol (77/23)	25	Theta temperature	28–80	0.51–0.52	23
Poly(vinyl acetate)	Acetone	18		68	0.33	110
		25		30	0.46	39,64,110
				42–66	0.35*	
				91	0.37	
				134	0.41	
		25		3.7	1.54	111,112
				6.6	1.13	
				8.4	0.79	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
				11.6, 12.9	0.53	
				20.8	0.38	
				27.1	0.34	
		30		70	0.35* ±0.02	113
				250	0.37* ±0.02	
				450	0.39 ±0.02	
		32, 39, 46		65, 64, 63	0.41, 0.42, 0.44	110
	Benzene	30		126	0.17	28
				50–450	0.37 ±0.03	113
				147	0.25	28
				197	0.3	
				262	0.45	
				281	0.65	
		30	Zero shear plot	124–381	0.34	
			Emulsion polymer	77	1.42	113
				133	1.21	
				229	1.05	
		35	Branched	45	0.28	115
				72–200	0.35* ±0.02	
				300	0.37* ±0.02	
				500	0.39* ±0.02	
				700	0.42* ±0.02	
		35	Linear	137–177	0.33* ±0.01	115
				196–250	0.34* ±0.01	
				281–570	0.35* ±0.01	
		40		204	0.25	28
				243	0.28	
				268	0.36	
				354	0.44	
			Zero shear plot	197–413	0.42	
	Chlorobenzene	18		71	0.44	110
		25		37–45	0.35* ±0.03	39,110
				66–69	0.44* ±0.01	
				99–121	0.35* ±0.04	
		32, 39, 46		68, 67, 65	0.43, 0.44, 0.4	110
	2-Chloroethylene	25				64
	Chloroform	18		101	0.34	110
		25		45	0.31	39,110
				62–92	0.37* ±0.02	
				146	0.28	
		32, 39, 46		99, 95, 92	0.37, 0.39, 0.41	110
	Dioxane	18		77	0.27	110
		25		75	0.29	39,110
		32, 39, 46		74, 73, 72	0.31, 0.32, 0.34	110
	Methanol	18		41	0.61	110
		25		30	0.41* ±0.04	39,110
				40	0.49* ±0.03	
				50	0.57* ±0.03	
		30				116
		32, 39, 46		44, 45, 47	0.52, 0.41, 0.39	110
	Toluene	18		46	0.57	110
		25		46	0.55	39,110
		30				116
		32, 39, 46		47, 47, 48	0.56, 0.56, 0.54	110
	Water	25	Partially alcoholized			117
			72.5% Hydrolyzed, unfract.	21	0.67	118
			Middle fractions	20	0.98	
			77.9% Hydrolyzed, unfract.	9.5	2.27	
			Middle fractions	10	3.87	
			73.3% Hydrolyzed, unfract.	20.2	1.03	
			Middle fractions	20.6	1.2	
Poly(vinyl alcohol)	Dimethyl sulfoxide	30				119
	DMSO/water (4/1, w/w)	30	No cooling	122	0.43	225
			Precooled to form clusters	77–99	0.75 ±0.03	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
			Precooled to form clusters	100	1.1	
			Precooled to form clusters	132	1.8	
	Water	25			0.5	120,139
	Water	30		30	0.57*	119,121
		30(?)		42.1	0.59	122
				71, 77, 86.5	0.69	
				96	0.71	
				165	0.81	
		30		40	0.59*	119,121
		30		40	0.9	123
		30		50	0.60*	121
				60	0.66*	
				70–80	0.68*	
				100	0.74*	
				170	0.83*	
	Water (dil. NaOH)	30	0.042 M, 0.084 M NaOH	88, 85	0.65, 0.7	114
			0.167 M NaOH	78	1.6	
	Water (boric acid/ 0.167 M NaOH)	30	0.005 M Boric acid	22	25	114
			0.01 M	28	16	
			0.02 M	42	5.5	
			0.06 M	84	1.8	
	Water	60		32	1.26	123
				59	0.93	
Poly(vinyl chloride)	Acetone	20		36	0.42	14
	Anisole	25		34	0.46	14
	Bromobenzene	25		40	0.4	14
	Butyl acetate	25		43	0.38	14
	γ-Butyrolactone	25		34	0.43	14
	Chlorobenzene	25		39	0.42	14
	Chloroform	20		38	0.49	14
	Cyclohexanone	20				64,124
		25		90–130	0.34	125,126
		30		100–121	0.35	127,128,129
		20–60		23–132		130
		80	Samples with different tacticity	94	0.36	131
				108	0.43	
				287	0.57	
				338	0.64	
				438	0.48	
	Cyclopentanone	20		46	0.33	14
	1,2-Dichloroethane	25		41	0.4	14
	Dimethyl formamide	25		40	0.3	14
	Dioxane	25		33	0.5	14
				40	0.48*	
				50	0.44*	
				60	0.41*	
				70	0.38*	
	Ethyl acetate	25		39	0.43	14
	Ethyl acetyl acetate	25		34	0.43	14
	Methyl ethyl ketone	25		26	0.34	14
				32	0.35	
				47–83	0.38 ± 0.01	
	Morpholine	30		71	0.64	132
				89	0.57	
				108	0.49	
		50		64	0.81	132
				79	0.67	
				98	0.53	
		69		58	0.85	132
				70	0.7	
				87	0.55	
	Nitrobenzene	25		41	0.33	14
	Tetrachloroethane	25		29	0.42	14
				36–76	0.37* ± 0.01	
				93	0.35	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
	Tetrahydrofuran	20	100% Conversion	20–143	0.28* ±0.02	133
				49	0.35	14
				171	0.31	133
				201–220	0.36* ±0.02	
		30		76–91	0.44* ±0.01	132
				107	0.47	
	Tetrahydrofurfuryl alcohol	25		44	0.35	14
	Tetramethylene sulfoxide	25		46	0.46	14
Poly(vinyl cyanoethyl ether)	Water	30				121
	Acetone	30				121
Poly(vinyl biphenyl)	Benzene	20		7	0.55	134
				22–38	0.51* ±0.04	
				93–134	0.34* ±0.01	
		30		7	0.56	134
				21–37	0.51* ±0.03	
				92–133	0.35* ±0.01	
		45		21–37	0.54* ±0.02	134
				91–129	0.36* ±0.01	
		65		7	0.51	134
				21–36	0.51* ±0.12	
				91–126	0.36* ±0.01	
		75		21–36	0.43* ±0.01	134
				90–122	0.36* ±0.01	
Poly(vinyl butyral)	Methanol	25		30	2.69	135
	Ethanol	25		63.2	0.49	135
	n-Propanol	25		75.6	0.58	135
	Isopropanol	25		53.9	1.01	135
	n-Butanol	25		85.2	0.201	135
	Isobutanol	25		57.2	2.29	135
	Cyclohexanone	25		75.1	0.43	135
Poly(vinyl formate)	Acetone	30		50	0.34	136
				113	0.54	
	Acetonitrile	30		48	0.3	136
				162	0.51	
	Dioxane	30		44	0.3	136
				134	0.55	
	Methyl acetate	30		62	0.42	136
				74	0.46	
	Methyl formate	30		48	0.3	136
				107	0.46	
Poly(*N*-vinyl imidazole)	Water (0.2 M NaBr)	25	Degree of neutr. = 0	106	0.63	137
			Degree of neutr. = 0.3	131	0.5	
			Degree of neutr. = 0.8	206	0.36	
Poly(1-vinyl naphthalene)	Benzene	20		16	0.46	134
				27	0.45	
				37	0.41* ±0.03	
		30		15	0.47	134
				27	0.48	
				37	0.43* ±0.02	
		45		15	0.61	134
				26	0.57	
				36	0.43* ±0.02	
		65		14	0.75	134
				25	0.46	
				36	0.44* ±0.01	
		75		14	0.78	134
				25	0.6	
				35	0.49* ±0.01	
Poly(2-vinyl naphthalene)	Benzene	20		18	0.5	134
				46	0.41	
				67–107	0.35* ±0.01	
		30		18	0.5	134
				45	0.43	
				86	0.38	
				106	0.36	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
		45		17	0.58	134
				43	0.45	
				63–103	0.39* ± 0.01	
		65		17	0.51	134
				20	0.43	
				43–101	0.38* ± 0.06	
		75		17	0.48	134
				43–100	0.38* ± 0.06	
Poly(vinyl phenylketone)	Benzene	25				112
Poly(4-vinylpyridine)	Ethanol	25				138
Poly(vinyl pyrollidone)	Dimethyl formamide	25			0.45	139
	Methanol	25		33		140
	Methanol + 0.33 N GC	25	GC; guanidine hydrochloride	30.7		
	Ethanol	25		34		
				28		
	Propanol	25		34		
				29		
	Water	15		17.2	0.45	141
		25		15	0.62	
		35		13.3	0.77	
		45		11.5	0.81	
		55		10.6	0.95	
		65		1.25	1.3	
	Water (salt soln.)	25	1.2 M NaH_2PO_4	15.5	0.97	226
		35	Theta temperature	14.7	1.99	
		25	0.5 M Na_2SO_4	16.9	0.85	
		36	Theta temperature	12.9	2.16	
		25	0.5 M Na_2CO_3	16.2	1.07	
		39	Theta temperature; Ref. contains data for seven other salts	15.5	2.6	
Poly(vinyltrimethylsilane)	Cyclohexane	25		96–154	0.35 ± 0.03	142
Poly(vinyl 4-trimethylsilyl benzoate)	Toluene	25		136	0.19	143
Poly(vinyl 3-trimethylsilyl benzoate)	Toluene	25		214	0.54	143
Poly(vinylidene fluoride)	Dimethylacetamide	25		76	0.35	144
				116	0.37	
				143	0.32	
				189	0.27	
				325		0.42
		25	[η] corr. for aggregation	108	0.33	145
				124	0.37	
				132	0.42	
				174	0.47	
	Dimethyl formamide	25		74	0.31	144
				128	0.36	
				175	0.39	
Poly(ethylene glycol monovinyl ether)	Water	25		~75	0.54	146
	Ethanol	25		?	0.47	
	Dimethyl formamide	25		~65	0.4	
1.4. POLY(OXIDES)						
Poly(oxyethylene)	Benzene	20		2	~3.7	147
				48	0.4	
	Chloroform	20		3	~0.9	147
				82	0.4	
	Dimethyl formamide	20		3	~0.6	147
				45	0.4	
	Toluene	30		3	~2.5	147
				39	0.4	
		35		1.1	8.16	148
				1.9	3.41	
				2.4	2.06	
				5.5	2.3	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
	Water	10.2	MW = 1.0×10^5	98.3	0.63	227
		18.1		91.4	0.71	
		24		84.9	0.87	
		32		77.5	0.97	
	Water	20		3	1.1	147
				5	0.4	
		25		37.7	0.39	149
		30		28.1	0.39	150
				36.5	0.46	149
				41.1	0.22	150
		35		1.7	4.95	148
				3	2.42	
				5	0.93	
				10.8	0.44	
	Water (2.40 M NaCl)	25		26.1	0.82	150
		54	Theta temperature	17	1.64	
	Water (1.5 M Na acetate)	25		28.9	0.56	149
		55	Theta temperature	20.8	0.9	
	Water (1.5 M Na formate)	25		29.5	0.57	149
		52	Theta temperature	21.2	0.98	
	Water (0.80 M KF)	25		29.5	0.56	151
		49	Theta temperature	22.7	0.76	
	Water (2.40 M KNO_3)	25		26	0.55	149
		53	Theta temperature; Refs. 149–151 include data on a number of other salts	20	0.87	
	Water (urea)	10.2		97	0.53	227
		20.1		89	0.57	
		32		80	0.72	
		10.2		116	0.43	
		16–32		109–96	0.47 ± 0.03	
Poly(oxymethylene)	*p*-Chlorophenol	60		135–270	0.3	152
	Dimethyl formamide	140		69	0.23	152
				102	0.21	
		150				152
Poly(oxypropylene)	Benzene	35				153
1.5. POLY(ESTERS)						
Poly(oxyethyleneoxy adipoyl)	Cyclohexanone	25				154
	Dimethyl formamide	25				154
Poly(bis(oxyethylene) oxyadipoyl)	Methyl ethyl ketone	25	Oligomers with different functionality			155
			Nonfunctional	3.1	0.39, 0.42	155
				3.6	0.46	
				4.3	0.42	
			Monofunctional	3.3	0.3	155
				4.2	0.34	
				4.5	0.42	
				5.2	0.32	
			Bifunctional	3.5	0.25	155
				4.1	0.32	
				4.8	0.26	
				5.3	0.22	
				5.7	0.3	
				8.7	0.25	
Poly(oxyethyleneoxy sebacoyl)	Cyclohexanone	25				154
Poly(oxyethyleneoxy terephthaloyl)	*m*-Cresol/phenol (1/1)	25				156
Poly(mono-ethyl itaconate)	Methanol (0.1 M KI)	25		40.2	0.25	157
				67.1	0.34	
				86	0.47	
	2-Ethoxyethanol	25		41.3	0.2	157
				55	0.22	
				71	0.3	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
1.6. POLYAMIDES						
Poly(iminoadipoylimino hexamethylene) (Nylon 66)	*m*-Cresol	20				158
	Formic acid (90%)	25		83	0.2	159
				100	0.22* ± 0.01	
				120	0.24* ± 0.02	
				140	0.27* ± 0.02	
				200	0.29* ± 0.01	
Poly(iminoisophthaloyl imino-1,2-phenylene)	Dimethyl formamide (1.18 N LiCl)	25	1,3- and 1,4-phenylene polymers also in this Ref. (in DMF/LiCl and sulfuric acid/LiCl)			160
Poly[imino(1-oxohexa methylene)] (Nylon 6)	Tricresol	25	Polymers with different end groups			161
	m-Cresol	?	Branched polymers with different end groups	27–220	2.75–0.26	162
		20–60				163
	Tricresol	25	(0.019 vol.% water)	50	1.1	161,164
				109	0.49	
				335	0.29	
	Formic acid (85%)	25		70	0.32* ± 0.08	165
				80	0.22* ± 0.06	
				85	0.18* ± 0.02	
				48	0.24	164
				86	0.12	
				460	0.13	
	(68.8%)	25		32	0.38	164
				200	0.32	
				240	0.34	166
				558	0.56	
				965	0.89	
				1340	1.31	
				73	0.24	166
				101	0.66	
				155	1.36	
				305	3.36	
	Hexafluoroisopropanol	25	(0.05 M CF_3COONa)	200–500	0.23	167
	Sulfuric acid (96%)	25		94–104	0.30* ± 0.07	165
	(93%)	25		63	0.42	164
				125	0.26	
				490	0.23	
				502	0.19	
	(80%)	25		48	0.5	164
				90	0.34	
				325	0.3	
	(62%)	25		34	1.06	164
				60	0.74	
				195	0.36	
	(60%)	25		52	0.52* ± 0.1	165
				54	0.44* ± 0.1	
				57	0.34* ± 0.06	
	(52.5%)	25		30	1.37	164
				50	0.96	
				135	0.44	
				152	0.39	
	(33%)	25				165
Poly[imino(1-oxo-undeca-methylene)]	Phenol: CCl_4 (1 : 1)	25				168
	Nylon 12	45				
		75				
Poly(iminoterephthaloyl imino-1,2-phenylene)	Sulfuric acid	25	1,3- and 1,4-phenylene polymers			160
	Dimethyl formamide (1.18 N LiCl)	25	also in this Ref. (in sulfuric acid)			160
Poly(amidobenzimidazole)	Sulfuric acid	25	Virgin fibers	440	0.5	169
Aramid fibers		25	Heated to 140°C	460	0.54	
		25	Heated to 160°C	440	0.65	
		25	Heated to 200°C	500	0.6	
		25	Heated to 250°C	520	0.6	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
Poly(*p*-benzanalide terephthalamide)	Sulfuric acid	25	Rod-like polymer, high MW	>100	~0.5	170
			Low MW	<10	>1.0	
Poly(caprolactam)	Sulfuric acid (80%)		Fibers	121–143	0.29* ± 0.02	171
1.7. OTHER COMPOUNDS						
Al-isopropoxypoly(vinyl butyral)	Methanol	25		32.4	1.87	135
	Ethanol	25		46.7	0.95	
	n-Propanol	25		51.9	0.87	
	Isopropanol	25		52.7	0.41	
	n-Butanol	25		58.6	0.54	
	Isobutanol	25		45.1	0.95	
	Cyclohexanone	25		51.4	0.91	
Poly(2-acrylamido-2-methyl propanesulfonic acid)	Water	25		68	0.53	228
	Water			218	0.27	
Poly(2-acrylamido-2-methyl propane sulfonamide	Water			178	0.31	228
	Water	25		480	0.25	229
Poly(epichlorohydrin)	Tetrahydrofuran	25		44–555	0.36* ± 0.03	172
	Cyclohexanone	25		51–755	0.36* ± 0.01	
Poly(*N*,*N*′-dimethyl(acryl amidopropyl) ammomium propane sulfonate	Water (0.5 M salt)	30	NH_4Cl	32	0.9	173
			LiCl	37	0.29	
			NaCl	39	0.16	
			KCl	40	0.15	
			$MgCl_2$	50	0.45	
			$CaCl_2$	55	0.48	
			$SrCl_2$	54	0.53	
Poly(dimethylaminoethyl methacrylate dimethyl sulfate)	Water (0.1 M salt)	30	KF	386	0.21	174
			KCl	243	0.23	
			KBr	224	0.25	
			KI	170	0.28	
			LiCl	280	0.11	
			NaCl	253	0.21	
			KCl	243	0.23	
			CsCl	247	0.5	
Poly[3-dimethyl(methacryl oyloxyethyl)ammonium propane sulfonate]	Water (KCl)	30	0.25 M	49	0.7	175
			0.30 M	55	0.55	
			0.40 M	62	0.41	
			0.50 M	74	0.41	
			0.8 M	80	0.34	
			1.50 M	93	0.29	
	Water (0.5 M)	30	LiCl	57	0.56	175
			NaCl	68	0.5	
			KCl	74	0.41	
			KBr	80	0.39	
			KI	98	0.38	
			$KClO_4$	106	0.37	
			$CaCl_2$	77	0.37	
Poly(ether imide)	Dichloromethane	10		43	0.43	176
		25		37	0.66	
	Pyridine	10		25	2.13	176
		25		23	2.44	
	N-Methyl pyrollidone	10		51	0.48	176
		25		45	0.59	
	NMP/water (96/9)	10		33	1	176
		25		34	0.8	
		50		29	1.16	
	NMP/water (95/5)	25		25	1.93	176
		50		23	2.23	
Poly(ethylene imine)	Water (1 M NaCl)	35		10.4–64.4	0.76* ± 0.02	230
Poly(ethylene oxide)urethanes	Tetrahydrofuran	25	Different hydrophobic end caps	19, 18.5, 24	0.4	177
Na-polyphosphate	Water (NaBr)	25		50–276	0.29* ± 0.04	178

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
Poly(di-*n*-hexylsilane)	Tetrahydrofuran	25		58	0.33	179
				87	0.36	
				133	0.34	
				143	0.4	
				192	0.44	
				515	0.38	
				831	0.66	
Poly(oxydimethylsilylene)	Benzene	25		251	0.44	180
	Carbon tetrachloride	25		312	0.51	180
	Chlorobenzene	25		219	0.61	180
	Cyclohexane	25		324	0.37	180
	n-Heptane	25		305	0.45	180
	Methyl ethyl ketone	25		151	0.8	180
	Tetrahydrofuran	25		319	0.39	180
	Toluene	25		62–241	0.55* ± 0.02	180
				146	0.51	181
				577–727	0.46* ± 0.01	182
				10–210	0.35–0.50	182
Poly(methylene *N,N*-dimethylpiperidinium chloride)	Water (NaCl)	20–60	Ionic strengths ranging 0.1–0.5 M			183
Poly[bis(2-phenylethoxy) phosphazene]	Tetrahydrofuran	25		8.4	0.42	231
				11.7	0.62	
				12.9	0.32	
Phenolphthalein poly(aryl ether sulfone)	Dimethyl formamide	25	MW = 0.8×10^5	29	0.49	Bo
			MW = 2.20×10^5	53.6	0.62	
			MW = 4.90×10^5	89.3	0.51	
	Chloroform	25	Reference includes data	28.5	0.74	Bo
			from additional solvents,	50.5	0.89	
			molecular weights	82.7	0.78	
Poly(phenyl quinoxaline)	Chloroform	25?		65	0.53	184
	Chloroform/toluene (98/2)			75	0.33	
	Chloroform/toluene (95/5)			62	0.31	
	Chloroform/ethanol (95/5)			78	0.06	
Poly(sodium acrylate)	Water (NaCl)	25	0.4% NaCl	256	0.38	185
			1.30%	153	0.42	
			5.00%	77	0.51	
			10.00%	59	0.65	
	Water (0.4% NaCl)	25	3% C8 substitution	276	0.34	
	10% NaCl			78	0.48	
	0.40% NaCl		3% C12 substitution	278	0.37	
	1.30% NaCl			165	0.6	
	5.00% NaCl			64	2.2	
	10.00% NaCl			34	6.3	
Poly(styrene sulfonic acid), potassium salt	Water (KCl)	25	Ionic str., $I = 1.00$ M	8.2	0.75	186,187
			$I = 4.0 \times 10^{-1}$ M, MW 41.5	15.7	1.14	
			$I = 1.0 \times 10^{-2}$ M	27.5	3.73	
			$I = 3.0 \times 10^{-1}$ M	39	12.4	
			$I = 1.0 \times 10^{-1}$ M	65.7	20	
			$I = 1.00$ M, MW 109.5	15.7	0.76	
			$I = 1.0 \times 10^{-1}$ M	39.9	0.49	
			$I = 7.0 \times 10^{-1}$ M	83.5	2.93	
			$I = 3.0 \times 10^{-1}$ M	105	6.62	
			$I = 1.0 \times 10^{-1}$ M	148	18.7	
			$I = 3.1$ M, MW 1170	16.6	4.92	
			$I = 1.0$ M	115	0.37	
			$I = 1.0 \times 10^{-1}$ M	361	0.26	
			$I = 1.0 \times 10^{-3}$ M	3353	0.73	
			$I = 3.0 \times 10^{-4}$ M	5786	1.28	
			$I = 3.0 \times 10^{-5}$ M	9661	7.91	
Sodium poly(styrene-sulfonate)-diallyldimethyl ammonium chloride			$I = 10^{-4}$ M	4480	22.9	233
			$I = 10^{-3}$ M	2750	2.51	
			$I = 10^{-2}$ M	1150	0.39	
			$I = 0.5$ M	202	0.29	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
			Ref. also gives data for copolymers with acrylamide			
Poly(thiopropylene)	Benzene	20				188
1.8. CELLULOSE, CELLULOSE DERIVATIVES, AND POLYSACCHARIDES						
Alginate(sodium)	Water ($NaCl/CuCl_2$)	30	Near gelation point	180	0.27	234
Amylose	Water (KOH)	25				189
	Water (NaOH)	25				189
	Water (KOH–NaCl)	25				189
	Water (1 N KOH)	25		139	0.19	190
		30		129	0.2	190
		35		121	0.48	190
		40		107	0.88	190
Arabinoglucuronoxylan	Water	25		41.6 ± 2.2	3.6 ± 0.6	235
Cellulose	Cd-ethylenediamine	20		339–1395	0.50 ± 0.01	191
	(Cadoxen)	25		426–510	0.46* ± 0.01	192
	Cu-ethylenediamine	25		440	0.54* ± 0.02	192
	(Cuoxen)			466	0.59	
				510	0.65	
	Zn-ethylenediamine (Zincoxen)	25		248–383	0.47* ± 0.09	192
	LiCl/dimethylacetamide	30	MW = 4.2 to 4.5 × 10^5	641–682	0.43–0.59	236
Cellulose acetate	Acetone	30				193
	Formic acid	30				193
	Pyridine	30				193
Cellulose diacetate		25		295	0.56	194
				196	0.8	
				185	1.3	
				155	1	
		30				
	Dimethyl formamide	25?	Subst. = 2.34 as-is reprecipitated	158	0.48	195
				145	0.87	
			Subst. = 2.34 as-is reprecipitated	230	0.32	
				200	0.72	
			Subst. = 2.55 as-is reprecipitated	199	0.29	
				195	0.35	
Cellulose triacetate	Acetic acid	25		72	0.42	196
				117	0.57	
	Chloroform	25		43	0.45	196
				72	0.43	
	Methylene chloride	15–30	Θ temp. = 27°C			197
	Tetrachloroethane	25		50	0.34	196
				82	0.38	
Cellulose acetate phthalate	Water (NaCl solns.)	35	Salt conc. = 0.002 M	90	8.64	198
			Salt conc. = 0.006 M	71	3.36	
			Salt conc. = 0.0.1 M	68	1.69	
Cellulose nitrate	Acetone	20		695–1195	0.53* ± 0.08	191
	Diethyl adipate	25				199
	Isoamyl acetate	25				200
Methyl cellulose	Water	20		400	1.2	237
Ethyl cellulose	Ethyl acetate	20		41–188	0.65 ± 0.15	191
Ethyl hydroxyethyl cellulose	Water	20		440	1	238
			0.5 mM/g SDS	175	11.3	
			1.0 mM/g	135	18	
			2.0 mM/g	125	13	
			5.0 mM/g	140	7.5	
Hydroxyethyl cellulose	Water	0		423	0.57	201
				845	0.74	
				1052	0.8	
				1218	0.87	
		15		402	0.43	201
				794	0.59	
				977	0.68	
				1130	0.75	

TABLE 1. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_h	Refs.
		20		273	1.22	237
		25		128	0.31	239
		25		381	0.3	201
				754	0.47	
				895	0.62	
				1062	0.67	
		35		370	0.22	201
				725	0.4	
				875	0.49	
				1010	0.57	
		40		100	0.75	239
		60		86	0.85	
	Water	25	pH 2.2	622	4.04	202
			pH 3.0	624	3.09	
			pH 5.0	610	2.94	
			pH 7.0	600	3.1	
			pH 9.0	674	2.39	
			pH 11.0	740	1.48	
			pH 12.0	792	1.23	
	Water (LiCl)	25	1×10^{-1} to 1×10^{-3} M	900* ± 42	0.98* ± 0.16	202
	Water (KCl	25		928* ± 14	0.90* ± 0.03	202
	Water ($CuCl_2$)	25		951* ± 1	0.86* ± 0.01	202
	Water ($MnCl_2$)	25		930* ± 15	0.98* ± 0.08	202
Degraded hydroxyethyl cellulose	Water	25	Thermal degradation in water or salt soln. at 60, 80, 100°C			202
Hydrophobically modified hydroxyethyl cellulose	Water	25		110	1.45	239
		40		91	2.22	
		60		69	3.75	
Hydroxypropyl cellulose	Water	20		134	0.83	237
Hydroxy propylmethyl cellulose	Water	20		740	0.54	
Na-carboxymethyl cellulose	Water (NaCl)	25	Subst. 0.75; 0.01, 0.1, and 0.2 M NaCl			198
	Water (1 M NaCl)	25	Subst. 0.5–2.5			203
	Water (1 N NaOH)	25	Subst. 0.5–2.5			203
	Water (NaCl)	25				204
Acidic hetero polysaccharides	0.5 M NaCl/10% cadox.	30	from *Auricularia auricula*	72	0.2	205
	0.5 M K, NaH phosphates		*judae*	101	0.36	
β-D-Glucan	Water	30	from *Auricularia auricula*	4900	0.49	205
	10% Cadoxen		*judae*	4050	0.41	205
	Water			265	0.21	205
	10% Cadoxen			353	0.23	205
	88% Formic acid			750	0.49	205
Lyzozyme	Water	5	Enzyme from egg-whites	3.05	1.35	240
		15	(glycoside hydrolase)	2.83	1.42	
		25		2.66	1.48	
		40		2.49	1.54	
		55		2.41	1.58	
Microbial polysaccharide	Water (NaCl)	25?	Kelco S-657; 0.001 M NaCl	752	0.99	206
				838	0.62	
				1452	0.73	
				2194	0.81	
			0.1 M NaCl	680	0.7	206
				750	0.43	
				1380	0.59	
				2097	0.6	
Welan gum	Water (NaCl)	25?	Kelco S-130; 0.001 M NaCl	738	0.94	206
				1078	0.99	
				1537	1	
				2471	0.86	
			0.1 M NaCl	641	0.46	206
				984	0.55	
				1510	0.51	
				2370	0.62	
Xanthan gum	Water (0.1 M NaCl)	25	Native	10300	0.45	207
			Renatured	13200	0.46	

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TABLE 2. SCHULZ–BLASCHKE CONSTANTS

Polymer	Solvent	T (°C)	Remarks	[η]	k_{sb}	Refs.
Poly(isoprene)						
Gutta percha	Toluene[a]	25				208
Poly(chloroprene)	Benzene	25		19–208	0.32	209
Poly(methylene)	*m*-Xylene[a]	120				208
Poly(ethylene)	Decalin	135	Low pressure	121–1535	0.29	210
Poly(1-butene)	Decalin	115	Stereoregular	$\eta_{sp} < 1$	0.48	211
Poly(isobutene)	Diisobutylene	20				208
Poly(acrylonitrile)	Dimethyl formamide	25				208
Poly(methyl methacrylate)	Acetone	25				208
				$\eta_{sp} < 1$	0.5	211,212
		32		$1/k_{sb} = 6.09 \log(\eta_{sp} + 5) - 2.05$		213
	Benzene[a]	25				208,212
	Butyl acetate	25				212
	Chloroform	20		25–480	0.3	10
	Chloroform[a]	25				208
		27.3				214
		32		$1/k_{sb} = 5.41 \log(\eta_{sp} + 5) - 1.15$		213
	Methyl ethyl ketone	25		$\eta_{sp} < 1$	0.5	211
	Toluene[a]	25				208
Poly(ethyl methacrylate)	Methyl ethyl ketone	23		$\eta_{sp} < 1$	0.33	211
Poly(*n*-butyl methacrylate)	Isopropanol	21.5	Theta temperature	$\eta_{sp} < 1$	1	211
	Methyl ethyl ketone	23		$\eta_{sp} < 1$	0.36	211
Poly(1-ethylbutyl methacrylate	Isopropanol	27.4	Theta temperature	$\eta_{sp} < 1$	0.89	211
	Methyl ethyl ketone	25		$\eta_{sp} < 1$	0.3	211
Poly(*n*-hexyl methacrylate)	Isopropanol	32.6	Theta temperature	$\eta_{sp} < 1$	0.7	211
	Methyl ethyl ketone	23		$\eta_{sp} < 1$	0.36	211
Poly(*n*-octyl methacrylate)	*n*-Butanol	16.8	Theta temperature	$\eta_{sp} < 1$	0.8	211
	Methyl ethyl ketone	23		$\eta_{sp} < 1$	0.46	211
Poly(*n*-lauryl methacrylate)	*n*-Butyl acetate	23		$\eta_{sp} < 1$	0.38	211
	Isopropyl acetate	13	Theta temperature	$\eta_{sp} < 1$	0.59	211
Poly(acrylamide)	Water	25		1400–1800	0.20* ± 0.06	6
	Water (1 M NaCl)	25		1200–2000	0.20* ± 0.07	6
Poly(vinyl alcohol)	Water	30		42.5–178	0.46* ± 0.02	122
Poly(vinyl chloride)	Cyclohexanone	25	MW 69000–106000		0.28 ± 0.01	215
			reprecipitated		0.32 ± 0.03	
	Cyclohexanone[a]	25				208
		20–60		21–139		130
Poly(vinyl acetate)	Benzene	30		$1/k_{sb} = 5.224 \log(\eta_{sp} + 4) - 0.65$		213
	Toluene	25				208
Poly(styrene)	Benzene	25		1		208
		30		$1/k_{sb} = 10.534 \log(\eta_{sp} + 3) - 2.65$		213
	Butanone[a]	25				208
	Chloroform	25				208
	Cyclohexane	34				208
	Ethyl acetate	25				208
	Methyl ethyl ketone	30				214
	Toluene[a]	25				208
		30				214
	m-Xylene[a]	25				208
Poly(α-methyl styrene)	Cyclohexane	30		28	0.82	216
				34	0.99	
				52	1.05	
				68	1.02	
				78	0.77	
	Cyclohexane/ ethylacetate (50/50)	30		37	0.4	216
				56	0.29	
				88	0.37	
				119	0.38	
				164	0.39	
Poly(2-methyl-5-vinyl tetrazole)	Chloroform	20		26	0.4	217
				37	0.26	
				56	0.41	
				86	0.26	

TABLE 2. *cont'd*

Polymer	Solvent	T (°C)	Remarks	[η]	k_{sb}	Refs.
				186	0.19	
				270	0.19	
	Dimethyl formamide	20		20	0.59	217
				39	0.38	
				64	0.33	
				128	0.23	
				236	0.22	
	Methylene chloride	20		27	0.26	217
				34	0.19	
				55	0.29	
				89	0.25	
				168	0.3	
				244	0.35	
Poly(oxyethylene)	Acetonitrile	25		$M_v > 10^4$	0.22	218
	Benzene	10		$M_v > 10^4$	0.21	218
		37		$M_v > 10^4$	0.23	
	Benzyl alcohol	25		$M_v > 10^4$	0.19	218
	Carbon tetrachloride	25		$M_v > 10^4$	0.3	218
	Dimethylformamide	25		$M_v > 10^4$	0.27	218
	Dioxane	25		$M_v > 10^4$	0.27	218
	Methanol	25		$M_v > 10^4$	0.26	218
	Methyl acetate	25		$M_v > 10^4$	0.27	218
	Water	25		$M_v > 10^4$	0.17	218
Poly(oxydimethylsilylene)	Butanone[a]	25				208
	Chloroform[a]	25				208
Poly(iminoadipoylimino hexamethylene) (Nylon 66)	Formic acid (90%)	25		83	0.2	159
				100	0.22* ± 0.02	
				120	0.24* ± 0.02	
				140	0.26* ± 0.02	
				200	0.28* ± 0.01	
Poly(amide imide)	*N*-Methyl pyrollidone	30		19–87	0.3	219
Cellulose	Cadoxen	20		339–1395	0.29 ± 0.08	191
	Cuoxam	20		946–1125	0.29	220
	Cuoxen	20		190–2800	0.29	221
Cellulose acetate	Acetone	25				64
Cellulose nitrate	Acetone	20	(13.7% N)	180–500	0.29	222
				500–1000	0.34	
				1000–1400	0.37	
				1400–2000	0.4	
				695–1995	0.30 ± 0.03	191
		27				64
	Ethyl acetate	20	(13.7% N)	200–600	0.26	222
				600–1200	0.3	
				1200–1800	0.33	
				1800–2400	0.37	
Ethyl cellulose	Acetone	20, 30, 40	Subst. = 2.73	24–180	0.35, 0.33, 0.32	223
	Benzene	20, 30	Subst. = 2.73	26–450	0.36, 0.35	223
		40	Subst. = 2.73	362–418	0.34	
	Isobutanol	20, 30, 40	Subst. = 2.73	25–420	0.34, 0.33, 0.32	223
	n-Butyl chloride	20, 30, 40	Subst. = 2.73	25–470	0.33, 0.33, 0.32	223
	Ethyl acetate	20, 30, 40	Subst. = 2.73	25–450	0.29, 0.28, 0.27	223
		20		41–1888	0.31 ± 0.05	191

[a] k_{sb} is roughly calculable from the Arrhenius constant.

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Theta Solvents

Hans-G. Elias
Michigan Molecular Institute, 1910 West St. Andrews Rd., Midland, MI 48640, USA

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A. INTRODUCTION

1. Fundamentals

1.1 Thermodynamics The theta state is defined as that state of a polymer solution at which the excess chemical potential, and correspondingly, the excess Gibbs energy of dilution is zero. For a given polymer–solvent system, this state is obtained at a certain characteristic temperature, the theta temperature Θ. A solvent at this temperature is called a theta solvent.

Since Flory (110) was the first to show the importance of the theta state for a better understanding of physical structures and properties of polymers, the theta temperature is sometimes also called "Flory temperature". The name "van't Hoff temperature" has also been suggested (127). However, neither "Flory temperature" nor "van't Hoff temperature" has gained acceptance.

The exact definition of the theta state is given by chemical thermodynamics. The chemical potential of a solvent 1, $\Delta\mu_1$, can be split into an ideal term and an excess term:

$$\Delta\mu_1 = \Delta\mu_1^{\mathrm{id}} + \Delta\mu_1^{\mathrm{exc}} \qquad \text{(A1)}$$

where the excess chemical potential at the thermodynamic temperature T is given by the enthalpy of dilution, ΔH_1, and the excess entropy of dilution, $\Delta S_1^{\mathrm{exc}}$:

$$\Delta\mu_1^{\mathrm{exc}} = \Delta H_1 - T\Delta S_1^{\mathrm{exc}} \qquad \text{(A2)}$$

A zero excess chemical potential does not imply that both the enthalpy of solution and the excess entropy of solution are zero as in the case of true ideal solutions where $\Delta H_1 \equiv 0$ and $\Delta S_1^{\mathrm{exc}} = 0$. Rather, a theta state means only that the terms on the right side of Eq. (A2) compensate each other at the theta temperature Θ, i.e., $\Delta H_1 \equiv \Theta\Delta S_1^{\mathrm{exc}}$ for $\Delta\mu_1^{\mathrm{exc}}$ at $T = \Theta$. Solutions in the theta state are thus not thermodynamically ideal but thermodynamically pseudo-ideal (306).

The chemical potential cannot be measured directly. It may be expressed, however, by the product of the osmotic pressure Π of the solution and the partial specific volume $^*\mathrm{v}_1$ of the solvent:

$$-\Delta\mu_1 = {}^*\mathrm{v}_1\Pi \qquad \text{(A3)}$$

The concentration dependence of the osmotic pressure of non-electrolyte solutions can be written as a power series

$$\Pi = A_1c_2 + A_2c_2^2 + A_3c_2^3 + \cdots \qquad \text{(A4)}$$

where $c_2 = m_2/V$ is the mass concentration of the polymer (mass m_2 of the polymer 2 per total volume V of the solution *after* mixing polymer and solvent) and A_1, A_2, $A_3, \ldots$ are first, second, third,... virial coefficients, respectively. The second virial coefficient is a measure of the interaction between two bodies, the third virial coefficient a measure of interactions between three bodies, etc. Second and third virial coefficients depend on the chemical structure and the molar mass of the polymer, the chemical structure of the solvent (and thus its interaction with the polymer), and the temperature.

The first virial coefficient is given by

$$A_1 = RT/\overline{M}_n \tag{A5}$$

where R is the general gas constant ($R = 8.314510$ J/K/mol) and $\overline{M}_n$ is the number-average molar mass of the polymer. Eq. (A4) is thus often written as

$$\frac{1}{(\overline{M}_n)_{app}} \equiv \frac{\Pi}{RTc_2} = \frac{1}{\overline{M}_n} + Bc_2 + Cc_2^2 + \cdots \tag{A6}$$

where $(\overline{M}_n)_{app}$ is the apparent number-average molar mass, $B = A_2/RT$, and $C = A_3/RT$.

The third term of the right-hand side of Eq. (A4) is often negligible at low polymer concentrations. Combinations of Eqs. (A1), (A3) and (A4) then yields,

$$A_2 = -\Delta\mu_1^{exc}/({}^*v_1 c_2^2) \tag{A7}$$

Since by definition the excess chemical potential is zero at the theta temperature, the second virial coefficient (but not necessarily the third virial coefficient) is also zero ($A_2 = 0$ at $T = \Theta$). The concentration dependence of the reduced osmotic pressure, Π/c_2, is thus zero at the theta temperature, albeit at low concentrations only. The same reasoning applies to other colligative methods (cryoscopy, ebullioscopy, vapor phase osmometry) and also to those physical methods that measure concentration dependencies of apparent molar masses (static light scattering, sedimentation equilibrium, combination of sedimentation and diffusion coefficient, etc.). An example is static light scattering which yields at the scattering angle $\vartheta \to 0°$:

$$\frac{1}{(\overline{M}_w)_{app}} \equiv \frac{K_0 c_2}{R_0} = \frac{1}{\overline{M}_w} + 2Bc_2 + 3Cc_2^2 + \cdots \tag{A8}$$

where $(\overline{M}_w)_{app}$ = apparent mass-average molar mass, K_0 = optical constant at zero angle, and R_0 = Rayleigh ratio at zero scattering angle. The virial coefficients B and C of light scattering average differently over interactions than those of colligative measurements; B and C of polymolecular ("polydisperse") polymers are numerically different for osmotic pressure and light scattering measurements.

The theta temperature may also be phenomenologically defined as the critical miscibility temperature at the limit of infinite molar mass (110). Since a solution may exhibit two critical miscibility temperatures, a polymer solution may display two theta temperatures. In the case of endothermic solutions, a lowering of temperature leads to less positive second virial coefficients and the theta temperature corresponds to an upper critical solution temperature (UCST) in the limit of infinite molar mass. The theta temperature corresponds to a lower critical solution temperature (LCST) in the case of exothermic solutions (see, e.g., (92)).

1.2. Unperturbed Dimensions The thermodynamic behavior described above results from the fact that long-range interactions between polymer segments are absent in the theta state. Long-range interactions are intramolecular interactions between segments or groups of one and the same polymer molecule that are separated by many chemical bonds along the chain; they are remote in sequence but adjacent in space. Short-range interactions are interactions between chain groups that are near to each other in sequence. They are determined by the length of chain bonds, the valence angles between chain atoms, and the hindrance to rotation around chain bonds (usually due to a pair (4 chain bonds) or two pairs (5 chain bonds) of conformers in the chain).

In a thermodynamically good solvent ($A_2 \gg 0$), polymer–solvent interactions are much larger than polymer–polymer and solvent–solvent interactions. The polymer chain expands in order to minimize polymer–polymer contacts; the dimensions of these chains are said to be perturbed. In such perturbed chains, the space occupied by one polymer segment is excluded for all other segments of the same polymer chain, i.e., even at infinite dilution.

In a theta solvent ($A_2 = 0$), polymer–solvent interactions are just balanced by polymer–polymer and solvent–solvent interactions. Long-range interactions disappear and the polymer chain assumes its so-called unperturbed dimensions which manifest themselves for linear chains by a dependence of the root-mean square radii of gyration s, on the square root of molar masses:

$$\langle s^2 \rangle_0^{1/2} = K_{s,0} M^{1/2} \tag{A9}$$

Intrinsic viscosities $[\eta]$ are also controlled by the space requirements of polymer molecules. For unperturbed coils of linear chains, one can write (see textbooks of polymer science)

$$[\eta]_0 = \Phi_0(\langle s^2 \rangle_0/M)^{3/2} M^{1/2} = K_0 M^{a_v} \tag{A10}$$

where Φ_0 is usually assumed to be a universal constant (but see Ref. 498). The dependence of the radius of gyration, $\langle s^2 \rangle^{1/2}$, or the intrinsic viscosity, $[\eta]$, on the square-root of the molar mass is generally taken as a manifestation of unperturbed dimensions and thus also of the presence of the theta state of the polymer.

The assumption that theta conditions lead to unperturbed dimensions is often fulfilled within limits of error for most of the investigated polymers but it is not true in the general

sense. The thermodynamic definition of the theta state refers to the *global* properties of polymer solutions whereas the definition of unperturbed dimensions relates to the *local* properties of the chain. Both definitions agree *exactly* only if infinitely thin chains are surrounded by a locally and globally homogeneous continuum of solvent molecules.

The ability of a theta solvent to generate unperturbed dimensions thus depends on the constitution and configuration of the polymer, the solvent, and the temperature [83] since all these factors influence long-range interactions (excluded volume effects and interactions with the solvent). Small molar mass dependencies of theta temperatures are sometimes detectable for single solvents (230), especially at low molar masses when the effects of end groups or small helical segments (525) become noticeable.

However, if the macromolecules have long side chains and if the main chain and the side chains are constitutionally different, then the theta state of a polymer solution may not be identical with the unperturbed state of polymer coils, even for single solvents. An example is the solution of poly(octadecyl methacrylate) in butyl acetate which is in the theta state at 10.5°C ($A_2 = 0$). At this temperature, the exponent a_v of the intrinsic viscosity/molar mass relationship of Eq. (A10) was found as $a_v = 0.44$ instead of 0.50, due to a contraction of the long side chains (406). A similar discrepancy between the theta state of the polymer–solvent system and the unperturbed dimensions of the polymer coils has been found for cyclic poly(styrene) in cyclohexane where $\Theta = 28.5$°C according to thermodynamics but $a_v = 0.40$ at the same temperature; $a_v = 1/2$ was observed for the considerably higher temperature of $T = 40$°C (366). In both cases, intrinsic viscosities were assumed to reflect unperturbed dimensions. This is not necessarily true, however, since atactic poly(methyl methacrylate) exhibited the same reduced mean-square radius of gyration, $\langle s^2 \rangle_0 / \overline{M}_w$, in the two theta solvents acetonitrile ($\Theta = 44$°C) and *n*-butyl chloride ($\Theta = 40.5$°C) whereas the corresponding viscosity quantities, $[\eta]_\Theta / \overline{M}_w^{1/2}$, definitely differed from each other despite the almost identical theta temperatures (512).

In mixed solvents, these effects may be enhanced by a possible distribution of solvent components, depending on the polarities of the polymer 2 and liquids 1 and 3; 1 is a solvent and liquid 3 usually a non-solvent (precipitant). It seems that in the absence of large variations of theta temperatures, the unperturbed dimension of a given apolar polymer is approximately the same in various apolar solvents. However, unperturbed dimensions (as determined from intrinsic viscosities) may vary widely for polar polymers in various polar theta mixtures (31,95,154). For a review of various methods for the determination of unperturbed dimensions in mixed solvents see (526).

2. Methods to Determine Theta Solvents

Methods for the determination of theta temperatures are discussed in greater detail in two reviews (527,528). As mentioned above, theta conditions do not necessarily lead to unperturbed dimensions of coils (and *vice versa*).

2.1. Phase Equilibrium (PE) Binary mixtures of a polymer in a single solvent phase-separate at various temperatures, T_{sep}, depending on the volume fraction ϕ_2 of the polymer. The maximum of the $T_{sep} = f(\phi_2)$-function is called the critical solution temperature T_{cst}. The experiment is repeated for a series of dilute solutions of polymers of the same constitution and configuration but of different molar mass. The relation between the critical solution temperature and the molar mass of the polymer is based on the Flory–Huggins lattice theory which predicts that

$$\frac{1}{T_{cst}} = \frac{1}{\Theta}\left[1 + \frac{1}{\psi_1}\left(\frac{1}{r^{1/2}} + \frac{1}{2r}\right)\right] \qquad \text{(A11)}$$

where ψ_1 is the Flory residual-entropy parameter and r is the ratio of the molecular volume of the polymer to that of the solvent. Since r is proportional to the (number-average) molar mass of the polymer, Eq. (A11) can be written as

$$\frac{1}{T_{cst}} = \frac{1}{\Theta}\left[1 + \frac{b}{(\overline{M}_n)^{1/2}}\right] \qquad \text{(A12)}$$

for polymers of sufficiently high r (or $\overline{M}_n$) (Shultz–Flory method) (110,529). Extrapolation of the inverse critical solution temperatures to infinite molar mass delivers the inverse theta temperature Θ.

The data must be extrapolated not only to infinite molar mass but also to infinite dilution if used with mixed solvents (191). Furthermore, the method can be used only for phase separations into two liquid phases. Care must therefore be taken with crystalline polymers.

2.2. Second Virial Coefficient (A) All absolute methods for the determination of molar masses may be used; most commonly applied are membrane osmometry and static light scattering. Less frequently used are vapor phase osmometry and sedimentation equilibrium. Absolute methods that depend on specific solvent behaviour cannot be applied; examples are cryoscopy and ebullioscopy. Measurements must be performed at sufficiently low polymer concentrations in order to avoid effects of third virial coefficients.

The concentration dependence of reciprocal apparent molar masses is determined for a given polymer–solvent pair at different temperatures. Second virial coefficients are calculated from the slopes of these curves (see Eqs. (A6) and (A8)) and plotted against temperature (110). The dependence of the second virial coefficients on temperature is linear only in the proximity of the theta temperature. Care must be taken, therefore, to work close to the theta temperature. Alternatively, the second virial coefficient may be measured at a constant temperature, using different solvent–nonsolvent ratios. However, appropriate precautions and corrections have to be used if mixed solvents are

used (Donnan equilibria in membrane osmometry, effects of differences in refractive indices in static light scattering, etc).

2.3. *Cloud-Point Titration (CP)* Dilute polymer solutions of different concentrations are titrated at constant temperature with a nonsolvent until the first sign of cloudiness. The volume fraction $\phi_{3,\mathrm{cp}}$ of the nonsolvent 3 at the cloud point is then plotted against the logarithm of the volume fraction $\phi_{2,\mathrm{cp}}$ of the polymer at the cloud point (89,90,531) and extrapolated to pure polymer:

$$\phi_{3,\mathrm{cp}} = \phi_{3,\Theta} - B_{\mathrm{cp}} \ln \phi_{2,\mathrm{cp}} \qquad \text{(A13)}$$

where B_{cp} is the slope of the $\phi_{3,\mathrm{cp}} = f(\ln \phi_{2,\mathrm{cp}})$-curve and $\phi_{3,\Theta}$ is the volume fraction of the nonsolvent in the theta mixture solvent–nonsolvent. At high molar masses (small B_{cp}) and polymer densities $\rho_2 \approx 1$ g/ml, mass-concentrations $c_{2,\mathrm{cp}} = \rho_2 \phi_{2,\mathrm{cp}}$ (in g/ml) can be used instead of volume fractions $\phi_{2,\mathrm{cp}}$ (93); neglect of these conditions may lead to errors (58). This "Elias method" has been shown to have theoretical justification from the Flory–Huggins lattice model (532,533); a comprehensive review of this method is available (93).

2.4. *Cloud Temperature Titration (CT)* In a variation of the cloud point titration method, cloud temperatures may be determined by cooling or heating of dilute polymer solutions of various concentrations until cloudiness appears (58). The inverse cloud point temperature T_{ct} is then plotted against the logarithm of the volume fraction $\phi_{2,\mathrm{ct}}$ of the polymer 2 at the cloud point and extrapolated to pure polymer:

$$\frac{1}{T_{\mathrm{ct}}} = \frac{1}{\Theta} - B_{\mathrm{ct}} \ln \phi_{2,\mathrm{ct}} \qquad \text{(A14)}$$

This method is also based on the Flory–Huggins lattice model (522,533). In a modification of the method, inverse cloud temperatures are plotted against $1/r^{0.6}$ (530), again based on the Flory–Huggins theory:

$$\frac{1}{T_{\mathrm{ct}}} = \frac{1}{\Theta}\left(1 + \frac{B_{\mathrm{r}}}{r^{0.6}}\right) \qquad \text{(A15)}$$

where r is the ratio of molecular volumes of polymer and solvent.

2.5. *Unperturbed Dimensions (RGM, VM, DM, SM)* Root-mean-square radii of gyration, $\langle s^2 \rangle^{1/2}$, depend on the a_{s} power of the molar mass M (110):

$$\langle s^2 \rangle^{1/2} = K_s M^{a_s} \qquad \text{(A16)}$$

The exponent becomes $a_{\mathrm{s}} = 1/2$ for the unperturbed state where $\langle s^2 \rangle = \langle s^2 \rangle_0$. The temperature dependence of the function $\langle s^2 \rangle = f(M)$ can thus be used to determine the temperature T_0 at which $a_{\mathrm{s}} = 1/2$ (RGM method).

This method is cumbersome; more often used is the temperature dependence of the intrinsic viscosity/molar mass relationship

$$[\eta] = K_{\mathrm{v}} M^{a_{\mathrm{v}}} \qquad \text{(A17)}$$

because $a_{\mathrm{v}} = 1/2$ at the unperturbed state (at T_0) (VM method). Less often used are the corresponding relationships between molar masses and other hydrodynamic properties such as sedimentation coefficients (SM method) or diffusion coefficients (DM method).

Unperturbed radii of gyration (from scattering experiments) always seem to indicate theta conditions (cf. Ref. 512) but the database is too small to allow definite proof. Unperturbed dimensions from hydrodynamic measurements in single solvents sometimes do not coincide with the theta state (cf. Refs. 366,466,512); see also Section 1.2. Hydrodynamic measurements in mixed solvents very often deliver different unperturbed dimensions for theta conditions (cf. Refs. 31,83,95,154).

2.6. *Other Methods (IG, PL, R)* The theta state and/or unperturbed dimensions have occasionally been determined by various other methods: refractometry (R) (7,24), dielectric measurements (E) (5), polarized luminescence (PL) (399), inverse gas chromatography (IG) (412), and dynamic light scattering (LS) (376).

Common methods for the determination of theta temperatures Θ, theta compositions ϕ_i, Θ of mixed solvents, and/or unperturbed dimensions are compared in the following table:

Method		Required for the application			
Abbreviation	Name	Minimum number of polymers	Knowledge of molar mass	Type of solvent	Determined parameter
A	Second virial coefficient	3	Yes	Preferably single	Θ
CP	Cloud point titration	1	No	Mixed	$\phi_{3,\Theta}$
CT	Cloud point temperature	1	No	Preferably single	Θ
PE	Phase equilibria (critical solution temperature)	3	Yes	Preferably single	Θ
VM	Intrinsic viscosity/molar mass	3	Yes	Single or mixed	$\Theta, \phi_{3,\Theta}$

B. TABLES OF THETA SOLVENTS FOR POLYMERS

In the following tables, theta solvents and theta temperatures have been compiled for various polymers from the literature. The polymers are subdivided into groups of chemically similar compounds (see beginning of chapter for Contents). Within each group, polymers are arranged alphabetically, mostly according to the polymer names used in the original reference; no attempt has been made to use either IUPAC names (systematic names) or poly(monomer) names exclusively. Monomer units in alternating and random copolymers are listed alphabetically, regardless of their proportions; their relative amounts are given in parentheses on a mole/mole basis. Segments of block and graft copolymers are usually noted in the sequence reported by authors. The following abbreviations are used: *alt* (alternating), *block* (self-explanatory), *co* (statistical or random (or unspecified)), *graft* (self-explanatory).

Polymers are further characterized by their tacticity (if any), provided it has been reported in the literature. Polymers by free radical polymerizations are usually assumed by authors to be "atactic". Tacticities are usually given as mole fractions of isotactic diads (x_i), syndiotactic diads (x_s), isotactic triads (x_{ii}), syndiotactic triads (x_{ss}), heterotactic triads (x_{is}), *cis*-configurations (x_{cis}), *trans*-configurations (x_{trans}). If no quantitative characterization was reported, tacticities are described as it (predominantly isotactic), st (predominantly syndiotactic), at (neither predominantly iso- nor syndiotactic), cis (predominantly cis-tactic), or trans (predominantly trans-tactic).

For each polymer, theta solvents are given in alphabetical order; no attempt was made to convert commonly used solvent names into systematic names (e.g. dioxane = 1,4-dioxane). In mixed solvents, the liquid listed first may thus be a solvent or a nonsolvent. Compositions of mixed solvents are given in vol./vol. unless otherwise noted (ex: w/w indicates weight per weight).

A recent (smaller) list (496) of "Theta Temperatures" is mainly concerned with unperturbed dimensions. Since these dimensions are often evaluated from measurements at nontheta temperatures using various theories of intrinsic viscosity/molar mass, or (far less frequent) radius of gyration/molar mass relationships, reported "theta temperatures" are often not theta temperatures *per se* but the temperatures at which measurements in thermodynamically *good* solvents have been performed. A comprehensive list of unperturbed dimensions of various polymers can be found in Section VII/1 of this Handbook and a list of characteristic ratios of polymethacrylates in (497).

TABLE 1. HOMOCHAIN POLYMERS

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
1.1. POLY(ALKANES)				
Poly(acenaphthylene)	Ethylene dichloride (1,2-dichloro ethane)	35	A, VM	238
		30	A, VM	237
		20	PE, VM	16
Poly(1-butene), atactic	*i*-Amyl acetate	23	PE, VM	245,246
	Anisole	83	VM	245
		83	PE, VM	246
		86.2	PE	190
	Diphenyl ether	141	PE, VM	246
	Phenetole	61	VM	245
		61	PE, VM	246
	Toluene	−46	PE, VM	246
–, isotactic	Anisole	89.1	PE	190
		89	PE, VM	246
	Cyclohexane/*n*-propanol (69/31)	35.0	VM	304
	Diphenyl ether	148	PE, VM	246
	Phenetole	64.5	PE, VM	246
Poly(butene-*co*-ethylene), 40 branches per 100 backbone carbon atoms	3-Octanol	5.0	VM	514
	2-Octanol	29.0	VM	514
	1-Octanol	59.0	VM	514
Poly(ethylene)	*t*-Amyl alcohol	199.2	PE	251
	Anisole	153.5	PE	251
	Benzyl phenyl ether	191.5	PE	251
	Bis(2-ethylhexyl) adipate	170	PE	324
		145	VM	351
		145	PE	240
	Bis(2-ethylhexyl sebacate)	150	PE	324
	Carbon disulfide	−73	PE	510
	n-Decanol	153.3	PE	251
	Dibutyl phthalate	>200	PE	324
	Dioctyl adipate	145	VM	508
	Diphenyl	128	PE	353

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
		127.5	PE, VM	485
		127.5	VM	492
		125	PE	324
		118	CT	355
		118	PE	462
	Diphenyl ether	165	A	177
		163.9	PE, VM	251,485
		161.4	PE	46
	Diphenyl methane	142.2	PE, VM	251,485
	Diphenylene oxide	118	PE	324
	n-Dodecanol	143.4	PE	353
		138	PE, VM	324
		137.3	PE	251
	n-Heptane	173.9	PE	132
	n-Hexane	133.3	PE	132
		133	PE	252
	n-Hexanol/*p*-xylene (70/30)	155	PE	8
	n-Hexanol/xylene (70/30)	170	CT	136
	Nitrobenzene	>200	PE	324
	p-Nonyl phenol	162.4	PE	251
	n-Octane	210	PE	132
	n-Octanol	180.1	PE	251
	p-Octyl phenol	174.5	PE	251
	n-Pentane	85	PE	252
		80.0	PE	132
	3,5,5-Trimethylhexyl acetate	126	A	353
		121	PE	353
Poly(ethylene-*alt*-propylene)	Benzene	19–21.4	CP	453
	n-Decyl acetate	5.0	CP	453
	n-Heptyl acetate	38.0	CP	453
	n-Hexyl acetate	60.9	CP	453
	n-Octyl acetate	27.0	CP	453
Poly(ethylene-*co*-propylene)	Methanol/toluene (50/50)			346
Poly(ethyl ethylene)	2-Octanol	23.5	A, VM	458
		23.5	VM	514
Poly(1-hexene)	Phenetole	61.3	VM	210
	Butanone/*n*-hexane (29.8/70.2)	8	PE	18
	Butanone/*i*-propanol (37/63)	24	PE	18
		23.5	A, PE	154
	(41.5/58.5)	4	A, PE	154
	Dioxane/*n*-hexane (40/60)	20.5	VM	19
	n-Hexyl chloride	13	A, PE	154
		13	A	18
Poly(isobutene)	*i*-Amyl benzyl ether	23.7	A, VM	339
	i-Amyl butyrate	28	A, VM	339
	i-Amyl *i*-valerate	22.1	A	183
		25.0	DM, VM	427
		25.0	A	517
		27	A	499
	i-Amyl *n*-valerate	22.1	SM, VM	221
		21.0	A	339
	n-Amyl butyrate	22.0	A	339
	Anisole	105.5	PE, VM	113
	Benzene	25.0	A	517
		25		44
		24.0	PE, VM	113
		24	VM	320
		22.8	A, VM	339
	n-Butanol/*n*-hexane (23.6/76.4)	25.0	CP	100
	n-Butanol/methylcyclohexane (29.2/70.8)	25.0	CP	100
	(42.1/57.9)	49.0	CP	100
	Butanone/carbon tetrachloride (33.7/66.3)	25.0	CP	100
	Butanone/cyclohexane (36.8/63.2)	25.0	CP	100
	Butanone/*n*-hexane (36.6/63.4)	25.0	CP	100
	n-Butyl *n*-butyrate	46.2	A	339

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Carbon tetrachloride/dioxane (63.8/36.2)	25.0	CP	100
	Chlorobenzene/*n*-propanol (67.5/37.5)	49.0	CP	100
	(76.0./24.0)	25.0	CP	100
	(79.7/20.3)	14.0	CP	100
	Chloroform/*n*-propanol (57.9/42.1)	49.0	CP	100
	(77.1/22.9)	25.0	CP	100
	(79.5/20.5)	14.0	CP	100
	Cyclohexane/dioxane (45.1/54.9)	25.0	CP	100
	Cyclohexane/*n*-propanol	35	VM	305
	Cyclohexanol/toluene (29.3/70.7)	25.0	CP	100
	Cyclopentane	188		536
	n-Decanol/*n*-hexane (41.1/58.9)	25.0	CP	100
	n-Decanol/methylcyclohexane (47.5/52.5)	25.0	CP	100
	Dibuty ether	204	A, RGM, VM	76
	Dioxane/*n*-hexane (48.2/51.8)	25.0	CP	100
	Dioxane/methylcyclohexane (51.0/49.0)	25.0	CP	100
	Diphenyl ether	148	PE	113
	Diphenyl ether/ethylbenzene (50/50)	76.0	PE	113
	(25/75)	26.8	PE	113
	Ethylbenzene	− 24.0	PE	113
	Ethyl caproate	57	PE	113
	Ethyl caprylate	22	PE	263
	Ethyl heptanoate	33		44
		33	PE	113
	Ethyl hexanoate	57		44
	Ethyl octanoate	22		44
	3-Ethylpentane	185		536
	n-Heptanol/*n*-hexane (37.4/62.6)	25.0	CP	100
	n-Heptanol/methylcyclohexane (39.5/60.5)	25.0	CP	100
	n-Hexane/*n*-hexanol (68.3/31.7)	25.0	CP	100
	n-Hexane/3-methylbutanone (57.6/43.4)	25.0	CP	100
	n-Hexane/*n*-octanol (63.7/36.3)	25.0	CP	100
	n-Hexane/*n*-pentanol (71.7/28.3)	25.0	CP	100
	n-Hexane/*n*-propanol (80.3/19.7)	25.0	CP	100
	2-Methylbutane (M = 23000, 150000)	52 ± 2		536
	–, (M = 760000)	45		536
	Methyl capronate	72.7	A	183
	Methyl caprylate	24.0	A	183
	Methylcycohexane/*n*-octanol (56.0/44.0)	25.0	CP	100
	Methylcyclohexane/*n*-pentanol (65.2/34.8)	25.0	CP	100
	Methylcyclohexane/*n*-propanol (74.2/25.8)	25.0	CP	100
	2-Methylhexane	153		536
	Methyl heptanoate	47.7	A	183
	3-Methylheptanone-5	55.5	A, VM	339
	Methyl pelargonate	5.9	A	183
	2-Methylpentane	103		536
	Pentane	76.0	A, RGM, VM	76
	Phenetole	87		44
		86.0	PE, VM	113
	Toluene	− 13.0	PE, VM	113
Poly(2-methyl-2-butylene) (= hydrogenated 1,4-poly(isoprene))	*n*-Hexyl acetate	60.9	A	363
Poly(methylethylene)	2-Octanol	37.6	VM	454
Poly([S]-4-methyl-1-hexene), $x_i > 0.95$	*o*-Chloronaphthalene	165	VM	262
	o-Dichlorobenzene	133	VM	262
Poly(4-methyl-1-pentene, $0.90 \leq x_i \leq 0.94$	Diphenyl	194.6	PE, VM	334
	Diphenyl ether	210.0	PE, VM	334
	Diphenylmethane	176.6	PE, VM	334
Poly[1-(4-methylpentyl)-1-butylene-*co*-1-(1,5-dimethylhexyl)ethylene (= hydrogenated poly(myrcene)	2-Octanol	51.0	VM	514
Poly(2-methylpentene-1-sulfone)	Butanone/*n*-hexane (35.4/64.6)	11.5	PE	18
	Butanone/*i*-propanol	22.5	PE	18
Poly(1-octene)	*n*-Pentane	162.5	PE	169
	Phenetole	50.4	PE	170

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
Poly(1-pentene), atactic	Anisole	85	PE, VM	472
	i-Butyl acetate	32.5	PE, VM	472
	Diphenylmethane	121.0	PE, VM	472
	Phenetole	64.0	PE, VM	472
	Phenetole	48.3	A	192
	Phenyl ether	149	PE, VM	472
–, isotactic	*i*-Amyl acetate	31.5	VM	243
	Anisole	85	PE, VM	472
	i-Butyl acetate	32.5	PE, VM	472
	Diphenylmethane	121.0	PE, VM	472
	2-Pentanol	62.4	PE	219
	Phenetole	55.8	A	192
		64.0	PE, VM	472
	Phenyl ether	149	PE, VM	472
Poly(propylene), atactic	*i*-Amyl acetate	34	VM	69
		34	VM	244
	n-Amyl acetate	36.6	A	333
	n-Butanol/carbon tetrachloride (33/67)	25.0	CP	78
	n-Butanol/*n*-hexane (32/68)	25.0	CP	78
	n-Butanol/methylcyclohexane (34/66)	25.0	CP	78
	i-Butyl acetate	65.5	A	333
		58.0	VM	244
	n-Butyl acetate	58.5	A	332
	Carbon tetrachloride/*n*-propanol (74/26)	25.0	CP	78
	1-Chloronaphthalene	74	PE	171,521
		68	A	314
	Cyclohexanone	92	PE	171,521
	Diphenyl	129	VM	244
	Diphenyl ether	153.3	PE	172
		146	VM	244
	n-Hexane/*n*-propanol	25	CP	78
	Methylcyclohexane/*n*-propanol (69/31)	25	CP	78
	1-Octanol	77	CP	453
	2-Octanol	37.6	CP	453
	3-Octanol	5.0	CP	453
	n-Propyl acetate	85.5	A	333
–, isotactic	*i*-Amyl acetate	70	A	152
		34		69
	i-Amyl benzylether	111	PE	448
	p-*t*-Amyl phenol	140.8	PE	448
	Benzyl phenyl ether	181.8	PE	448
	Benzyl propionate	132	PE	448
	n-Butyl alcohol	147.2	PE	448
	t-Butyl alcohol	122	PE	448
	p-*t*-Butyl phenol	166.0	PE	448
	1-Chloronaphthalene	74	A	521
	p-Cresol	206	PE	448
	Dibenzyl ether	183.2	PE	255
		183.2	PE	448
	Diphenyl	125.1	PE	255
		125.1	PE	448
		125.0	VM	244
	Diphenyl ether	146.2	PE	172
		145	PE, VM	171,521
		143	VM	244
		142.8	PE	255
		142.8	PE	448
	Diphenyl methane	116.5	PE	448
	p-Ethyl phenol	184	PE	448
	i-Octyl phenol	115	PE	448
	p-Octyl phenol	106	PE	448
–, syndiotactic	*i*-Amyl acetate	45	A	152
Poly(propylene), head-to-head	*i*-Amylacetate	43	PE	471
		56.8	VM	514
Poly(vinyl ethylene), at	2-Octanol	32.8	A, VM	458

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
1.2. POLY(ALKENES)				
1,4-Poly(butadiene), 97.0% cis	*n*-Heptane	−1	PE	242
	n-Propyl acetate	35.5	A, VM	242
95.0% cis	Diethyl ketone	10.3	VM	362
94.6% cis	5-Methyl-2-hexanone/2-pentanone (1/3)	46.2	PE	2
	(1/1)	32.7	PE	2
	(3/1)	22.3	PE	2
	3-Pentanone	10.3	PE	2
	3-Pentanone/2-pentanone (3/2)	30.0	PE	2
94.0% cis	Diethyl ketone	213	PE	66
	Ethyl propyl ketone	240	PE	66
	Propylene oxide	146	PE	66
93.0% cis	Diethyl ketone	208	PE	66
		14	PE	66
	Ethyl propyl ketone	237	PE	66
		−22	PE	66
	Propylene oxide	141	PE	66
		35	PE	66
90.0% cis	*i*-Butyl acetate	20.5	A, VM	70
	n-Heptane/*n*-hexane (25/75)	20	PE	282
	(50/50)	5	PE	282
	5-Methyl-2-hexanone	12.6	PE	1
	2-Pentanone	59.7	PE	1
	3-Pentanone	10.6	PE	1
–, 70% cis-1,4; 23% trans-1,4; 7% 3,4	Dioxane	22.3	VM	447
–, 43% 1,2 units; trans/cis = 2.3/1	Dioxane	15.7	A	363
–, 36% cis; 57% trans; 7% 1,2-vinyl	Dioxane	26.5	A, VM	480
–, –, hydrogenated	*n*-Hexyl acetate	65.0	A	363
1,4-Poly(butadiene), 9% cyclization	Cyclohexanone/dioxane (12/88)	30	A, VM	358
31% cyclization	Cyclohexanone/dioxane (17/83)	30	A, VM	358
46% cyclization	Cyclohexanone/dioxane (21/79)	30	A, VM	358
63% cyclization	Cyclohexanone/dioxane (30/70)	30	A, VM	358
81% cyclization	Cyclohexanone/dioxane (39/61)	30	A, VM	358
Poly(butadiene-*co*-styrene) (76.1/23.9)	Methyl *i*-butyl ketone	46	PE	145
	2-Pentanone	21	PE	145
(75/25)	*n*-Octane	21	VM	284
(70/30)	*n*-Octane	21	PE, DM, SM, VM	283
1,4-Poly(chloroprene), cis	Butanone	25	A	133
		25	VM	455,495
	Cyclohexane	45.5	PE	133
	Cyclopentane	56.3	PE	133
	Decalin, *trans*	2	A	455
1,4-Poly(2,3-dimethylbutadiene)				
>85% trans-1,4; 3% 1,2-vinyl	Cyclohexane/*n*-propanol (81.3/18.7)	25	CP	483
1,4-Poly(isoprene),				
Natural rubber	Butanone	25	VM	88
	n-Hexane/*i*-Propanol (1/1)	21	VM	284
	2-Pentanone	14.5	PE	352
96% cis	Dioxane	31.2	PE	11
	n-Heptane/*n*-Propanol (69.5/30.5; w/w)	25	A, CP, VM	74
94% cis	Methyl isobutyl ketone	16.5	A	42
	Methyl propyl ketone	33	A	42
trans (gutta percha)	*n*-Propyl acetate	60	PE	352
trans (other)	Dioxane	47.7	PE	352
	i-Propanol/toluene (36.2/63.8)	50	A, CP	11
	(35.5/64.5)	45	A, CP	11
	(34.2/65.8)	40	A, CP	11
	(33.5/66.5)	35	A, CP	11
	(32.4/67.6)	30	A, CP	11
–, 51% 1,4-units (mainly trans; 49% 3,4-units, 1-2% 1,2-units	2-Octanol	41.3	A	363
–, –, hydrogenated	2-Octanol	55.3	A	363
–, <5% 1,4-units, 20–25% 1,2-units, 70–75% 3,4-units	2-Octanol	30.5	A	363

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
–, –, hydrogenated	2-Octanol	26.2	A	363
1,4-Poly(isoprene), star	Dioxane	34.1	A	130
4-arm star	Dioxane	33.4	A	130
6-arm star	Dioxane	33.5	A	130
8-arm star	Dioxane	32.8	A	20
12-arm star	Dioxane	32.9	A	20
1,4-Poly(isoprene), 94% cis, linear	Methyl propyl ketone	33	A	42
3 branches	Methyl propyl ketone	33	A	42
11 branches	Methyl propyl ketone	27.8	A	42
22 branches	Methyl propyl ketone	23.5	A	42
22 branches	Methyl isobutyl ketone	15	A	42
1,2-*co*-3,4-Poly(isoprene) (35/65)	Benzene/*i*-propanol (55/45)	20	CP	98
1,4-Poly(isoprene), brominated (30% of double bonds)	Cyclohexane	20	A	310
Poly(isoprene-*block*-styrene)	Butanone	44	VM	347
Poly(1-methyl-1-butenylene-*co*-isopropenylethylene)	2-Octanol	41.3	A	363
Poly(2-methyl-1,3-pentadiene) (= Poly(1,3-dimethyl-1-butenylene))	Dioxane	61.2	VM	454
	2-Octanol	28.9	VM	454
Poly[1-(4-methylpentyl)-1-butylene-*co*-1-(1,5-dimethylhexyl)ethylene]	2-Octanol	51.0	A	363
Poly(myrcene), 90% 1,4, 10% 3,4-	2-Octanol	35.9	VM	514
Poly(pentenamer), 80–85% trans	*i*-Amyl acetate	38	VM	347,125
85% trans	*i*-Amyl acetate	38	VM	361
Poly(1-phenyl-1-propyne)	Cyclohexane	36.0	A	491
1.3. POLY(STYRENES)				
Poly(4-acetoxystyrene)	Butyl acetate	26.8	VM	367
	i-Propyl acetate	19.7	VM	367
Poly(*p*-bromostyrene)	Benzene	20	VM	168
Poly(*p*-*t*-butylstyrene)	1-Hexanol	65.0	A, PE	515
	1-Nitropropane	31.0	A, VM	197,465
		31.0	A, PE	515
		31	VM	370
	3-Nonanol	10.9	A, PE	515
	2-Octanol	32.7	A, PE	515
	2-Octanol	32.7	VM	370,473
Poly(*p*-*t*-butylstyrene)-*block*-poly(dimethyl-siloxane)-*block*-poly(*p*-*t*-butylstyrene); 28 wt.% butylstyrene units	1-Nitropropane	157	PE	365
	Butanone	31	PE	365
Poly(*o*-chlorostyrene)	Butanone	25	PE, VM	224
Poly(*p*-chlorostyrene)	Benzene	8	PE, VM	224
	Benzene/methanol (5.5/1)	26.7	PE	139
	(5.0/1)	32.4	PE	139
	(4.5/1)	41.6	PE	139
	n-Butyl acetate	33.7	VM	195
	t-Butyl acetate	65.4	PE	156
	n-Butyl carbitol	50.1	PE	156
	Carbon tetrachloride	58.9	PE	196
		52.3	PE	158
		50.7	PE	156
	Carbon tetrachloride/toluene (1/1)	13.4	PE	196
	(5/2)	32.0	PE	196
	Cumene	60.9	PE	158
		59.0	PE	157
	Ethyl acetate	11.7	VM	195
	Ethylbenzene	– 7.5	PE	158
		– 14.7	PE	156
	Ethyl chloroacetate	– 1.3	PE	158
		– 1.8	PE	156
	Methyl chloroacetate	65.0	PE	158
		64.6	PE	156
	i-Propyl acetate	75.7	PE	156
		65.0	PE	158

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	i-Propyl benzene	59.0	PE	156
	i-Propyl chloroacetate	− 8.2	PE	156
		− 8.2	PE	158
	Tetrachloroethylene	44.4	PE	156
Poly(*p*-chlorostyrene-*co*-methyl methacrylate) (51.6/48.4)	*trans*-Decalin/trichloroethylene (78/22)	22.3	VM	239
Poly(*p*-decylstyrene)	Butanone/ethylbutyl ketone (1/1.24)	21.0	A	464
		18.1	PE	464
Poly(2,5-dichlorostyrene)	Ethanol/ethyl acetate (6.3/93.7; w/w)	30.5	A	103
Poly(3,4-dichlorostyrene)	*n*-Butanol/*n*-butyl acetate (7.1/92.9; w/w)	32.9	A	102
Poly(*p*-hexylstyrene)	Butanone	30.0	A	464
		29.3	PE	464
Poly(*p*-methoxystyrene)	*i*-Amyl acetate	75.0	PE	281
	Benzene/cyclohexanol (61.2/38.8)	25	A, CP	226
	Benzene/*n*-heptane (72.5/27.5)	25	CP	295
	Benzene/methanol (73.7/26.3)	25	A, CP	226
	Butanone/*n*-heptane (80.0/20.0)	25	A, CP	226
	Butanone/*n*-propanol (80.6/19.4)	25	A, CP	226
	t-Butylbenzene	52.2	PE	281
	Chloroform/cyclohexane (63.9/36.1)	25	A, CP	226
	Chloroform/methanol (66.5/33.5)	25	A, CP	226
	Cyclohexanol/toluene (37.2/62.8)	25	A, CP	226
	Dichlorodecane	92.6	PE	281
	Methyl isobutyl ketone	23.4	CP	281
Poly(*p*-methoxystyrene-*co*-styrene)				
26.4/73.6	*i*-Amyl formate	30.5	CT	280
53.0/47.0	*i*-Amyl formate	22.8	CT	280
	i-Amyl propionate	18.1	CT	280
	Hexyl methyl ketone	27.0	CT	280
75.6/24.4	*i*-Amyl formate	37.0	CT	280
	i-Amyl propionate	>50.0	CT	280
	t-Butylbenzene	12.5	CT	280
	Hexyl methyl ketone	>30	CT	280
Poly(α-methylstyrene) $x_s = 0.95$; $x_{ss} = 0.90$	Cyclohexane	32.3	A	63
$x_s = 0.91$; $x_{ss} = 0.81$	Cyclohexane	33.1	A	63
$x_s = 0.83$; $x_{ss} = 0.68$	Cyclohexane	34.3	A	63
$x_s = 0.65$; $x_{ss} = 0.44$	Cyclohexane	36.8	A	63
$x_{ss} = 0.44$	Cyclohexane	37.0	VM	64
$x_s = 0.64$	Cyclohexane	39	A, VM	3
atactic	Benzene/methanol (79.4/20.6)	30		272
	Butanone	31		217
	n-Butyl chloride	− 10		536
		139		536
	1-Chlorodecane	80.0	VM	470
	1-Chloroheptane	20, 27	VM	479
	1-Chlorohexane	5.7, 10	VM	479
	1-Chlorooctane	43, 53	VM	479
	Cyclohexane	34.5	VM	479
		38	VM	59
	trans-Decalin	9.5	VM	266
		10.0	VM	479
	Diethyl succinate	16.4	A, VM	494
	n-Hexyl acetate	85.0	VM	479
isotactic	Butanone	45		217
Poly(*p*,*i*-propylstyrene)	Dioxane/*i*-propanol (35/65)	20	CP	98
Poly(*p*,*i*-propylstyrene-*co*-styrene)				
(88/12)	Dioxane/*i*-propanol (37/63)	20	CP	98
(56/44)	Dioxane/*i*-propanol (44/56)	20	CP	98
(33/67)	Dioxane/*i*-propanol (48/52)	20	CP	98
Poly(styrene)	*i*-Amyl acetate	220	PE	296
		− 49	PE	296
	Benzene	249.8	PE	460
	Benzene/*i*-Propanol (58/42)	35	A	62
	Benzene/cyclohexanol (38.4/61.6)	25	A, CP	95
	Benzene/*n*-heptane (44/56)	35	A	62

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Benzene/*n*-hexane (38/61)	20	CP	128
	(34.7/65.3)	25	A, CP	95
	Benzene/methanol (74.7/25.3)	35	A	62
	(74/26)	34	VM	31
	(77.8/22.2)	25	A, CP	95
	(78/22)	23.5	A	42
	(78/22)	21.5	PE	42
	Benzene/*i*-propanol (66/34)	20	CP	98
	(64.2/35.8)	25	A, CP	95
	(69/31)	35	A	62
	Bicyclohexyl	61	PE	522
	Butanone	148.8	PE	460
	Butanone/methanol (89/11)	25	A, VM	273
	(89.7/11.3)	25	A, CP	95
	(88.9/11.1)	30	PE	315
	Butanone/*i*-propanol (85.7/14.3)	23	A	53
	(82.6/17.4)	34	VM	31
	(87/13)	67	A	115
	(87/13)	67	A	274
	i-Butyl acetate	−46	PE	296
	t-Butyl acetate	−34.7	PE	374
		109.3	PE	374
	Butylchloride	35.6	SM	233
	n-Butyl formate	−9	A	307
		−7.5	CP	375
	Carbon tetrachloride/*n*-butanol (65/35)	35	A	62
	Carbon tetrachloride/heptane (53/47)	35	A	62
	Carbon tetrachloride/methanol (81.7/28.3)	25	A, CP	95
	Chlorobenzene/di-*i*-propyl ether (32/68)	25	A, CP	95
	1-Chlorodecane	6	CT	22
		6.6	A	269
		8.5	VM	456
	1-Chlorodecane/3-methylcyclohexane			
	(21.8/78.2)	22.8	CT	22
	(25.0/75.0)	35.0	CT	22
	(50.5/49.5)	59.6	CT	22
	(90.0/10.0)	87.8	CT	22
	1-Chlorododecane	58.6	A	269
		58.6	VM	456
	Chloroform/methanol (74.7/25.3)	25	A, VM	273
	(75.2/24.8)	25	A, CP	95
	1-Chloroundecane	32.8	A	269
		32.8	A	270
		32.8	VM	456
	Cyclodecane	16	PE	445
	Cycloheptane	17	PE	445
		19.0	VM	456
	Cyclohexane	213	PE	371
		34.0	VM	31
		34.0	PE	189
		34.0	A	307
		34.0	PE	439
		34.4	A, VM	188
		34.5	VM	2, 476
		34.5	VM	488
		34.5	A	42
		34.5	VM	290
		34.5	DM, VM	427
		34.5	VM	456
		34.8	A	270
		35.0	A	274
		35.0	DM, SM	43,308
		35.0	DM	232
		35.0	A	229
		35.0	SM	144

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
		35.0		328
		35.0	A	439
	Cyclohexane, deuterated	40.2		328
		40.0	A	439
		38	PE	438
	Cyclohexane/methylcyclohexane (2/1)	43	VM	2
	(1/1)	48	VM	2
	(1/2)	54	VM	2
	Cyclohexane/toluene (86.9/13.1)	15	PE	315
	Cyclohexanol	79	CT	135
		83.5	A	118
		83.5	VM	290
		83.5	A	307
		86	PE	461
		87	PE	8
		87.8	CT	22
	Cyclopentane	19.6	PE	203
		19.6	A, VM	368
		19.8	PE	460
		20		536
		20.5	VM	456
		20.6	PE	204
		154		536
		154.5	A, VM	368
		154.2	PE	203
	Cyclooctane	12	PE	445
		20.5	VM	456
	Decalin (w_{cis} = 0)	23.8	A	153
	(w_{cis} = 0)	22.8	CT	22
	(w_{cis} = 0)	21.2	A	26
	(w_{cis} = 0)	21.0	DM, VM	427
	(w_{cis} = 0)	20.4	PE, VM	119
	(w_{cis} = 0.20)	21.2	A	26
	(w_{cis} = 0.23)	19.3	PE	268
	(w_{cis} = 0.50)	15.5	A	26
	(w_{cis} = 0.54)	16.0		160
	(w_{cis} = 0.60)	15.0	A	26
	(w_{cis} = 0.66)	15.2	A	451
	(w_{cis} = 0.80)	14.0	A	26
	(w_{cis} = 1.00)	12.5	A	26
	(w_{cis} = 1.00)	12.2	A	451
	(w_{cis} = 1.00)	10.8	CP	523
	cis/trans	19.3	PE	271
	cis/trans	14.5	A	42
	unknown	31	A	289
	unknown	29.5	A	153
	unknown	18.2	DM	182
	Diethyl ether/dimethoxy ethane (0.7/0.3)	−5	A	356
		−27	A	356
	Di(2-ethylhexyl) phthalate	22		160
	Diethyl malonate	31	A	307
		34.2	VM	2
		34.5	VM	456
		35.6	PE	42
		35.9	A	270
		36.0	VM	503
	Diethyl malonate/diethyl oxalate (4/1)	40	VM	2
	(1/1)	47	VM	2
	(1/4)	52.6	VM	2
	Diethyl oxalate	51.5	A	307
		55.8	VM	2
		58.2	VM	456
		59.6	CT	22
	Dimethyl succinate	67.6	VM	456
	Dioctylphthalate	22		26

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Dioxane/*n*-heptane (41.5/58.5)	35	A	62
	Dioxane/*n*-hexane (38/62)	20	CP	128
	Dioxane/methanol (71.4/28.6)	25	A, CP	95
	(65.1/34.9)	34	VM	31
	(66.5/33.5)	35	A	62
	(66.5/33.5)	35	A, VM	82
	Dioxane/*i*-propanol (55/45)	20	CP	98
	(51.5/48.5)	35	A	62
	Ethyl acetate	−44.3	LS	376
		−44	PE	296
		−43.5	CP	375
		139	PE	296
	Ethyl acetoacetate	108.5	CP	147
	Ethylcyclohexane	70	PE	114
		75.0	VM	456
	Heptane/nitropropane (58/42)	35	A	62
	Heptane/toluene (52.4/47.6)	30	PE	315
	Hexane/3-methylbutanone (48/52)	20	CP	99
	Hexyl *m*-xylene	12.5	A	307
	Methanol/tetrahydrofuran (28.7/71.3)	25	A, CP	95
	Methanol/toluene (20/80)	25	A, VM	273
	(23/77)	25.0	CP	505
	(23.1/76.6)	25.0	VM	490
	(24.8/75.2)	34	VM	31,490
	(27.2/72.8)	45.0	VM	490
	Methyl acetate	43	PE	296
		114	PE	296
	Methyl cyclohexane	60	VM	290
		67.2	A	184
		68	A	307
		68.0	VM	456
		69.3	A	438
		70.5	VM	2
		70.5	VM	85
	3-Methyl cyclohexanol	98.0	CT	22
		98.0	VM	296
	Methyl cyclopentane	75	PE	440
		144	PE	440
	D,L-Menthol	115	VM	290
	1-Phenyldecane	28.0	A	124
		30.6	PE	124
	i-Propyl acetate	−27	PE	296
		107	PE	296
	n-Propyl acetate	−80	PE	296
		178	PE	296
	D,L-Terpineol	78.5	VM	290
	Tetrahydrofuran/water (92.3/7.7)	25	CP	322
	Toluene (estimated theta temperature)	−154		375
Poly(styrene), deuterated	Cyclohexane	30		328
		30	A, PE	439
	Cyclohexane, deuterated	36		328
		36	A	439
		35	PE	439
	Carbondisulfide	36	RGM	60
Poly(styrene), H-shaped	Cyclohexane	34.8	VM	372
Poly(styrene), head-to-head	Cyclohexane	19	A	329
		16		369
Poly(styrene), combs (theta temperatures depend strongly on number and length of branches)	Benzene/methanol (78/22)	16–24	PE	42
		16–24	A, VM	502
	Cyclohexane	18–33	PE	42
		18–33	A, VM	502
		20–36	A, CT	75
		28–33	A	294

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Decalin (cis-trans)	4.5	PE	42
		4.5	A, VM	502
	Diethyl malonate	22	PE	42
		22	A, VM	502
Poly(styrene), 3-star	Cyclohexane	34.8	A	493
Poly(styrene), 9.4-star	Cyclohexane	22	VM	486
Poly(styrene), (6–15.5) stars	Cyclohexane	18–33	A	524
Poly(styrene), cyclic	Cyclohexane	40	VM	366
		28.5	A	373
Poly(1,4-divinylbenzene) (soluble; by anionic polymerization)	Decalin (trans)	25	A	364
1.4. POLY(VINYLS)				
Poly(2,5-dimethyl-4-vinylethynylpiperidol-4)	Dimethylformamide	25	VM	444
Poly(divinyl ether-*co*-maleic anhydride methyl ester) (1/2)	Tetrahydrofuran	30	VM	302
Poly(isobutyl vinyl ether-*alt*-maleic anhydride)	Acetone	29.8	VM	235
	NaCl/water (1 mol/l)	25	VM	235
Poly(maleic acid-*alt*-vinyl pyrrolidone)	Acetone/dimethylsulfoxide (65.4/34.6)	25	VM	434
	Na_2SO_4/water (0.986 mol/l)	25	VM	434
Poly(2-methyl-5-vinylpyridine)	*i*-Amyl acetate	53.2	PE	123
	n-Amyl acetate	48.2	VM	120
		48.4	PE	123
	i-Butyl acetate	49.0	PE	123
	n-Butyl acetate	21.8	VM	120
		21.8	PE	123
	i-Butyl methyl ketone	37.4	VM	120
		38.7	PE	123
	Ethyl *n*-butyrate	50.0	PE	123
	Ethyl propionate	25.4	PE	123
	Propionitrile	– 3.6	PE	123
	n-Propyl acetate	19.3	PE, VM	123
	n-Propyl propionate	58.0	PE	123
	Tetrahydronaphthalene	49.5	PE	123
Poly(9-vinyl adenine)	Sodium cacodylate/water (0.1 mol/l)	26	A	167
	Sodium chloride/water (0.1 mol/l)	40	A	167
Poly(vinyl acetate)	Acetone/*i*-propanol (23/77)	30	PE	338
	Butanone/*i*-propanol (73.2/26.8)	25	A,PE	316
	n-Butyl ethyl ketone	29.0	VM	223
	Cetyl alcohol	123	PE	28
	Di-*i*-butyl ketone	136.5	CP	147
	Ethanol	19	A	42
	Ethanol/methanol (80/20)	17	PE	250
	(60/40)	26.5	PE	250
	(50/50)	34	PE	338
	(40/60)	36	PE	250
	n-Heptane/3-methylbutanone (26.8/73.2)	25	A,PE	316
	(27.3/72.7)	30	A,PE	222
	3-Heptanone	29	A,PE	223
		29	A	42
	Methanol	6	PE	250
		6	PE	345
	6-Methyl-3-heptanone	66	A,PE	223
	i-Propanol	52.6	CP	380
	i-Propanol, deuterated	51.8	CP	380
–, branched	Ethanol	12–15	A	42
	3-Heptanone	26	A	42
–, grafted by styrene	Di(*i*-butyl) ketone	136.5	CP	147
	Ethyl acetoacetate	108.5	CP	147
Poly(vinyl alcohol)	*t*-Butanol/water (32.0/68.0; w/w)	25	CP	357
	Ethanol/water (41.5/58.5; w/w)	25	CP	357
	Methanol/water (41.7/58.3; w/w)	25	CP	357
	i-Propanol/water (39.4/60.6; w/w)	25	CP	357
	n-Propanol/water (35.1/64.9; w/w)	25	CP	357
	NaCl/water (2 mol/l)	25	CP	258
		27 ± 3		536

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Water	97	PE	79
–, urethanized 4.9%	*n*-Propanol/water (30/40)	30	CT	299
	(40/50)	60	CT	299
8.1%	*n*-Propanol/water (30/40)	30	CT	299
	(40/50)	60	CT	299
11.5%	*n*-Propanol/water (30/40)	30	CT	299
	(40/50)	60	CT	299
Poly(vinyl benzoate)	Xylene	32.5	A	301
Poly(4-vinyl biphenyl)	2-Methoxyethanol/dimethoxyethane (70.6/29.4)	30	A,VM	237
Poly(vinyl bromide)	Methanol/tetrahydrofuran (17/83)	20	A	56
Poly(vinyl carbanilate)	Acetone/water (92.2/7.8)	20	A	41
	Butanone/water (44/56)	20	A	41
	Diethyl ketone	35	A	41
	Dioxane/methanol (28/72)	20	A	41
	Methanol/tetrahydrofuran (71.5/28.5)	20	A	41
Poly(*N*-vinyl carbazole)	Chlorobenzene	– 37.4	VM	207
	Chlorobenzene/methanol (85.9/14.1)	25	CP,VM	126
	1,3-Dichlorobenzene/methanol (85.0/15.0)	25	CP,VM	126
	Nitrobenzene	– 21.4	VM	207
	Toluene	37	A,VM	200
		39	A	249
Poly(vinyl chloride)	Benzyl alcohol	155.4	PE	303
	n-Butanol/cyclohexanone (15.8/100)	59	E	4
	(41.5/100)	72	E	4
	Cyclohexane/dimethylformamide (100/12.8)	40.5	E	4
	Cyclohexanone	22	A	321
		51	E	4
	Dimethylformamide	36.5	E	4
	Methanol/tetrahydrofuran (42/58)	22	A,CP	137
	Phenetol	88	VM	377
	Tetrahydrofuran/water (100/5)	17	E	4
	(91.5/8.5)	25	A	186
	(100/11.9)	30	CT	253
	(100/11.9)	30	E	4
	(100/9.5)	30	CT	253
	o-Xylene	84	VM	377
–, isotactic and syndiotactic			E	6
Poly(vinyl *p*-chlorobenzoate)	*n*-Butanol/butanone (47/53)	60	PE,VM	298
Poly(vinyl cyclohexane)	Tetrahydrofuran	25	A	97
Poly(vinylethylene) (98% 1,2-, 2% 1,4-)	1-Hexanol	66	VM	514
Poly(*N*-vinylimidazole)	*n*-Butanol	25		337
Poly(vinyl methyl ether)	Cyclohexane	51	A	520
Poly(β-vinyl naphthalene)	Decalin/toluene (56.5/43.5)	30.2	A,VM	104
Poly(vinyl pivalate)	Acetone/methanol (38.2/61.8)	20	CP	80
	Benzene/methanol (33.3/66.7)	20	CP	80
	Butanone/methanol (24.6/75.4)	20	CP	80
Poly(3-vinylpyrene)	Chloroform	25	VM	319
	Methanol/tetrahydrofuran (8/92)	25	CP,VM	319
Poly(2-vinylpyridine)	Benzene	11.4	VM	413
		15	VM	81
		16.2		378
	n-Heptane/*n*-propanol (59.6/40.4; w/w)	25.0	PE	149
Poly(*N*-vinylpyrrolidone)	Acetone/water (66.8/33.2)	25.0	CP,VM	90
	Dioxane	– 10	A	39
	NaCl/water (0.55 mol/l)	25	PE	234
	Water	130.5	CT	381
Poly(vinyl stearate)	*n*-Octane	17	VM	313
Poly(*N*-vinyl succinamic acid)	NaCl/water (0.2 mol/l)	25	VM	265
Poly(vinyl sulfonic acid)	KBr/water (0.347 mol/l)	5.7	PE	87
	KCl/water (0.349 mol/l)	5.5	PE	87
	(0.65 mol/l)	26.0	PE	87
	(1.001 mol/l)	44.5	PE	87
	NaBr/water (0.346 mol/l)	– 0.6	PE	87
	(1.008 mol/l)	40.1	PE	87
	NaCl/water (1.003 mol/l)	32.4	PE	87

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
Poly(1-vinyl-1,2,4-triazole)	Dimethylformamide	25	VM	430
	Dimethylformamide/dioxane (76.6/23.4)	25	CP	91
		25	CP	211
1.5. POLY(ACRYLICS) AND RELATED COMPOUNDS				
Poly(acrylamide)	Methanol/water (2/3)	20	VM	33
	(41/59)	25	A, VM	463
	NaCl in water (0.1 mol/l)/methanol (59/41)	21	A, RGM	442
Poly(2-acrylamido-2-methylpropane-sulfone amide)	Dioxane/water (18.5/81.5)	25	CP	391
Poly(acrylic acid)	Dioxane	30	A, PE	263
	Water/0.2 mol/l HCl	14 ± 5		536
Poly(acrylonitrile)	Dimethylformamide/methanol (81/19)	20	A, VM	387
	Ethylene carbonate	60	VM	163
	Ethylene carbonate/water (85/15; w/w)	29.3	VM	384
	(85/15; v/v)	44	VM	468
	Nitric acid/water (55/45; w/w)	25	VM	384
Poly(acrylonitrile-*co*-butadiene) (35/65)	Butanone/cyclohexane (47.5/52.5)	25	SM, VM	306
(40/60)	Acetonitrile/butanone (79/21)	19–22	DM, SM	285
	Benzene/cyclohexane (85.5/14.5)	19–22	DM, SM	285
	Butanone/cyclohexane (47.4/52.5)	22	DM, SM	285
	Butanone/*i*-propanol (60/40)	20	DM, SM	285
	Cyclohexane/ethyl acetate (32.7/67.3)	19–22	DM, SM	285
Poly(acrylonitrile-*co*-methyl acrylate) (95/5)	Ethylene carbonate/water (82.5/17.5; w/w)	24.8	VM	385
	Nitric acid/water (51/49; w/w)	24.8	VM	385
Poly(acrylonitrile-*co*-methyl methacrylate) $x_{AN} = 0.236$	Benzene	19.8	VM	379
$x_{AN} = 0.5$	Benzene/dimethylformamide (6.5/1)	30		379
$x_{AN} = 0.74$	Benzene/dimethylformamide (5/3)	30		379
Poly(acrylonitrile-*co*-styrene) (1/2)	Benzene/methanol (66.7/33.3)	25	CP	91
	Dimethylformamide/methanol (44.7/55.3)	25	CP	91
(51/49)	Ethyl acetate	40–43	PE	216
Poly(*t*-butyl acrylate)	Benzene/methanol (52/48)	25		213
	n-Hexane	24.2	VM	159
Poly(*t*-butyl acrylate-*co*-vinylidene chloride) (16.7/83.3)	Benzyl alcohol	44	PE	12
Poly(cetyl acrylate)	Butyl acetate	15.2	VM	341
Poly(cyclohexyl methacrylate)	*n*-Butanol	23.0	VM	450
Poly(decyl acrylate)	*i*-Amyl alcohol	− 8.5	A, PE	340
	n-Butyl alcohol	− 24.5	A, PE	340
	Ethyl acetate	9–11	A, PE	340
	n-Hexanol	34	A	388
		43.2	PE	388
	n-Pentanol	70	A	388
		75.6	PE	388
Poly(ethyl acrylate)	*n*-Butanol	44.9	PE	212
	Ethanol	37.4	PE	212
	Methanol	20.5	PE	212
	n-Propanol	39.5	PE	212
		39.5	VM	323
Poly(ethyl acrylate-*co*-vinylidene chloride) (14.9/85.1)	Ethyl acetoacetate	49.6	PE	12
Poly(hexyl acrylate-*co*-vinylidene chloride) (14.5/85.5)	Benzyl alcohol	56.8	PE	12
Poly(hexadecyl acrylate)	*n*-Heptanol	20.5	A	388
		30.1	PE	388
	n-Hexanol	52.2	A	388
		60.2	PE	388
Poly(phenyl acrylamide)	Water	− 8	A	441
Poly(*N*-*i*-propyl acrylamide)	Dioxane	20		389
	Water	31	PE	142
		30.6	VM	390
		30.6	LS	534
		20	VM	382

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
Poly(*i*-propyl acrylate), atactic	1,2-Butanediol/1,3-butanediol (68.4/31.6)	121.0	PE	218
	n-Decane	166.6	PE	218
isotactic	1,2-Butanediol/1,3-butanediol (68.4/31.6)	123.5	PE	354
	n-Decane	178.0	PE	354
syndiotactic	*n*-Decane	168.3	PE	218
Poly(*n*-octyl acrylate-*co*-vinylidene chloride) (15.5/84.4)	Benzyl alcohol	77.9	PE	12
Poly(phenyl acrylate)	Ethyl lactate	11.7	A, CP	146
		13.8	VT	383
Sodium poly(acrylate)	NaBr/water (1.504 mol/l)	15.0	A	452

1.6. POLY(METHACRYLICS) AND RELATED COMPOUNDS

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
Poly(benzyl methacrylate)	Cyclohexanone	73.2	PE,VM	291
	Cyclopentanol	83.5	A	292
Poly(*p*-biphenyl methacrylate)	Benzene	10	VM	129
Poly(DL-*i*-bornyl methacrylate)	1-Octanol	39.6	A	396
Poly(4-*t*-butylcyclohexyl methacrylate)	Cyclohexane	− 133		288
	n-Butanol	40		288
Poly(*n*-butyl methacrylate)	*i*-Butanol	10.7	VM	205
	n-Decane	84.8	VM	205
	Dimethylformamide	23.6	PE	254
	n-Dodecane	101	VM	205
	Ethanol	≈45	IG	412
	n-Hexadecane	119.8	VM	205
	Methyl carbitol	87.9	PE	254
	Methyl cellosolve	59.6	PE	254
	n-Octane	68.9	VM	205
	i-Propanol	20.9	VM	205
		21.5	A,VM	50
		23	IG	412
		23.7	A, PE	54
		25	A	348
Poly(*i*-butyl methacrylate), isotactic	Dimethylformamide	48.1	PE	254
	Methyl carbitol	115.6	PE	254
	Methyl cellosolve	74.9	PE	254
Poly(*t*-butyl methacrylate)	Cyclohexane	10	VM	466
		10	PE	518
	n-Heptane	64	PE	518
Poly(2-*t*-butylphenyl methacrylate)	Cyclohexane	18.5	PE,VM	336
Poly(*p*-*t*-butylphenyl methacrylate)	Cyclohexane	25	VM	121
Poly(2-chloroethyl methacrylate)	*o*-Dichlorobenzene	35.7	A	397
Poly(cyclobutyl methacrylate)	*n*-Butanol	37.5	PE	404
Poly(cyclobutylmethyl methacrylate)	*n*-Butanol	40.0	VM	504
Poly(cyclododecyl methacrylate)	Hexyl acetate	35	PE	404
Poly(cyclohexyl methacrylate)	*n*-Butanol	22.5	A,VM	166
		22.5	VM	131
		22.5	VM	312
	n-Decane	93.6	VM	312
	n-Decanol	23.0	VM	312
	n-Dodecane	97.5	VM	312
	n-Hexanol	9.2	VM	312
	n-Nonanol	20.2	VM	312
	n-Octane	83.4	VM	312
	n-Octanol	17.9	VM	312
	n-Propanol	39.5	VM	312
Poly(cyclooctyl methacrylate)	2-Butanol	45	PE	404
Poly(cyclopentyl methacrylate)	Cyclohexane	36	A	404
Poly(decyl methacrylate)	Ethyl acetate	11	A	401,457
	n-Pentanol	9.6	PE	140
Poly(2,6-dimethylphenyl methacrylate)	Toluene	25.0	A	411
	Tetrahydrofuran/water (90.6/9.4)	25.0	A	411
Poly(2,6-diisopropylphenyl methacrylate)	Tetrahydrofuran/water (90.1/9.1)	25	VM	467

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
Poly(diphenylmethyl methacrylate)	3-Heptanone	45	PE,VM	405,478
Poly(docosyl methacrylate)	Amyl acetate	31	A	401,457
Poly(dodecyl methacrylate)	*n*-Amyl alcohol	29.5	A,VM	247
Poly(ethylbutyl methacrylate)	*i*-Propanol	27.4	A, PE	77
Poly(ethyl methacrylate)	Butanone/*i*-propanol (12.5/87.5)	23	A, PE	52
	n-Butyl bromide	0	VM	349
	Methyl *n*-propyl ketone	– 1	VM	349
	i-Propanol	36.9	A, PE	54
		36.9	VM	474
	m-Xylene	– 3	VM	349
Poly(glycidyl methacrylate-*co*-lauryl methacrylate) (3/97)	Ethanol/*n*-heptane (69/31)	– 24	CP	257
	(62/38)	1	CP	257
	(56/44)	24	CP	257
	(49/51)	40	CP	257
	n-Heptane/*n*-propanol (56/44)	1	CP	257
	(70/30)	24	CP	257
Poly(*n*-hexyl methacrylate)	*i*-Propanol	32.6	A, PE	47
		37	VM	34
	n-Propanol	20.0	A	388
		21.3	PE	388
	Urea/water (4 mol/l)	10	VM	86
	(6 mol/l)	27.2	VM	86
	(8 mol/l)	52.5	VM	86
Poly(2-hydroxyethyl methacrylate), it	2-Butanol	3.7	VM	484
	Ethanol	15.8	VM	484
	1-Propanol	32.1	VM	484
	2-Propanol	14.0	VM	484
	Water	15.3	VM	484
Poly(isobutyl methacrylate)	2-Hydroxymethyltetrahydrofuran	19.5	PE	507
Poly(*n*-lauryl methacrylate)	*i*-Propyl acetate	13	A, PE	48
		13	PE,VM	489
	n-Pentanol	29.5	A, PE	206
		29.5	VM	208
Poly(5-*p*-menthyl methacrylate)	2-Pentanone	25	VM	336
Poly(methacrylic acid)	Dioxane/dimethylformamide (7/5)	26.9	VM	392
	HCl/water (0.002 mol/l)	30	VM	165
	Methanol	151	PE	393
		26	VM	394
	NaCl/water (0.5 mol/l)	43	A	164
	(0.05 mol/l)	68	A	164
Poly(methacrylonitrile)	Dimethylformamide	29.2	VM	275
Poly(hexyleneoxyphenylenecarboxy-phenyleneoxymethylene methacrylate)	Toluene	15.5	A	402
	Toluene-d_8	6.5	A	402
Poly(methyl *n*-butacrylate)	*n*-Butanol	13	A	155
Poly(methyl ethacrylate)	Di(*i*-butyl) ketone	11.4	A	155
Poly(methyl methacrylate)	Acetone	– 126		288
		– (55 ± 10)	VM	112
	Acetone/ethanol (47.7/52.3)	25	A, CP	96
	Acetone/methanol (78.1/21.9)	25	VM	278
	Acetonitrile	28	VM	278
		30	A,VM	57
		30.5	RGM	414
		32.3	A,VM	409
		38	VM	162
		44	A	407,410,519
		44	DM,VM	427
		44.0	RGM	512,513
		45 ± 10	VM	112
		60	PE,VM	112
	Acetonitrile/butanol (93/7)	25	A	220
	Acetonitrile/methanol (90/10)	25	A	220
	Acetonitrile/pentyl acetate (93/7)	25	A	220
	Acetonitrile/*n*-propanol	25	A	220

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	i-Amyl acetate	57.5	A	174
	n-Amyl acetate	41	VM	112
	n-Amyl methyl ketone	15	VM	293
	Benzene	−223	VM	112
	Benzene/*n*-hexane (70/30)	20	CP	128
	2-Butanol/1-chlorobutane (80/20)	39.2	A	403
	Butanone	−98	VM	112
	Butanone/cyclohexane (59.5/40.5)	25	A, CP	96
	Butanone/*n*-hexane (70.7/29.3)	25	A, CP	96
	Butanone/*i*-propanol (58.2/41.8)	4	A	174
	(55/45)	7.0	A	311
	(55/45)	12.8	A	174
	(38/62)	20	CP	128
	(50/50)	22.8	A	174
	(50/50)	25	PE	300
	(50/50)	25	VM	32
	(50/50)	25	A	49
	(58.2/41.8)	25	A	96
	(46.8/53.2)	28.5	A	174
	2-Butoxyethanol	75.0	VM	278
		75.0	VM	443
	n-Butyl acetate	−20	A	174
	n-Butyl chloride	32.6	A	173
		34.0	VM	278
		35.0	A	311
		35.0	RGM	414
		35.0		509
		35.4	A	174
		35.4	VM	400
		40.6	A	407
		40.8	DM,VM	427
		40.8	RGM	512,513
		40.8	A	519
	Carbon tetrachloride	27	VM	112
	Carbon tetrachloride/*n*-hexane (99.4/0.6)	25	CP	96
	Carbon tetrachloride/methanol (53.3/46.7)	25	CP	96
	Chloroform	−273	VM	112
	Cyclohexane/dioxane (53/47)	20	A,VM	82
	(53.4/46.6)	25	A,CP	96
	Cyclohexanol	77.6		117
	Cyclohexanone/*i*-propanol (51.6/48.4)	21–22	VM	279
	Decalin (trans)	23.5	VM	277
	Dichloroethane	−233	VM	112
	2,2-Dimethyl-4-pentanone	35	PE	112
	2,4-Dimethyl-3-pentanone	41	VM	32
		46	PE	112
	Dioxane/*n*-hexane (59/41)	20	CP	98
	Dioxane/water (85/15)	25	A	343
	2-Ethoxyethanol	27.1	VM	443
		30.1	VM	278
		37.8	A,VM	409
	Ethyl acetate	−98	VM	112
	Ethyl *n*-butyraldehyde	22	PE	112
	2-Heptanone	11	VM	112
		11.5	RGM	414
	3-Heptanone	25	VM	112
		33.7	PE	300
	4-Heptanone	33.8	PE	112,516
		34 ± 10	VM	112
		40.4	A	174
	n-Hexane/3-methyl-2-butanone (17/83)	20	CP	99
	n-Hexane/toluene (18.8/81.2)	25	CP	96
	Methanol/toluene (64.3/35.7)	26.2	A, PE	54

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	2-Methoxyethanol	−2	VM	278
		−2	VM	443
	Methyl *i*-butyrate	−(53 ± 10)	VM	112
	Methyl methacrylate	−163	VM	112
	2-Methyl-4-pentanone	−42	A	174
	Methyl *i*-valerate	−37	A	174
	Nitrobenzene/*i*-propanol (51.6/48.4; w/w)	18	VM	227
	Nitromethane	32.0	RGM	414
	2-Octanone	60	PE	112
	3-Octanone	72	PE	112,516
	Tetralin	74	CT	147
	Toluene	−(65 ± 10)	VM	112
		−178	PE	408
	m-Xylene	24	VM	277
$x_i = 0.07$	*p*-Cymene	159.7	PE	300
	n-Propanol	84.4	PE	300
$x_i = 0.08$	Acetonitrile	43.0	A	511
$x_i = 0.09$	Butanone/*i*-propanol (50/50)	30.3	PE	300
	p-Cumene	152.1	PE	300
	3-Heptanone	40.0	PE	300
	n-Propanol	75.9	PE	300
$x_i = 0.94$	Acetonitrile	27.6	PE	187
	Butanone/*i*-propanol (55/45)	25.0	A	311
	n-Butyl chloride	26.5	A	311
$x_i = 1.00$	Butanone/*i*-propanol (55/45)	8.0	A	311
	n-Butyl chloride	26.5	A	311
	n-Propanol	85.2	PE	300
Poly(methyl methacrylate-*co*-9,10-anthrylenedimethyl dimethacrylate (99.86/0.14)	Toluene/octane (78/22)	25	PL	399
Poly(methyl methacrylate-*block*-α-methylstyrene)	1-Chlorohexane	93	PE	179
	3-Heptanone	84	PE	179
	2-Methyl cyclohexanol	62	PE	179
	2-Octanone	94	PE	179
Poly(methyl methacrylate-*alt*-styrene) (50/50)	Cyclohexanol	60.8	A,VM	181
Poly(methyl methacrylate-*block*-styrene)				
(14.9/85.1)	Cyclohexanol	84	A,VM	181
(15.4/84.6)		84	A	267
(26.8/73.2)		84	A,VM	180
(27.6/72.4)		84	A	267
(various)		82	PE	179
(50/50)		81.6	A	118
(50/50)		81.1	A,VM	181
(50.4/49.6)		81.3	A,VM	180
(50.4/49.6)	2-Ethoxyethanol	81.0	A,VM	180
(51.4/48.6)		81.0	A	267
(51.4/48.6)	Cyclohexanol	81.3	A	267
(64.1/35.9)		80.5	A	267
(64.1/35.9)	2-Ethoxyethanol	69.5	A	267
Poly(methyl methacrylate-*co*-styrene)				
(23.7/76.3)	Benzene/*n*-hexane (44/56)	20	CP	99
	Benzene/*i*-propanol (57/43)	20	CP	99
	n-Hexane/3-methylbutane (40/60)	20	CP	99
(29.8/70.2)	Cyclohexanol	63.0	A,VM	180
	2-Ethoxyethanol	72.8	A,VM	180
(30.6/69.4)	Cyclohexanol	63.0	A	267
	2-Ethoxyethanol	72.8	A	267
(41.9/58.1)	Benzene/*n*-hexane (51/49)	20.0	CP	99
	Benzene/*i*-propanol (51/49)	20.0	CP	99
	n-Hexane/3-methylbutanone (34/66)	20.0	CP	99
(43.8/56.2)	Cyclohexanol	61.3	A,VM	180
	2-Ethoxyethanol	58.4	A,VM	180
(44.8/55.2)	Cyclohexanol	61.3	A	267
	2-Ethoxyethanol	58.4	A	267

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
(48.0/52.0)	Cyclohexanol	61.6	A,VM	181
(50.0/50.0)	Cyclohexanol	68.6	A	118
(51.4/48.6)	Cyclohexanol	81.3	A	178
	2-Ethoxyethanol	81.0		178
(57.7/42.3)	Benzene/*n*-hexane (59/41)	20	CP	99
	Benzene/*i*-propanol (48/52)	20	CP	99
	n-Hexane/3-methylbutanone (29/71)	20	CP	99
(64.1/35.9)	Cyclohexanol	80.5	A	178
	2-Ethoxyethanol	69.5	A	178
(70.7/29.3)	Cyclohexanol	68.0	A,VM	180
	2-Ethoxyethanol	40	A,VM	180
(71.5/28.5)	Cyclohexanol	68.2	A	267
	2-Ethoxyethanol	40	A	267
(73.9/26.1)	Benzene/*n*-hexane (62/38)	20	CP	99
	Benzene/*n*-propanol (41/59)	20	CP	99
	n-Hexane/3-methylbutanone (24/76)	20	CP	99
Poly(β-naphthyl methacrylate)	Tetralin	20	VM	264
	Toluene	52	VM	264
Poly(octadecyl methacrylate)	Butyl acetate	10.5	A	406
Poly(*n*-octyl methacrylate)	*n*-Butanol	16.8	A, PE	51
Poly(*i*-octyl methacrylate)	Acetone/*n*-heptane (64.1/35.9)	25	A, CP	161
Poly(*i*-octyl methacrylate-*co*-styrene) (20/80)	Butanone/methanol (99.4/0.6)	25	A, CP	161
Poly(pentachlorophenyl methacrylate)	Benzene	37	PE	287
		40	R,VM	24
	Benzene/ethylbenzene (5/5)	30	PE	287
	Benzene/toluene (1/9)	10	PE	287
	(5/5)	14	PE	287
	Chloroform	35	PE	287
	o-Dichlorobenzene	– 126		288
	Ethylbenzene	25	PE	287
		25		288
		25	R,VM	24
Poly(4-phenylbutyl-1-methacrylate)	1-Chloroundecane	23.0	VM	477
Poly(2-phenylethyl-1-methacrylate)	1-Chloroheptane	27.5	VM	477
Poly(phenyl thiolmethacrylate)	Butanone	25	VM	176
Poly(stearyl methacrylate)	Propyl acetate	36	A	401,457
Poly(tetrahydrofurfuryl methacrylate)	2-Hydroxymethyltetrahydrofuran/methanol (80/20)	31.2	PE,VM	359
Poly(tetrahydro-4*H*-pyranyl-2-methacrylate)	*i*-Butanol	30.5	A	481
Poly(2,4,5-trichlorophenyl methacrylate)	Benzene	21.8	VM	395
		25.0	VM	398
Poly(tridecyl methacrylate)	Ethyl acetate	27	A	401,457
1.7. OTHER CARBON CHAINS				
Poly[di(*n*-amyl) itaconate]	Acetone/methanol (99/1)	30	CP	350
	Acetone/water (98/2)	30	CP	350
	Benzene/methanol (60/40)	30	CP	350
	Butanone/methanol (63/37)	30	CP	350
	Chloroform/methanol (52/48)	30	CP	350
	Ethyl acetate/methanol (65/31)	30	CP	350
	Methanol/toluene (43/57)	30	CP	350
Poly(dibenzyl itaconate)	Tetrahydrofuran/water (87.4/12.6)	25.0	VM	470
Poly[di(*n*-butyl) itaconate]	Acetone/methanol (99/1)	30	CP	350
	Acetone/water (97/3)	30	CP	350
	Benzene/methanol (42/58)	30	CP	350
	Butanone/methanol (38/62)	30	CP	350
	Chloroform/methanol (40/60)	30	CP	350
	Ethyl acetate/methanol (40/60)	30	CP	350
	Methanol/toluene (54/46)	30	CP	350
Poly[di(*n*-decyl) itaconate]	Benzene/methanol (82/18)	30	CP	350
	Chloroform/methanol (75/25)	30	CP	350
	Methanol/toluene (21/79)	30	CP	350
Poly(diethyl itaconate)	Acetone/water (91/9)	30	CP	350
	Benzene/*n*-heptane (53/47)	30	CP	350

TABLE 1. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Butanone/mineral spirits (34/66)	30	CP	350
	Ethanol/water (91/9)	30	CP	350
Poly[di(*n*-heptyl) itaconate]	Benzene/methanol (42/58)	30	CP	350
	Butanone/methanol (88/12)	30	CP	350
Poly[di(*n*-hexyl) itaconate]	Benzene/methanol (64/36)	30	CP	350
	Butanone/methanol (68/32)	30	CP	350
	Chloroform/methanol (64/36)	30	CP	350
	Ethyl acetate/methanol (78/22)	30	CP	350
	Methanol/toluene (28/72)	30	CP	350
Poly(dimethyl itaconate)	Acetone/methanol (71/29)	30	CP	350
	Acetone/water (80/20)	30	CP	350
	Benzene/*n*-hexane (93/7)	30	CP	350
	Benzene/methanol (41/59)	30	CP	350
	Butanone/cyclohexane (86/14)	30	CP	350
	Butanone/*n*-hexane (90/10)	30	CP	350
	Butanone/methanol (62/38)	30	CP	350
	Chloroform/methanol (32/68)	30	CP	350
	Ethanol/water (95/5)	30	CP	350
Poly(*N*-2,4-dimethyl phenylmaleimide)	Butyl acetate	21	DM,VM	342
Poly[di(*n*-nonyl) itaconate]	Ethanol/water (5/95)	30	CP	350
Poly[di(*n*-octyl) itaconate]	Benzene/methanol (80/20)	30	CP	350
	Butanone/methanol (99/1)	30	CP	350
	Chloroform/methanol (71/29)	30	CP	350
	Ethyl acetate/methanol (99/1)	30	CP	350
	Methanol/toluene (22/78)	30	CP	350
Poly[di(*n*-propyl itaconate]	Acetone/water (94/6)	30	CP	350
	Ethanol/water (8/2)	30	CP	350
Poly[di(*n*-undecyl) itaconate]	Benzene/methanol (83/17)	30	CP	350
	Chloroform/methanol (77/23)	30	CP	350
Poly[*N*-(*n*-octadecyl) maleimide]	*n*-Butanol	120.5	CP,VM	17
	n-Decanol	39.3	CP,VM	17
	n-Hexanol	78.9	CP,VM	17
	n-Octanol	53.6	CP,VM	17
Poly(mono(*n*-octyl) itaconate)	2-Propanol	30	VM	386
Poly(tetrafluoroethylene-*co*-trifluoronitrosomethane (1/1)	Trichlorotrifluoroethane	35	VM	248

TABLE 2. HETEROCHAIN POLYMERS

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
2.1. POLY(ACETALS) AND POLY(ETHERS)				
Poly(oxy-2,6-dimethyl-1,4-phenylene)	Methylene chloride	89.2	VM	317
Poly(oxyethylene); poly(ethylene oxide)	Acetonitrile/*i*-propyl ether (45/55)	20	CP	98
	Benzene/*i*-octane (100/48)	70.8	CT	134
		71	PE	8
	$CaCl_2$/water (2 mol/l)	82	CT	260
		86	CT	36
	Chloroform/*n*-hexane (54/46)	20	CP	98
	(47.4/52.6)	20	CT,VM	90
	CsCl/water (2 mol/l)	60	CT	260
	Diethylene glycol diethylether	50	VM	25
	KCl/water (2 mol/l)	54	CT	36
		57	CT	260
	KF/water (0.30 mol/l)	78.0	PE	482
	(0.50 mol/l)	66.0	PE	482
	(0.80 mol/l)	49.0	PE	482
	(1.00 mol/l)	38.0	PE	482
	KNO_3/water (2 mol/l)	65	CT	36
	KOH/water (1.24 mol/l)	25	PE,VM	416
	K_3PO_4/water (0.20 mol/l)	63.0	PE	482

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Table 2. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	(0.30 mol/l)	45.0	PE	482
	(0.35 mol/l)	38.0	PE	482
	(0.40 mol/l)	26.0	PE	482
	K_2SO_4/water (0.45 mol/l)	34	CT	259
		34	CT	36
		35	PE	13
		35	VM	25
	LiCl/water (2 mol/l)	90	CT	36
		90	CT	260
	Methyl *i*-butyl ketone	50	VM	25
	$MgCl_2$/water (2 mol/l)	80	CT	260
		90	CT	36
	$MgSO_4$/water (0.39 mol/l)	42	CT	259
		42	CP	36
		42		536
		45	PE	13
	NaCl/water (2 mol/l)	60	CT	260
		61	CT	260
	Na acetate/water (0.75 mol/l)	75.0	PE	482
	(1.50 mol/l)	55.0	PE	482
	(2.00 mol/l)	45.0	PE	482
	(3.00 mol/l)	31.0	PE	482
	$Na_2S_2O_3$ (0.20 mol/l)	74.0	PE	482
	(0.30 mol/l)	63.0	PE	482
	(0.40 mol/l)	52.0	PE	482
	(0.50 mol/l)	41.0	PE	482
	NH_4Cl/water (2 mol/l)	76	CT	260
		77	CT	36
	Nitroethane/*i*-propyl ether (45/55)	20	CP	98
	RbCl/water (2 mol/l)	56	CT	260
	$SrCl_2$water (2 mol/l)	73	CT	260
		82	CT	36
	$ZnSO_4$/water (0.30 mol/l)	54.0	PE	482
	(0.35 mol/l)	48.0	PE	482
	(0.45 mol/l)	35.0	PE	482
	21 salts in water (various concentrations)	97		417
	Water	5.1	DM,VM	45
		96	CT	36
		102	A	418
		103	VM	416
		108.3	VM	419
		117	CT	260
		92 – 109	VT	383
Poly(oxyethylethylene), poly(butylene oxide)	*i*-Propanol	29.8	VM	225
		30	VM	35
Poly(oxy(2-hydroxytrimethylene)oxy-1,4-phenylene-isopropylidene-1,4-phenylene)	Cyclohexanone/toluene (32.5/67.5)	22	VM	194
	Tetrahydrofuran/toluene (2/1)	30	SM	37
Poly(oxypropylene); poly(propylene oxide)	*i*-Octane	50	A	10
Poly(oxytetrafluoroethylene)-*co*-poly(oxydifluoromethylene) (40/60)	Freon TF	25	VM	415
Poly(oxytetramethylene); poly(tetrahydrofuran)	Acetonitrile/benzene (61.5/38.5)	25	CP	94
	Acetonitrile/butanone (38.3/61.7)	25	CP	94
	Acetonitrile/carbon tetrachloride (50.2/49.8)	25	CP	94
	Acetonitrile/chlorobenzene (60.1/39.9)	25	CP	94
	Acetonitrile/tetrahydrofuran (58.7/41.3)	25	CP	94
	Acetonitrile/toluene (61/39)	25	CP	94
	n-Butanol	5	PE	107
	Butanone	25	VM	214
	Chlorobenzene	25	VM	214
	Chlorobenzene/*n*-octane (25.0/75.0)	10	A, CP	106
	(21.5/78.5)	25.8	A, CP	106

Table 2. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	(14.5/85.5)	46.0	A, CP	106
	(13.0/87.0)	63.0	A, CP	106
	(10.9/89.1)	80.0	A, CP	106
	Cyclohexane/*n*-heptane	26	VM	214,228
	Diethyl malonate	33.5	PE	105
	Ethyl acetate/*n*-hexane (22.7/77.3)	30.4	PE	105
		33	A	199
	i-Propanol	44.6	PE	105
	Toluene	28.3	A	9
Poly(oxytrimethylene)	Cyclohexane	27	PE	55
2.2. POLY(ESTERS)				
Poly(bisphenol A-*co*-(isophthalic acid + terephthalic acid; 1:1)	Cyclohexane/dioxane (32/68)	25	CP	437
Poly(decamethylene perfluorosebacate)	*s*-Tetrachloroethane	25	VM	446
Poly(diphenylphthalide dicarboxylic acid-*alt*-*p*,*p*′-dihydroxydiphenyl)	Dichloroethane	25	A	420
Poly(β-hydroxybutyrate)	Chloroform/heptane (50.2/49.8)	25	CP	421
	2,2,2-Trifluoroethanol/water (52.6/47.4)	25	CP	421
Poly(1-(6-[4-(4-methoxyphenoxycarbonyl)-phenoxy]hexyloxycarbonyl)-1-methyl-ethylene)	Toluene	17.0	A,VM	506
Poly(oxyadipoyloxyhexamethylene); poly(hexamethylene adipate)	Cyclohexanol	64	PE	360
Poly(oxyadipoly-poly(oxyethylene) mol. wt. of PEOX = 150	Chloroform/*n*-hexane (65/35)	20	CP	98
200	(63/37)	20	CP	99
300	(62/38)	20	CP	98
387	(60/40)	20	CP	98
600	(59/41)	20	CP	98
2580	(57/43)	20	CP	98
7000	(56/44)	20	CP	98
Poly(oxyadipoyloxytetramethylene); poly(tetramethylene adipate)	Benzene/*n*-hexane (83.3/16.7)	25	CP	175
	Cyclohexanol	77	PE	360
	Chlorobenzene/*n*-hexane (75.9/24.1)	25	CP	175
	n-Hexane/nitrobenzene (43.3/56.7)	25	CP	175
Poly(oxycaproyl); poly(ε-caprolactone)	Benzene/*n*-hexane (85.1/14.9)	25	CP	175
	Chlorobenzene/*n*-hexane (70.2/29.8)	25	CP	175
	Nitrobenzene/*n*-hexane (67.0/33.0)	25	CP	175
Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene); bisphenol A polycarbonate	*n*-Butyl benzyl ether	170	A	27
	Chloroform	20	A	73
	Chloroform/ethanol (74.5/25.5)	18	CP	193
	Cyclohexane/dioxane (36.1/63.9; w/w)	25	VM	241
Poly(oxyethyleneoxyadipoyl)	Cyclohexanol	114.5	PE	360
Poly(oxyethyleneoxysuberoyl)	Cyclohexanol	88	PE	360
Poly(oxyethyleneoxyterephthaloyl); poly(ethylene terephthalate)	Cyclohexane/dichloroacetic acid (6/4)	25	A,VM	344
Poly(oxyoctamethyleneoctasebacoyl)	Benzene/*n*-hexane (48.3/51.7)	25	CP	175
	Bromobenzene/*n*-hexane (45.0/55.0)	25	CP	175
	Chlorobenzene/*n*-hexane (37.5/62.5)	25	CP	175
DL-Poly(oxy(1-oxo-3-methyltrimethylene)) poly(DL-β-methyl-propiolactone)	Butyl chloride	13	A,VM	143
Poly(oxysebacoyloxy-poly(oxyethylene)); mol. wt. of PEOX = 387	Acetonitrile/*i*-propyl ether (35.8/64.2)	20	CP	98
	Chloroform/*n*-hexane (56/44)	20	CP	98
Poly(12-oxystearoyl); poly(12-hydroxystearic acid)	*n*-Butanol/*n*-heptane (81/19)	1	CP	257
	Ethanol/*n*-heptane (39/61)	1	CP	257
	(51/49)	24	CP	257
	(59/41)	40	CP	257
	n-Heptane/*n*-propanol (35/65)	1	CP	257
	(16/84)	24	CP	257

Table 2. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
Poly(oxysuberoyl-poly(oxyethylene)) mol. wt. of PEOX = 387	Acetonitrile/*i*-propyl ether (38.6/61.4)	20	CP	98
	Chloroform/*n*-hexane (58/42)	20	CP	98
Poly(oxysebacoyloxy-poly(oxyethylene)); mol. wt. of PEOX = 387	Acetonitrile/*i*-propyl ether (35.8/64.2)	20	CP	98
	Chloroform/*n*-hexane (61/39)	20	CP	98
Poly(phenolphthalein-*alt*-terephthalic acid)	Tetrahydrofuran	19	A	420
Poly[2,2-propane-bis(4-phenylthiocarbonate)]	Chloroform/cyclohexane (76.5/23.5)	25	VM	469
2.3. POLY(AMIDES)				
Poly(2-acrylamido-2-methylpropane sulfonamide)	Dioxane/water (18.5/81.5)	25	A,VM	475
Poly(γ-benzyl-L-glutamate)	Dichloroethane/diethylene glycol (80/20)	25	A	209
Poly([*n*-hexylimino)carbonyl]; poly(*n*-hexyl isocyanate)	Carbon tetrachloride/methanol (81.5/18.5)	25	CP	29
	Methanol/toluene (19.5/80.5)	25	CP	29
Poly(iminoadipoyliminohexamethylene); poly(hexamethylene adipamide)	Carbon tetrachloride/*m*-cresol/cyclohexane	20	SM	335
	Formic acid/KCl/water	25	A,VM	101
Poly(imino(1-oxohexamethylene)); poly(ε-caprolactam)	$CaCl_2$/methanol (15 g/dl)	35	VM	256
	Chloroform/perfluoro alcohol (7/3)	25	PE	198
	m-Cresol/decalin (25/75)	30	CT	148
	KCl in formic acid (2.3 mol/l)/water (90/10)	25	VM	422
Poly(iminoterephthaloylimino-2,2,4/2,4,4-trimethylhexamethylene)	Aniline	142	CT, PE	141
	Pyrroline	62	PE	141
Poly[*N*-methylimino(1-oxodecamethylene)]; poly(*N*-methyldodecane lactam)	Dioxane	30.5	A,VM	286
Poly(L-proline)	Trifluoroethanol	130	A	227
	Water	100	A	227
Poly(pyromellitic acid-*co*-4-amino-1,4-phenyleneoxy-1,4-phenyleneamine)	Dimethylacetamide/dioxane (1/2.5)	21	A,VM	449
Poly(pyromellitic acid-*co*-4-amino-1,4-phenyleneoxy-1,4-phenyleneoxy-1,4-phenyleneamine)	Dimethylacetamide/dioxane (1/7.5)	21	A,VM	449
2.4. POLYUREAS, POLYURETHANES AND OTHER NITROGEN CHAINS				
Poly(1,4-butylene glycol-*co*-4,4′-diphenylmethanediisocyanate-*co*-poly(oxycaprolyl))	Dimethylformamide	82	VM	318
Poly(ethylene glycol-*co*-4,4′-diphenylmethane diisocyanate)	Acetone/dimethylformamide (21/79)	25	VM	23
Poly[2-methoxy-4,6-di(*p*,*p*′-isopropylidene diphenyloxy) *s*-triazine]	Butanol/1,2-dichloroethane (38/62)	30	VM	435
Poly(ureylene heptamethylene); Poly(heptamethylene urea)	Dichloroacetic acid	46	VM	109
	Sulfuric acid (90%)	46	VM	109
Polyurethane from polypropylene glycol and 2,4,4-tolylene diisocyanate	2,4,4-Trimethyl pentane	39.5	VM	236
2.5. POLYSACCHARIDES				
Amylopectin	Water	25	A	325
Amylose	Acetone/dimethyl sulfoxide (43.5/56.5)	20	VM	40
	Dimethyl sulfoxide/methanol (49/51)	25.0	VM	61
	Dimethyl sulfoxide/0.5 mol/l KCl in water (25/75)	25	VM	61
	Guanidinium chloride in water (4.2 mol/l)	25	VM	424
	0.33 mol/l KCl in water	22.5	VM	14
		25	VM	108
	Sodium acetate buffer	25	VM	61
Amylose tricarbanilate	Pyridine/water (86.7/13.3)	25	A	15
Cellulose diacetate	Acetone	155	PE	330
		159.8	PE	426
	Butanone	37	PE	331
		49	PE	426

Table 2. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
		50	A	332
		158.8	PE	426
		170	PE	331
Cellulose triacetate	Acetone	27	PE	65
		181	PE	65
Cellulose tributyrate	Tetrachloroethane	56.6	A	150
Cellulose tricaproate	Dimethylformamide	41	A	191
Cellulose tricaprylate	Dimethylformamide	140	PE	215
	3-Phenylpropanol	48	PE	215
Cellulose tricarbanilate	Anisole	94	A	425
	Cyclohexanol	73	A	425
Dextran	Water	101.8	A	535
Hydroxyethyl cellulose	Water	− 73	A	423
2.6. CARBON–SULFUR CHAINS				
Poly(arylate-arylenesulfonoxide)	Dioxane	23.5		501
Poly(arylate-*block*-arylenesulfonoxide)	Dioxane	23.5		501
Poly(propylene sulfide)	*n*-Heptane/toluene (31.5/68.5)	25	CP	261
Poly(sulfonyl-1,4-phenyleneoxy-1,4-phenylene-dimethylmethylene-1,4-phenylene-oxy)	Dimethylsulfoxide	105.5	VM	428
Poly(arylene sulfonate)	Dioxane	26.8	PE	436
Poly(diphenylether sulfone)	Dimethylformamide/methanol (83/17)	25.0	VM	500
2.7. SILICON–OXYGEN CHAINS				
Poly(oxydimethylsilylene) poly(dimethyl siloxane)	Acetone/toluene (6/5)	29.5	A	68
	Benzene	− 7	A	202
		− 5.2	VM	201
		− 3	A	202
	Benzyl alcohol/carbon tetrachloride (21.2/78.8)	25	CP	94
	Benzyl alcohol/chloroform (12.8/87.2)	25	CP	94
	Benzyl alcohol/ethyl benzene (14.6/85.4)	25	CP	94
	Benzyl alcohol/methylene chloride (22.7/77.3)	25	CP	94
	Benzyl alcohol/trichloroethylene (21.7/78.3)	25	CP	94
	Benzyl alcohol/toluene (16.2/83.8)	25	CP	94
	Bromobenzene	78.3	VM	201
		78.7	A	309
	Bromocyclohexane	28	VM	433,459
		36.8	VM	201
		39.0	A	209
	Bromocyclohexane/phenetole (85.7/14.3)	36.3	A	309
	Butanone	19.8	PE	432
		19.8	VM	201
		20.0	A	67
		20.0	PE	111
		20.0	A	202
	n-Butyl acetate	− 38.2	VM	201
	Chlorobenzene	− 19.2	VM	201
		68	A	202
	Chlorobenzene/dimethyl phthalate (88.2/11.8)	56.3	A	309
	Cyclohexane	− 81	A	202
		− 68.2	VM	201
	Cyclohexanol/toluene (34/66)	25	CP	94
	Dichlorobenzene	87	PE	71
	Ethanol/*n*-heptane (49/51)	63	CT	72
		65	PE	72
		67 ± 2		536
	Ethyl acetate	4.8	VM	201
		18	A	202
	Ethyl iodide	2.1	A	309
	n-Heptane	− 173.2	VM	201
	n-Hexane	− 173.2	VM	201
	Methylcyclohexane	− 113.2	VM	201

Table 2. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Methylcyclopentane	−98.2	VM	201
	Nitroethane/toluene (25.9/74.1)	25	CP	94
	Nitromethane/toluene (18.9/81.1)	25	CP	94
	Nitropropane/toluene (36/64)	25	CP	94
	n-Nonane	−113.2	VM	201
	n-Octane	−143.2	VM	201
	Perfluorooctane/tetrachlorodifluoroethane (33.2/66.8; w/w)	22.5	A, PE	67
	Phenetole	83.0	PE	111
		83.0	A	202
		89.3	VM	201
		89.5	A	309
	n-Propyl acetate	−28.2	VM	201
	Styrene	35	A	429
	Toluene	−30	A	202
		−33.2	VM	201
	Xylene	−47	A	202
		−48.2	VM	201
Poly(methylphenylsiloxane)	Di-*i*-butylamine	30.4	VM	487
Poly(phenylsilasesquioxane)	1,2-Dichloroethane	50.5	VM	138,431
		56		276
	Mesitylene/toluene (30/70)	25	A	185
Poly(γ-trifluoropropyl methyl siloxamer)	Cyclohexyl acetate	25	VM	38
	Methyl hexanoate	72.8	VM	38
2.8. PHOSPHORUS–OXYGEN CHAINS				
Poly(phosphate)	LiBr/water (1.80 mol/l)	25	A	326
	LiCl/water (0.40 mol/l)	20	A	297
	NaBr/water (0.415 mol/l)	25	A	327

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Table 2. *cont'd*

Polymer (mol/mol)	Theta solvent (v/v)	Theta temp. (°C)	Method	Refs.
	Methylcyclopentane	–98.2	VM	201
	Nitroethane/toluene (25.9/74.1)	25	CP	94
	Nitromethane/toluene (18.9/81.1)	25	CP	94
	Nitropropane/toluene (36/64)	25	CP	94
	n-Nonane	–113.2	VM	201
	n-Octane	–143.2	VM	201
	Perfluorooctane/tetrachlorodifluoroethane (33.2/66.8; w/w)	22.5	A, PE	67
	Phenetole	83.0	PE	111
		83.0	A	202
		89.3	VM	201
		89.5	A	309
	n-Propyl acetate	–28.2	VM	201
	Styrene	35	A	429
	Toluene	–30	A	202
		–33.2	VM	201
	Xylene	–47	A	202
		–48.2	VM	201
Poly(methylphenylsiloxane)	Di-*i*-butylamine	30.4	VM	487
Poly(phenylsilasesquioxane)	1,2-Dichloroethane	50.5	VM	138,431
		56		276
	Mesitylene/toluene (30/70)	25	A	185
Poly(γ-trifluoropropyl methyl siloxamer)	Cyclohexyl acetate	25	VM	38
	Methyl hexanoate	72.8	VM	38
2.8. PHOSPHORUS–OXYGEN CHAINS				
Poly(phosphate)	LiBr/water (1.80 mol/l)	25	A	326
	LiCl/water (0.40 mol/l)	20	A	297
	NaBr/water (0.415 mol/l)	25	A	327

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Fractionation of Polymers

J. M. Barrales-Rienda, A. Bello, P. Bello, G. M. Guzmán
Departamento de Química-Física de Polímeros, Instituto de Ciencia y Tecnología de Polímeros, Consejo Superior de Investigaciones Científicas, Madrid, Spain

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A. PRINCIPLES OF POLYMER FRACTIONATION

As a general rule, the composition of a polymeric substance is not homogeneous. The differences between the macromolecules of such a substance may be classified according to three main properties: (a) molecular weight, (b) chemical composition, and (c) molecular configuration and structure. Fractionation of a polymeric substance means the separation of that substance into its different molecular species, using a suitable experimental technique, in order to obtain homogeneous fractions. The molecular weight distribution is a general feature for practically all synthetic polymers; it is a consequence of the particular nature of the polymerization process by which they are made. Natural polymers usually have molecular weight distributions as a result of the degradation processes suffered by the substance during

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isolation from living tissues. Additional causes, such as more or less accidental degradation during processing, improper handling, or routine use, may contribute substantially to an increase in the width of the natural molecular weight distribution already present in the sample. The existence of molecular weight heterogeneity in macromolecular substances is therefore quite general. It is one of their fundamental properties and is directly responsible for the necessity of using several molecular weight averages for their description. It also exerts a permanent influence on all the properties of the substance, both in solution and in the solid state.

Differences in chemical composition in polymers originate from those reaction which offer several possibilities of substitution along the backbone of the macromolecules, for instance, the synthesis of random, block and graft copolymers and then any partial chemical transformations to which the substances can be subjected.

The third kind of heterogeneity mentioned above refers to differences in the physical configuration of the macromolecules, such as those between linear and branched polymers, and also to differences in the tacticity of the several molecular species present in the mixture, which is usually reflected in varying amounts of amorphous and crystalline materials in the substance.

Most of the experimental techniques developed so far to fractionate polymers refer to fractionation according to molecular weight. Chemical composition and physical structure differences are handled by more or less sophisticated modifications of the solubility method, such as varying the nature of solvent/nonsolvent mixture or the temperature of extraction, or by using an appropriate active support (adsorbent). The experimental techniques referred to in the tables are mostly based on the variation of some properties directly related to the molecular size. It is common to classify the fractionation method according to their preparative analytical character. The latter methods do not isolate fraction; they are mainly intended to explore the molecular weight distribution of the polymer. The classification of fractionation methods together with the basic idea of each experimental technique is briefly described below. Reviews of polymer fractionation have been published by Cragg and Hammerschlag (660), Desreux and Oth (745), Schulz (2902), Conrad (613), Hall (1198), Channen (544), Guzmán (1172,1174), Bello, Barrales-Rienda and Guzmán (276,277), Fuchs and Leugering (936), Kaesbauer and Schuch (1584), Screaton (2924), Schneider (2878), Cantow (506), Johnson, Porter and Cantow (1506), Moll (2231), Tung (3284,3286), Francuskiewicz (918). Reviews dealing with some specific aspects of fractionation have been published by Schurz (2915), Samsonov (2826), Schneider (2880), Giddings (1047, 1050–1052,1147). Reviews concerning theoretical aspects of polymer fractionation have been given in the book of Tompa (3217), and by Voorn (3397), Huggins and Okamoto (1392), and Koningsveld (1749).

In recent years, gel permeation chromatography (GPC) has become a technique of widespread use not only for molecular weight distribution but also for preparative fractionation. There exists much information on this technique in recent literature. General reviews on GPC have been published by Cantow, Porter and Johnson (505), Heitz and Kern (1262), Altgelt and Moore (71), Johnson and Porter (1507,1508), Altgelt (72), Determann (748), Altgelt and Segal (73), Lambert (1854), Ouano, Barrall II and Johnson (2492), Dawkins and Yeadon (717), Janča (1471), Ouano (2494), Barrales–Rienda (225), Bruessau (452), Hamielec and Styring (1202), Dawkins (718) and books by Yau, Kirkland and Bly (3552), Belenkii and Vilenchik (275), Janča (1474). Also, nonexclusion liquid chromatographies and cross fractionations for copolymers have been reviewed by Glöckner (1071,1076,1080), Vela Estrada and Hamielec (3366) and Mori (2283); temperature rising elution fractionation (TREF) by Wild (1710,3475, 3476); and field flow fractionation (FFF) by Janča (1476).

B. FRACTIONATION METHODS

1. Fractionation by Solubility

(a) Fractional Precipitation

Addition of Nonsolvent Successive precipitation of polymer species from a solution by addition of a miscible nonsolvent. The larger molecules precipitate first.

Lowering the Temperature Successive precipitation of polymer species from a solution by controlled cooling. The larger molecules precipitate first.

Solvent Volatilization Successive precipitation of polymer species from a solution of the polymer in a solvent/nonsolvent mixture by controlled evaporation of the more volatile solvent. The larger molecules precipitate first.

Pressure Variation at Lower Critical Solution Temperature Successive separation is carried out at a lower critical solution temperature (LCST) under isothermal conditions by changing the pressure of the system. Low molecular weight species are precipitated first. The efficiency of the method is poor in low molecular weight ranges.

(b) *Turbidimetric Titration* Continuous precipitation of polymer species from a very dilute solution by progressive addition of nonsolvent. In the absence of coagulation, the amount of polymer precipitated can be measured by the increase in optical density of the solution. The larger molecules precipitate first. This is an analytical method and can also be reversed, i.e; the polymer is first precipitated completely, and then redissolved by progressive addition of solvent.

(c) *Summative Precipitation* Simultaneous precipitation of polymer species from several solutions of the same sample by addition of increasing amounts of nonsolvent to the solution. The sum of all the precipitates constitutes a cumulative weight distribution. This is an analytical method.

(d) *Cumulative Volume of Precipitate* Successive precipitation of polymer species from a solution by addition of increasing amounts of nonsolvent. Fractions are not isolated

and the cumulative volume of precipitate is observed and determined after each nonsolvent increment. This is an analytical method.

(e) Fractional Solution

Direct Extraction Small polymer molecules are brought in direct contact with the solvent to extract low-molecular weight species from the swollen polymer. Subsequent fractions can be obtained either by different solvent mixtures of increasing dissolution power, or by raising the temperature stepwise with the same solvent. Smaller molecules are extracted first.

Film Extraction

CONTINUOUS OPERATION (CONTINUOUS FILM EXTRACTION) (CFE) The polymer solution is applied as a thin coating on both sides of a slowly moving belt. On passing through a drying region the solvent evaporates; the thin film on the belt is extracted continuously in a series of tubes containing solvent/nonsolvent mixtures of increasing dissolution power kept at constant temperatures.

BATCH OPERATION (FILM EXTRACTION) It works by using support material to obtain a very thin film with a large surface area. A metal foil is coated thinly with a polymer solution and the solvent is stripped out; after drying, the foil is cut into strips and extracted successively with solvent/nonsolvent mixtures of increasing solvent power, or by raising the temperature stepwise with the same solvent. Smaller molecules are extracted first.

Column Extraction The polymer is distributed on an inert support (small glass beads or sea sand) packed in a column which will subsequently have solvent passed through it either in an upward or downward direction. Successive elutions then take place in steps by the use of different solvent mixtures or by different extraction temperatures.

Temperature-Rising Elution Fractionation (TREF) The sample is loaded by injection in hot solution into a column packed with an inert support. The column is held in a hot bath. The loaded column is then cooled down to room temperature at a rate as slow as possible. The polymer to be fractionated must be deposited on the inert support by programmed cooling slow enough for crystallization, in such a way that it facilitates and promotes the crystallization of the different branched species in layers one upon the other. This step favours the effective separation by elution with increasing temperatures, which may be carried out stepwise or continuously. Therefore, polymer species are eluted with a solvent from the column as the temperature rises at a selected rate of heating. Molecules are eluted first according to their short-chain branches, i.e., with respect to degree of branching.

Coacervate Extraction A liquid polymer-rich gel phase (coacervate) is extracted by a solvent, forming a sol phase. Both the sol phase (or extracting agent) and the gel phase (coacervate) contain the same solvent and nonsolvent and are formed only together with the polymer fractionated (i.e., solvent and nonsolvent are completely miscible without the polymer). Thus, this procedure is a liquid–liquid extraction. Successive extraction of polymer species can be done from the coacervate. Smaller molecules are extracted first.

Continuous Polymer Fractionation (CPF) It represents a special variety of a counter-current extraction that functions in the following way: A comparatively concentrated solution of the polymer in a given solvent [it can also be a solvent/non-solvent mixture (the feed, FD)] is introduced into a pulsed sieve-bottom column at one end, and the same solvent or solvent/nonsolvent mixture but free of polymer (extracting agent, EA) is added at the other end. Both phases are homogeneous as they enter the column, but the CPF splits the polymer into two fractions by demixing inside the column in such a way that the molecules of different mass distribute between the two phases. This treatment really forms a coacervate due to the limited solubility of the polymer in the solvent/nonsolvent system. The coacervate is continuously extracted inside a counter-current column by the liquid extracting agent whereby the polymer molecules will be distributed over the counter-current phases according to their MW. The high molecular weight material remains in the phase resulting from the feed and leaves the column as the gel phase, whereas the low molecular weight material is extracted with the sol phase, so these two fractions leave the column as gel and sol phases, respectively. Thus, the original polymer can be split into two fractions at a desired MW in one continuous run.

(f) Partition Between Immiscible Solvents

Polymer species are distributed according to molecular size between two immiscible liquids of different solvent power. Counter-current extraction is particularly suitable for this method.

(g) Fractionation with Demixing Solvents

It is possible to separate chemically different polymers dissolved in a suitable homogeneous solvent mixture quantitatively, if the solvents are miscible at high temperatures but show phase separation at a lower temperature. Demixing is reached by slow-cooling the system to the desired separation (equilibrium) temperature. Stirring of the system is advantageous. Details of the demixing procedure depend on polymer species. Blends of polymers and copolymers, including block-, graft- and statistical copolymers, can be separated in one fractionation step with respect to their chemical nature. Multistep fractionation methods using demixing solvents (cumulative, successive, semicumulative, and head–tail type of fractionation) have been used to determine the chemical distribution of binary copolymers as well as block- and graft-copolymers.

(h) Fractional Crystallization

Successive separation of species from polymer solutions by crystallization at different temperatures. The crystallization can be carried out under stagnant conditions, but considerable improvement in the efficiency is obtained if the crystallization is induced by fast stirring (stirring crystallization). Under these conditions, the high molecular weight constituent crystallizes first, settling on the stirrer as long thin fibrillar crystals. The technique can be coupled with fractional

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extraction at increasing solution temperatures. The method is poorly reproducible.

Crystallization Analysis Fractionation (CRYSTAF) It is based on the segregation of crystals of different morphology or comonomer content by crystallization. In CRYSTAF, the separation and analysis are performed in a single step (the crystallization cycle), where concentration of the polymer solution is intermittently sampled and analyzed as the temperature goes down. The temperature–concentration data which are obtained correspond, in the cases of branched poly(olefins) or their copolymers with a-olefins, to the cumulative curve of the side chain branching distribution (SCBD). The last point at the lowest temperature of the experiment is the soluble or noncrystallizable fraction.

2. Fractionation by Chromatography

(a) Adsorption Chromatography (Chromatography on an active support) The adsorption of polymer species on an active support depends on the molecular weight.

Frontal Analysis The active support is packed in a column. A solution of polymer passes down the column and is collected when leaving it. The concentration in the effluent changes with the volume collected, and presents successive fronts due to the differential adsorption of molecular species on the active support.

Elution Analysis

COLUMN A small quantity of polymer is adsorbed on the upper portion of the support packed in the column. Elution with a suitable solvent takes place; each component moves down the column at a different rate and is completely displaced at some time and collect in the effluent; in the gradient elution method, the eluent is a liquid of increasing solvent power.

THIN LAYER CHROMATOGRAPHY (TLC) A thin layer chromatographic system is represented by the following three elements: a stationary phase which is a thin layer formed usually on a glass plate with an adsorbent like silica gel (the thin layer is activated by drying); a mobile phase which is any solvent or mixture used as a developer, and a sample. Separation is effected because the migration rate of each component relative to that of the mobile phase is retarded by the stationary phase to different degrees. A spot of the polymer solution is put on the plate, and after drying, the plate is placed vertically in a tank containing a suitable solvent or mixture. As the solvent moves upwards, it carries along each component at different rates. Separated, colorless species can be made visible by appropriate methods. When TLC is used in combination with a concentration gradient method, the composition of the developer (solvent or mixture) changes with the development time. In general, the TLC of a polymer may be classified into four types depending on the separation mechanism: adsorption–desorption, partition, molecular sieving (size exclusion), and ion-exchange process. However, only two of the above mechanisms, adsorption and molecular sieving, are applicable to separation of high polymers.

(b) Competitive Selective Adsorption This method is applied to separate mixtures of tactic forms into their components. The principle of separation consists of a competitive adsorption of two different tactic polymers from the solution onto solid surface. The two tactic forms compete for occupying active sites on the solid adsorbent; one of them will be selectively adsorbed on the adsorbent, while the second one will be unadsorbed and remain in solution. In practice, the separation is carried out by adding the solid adsorbent to the solution of the tactic mixture. The solvent must be selected in such a way that the stereocomplex formation between tactic forms rarely occurs.

(c) "Precipitation" Chromatography (Baker–Williams Method) (Chromatography on an inactive support) The support is an inert material packed in a column. On top of the column, a small amount of polymer is placed, as in elution chromatography. A temperature gradient is set along the column, the upper part being at higher temperature than the bottom; then the elution takes place with a solvent mixture of increasing solvent power. Polymer species move down the column being in a continuous exchange between a precipitated phase and a saturated solution. This distribution depends on the molecular size. Precipitation chromatography can also be carried out in the absence of a temperature gradient. It then becomes essentially a continuous fractionation by fractional solution. (see under Fractional Solution Column Extraction).

(d) Normal-Phase and Reversed-Phase Liquid Chromatography Copolymer separation by non-steric liquid chromatography (NELC) can be achieved in practice by the difference of adsorption power between the copolymers and the stationary phase. In both NPLC and RPLC, the mobile phase should be a good solvent for the copolymers during the entire elution.

In NPLC, stationary phases are polar, for example, silica gel, silica-CN, silica-NH_2 and poly(acrylonitrile) gel; retention times increases with sample polarity and mobile phases are less polar. Gradient elution is performed to increase the content of a polar solvent in the mobile phase, i.e. the polarity of the eluent increases in the course of a run.

RPLC is performed on non polar columns, i.e. stationary phases are hydrophobic (e.g. packed with crosslinked poly(styrene) (PS), or an alkyl branched phase materials such as silica-ODS), and the retention times decrease with polarity. Mobile phases are polar. RP gradient elution is performed to increase the content of less polar solvent in the mobile phase, i.e. the polarity of the eluent decreases in the course of a run.

(e) Gel Permeation Chromatography (GPC) (Chromatography on a porous support) Gel permeation chromatography, sometimes referred to as size-exclusion chromatography (SEC), is an analytical or preparative technique in which solute molecules are separated according to their effective hydrodynamic volumes in solution. A

gel permeation chromatographic system is composed of three fundamental elements. The stationary phase is an expanded and highly crosslinked polymer gel network (expanded silica gel, gel of porous glass, or some of these, but modified by chemical or physical treatments). The gel is packed into a chromatographic column; a mobile phase which may be any solvent or mixture for the polymer and a good swelling agent for the gel. The polymer sample in dilute solution is injected onto a column which contains porous particles with solvent and which is continuously fluxed with eluent. The separation occurs as the polymer molecules in the eluent solvent (mobile phase) percolate through the porous bed (stationary phase). As a result of the restrictions imposed by the size of the pores on the larger molecules, there is a greater pore volume available to the low molecular weight species giving them in effect a longer path length and they, therefore, are more strongly retarded during elution. In other words, small molecules are able to penetrate into the pores of the beads more readily than the larger ones. This effectively increases the retention volume as molecular size decreases. Hence an inverse relationship between retention volume and molecular weight of the polymer exists.

Since from an ideal point of view polymer solubility and adsorption are not occurring in this chromatographic process, the volume of eluent required for the elution of any macromolecules species must essentially be dependent on chain length and appears to be insensitive to structure (universal calibration). However, this seems to be not always the case (non-exclusion effects).

(f) Surface Exclusion Chromatography (Hydrodynamic exclusion chromatography) Conventional gel permeation chromatography (GPC) fails when applied to the characterization of very large macromolecules. Such polymers are easily oriented or deformed by hydrodynamic forces occurring in columns. Hence, steric pore exclusion mechanisms are disturbed, separation efficiency is poor, and the relationship between elution volume and molecular weight is no longer found valid for the highest molecular weight species.

Surface exclusion chromatography (hydrodynamic exclusion chromatography) has been developed for rigid particle size determinations. This technique has been shown to be efficient for size separation of proteins and latexes. It uses a non-porous packing as a stationary phase.

(g) Partition Chromatography Polymer species are distributed between two liquid phases, one of them mobile and the other fixed by absorption on a support. The support consists of strips or sheets of porous paper. The immobile phase is packed in a column.

(h) Phase Distribution Chromatography (PDC) Separation of polymer components in a PDC column is based on thermodynamic and kinetic interactions between the mobile phase (the polymer to be analyzed is dissolved in a Q-solvent) and a gel (stationary phase) of the same linear high polymer situated as a non-crosslinked coating on the surface of small glass bead. It is important to keep the temperature always below the Q-temperature of the sample. The separation efficiency increases sharply with decreasing temperature since the higher molecular species dissolve in the gel phase to a higher extent than the lower molecular species, the former leave the column later. It is a powerful method for the correct determination of narrow molecular weight distributions.

(i) Field Flow Fractionation (FFF) Field flow fractionation resembles chromatography in both the experimental and dynamical aspects of its operation, and it can therefore be thought of as a chromatographic method. It requires neither a stationary phase in the classical sense, nor the packing to support as is characteristic of chromatography. For this reason FFF has been described as one phase chromatography. Like chromatography, it is an elution technique used to separate components as they are transported through a column by a stream of solvent. The method is based on the difference between the flow rates in the center and near the column walls which obey Poiseuille's law. Retention is caused by an external field or gradient which forces the solute into narrow layers occupying the slow flow regions near the wall of an empty channel. Several types of FFF based on the type of force field applied have been developed.

Classical FFF

THERMAL FFF Thermal field flow fractionation (ThFFF) is a high-resolution separation method for a wide range of relatively non-polar polymers in suitable organic solvents. Certain polar macromolecules can also be fractionated by ThFFF in totally aqueous systems. ThFFF separations are carried out with a single mobile phase in a thin, open channel by applying a large thermal gradient across highly polished parallel plates between which a spacer is clamped. It is usually composed of two metallic blocks with highly polished surfaces. ThFFF separations are governed by two transport mechanisms acting in opposition: thermal diffusion, which is the movement of mass in response to a temperature gradient, and ordinary (Fickian) diffusion, which is the movement of mass in response to the concentration gradient established by thermal diffusion.

SEDIMENTATION FFF Either natural gravitational or centrifugal forces in the centrifuge serve as an effective field. The channel is usually coiled around the interior basket of a centrifuge rotor. This technique separates components on the basis of their mass differences.

ELECTRICAL FFF The altogether homogeneous field is induced by electrical current across the channel. Charged macromolecules interact with the field and are separated according to the ratio of electrophoretic mobility to diffusion coefficient.

FLOW FFF Flow field-flow fractionation separates according to differences in diffusion coefficients.

PRESSURE FFF Pressure field-flow fractionation (pressure FFF) and flow FFF are by nature very similar. In both

cases, it is the cross flow that represents the lateral field. The principal difference is that in flow FFF, the flow field is applied externally across the channel formed between two parallel plane membranes, whereas in pressure FFF, the lateral flow across the wall of a circular-cross-section capillary is initiated by an internal pressure drop in a liquid pumped along the semipermeable capillary.

MAGNETIC FFF Magnetic field-flow fractionation has been studied in only a few cases dealing with theoretical principles of the separation and retention of bovine serum albumin in the presence of nickel (II) ions in a magnetic field of 400 G and retention of metal oxides.

CONCENTRATION FFF Concentration field flow fractionation (concentration FFF) is the only FFF technique that could make use of a concentration gradient of a mixed solvent across the channel in order to induce effective chemical forces or chemical field.

SHEAR FFF Shear field-flow fractionation (shear FFF) has been proposed as a technique in which shear forces are responsible for migration perpendicular to flow. An internal shear force field is induced in the annular space between two concentric cylinders that are in relative rotational motion.

Focusing FFF

SEDIMENTATION-FLOTATION FOCUSING FFF In SFFFFF solute particles or macromolecules "sediment" or float in the density gradient of a liquid phase according to the difference between the local density of the liquid and that of the particle or macromolecule. At quasi-equilibrium, the solute species are focused in a thin layer at the position where the density of the environment is the same as the solute density.

ISOELECTRIC FOCUSING FFF The electrophoretic mobility of amphoteric macromolecules is a function of pH and is zero at the isoelectric point. This means that if a stable pH gradient is formed in the FFF channel due to an applied electrical field, the amphoteric solute under the influence of this field is focused into the position of the isoelectric point. In a steady state, this transport is balanced by ordinary diffusion.

(j) Ion-Exchange Chromatography The support is an ion-exchange resin, constituting an immobile phase, through which the solution of polymer is passed. This method is appropriate for polymer species bearing electric charges; the molecules are distributed between the liquid phase and the interface, according to their ionic adsorption forces, which depend on the electric charge and the size of the macromolecules.

(k) Hydrodynamic Chromatography Hydrodynamic chromatography (HDC) is a rather new technique for separating solutes or dispersed materials at high dilution in the micron range, according to decreasing size. It is based on the effect of a radial flow gradient inducing different mobilities according to size. Larger particles are located preferentially in the axis of capillaries where the flow rate is maximum; whereas smaller ones are closer to the walls where the flow rate is minimum. Packed and open capillary columns can separate particles below and above one mm, respectively. It involves injection of a dilute latex sample into a carrier stream (the aqueous eluent) which is pumped through the system at a constant flow rate. The column is packed with non-porous beads. Larger particles exit the column before smaller ones and are detected using a suitable system of detection. It is a complementary method to field-flow fractionation (FFF), steric exclusion chromatography (SEC) and superfluid chromatography.

3. Cross Fractionation

Most of the copolymers and polymers obtained by chemical modification reactions generally possess a two-dimensional distribution: MWD (Molecular Weight Distribution) and CCD (Distribution of Chemical Composition). An analogous problem exists with polyolefins: MWD and distribution of Short-Chain Branching (SCB). It is normally impossible that they can be adequately fractionated by both molecular weight (MWD) and by chemical composition (CCD). The problem is overcome by cross fractionation. The term cross-fractionation refers to any combination of fractionation methods capable of evaluating the distribution in size and composition.

(a) Classical Cross Fractionation Cross fractionation requires two solvent/nonsolvent systems to separate in two different directions. A solvent/nonsolvent combination fractionating solely by MW would be appropriate for the evaluation of the MWD, another one separating by CC would be suited for measuring the CCD of the material. Fractions of the starting material obtained by one precipitant are redissolved and fractionated once more with the help of the complementary precipitant yielding the final fractions. Owing to its high expenditure of time and materials, classical cross-fractionation is seldom performed. However, this procedure is irreplaceable for the production of narrow molecular weight distribution fractions in both MW and CCD on a preparative scale.

(b) Non-Classical Cross Fractionation This technique of cross fractionation can be performed off-line or on-line. Typical cross-fractionations include partition chromatography-SEC, gradient elution-SEC, SEC-turbidimetric titration, gradient elution-TREF, TREF-SEC and demixing fractionation-demixing fractionation.

(c) Orthogonal Chromatography This technique is a special case of non-classical cross fractionation in which two coupled SEC techniques are used. SEC in different eluents can separate a copolymer in two diverging directions. Two SEC instruments are coupled together so that the eluent from the first one flows through the injection valve of the second one.

(d) Cross Fractionation by Bidimensional TLC Combined types of TLC are often for the separation of polymers, copolymers, etc. This technique allows separation according to chemical composition, molecular weight, and stereoregularity. Copolymers, LD and LLD poly(ethy-

lenes) and chemically modified polymers are extremely multicomponent materials which often exhibit simultaneous distributions of molecular weight, composition, and monomer sequence length. Interference of the remaining two distributions while attempting to elucidate one of them greatly complicates analysis. Cross fractionation (bidimensional) TLC is a method to elucidate such problems.

4. Fractionation by Sedimentation

(a) Sedimentation Velocity Sedimentation velocity of polymer species in a high centrifugal field is a function of molecular size. This is usually an analytical method unless a velocity ultracentrifuge of the preparative type is used.

(b) Sedimentation Equilibrium At lower rotational speeds of the ultracentrifuge, it becomes possible to create an equilibrium situation such that the rate of sedimentation is exactly equal to the rate of back-diffusion of the macromolecules. Larger polymer molecules are then found closer to the bottom of the cell than smaller ones.

(c) Density Gradient Technique In a performed or self-generated density gradient, the polymer collects around the position of its own density in a band. The width of this band is dependent on the molecular weight of the polymer. A band of polydisperse macromolecules contains more high-molecular-weight polymer near its maximum than near its "tails". This technique is also capable of separating according to composition.

5. Fractionation by Diffusion

(a) Thermal Diffusion A polymer solution is placed between two surfaces, and a high temperature gradient is established between them. The solution is in contact with an upper and a lower reservoir. The temperature gradient gives rise to a thermal circulation of the molecules, producing a separation of polymer species, which migrate towards the lower reservoir. Thermal diffusion is more pronounced for the larger molecules than for the smaller.

(b) Brownian Diffusion Polymer molecules diffuse at different rates from a solution into a solvent by a boundary, depending on their molecular weights. The translational diffusion constants can be determined by special optical means and related to the inhomogeneity of the sample. This is an analytical method.

6. Fractionation by Ultrafiltration Through Porous Membranes

A polymer solution is submitted to ultrafiltration through a series of membranes of different porosity. The rate of diffusion depends on the molecular size and the degree of permeability of the membranes. It is possible to isolate fractions with varying molecular weights at different times.

7. Fractionation by Zone Melting

A solid solvent is packed in a column. A small amount of polymer is put on top of the solid solvent and dissolved by heating a narrow zone. After solidification, a lower zone is heated, melted, and resolidified. The full column is treated in this way. Polymer species move down the column at different rates, depending on their molecular size during the molten stage. At the end, the polymer is distributed throughout the entire column and recovered by cutting the solid into several portions and sublimating the solvent.

8. Electron Microscopic Counting Method

With most glassy amorphous polymers, it is possible by means of the electron microscope, to observe single spherical molecules, if very dilute solutions in a solvent/nonsolvent mixture are sprayed onto a thin substrate. Consequently, the weight- and number-average molecular weights and molecular weight distributions can be obtained. The method can be recommended and applied only for polymers with molecular weights higher than 5×10^5.

C. TABLES OF FRACTIONATION SYSTEMS FOR DIFFERENT POLYMERS

TABLE 1. MAIN-CHAIN ACYLIC CARBON POLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
1.1. POLY(DIENES)				
Poly(diacetylene)	Chromatography	Chloroform	SEC, styragel	2640,3450
			SEC, ultrastyragel	1677
		Methylene dichloride	SEC, μ-styragel	2620
Poly(butadiene)	Chromatography	1,2,4-Trichlorobenzene	SEC	1380,2073,2074
		Benzene/ethanol	Precipitation chromatogr.	624,626
		Benzene/methanol	Precipitation chromatogr., 35–28°C	2636
		Butyl acetate/isopropanol	Precipitation chromatogr., 25–55°C, 1,4-*cis*	2756

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Carbon tetrachloride followed by amyl chloride	Two dimension TLC, silica gel, 1,4-*trans*,1,4-*cis* and 1,2-vinyl	779
		Chloroform	SEC	2925,2927
			SEC, carboxy + hydroxy term.	1879
		Chloroform, tetrahydrofuran	Three-arm star	2608
		Diisobutene/isooctane	Precipitation chromatogr.	1397
		Diisobutene/*n*-propanol	Precipitation chromatogr., 1,4-*cis*	1397
		Ethyl acetate	Hydroxytelechelic; SEC, styragel	740
		Methanol, ethanol	Column elution, carboxy term.	1880
		Methylene chloride	Hydroxytelechelic; SEC, Porasil	740
			SEC, 1,4,-*trans*, 1,4,-*cis* and 1,2,-vinyl (modified)	1919
		n-Heptane/isooctane	Precipitation chromatogr. 50–40°C	1272
		o-Dichlorobenzene	SEC, 130°C	1251,1252
			SEC, 140°C, 1,2-	141,142
			SEC, 150°C, 1,4-*cis*	3031
			SEC, 25°C, 1,4-*cis*	1214
		Tetrahydrofuran	SEC	12,379,380,381,547, 886,956,1824,1852, 2667,2677,3314,3346
			SEC, 25°C	2555
			SEC, deuterated	146
			SEC, low MW	1842,1878
			SEC, modified	2900,2901
			SEC, phenogel, telechelic	592
			SEC, star branched	1196,1783
			SEC, μ-styragel, 30°C, three arms	2561
			SEC, carboxy term	2925,2926,2927
			SEC, cyclized	366
		Toluene	SEC	7,2073,3241
		Toluene/isopropyl alcohol	Precipitation chromatogr., 44–24°C	1379
		Toluene/*n*-propanol	Precipitation chromatogr., 1,4,-*cis*.	1397
		Trichlorobenzene	SEC, 135°C, hydrogenated	2555
		Trichloroethylene	SEC, 23°C	3195
	Coacervation	Benzene/pentane		1214
	Extraction	Benzene/acetone	Branched polymer	3364
		Benzene/acetone-methanol (9/1)	28°C	625
	Field flow	Water (0.1% w/w FL-70 detergent + 0.02% sodium azide	Sedimentation, latexes	352
	Fractional crystallization	Heptane	Several temperatures, 1,4,-*trans*	3241,3242
	Fractional precipitation	Benzene/acetone:dioxane followed by acetone : methanol		1001
		Benzene/methanol		428,430
			25°C	882
			25°, 1,4,-*cis*	2373
			25°C, Hydroxy term.	1396
			Low. temp., 1,4,-*cis*	7
		Benzene/*n*-butanol		1726
		Heptane/acetone	1,4,-*cis*	2260
		n-pentane–dioxane/methanol	Hydrogenated	3510
		Pentane/methanol	30°C, carboxy term.	922
		Tetrahydrofuran/water	Chlorinated	3136,3346
		Toluene/ethanol	1,4,-*cis*	442
		Toluene/heptane	1,4,-*trans*	3416
		Toluene/methanol	1,4,-*cis*	813,3597
			28°C	110
			Cyclic, 1,4,-*cis*-tri- and tetrachain	2666,3586
		Toluene/*n*-butanol		1726
	Fractional solution	Benzene/methanol	Cyclopolymer	3524
		Chloroform, chloroform–ethanol, ethanol, carbon tetrachloride, carbon tetrachloride-chloroform	Column elution, carboxy + hydroxy term.	1879

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Chloroform/methanol	Column elution	2925,2926
		Ethyl ether	Extraction	2371
	Sedimentation velocity	Diethyl ketone	Ultracentrifuge, 10.3°C	3333
		n-heptane/isooctane	Ultracentrifuge, 20.5°C 1,4,-*cis*	2259
		n-Hexane/*n*-heptane (1/1)	Ultracentrifuge, strereoreg.	59,2624
		Octane	Ultracentrifuge	429,430
	Turbidimetric titration	Carbon tetrachloride/*n*-butanol		1332,1332,3559
Poly[(3,5-di-*tert*-butyl-4-hydroxyphenyl)acetylene]				
	Chromatography	Tetrahydrofuran	SEC, styragel	2401
Poly(*tert*-butylacetylene)	Chromatography	Chloroform	SEC, μ-styragel	2071
		Chloroform	SEC, styragel	2356
Poly(1-chloro-1-decyne)	Chromatography	Chloroform	SEC, styragel	3568
Poly(1-chloro-1-hexadecyne)	Chromatography	Chloroform	SEC, styragel	3568
Poly(1-chloro-1-hexyne)	Chromatography	Chloroform	SEC, styragel	3568
Poly(1-chloro-1-octyne)	Chromatography	Chloroform	SEC, styragel	3568
Poly(1,1,2-trichlorobutadiene)	Fractional precipitation	Benzene/petroleum ether		2546,3027
Poly(chloroprene)	Chromatography	Benzene	SEC, 25°C	1984
		Benzene/methanol	Precipitation chromatogr., 28–35°C	2636
		Butanone	SEC, 25°C	1610
		Butanone : methyl alcohol (0.887/0.113)	SEC, 25°C	1610
		Chloroform	SEC	2890
		Tetrahydrofuran	SEC	649
	Fractional precipitation	Benzene/acetone		1233
		Benzene/methanol		1206,2221, 2222,2223
			1,4,-*trans*	2847
		Butanone/methanol	25°C	682
	Fractional solution	Benzene/isopropanol	30°C	344
		Benzene/methanol	Neoprene, 30°C cont, film ext.	345,2890
	Sedimentation velocity	Butanone	20°C	2890
	Thermal diffusion	Benzene		1725,1789
	Turbidimetric titration	Benzene/methanol		2129
Poly(1-ferrocenyl-1,3-butadiene)				
	Chromatography	Tetrahydrofuran	SEC	3347
Poly[*o*-(trifluoromethyl)phenyl)acetylene]				
	Chromatography	Chloroform	SEC, styragel	2067,2070
Poly(2,4-hexadiyn-1,6-ylene-asbacate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1814
Poly(1,4-bis(homoallyl)cubane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	557
Poly(5-hydroxyoctylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2700
Poly(isoprene)	Chromatography	Benzene/methanol	Precipitation chromatogr.	365,1964, 2332,2636
			Precipitation chromatogr., glass beads	436
		Chloroform	30°C, SEC, styragel	297,708,716
			SEC, ultrastyragel	3553
		Cyclohexane	SEC	716,1962
		Cyclohexanone	Partition on paper	195,309
		Methylene chloride	SEC μ-styragel	1919
		o-Dichlorobenzene	SEC, 135°C	709
		Tetrahydrofuran	SEC, μ-styragel, 25°C, amino-capped	700
			SEC, μ-styragel, 30°C, three and four arms	2561
			SEC, styragel, several structures	22,81,112,427, 495,886,1166, 1184,1185,1243, 1308,2105,2677, 3396
		Tetrahydrofuran, toluene/methanol (95/5)	SEC, μ-styragel and sodium salt carboxylated	888
		Toluene	SEC, preparative styragel	551
		Toluene/isopropyl alcohol	Precipitation chromatogr.	1379
		Trichlorobenzene	SEC, 130°C	1215,1380

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Field flow	Tetrahydrofuran	Thermal	1146
	Fractional precipitation	Benzene/acetone	Havea	1233
		Benzene/ethanol	Gutta percha, balata, synthetic *trans*-poly(isoprene)	625
		Benzene/isopropanol	Low temp.	359
		Benzene/methanol	*cis*	10
			Low temp.	359,551,1039,1158
		Benzene/*n*-butanol		2640
		Chloroform/acetone	Pale crepe	484
		Dichloroethane/butanone		1963
		Hexane/1-propanol	*cis*, 26°C	2597
		Toluene–ethanol (4 : 1)/ethanol	Rubber	3230,3438
		Toluene/boiling methanol	Chlorinated natural rubber	65
		Toluene/methanol		87,88,112,256, 386,470,883, 1828,2332, 2759,3406
			trans,1-4,*cis*,1-4	436,3507
		Toluene/*n*-butanol	30°C	2639
	Fractional solution	Acetone	Have a extraction	1505
		Acetone, *n*-hexane	Guayule, extraction	1231,1232,2123
		Amyl acetate/2-ethoxyethanol mixtures	Column extraction	1828
		Benzene/methanol	25°C, column extraction, natural rubber	437,3455
	Thermal diffusion	Tetrahydrofuran	Natural rubber	1904
	Trubidimetric titration	Carbon tetrachloride/*n*-butanol		1332
		Toluene–ethanol (4 : 1)/ethanol	25°C	2643
Poly(1-isopropylidenedicyclopentadiene)				
	Fractional precipitation	Toluene/methanol		533
Poly(1,4-(2,3-dimethylbutadiene)				
	Fractional crystallization	Toluene/methanol	28°C	111
Poly(1,4-*cis*-(2-methyl-1,3-pentadiene)				
	Fractional solution	Diethyl ether, heptane, toluene	Direct extraction	485
Poly(norbornadiene)	Extraction	Toluene, *o*-dichlorobenzene		2218
Poly(1,3-pentadiene)	Fractional solution	Benzene/butanone	Amorph/cryst., 1,4-*cis*, isotactic	2370
Poly(perfluorobutadiene)	Fractional solution	Hexane, hexafluorobenzene	Extraction	3220,3221
Poly(1-phenylbutadiene)	Chromatography	Tetrahydrofuran	SEC, styragel	3106
Poly(phenylacetylene)	Chromatography	Tetrahydrofuran	SEC, 25°C, styragel	2932
Poly(spiro-2,4-hepta-4,6-diene)	Fractional precipitation	Benzene/isopropanol		1247
1.2. POLY(ALKENES)				
Poly(α-olefins) (General)	Chromatography	Benzene/ethanol	Precipitation chromatogr.	843
Poly(1-butene) See Poly(ethylethylene)				
Poly(butylethylene)	Chromatography	1,2,4-Trichlorobenzene	80°C, styragel, SEC	3418
		Tetrahydrofuran	SEC, ultrastyragel, 30°C	160
	Fractional precipitation	Cyclohexane/acetone		1931
		Toluene/*n*-butanol		3223
		Xylene/triethylene glycol	130°C	2974
Poly(cyclohexylethylene)	Fractional solution	Benzene	Extraction	2497
Poly(cyclopentylethylene)	Fractional solution	Ethyl ether	Extraction	2497
Poly(cyclopropylethylene)	Fractional solution	Benzene	Extraction	2497
		Ethyl ether, *n*-heptane, octane, nonane	Extraction	2501
Poly(ethylene)	Chromatography	1,2,4-Trichlorobenzene	SEC, 135°C	2520
			SEC, μ-styragel, 145°C, HDPE, LLDPE, LDPE	731
			SEC, styragel, 140°C	3456
			SEC, styragel, 145°C	1925
			SEC, ultrastyragel, 135°C	824
		Chlorobenzene	SEC, 100°C merckogel, and styragel	1266
		Diphenyl ether, tetralin/triethylene glycol	Continuous fractionation (counter current extraction) > 130°C	1018

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Ligroin/2-(2-butyl)ethanol	Precipitation chromatogr.	3015
		o-Dichlorobenzene	SEC	3318
			SEC, Low MW HDPE	3376
			SEC, styragel	2355
			SEC, styragel, 130°C, 135°C, 138°C	190,235,236,617, 709,712,963,1045, 1411,1646,1981, 1982,2347,3030, 3479
		Perchloroethylene	SEC, 110°C	2783,3394
		Propane	Supercritical fluid fractionation	2127
		Tetralin	SEC, 125°C	1984
		Tetralin/2-butoxyethanol	Precipitation chromatogr., 110–160°C	611,1143
		Toluene	SEC, 25°C, low MW	81,126
		Trichlorobenzene	SEC	379,381,509,607, 614,615,639,723,751, 785,786,1006,1311,1643, 1644,1704,1989,2076, 2139,2346,2347,2348, 2349,2482,2509,2590, 2661,2697,2698,2820, 2821,2868,2881,3282, 3377,3403,3433,3434, 3435,3441,3458,3462, 3469,3470,3471,3472, 3480
			SEC, styragel, 135–140°C, branched	1823
	Coacervation	Dibutyl phthalate/decalin (60/40)		3480
		o-Dichlorobenzene/triethylene glycol	138°C	709
		Xylene/poly(oxyethylene)		1839,2451,2919
		Xylene/triethylene glycol	Branched	1823
		Xylene : ethyl cellosolve–poly(oxyethylene) (50/50)	120°C	2661
	Cross-fractionation	*o*-Dichlorobenzene	SEC (135°C), LLDPE	3602
			TREF; SEC, 140°C, LLDPE	3318
		Trichlorobenzene	TREF-Chromosorb, SEC 140°C	2183
		Xylene	TREF (silica)	3602
	Extraction	Phenyl ether, tetralin/triethylene glycol		1014
	Fractional crystallization	1,2,4-Trichlorobenzene	CRYSTAF, LLDPE, 95–30°C	1675,2237
			CRYSTAF, LLPDE, 95–30°C	2235
			CRYSTAF, LLPDE, VLDPE, 95–30°C	2236
			CRYSTAF, metallocene resins blend	2236
		Xylene		1287,1625,1627,1645, 1748,2076,2559,2560, 2665
			UHMWPE	2119
		Xylene, perchloroethylene or 1-Chloronaphthalene	Lowering temp. stirred	2560
	Fractional demixing	Dimethylformamide/methylcyclo hexane	Chlorinated PE	1817
	Fractional precipitation	2,4-Dimethylpentane	At a lower critical solution, temp. is sensitive to the side-group content	212
		2-Ethylhexanol/decalin (85/15)	Solvent volatilization., low temp.	1619,3451, 3452,3453
		Amyl acetate	133°C, lowering temp.	21

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Benzene/poly(oxyethylene)	75°C	2364
		Epichlorhydrine/*n*-hexane	35°C	1566
		Liquid ethylene at 130 atm. and 80°C	Releasing pressure	3298
		p-Xylene/*n*-hexanol	Turbidimetric by lowering temp.	16
		Tetralin/2-ethoxyethanol (1/3)	Lowering temp., branched	1990
		Tetralin/benzyl alcohol (3/2)	Lowering temp. 105–165°C	1578,1709
		Toluene/methanol		697
		Toluene/*n*-butanol	115–100°C Lowering temp.	1815
		Toluene/*n*-propanol	Lowering temp.	2364,3299
		Toluene/poly(oxyethylene)	80°C	2392
		Toluene/triethylene glycol	107°C	1578
		Xylene/*n*-butanol	100–115°C	1815
		Xylene/*n*-propanol	90°C	125
		Xylene/poly(oxyethylene)	75°C, 80°C, 130°C	1555,2314,2364, 2450,2451
		Xylene/triethylene glycol	90°C	18,278,279,280, 281,342,1628, 1630,2339,2701, 2974,3163,3279, 3280,3281
	Fractional solution	1,2,4-Trichlorobenzene	LLDPE	2895,3478
		2-Ethoxy ethyl acetate (cellosolve)/decalin	130°C, glass beads	3480
		Anhydric carbonic, pentane	Supercritical	2884
		Carbon dioxide, propane, propane–modified carbon dioxide	SCFF, Low MW HDPE	3376
		Cyclohexanone	Rising temp.	2896
		Decalin	150°C	1872
		Decalin/2-ethoxy-ethyl acetate	Column elution	1126
		Decalin/ethylene glycol–hexanol	139°C, column elution	1735
		Diisopropyl ether, benzene, xylene	Extraction, waxes	1722
		Ethyl benzene/cellosolve	120°C, column elution	963
		Mesitylene/2-butoxyethanol	Column elution, 126°C	3224
		o-Dichlorobenzene/dimethyl phthalate	127°C, glass beads column elution	2933,2934
		Petroleum ether	Column elution, low MW	1025
		Tetralin	Quartz sand, column extraction, variable temp. gradient	467
		Tetralin/2-butoxyethanol	126°C, column elution analytical and preparative, branched	3224
		Trimethylbenzene/butylcellosolve	Column elution, glass beads, 130°C	1954
		Toluene	Column elution	743,744,2364
		Toluene/poly(oxyethylene)	80°C	2390,2391
		Xylene		1235,1628,1629,1642
			128°C, column extraction	2466
			Rising temp.	305,615
		Xylene, chloronaphthalene, perchloroethylene	Increasing temp.	2560
		Xylene/butyl cellosolve	125°C, Column elution	2808,3220
		Xylene/2-butoxyethanol	Column elution	574,641,871,1224, 1246,2338,2340, 2344,3224
		Xylene/2-ethoxy-ethyl acetate (cellosolves)	Column elution, 125°C	2466
		Xylene/butyl cellosolve	Column elution, 127°C	2343
		Xylene/diethylene glycol monomethyl ether	Column elution 126°C	917,1200,1276,1342, 1359,1632,1668,1669, 1832,2076,2138,2246, 2354,2804,2820,2821, 2867,3452,3453,3469, 3470,3519

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Xylene/ethyl cellosolve	Column elution, 120°C, LLDPE	1367
		Xylene/*n*-butanol	Film extraction	935
		Xylene/trichloroethylene	Boiling mixt., 46–86°C	1642
		Xylene/triethylene glycol	Column elution	279,3279
	Sedimentation equilibrium	Biphenyl	Ultracentrifuge, 123.2°C	2893
	Sedimentation velocity	1-Bromonaphthalene	Ultracentrifuge, 110°C	2117
		1-Chloronaphthalene	Ultracentrifuge, 120°C	2244
	Stirring-induced fractional precipitation	Decalin	100–78°C	1293
	Thermal field flow	*o*-Dichlorobenzene	90–140°C	2520
		Water/ethylene glycol or silicone oil, water/glycerol	90–130°C	2520
	TREF	1,2,4-Trichlorobenzene	Chromosorb-P, TREF room – 20°C/hour	3241
			Glass beads, LLDPE	2896
			LLDPE	728,1514,1849
		Butyl cellosolve	Glass beads, deuterated	1954
		Chloronaphthalene	HP-LPDE, HDPE, LLDPE	1648
		o-Dichlorobenzene	Chromosorb-P, analytical, low density and low linear density	1710
			Direction of separation SCB	3318
			SEC	3603
			TREF (glass beads)	2355
		Trichlorobenzene	20°C/h	3474
			Chromosorb-P, analytical + preparative, very low density	1581
			HP-LDPE/LLDPE blends	3026
			LLDPE, 140°C	2183
			Steel shot, analytical + preparative, low linear density	1255
		Xylene	25–120°C	1367
			Chromosorb P, branched	1823
			Chromosorb-P, analytical + preparative, low density	3473
			LLDPE, sylanated glass beads	186
			Sand, preparative, low density	2973
	Turbidimetric titration	α-Chloronaphthalene/20% dimethyl phthalate		1413,3162
		Xylene/*n*-hexanol		1238
Poly(ethylethylene) *Poly(1-butene)*				
	Chromatography	Benzene/butanone	Precipitation chromatogr., 18–50°C	1179
		Dichlorobenzene	SEC, 125°C	1982
		Trichlorobenzene	SEC, styragel, 80°C, 135°C	2758,3418
	Extraction	Boiling ether	Tacticity	480
	Fractional precipitation	Cyclohexane/acetone	35°C	635,2841
		Cyclohexane/cyclohexanol-glycol (3/1)	115°C	3083
		Decane	Lowering temp.	1589
		o-Dichlorobenzene/dimethylformamide		548,2263
		Petroleum ether/acetone		735
		Toluene/methanol	30°C, atactic	2261,2263
		Xylene/triethylene glycol	130°C	2974
	Fractional solution	Benzene/methanol	Extraction	843
Poly(hexadecylethylene) *(poly(1-octadecene)*				
	Chromatography	Trichlorobenzene	80°C	3415
	Fractional precipitation	Xylene/triethylene glycol	130°C	2974
Poly(1-hexene) see Poly(butylethylene)				
Poly(hexylethylene) *poly(1-octene)*				
	Chromatography	Trichlorobenzene	SEC, styragel, 80°C	3418
	Fractional precipitation	Cyclohexane/acetone		1682
		Xylene/triethylene glycol	130°C	2974

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(isobutene) see Poly(1,1-dimethylethylene)				
Poly(3-methyl-1-hexene)	Fractional solution	Acetone, ethyl acetate, diethyl ether, cyclohexane	Extraction	3387
Poly(4-methyl-1-hexene)	Fractional solution	Acetone, ethylacetate, diethyl ether, cyclohexane	Extraction	3387
Poly(3,7-dimethyl-1-octene) see Poly(1,5-dimethylhexyl-ethylene)				
Poly(3-methyl-1-pentene) see Poly(1-methylpropyl)ethylene)				
Poly(4-methyl-1-pentene) see Poly(2-methylpropyl)ethylene)				
Poly(endo, exo-5,6-dimethylbicyclo[2.2.1]hept-2-ene)				
	Chromatography	Tetrahydrofuran	SEC, Shodex	3095
Poly(2-methylbutyl)ethylene) *(poly-4-methyl-1-hexene)*				
	Chromatography	Alcohols, aromatic hydrocarbons, ethers	Column elution on active support	2603
		Methylcyclohexane	SEC, styragel, 60°C	2382
	Fractional precipitation	Benzene–nitrobenzene	Lowering temp. 61–25°C	1973,2382
	Fractional solution	Benzene and ethyl ether	Stereoisomers, extraction	2382
		Boiling (acetone, ethyl acetate, ethyl ether, isopropyl ether and cyclohexane)	Stereoisomers, extraction	331
Poly(1,1-dimethylethylene) *Poly(isobutylene)*				
	Chromatography	2-Methylheptane	Column elution Charcoal and colloidal silica	1959
		Benzene/acetone	Precipitation chromatogr., glass beads, 28–50°C	500,501,2648
		Carbon tetrachloride	SEC	620
		Chloroform	SEC, μ-styragel, 38°C	772
		Diisobutene/*n*-butanol	Precipitation chromatogr., 10–60°C	2513
		Heptane	SEC, styragel	2657
		Hexane/ethanol	Precipitation chromatogr., 10–60°C	2513
		Tetrachloromethane, chloroform, ethanol–chloroform	Column elution, 30°C silica gel	3583
		Tetrahydrofuran		965
			SEC μ-styragel	1389,1657,1663,2387,2679
			SEC, ultrastyragel	1595
			SEC, styragel	431,504,966,1655,2229, 2294,2398,2399,3570
			SEC, ultrastyragel	164
		Trichlorobenzene	SEC, 150°C	2650
		Xylene/*n*-propanol	Precipitation chromatogr., 25–70°C glass bead	2229
			Precipitation chromatogr., 10–60°C	2513
	Fractional precipitation	2,4,4-Trimethylpentene/*n*-butanol		1959
		Benzene/acetone		322,323,644,645, 678,903,913,914, 928,1796,2043,2044
		Benzene/methanol	28°C	785,909,1492
		Chloroform–methylene chloride/acetone		2833
		Cyclohexane/butanone	25°C	2524
		Heptane/ethanol		373
		Liquid ethylene at 130 atm. releasing pressure	80°C	3298
		Toluene/methanol		184,2664,3126
	Fractional solution	Benzene (theta technique)	Column elution, 24.5°C	2086
		Benzene, benzene/methanol	Column elution	2353
		Hexane/ethanol	Column elution, 25°C	3583
		Toluene, methyl ethyl ketone	Continous operation	1016
		Toluene/acetone mixtures	Extraction, 30°C	322
		Toluene/butanone, heptane/butanone	Continous operation	1017
		Toluene/methanol	Column elution, charcoal	324,1857

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Sedimentation velocity	2,2,4-Trimethylpentane		3410
	Thermal diffusion	*n*-heptane	Gradient 40–50°C	1833
	Turbidimetric titration	Butyl acetate, butyl ether, methoxymethanol, methyl propyl ketone, diethyl ketone, ethyl amyl ketone, heptane/*n*-butanol	Lowering temp.	2234
Poly(1,5-dimethylhexylethylene)				
	Chromatography	Acetone/ethyl ether, benzene, ethyl ether	20–78°C polymeric active support	2603
	Extraction	Boiling (acetone, ethyl acetate, ethyl ether, diisopropyl ether, cyclohexane)		595
Poly(2-methylpropene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	568
Poly(1-methylpropylethylene)	Chromatography	Acetone/ethyl ether, benzene	Column elution, 18–20°C, active support, acetone soluble fraction	2603
	Fractional solution	Boiling (acetone, ethyl acetate, and benzene)	Extraction	2602
Poly(2-methylpropylethylene)	Fractional precipitation	Benzene/nitrobenzene (3/1)	Lowering temp.	2382
		Decalin/ethyl cellosolve		3150
	Fractional solution	Benzene and ethyl ether	Stereoisomers, extraction	2382
Poly(nonylethylene) *Poly(1-undecene)*				
	Chromatography	Trichlorobenzene	SEC, styragel, 80°C	3418
Poly(octadecylethylene)	Fractional solution	Boiling ethyl ether	Extraction	1996
Poly(1-octenylene) *Poly(octenamer)*				
	Chromatography	Tetrahydrofuran	SEC, styragel, spherosil	126,1066
Poly(1-pentenylene) *Poly(pentenamer)*				
	Chromatography	*o*-Dichlorobenzene	SEC, styragel, 135°C	3608
		Tetrahydrofuran	SEC, styragel, spherosil	126,2832,3490
	Fractional precipitation	Toluene/methanol	40/20 (°C)	1044,3490
Poly(pentylethylene) *Poly(1-heptene)*				
	Chromatography	Trichlorobenzene	SEC, styragel, 80°C	3418
Poly(propylene)	Chromatography	1,2,4-Trichlorobenzene		608
			SEC	3541
			SEC, μ-styragel, 135°C	1907
			SEC, μ-styragel, 145°C	1925
			SEC, ultrastyragel, 140°C	2670
			SEC, ultrastyragel, 135°C	824
		1,2-Dichlorobenzene	SEC, μ-styragel, 135°C	185
		Cyclohexane	SEC, μ-styragel, 70°C	3561
		Isopropyl ether	High MW and crystallinity	2367
		Ligroin/2-butoxyethanol	Precipitation chromatogr., 75–170°C	3015
		o-Dichlorobenzene	SEC	1634
			SEC, styragel, 135°C	767,768,769,771, 1588,1638,1946, 1982,1994,2434, 2760,2789, 3365,3386
			SEC, styragel, 140°C	2216
			SEC, styragel, preparative 135°C	148
		Petroleum ether/methanol	Silica gel, 0–48°C, low MW	1026
		Tetralin	Column elution increasing temp. 20–150°C	612
			SEC, 130–145°C	1853
		Tetralin/2-butoxyethanol	Precipitation chromatogr, 140–180°C	611
		Tetralin/diethylene glycol monobutyl ether (mixtures)	Column elution, 165°C according to MW	612
		Tetralin/diethylene glycol monomethyl ethyl ether	Column elution, 145°C	2265
		Trichlorobenzene	SEC, 135°C,130°C,150°C	607,673,1774, 2487,2488,3377

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Trichlorobenzene/dimethyl phthalate	Precipitation chromatogr. temp. grad. 55–125°C glass beads	169
	Coacervation	*o*-Dichlorobenzene/triethylene glycol	Isotactic	191
		Tetralin/poly(oxyethylene)	140°C	2720
	Extraction		17 Hydrocarbon fractions with increasing b.p. from 35 to 130°C	2337
		Acetone, ethyl ether, *n*-pentane, *n*-hexane, *n*-heptane, *n*-octane	Isotactic	1956,2201,2372,2797
		Boiling (acetone, ethyl ether, *n*-hexane, *n*-heptane	Amorphous and crystalline	958
		Boiling (heptane, xylene)	Tacticity	536
		Boiling diethyl ether, hexane, heptane	Tacticity	479
		Boiling heptane, octane	Tacticity	213
		Boiling hexane, heptane, toluene	Syndiotactic	185
		Boiling xylene	Tacticity	536
		Boiling xylene, octane	Tacticity	535
		Boiling (ethyl ether, *n*-heptane, methyl cyclohexane)	Amorphous and crystalline	3351
		Different solvents	Different temp.	1539
		Ethyl ether, *n*-hexane, *n*-heptane	Syndiotactic	2438
		Heptane	Boiling	1970,3032,3252
			Hot and cold	892
		Heptane, diethyl ether, hexane/heptane	Kumagawa extraction	478
		Heptane, *n*-octane, xylene	Tacticity	2536
		Hexane	Boiling	2751
		n-Octane, *n*-heptane, *n*-hexane, *n*-pentane	Stereoregular separation	2539
		Xylene/ethylene glycol monoethyl ether		2674
	Fractional crystallization	1,2,4-trichlorobenzene	CRYSTAF, isotactic + sindiotactic mixture	2236
		n-Heptane	Stirred, opt. act. (amorphous and crystalline)	2500
		o-Xylene		341
		Octane	Lowering temp.	2539
		Perchloroethylene	70–90°C, isotactic	2560
		Xylene	Stereoregular separation	1550
	Fractional precipitation	Benzene/acetone		906
		Benzene/methanol	Atactic	293,1679
		Cyclohexane/acetone	Atactic	1681,2252
		Cyclohexane/isopropanol		124
		Cyclohexanone/ethylene glycol or dimethyl phthalate	Isotactic, 130–135°C	1681
		Decalin/phenol–decalin/ propylene glycol	130°C, nitrogen atm.	1870
		o-Dichlorobenzene/benzyl alcohol		2264
		Trichlorobenzene/dimethyl phthalate	140°C	169
		Xylene/poly(oxyethylene)	112°C,134°C	704,1557
		Xylene/triethylene glycol	130°C	2974
	Fractional solution	17 Hydrocarbon fractions with increasing b.p. from 35 to 130°C		
		Acetone, diethyl ether, *n*-pentane, *n*-hexane, *n*-heptane	Extraction	1940

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Acetone, diethyl ether, *n*-pentane, *n*-hexane, *n*-heptane	Extraction, anisotactic	2752
		Butyl cellosolve/diethyleneglycol monobutyl ether	165°C	1360
		Decalin	Rising temp.	2435
		Decalin/2-ethoxyethanol	Column extraction,110°C	1416
		Decalin/acetophenone	Column elution,146.5°C	2556
		Decalin/benzyl alcohol	Column elution,152°C	2556
		Decalin/diethylene glycol monobutyl ether	Column elution,161°C	2434
		Decalin/ethyl carbitol	Column elution,160°C	2435
		Diethyl ether, pentane heptane, aliphatic hydrocarbons, decalin	Successive extraction	1907
		Ether, hexane, heptane		609
		Ethylene glycol monobutyl ether/diethylene glycol monobutyl ether	Gradient extraction several temp.	1907
		Hexane, *n*-decane		1684
		Kerosene/diethylene glycol monomethyl ether	Column extraction,150°C	3350,3467
		Kerosene/diethyleneglycol monobutyl ether	Column elution,155°C,160°C	1420,2433
		Kerosene/ethylene glycol (10%) in 2-butoxyethanol	Column extraction 156°C, isotactic	673,872,2983
		Nine solvents of increasing solvent power and boiling point	According to crystallinity	2385
		o-Dichlorobenzene/diethylene glycol	Column elution, 168°C, 170°C and 172°C	704,1329,2137,2649
		o-Dichlorobenzene/diethylene glycol monobutyl ether	Column elution,166°C	3517,3518
		o-Dichlorobenzene/dimethyl phthalate	Column elution,150°C	2933
		Tetralin	Column extraction, increasing temp.	3016
		Tetralin/2-butoxyethanol	Column extraction	3146
		Tetralin/2-ethoxyethanol	Column extraction,170°C	2519
		Tetralin/diethylene glycol monomethyl ether–ethylene glycol (75%–25%)	Column extraction,180°C, isotactic	1312
		Tetralin/dimethyl phthalate	Column extraction,155–178°C	2161
		Xylene/2-ethoxyethanol	165°C	1359
		Xylene/ethylene glycol monoethyl ether	Gradient extraction, several temp.	1907
		Xylene/ethylene glycol monoethyl ether, ethylene glycol monobutyl ether/diethyleneglycol monobutyl ether	Temperature (121–128°C) and (159–161°C)	536
		Xylene/methanol	Column extraction, 56°C, atactic	2649,2983
		Xylene/poly(oxyethylene)	Coacervate extraction,134°C	704
	TREF	Trichlorobenzene	140–30°C	3026
		Xylene	20–130°C, column extraction	1536
			25–130°C, glass beads	2216
	Turbidimetric titration	Benzene/methanol	30°C, atactic	1522
		Chloroform/isopropanol	30°C, atactic	1522
		Tetralin/butyl cellosolve	110°C	3145,3146
Poly(propylethylene)	Fractional precipitation	Toluene/methanol	30°C, isotactic	696,2262
Poly(tetradecylethylene) *Poly(1-hexadecene)*				
	Chromatography	Trichlorobenzene	SEC, styragel, 80°C	3418
Poly(undecylethylene) *Poly(1-tridecene)*				
	Chromatography	Trichlorobenzene	SEC, styragel, 80°C	3418
Poly(vinylcyclohexane) see Poly(cyclohexylethylene)				

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
1.3. POLY(ACRYLIC ACID) AND DERIVATIVES				
Poly(acrylamide)	Chromatography	Sodium sulfate 0.5 M	SEC, aquagel-OH	2121
	Electron microscopy	Water/*n*-propanol (dispersant agent)		2686
	Fractional precipitation	Formamide	SEC	2465
		Formamide/water (1/15)	SEC, surface modified silica	336
		Sodium nitrate (water) 0.5 N	SEC	752
		Sodium sulfate (water) 0.1 N	SEC	1703
		Water	SEC, TSK-gel, Sephadex	1224,2361
		Water/acetone–methanol		3500
		Water/isopropyl alcohol		3375
		Water/methanol	30°C, 25°C	252,253,336,805, 2199,2465,2910
			Hydrolyzed, decreasing temp.	2920
	Sedimentation velocity	Water		1993
Poly(acrylic acid)	Chromatography	Dioxane	Continuous fractionation (counter current extraction) >40°C	1177
		Sodium chloride (water) 0.3 N	SEC, TSK-gel sodium salt	1616
		Water	SEC	1636
	Electrophoresis	Sodium acetate buffer, pH = 5.0		560
	Extraction	Water/isopropanol	Partially neutralizated	868
	Extraction (CPF)	Dioxane		1177
	Fractional precipitation	Methanol/ether		1680,1708
		Methanol/ethyl acetate	20°C	3255,3263
		Methanol/water	Θ-point phase as a sodium salt	2176
		n-Propanol/1,2-dichloroethane		3046
	Fractional solution	Dioxane	CPF	1177
		Dioxane–water	Extraction	1848
Poly(acrylic acid), sodium salt	Field flow	Water + 0.02 M triethanolamine + 0.1 M potassium chloride		1046,1047,1048,1049, 1050,1051,1052
	Fractional precipitation	Sodium hydroxide 0.4 N (water)/ methanol–water–sodium hydroxide 2.2 N	Stepwise lowering temp. 40–20°C	2809
Poly(acrylic anhydride)	Chromatography	Tetrahydrofuran	SEC, cyclocopolymer	2083
Poly(*N*-acryloyl-*o*-aminobenzoic acid)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2532
	Fractional precipitation	Tetrahydrofuran/petroleum ether	30°C	2532
Poly(*N*-acryloyl-*N*′-methyl piperazine)				
	Chromatography	Tetrahydrofuran		3506
Poly[4-(acryloyloxy)propoxy)-4′-cyanobiphenyl]				
	Chromatography	Chloroform	SEC, styragel	2839
Poly(benzyl acrylate) chromium tricarbonyl				
	Chromatography	Tetrahydrofuran	SEC	2611
Poly(*n*-butyl acrylate)	Chromatography	Butyl acetate	SEC, styragel, 70°C	3501
		Methylene chloride	SEC	1928
		Tetrahydrofuran	SEC	826
			SEC, ultrastyragel	1980
	Fractional solution	Nitrous oxide	Supercritical	2882
Poly(*tert*-butyl acrylate)	Chromatography	Tetrahydrofuran	SEC, star-shaped molecules	3245
	Fractional precipitation	Methanol/methanol–water	25°C	1498
Poly(*n*-butyl α-bromoacrylate)	Chromatography	Tetrahydrofuran		2852
Poly(4-(butylphenylazoxy)phenyl acrylate) *Poly(n-butyl-p-acryloyl azoxy benzene)*				
	Fractional precipitation	Chloroform/*n*-heptane		2544
Poly(cholesteryl acrylate)	Fractional precipitation	Benzene/acetone		3271
Poly(*n*-decyl acrylate)	Fractional precipitation	*n*-heptane/acetone		857,3269
Poly(diacetone acrylamide) *Poly(N-(1,1-dimethyl-3-oxobutyl)acrylamide)*				
	Fractional precipitation	Methanol/water		1502
Poly(ethyl acrylate)	Field flow	Water + FL-70 tensoactive	Sedimentation, cyclical-field, spheres	1903
	Fractional precipitation	Acetone/methanol		2019
		Acetone/water–methanol (1:5)	30°C	1941,1942,1943
		Butanone/methanol–water	30°C	3056
	Turbidimetric titration	Chloroform/*n*-hexane		1991
Poly(ethyl-α-bromoacrylate)	Chromatography	Tetrahydrofuran		2852

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(2-ethyl-*n*-hexyl acrylate)	Fractional precipitation	Tetrahydrofuran/ethanol-*n*-hexane (2/1)	25°C	3442
Poly[(*N*-ethylcarbazol-3-yl) methyl acrylate]	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3000,3001
Poly(ferrocenyl ethyl acrylate)	Chromatography	Tetrahydrofuran	SEC	2612
Poly(ferrocenyl methyl acrylate)	Chromatography	Tetrahydrofuran	SEC	2609,2610
Poly(fluoroalkyl-2-trifluoromethyl acrylate)	Chromatography	Tetrahydrofuran	SEC, styragel	2362
Poly(*N*-formyl acrylamide)	Chromatography	Dimethylformamide	SEC, vinyl acetate copolymer gel (Merckgel)	3225
Poly(1,1-dihydroperfluorobutyl) acrylate	Fractional precipitation	Benzenetrifluoride/methanol		2714
Poly(2-hydroxyethyl acrylate)	Chromatography	Tetrahydrofuran	SEC, styragel, telomer	402
Poly(*N*-isoproplyacrylamide)	Chromatography	Methanol		2124
	Fractional precipitation	Ethanol/diethyl ether		3207
Poly(isopropyl acrylate)	Fractional precipitation	Benzene/*n*-hexane	25°C, atactic	2042
		Chlorobenzene/*n*-hexadecane	110–115°C, stereoregular	2042
Poly(isopropyl-α-bromoacrylate)	Chromatography	Tetrahydrofuran		2852
Poly(*N*-isopropylacrylamide)	Chromatography	Dimethylpirrolidone	SEC, μ-bondagel	2864
	Fractional precipitation	Acetone/*n*-hexane		950
	Phase separation	Water-fed acetone/*n*-hexane		2445
Poly[4′-methoxyphenyl-4-((acryloxyloxy)propoxy)benzoate)]	Chromatography	Chloroform	SEC, styragel	2839
			SEC, styragel, analytical, preparative	1408
Poly(*trans*-11{4-[5-(4-methoxyphenyl)-1,3-dioxan-2-yl]-2,6-dimethylphenoxy}undecyl acrylate]	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1381
Poly(methyl acrylate)	Fractional precipitation	Acetone/petroleum ether		1136
		Acetone/water–methanol		1167,1958
		Benzene/methanol		2059
		Benzene/petroleum ether		2001
		Butanone/methanol		1773
		Liquid ethylene at 130 atm and 80°C	Releasing pressure	3298
		Tetrahydrofuran/methanol–water (1 : 1)	25°C	3442
	Fractional solution	Chlorodifluoromethane	Supercritical fluid fractionation	2127
	Turbidimetric titration	Toluene/methanol		3398
Poly(methyl α-bromoacrylate)	Chromatography	Tetrahydrofuran	SEC, styragel	159,2852
Poly(methyl α-chloroacrylate)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	159
	Fractional precipitation	Acetonitrile/methanol		1267
Poly(*N*-(1,1,-dimethyl-3-imidazolylpropyl acrylamide)	Fractional precipitation	Methanol/mesitylene		1207
Poly(methyl α-(trifluoromethyl)acrylate)	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C, 40°C	1446
Poly(*N*,*N*-dimethylacrylamide)	Chromatography	Dimethylformamide + lithium bromide 0.1%		3042
		Tetrahydrofuran	SEC, ultrastyragel, 25°C	3506
Poly(2-methylsulfinyl ethylacrylate)	Fractional precipitation	Chloroform/toluene	30°C	1335
Poly(1-(2-methylsulfinyl) ethoxycarbonyl)ethylene)				
Poly(*n*-octadecyl acrylate)	Chromatography	Tetrahydrofuran		2964
Poly(1-oxyl-2,2,6,6-tetramethyl-4-piperidyl) acrylamide	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 22°C	1582
Poly(1-oxyl-2,2,6,6-tetramethyl-4-piperidyl) acrylate	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 22°C	1582
Poly(1,2,2,6,6-pentamethyl-4-piperidyl) acrylate	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 22°C	1582
Poly(*n*-pentyl α-bromoacrylate)	Chromatography	Tetrahydrofuran	SEC, styragel	2852
Poly(phenyl acrylate)	Fractional precipitation	Toluene/methanol	28°C	1347

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(4-phenylazoxyphenyl acrylate)				
	Fractional precipitation	Chloroform/*n*-heptane		2544
Poly(*n*-propyl acrylate)	Fractional precipitation	Acetone/methanol		2019
Poly(*n*-propyl α-bromoacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2852
Poly(3-sulfonylpropane methacrylamide)				
	Fractional precipitation	Ethanol/*n*-heptane		894
1.4. POLY(METHACRYLIC ACID) AND DERIVATIVES				
Poly(alkylphenyl methacrylates)s (General)				
	Fractional precipitation	Benzene/methanol		2690
Poly(6-(anisyloxycarbonylphenoxy)hexylmethacrylate)				
	Fractional precipitation	Trichloromethane/methanol		3053
Poly(benzyl methacrylate)	Fractional precipitation	Butanone/methanol		2749
Poly(2-biphenyl methacrylate)	Fractional precipitation	Benzene/methanol		38
Poly(*p*-*tert*-butylcyclohexyl methacrylate)				
	Fractional precipitation	Dioxane/methanol		990
Poly(*n*-butyl methacrylate)	Chromatography	Benzene	SEC, styragel	1263
		Tetrahydrofuran	SEC	690
			SEC, styragel	2824
		Tetralin	SEC, styragel, 75°C	2975
		Toluene		261
	Fractional precipitation	Acetone/methanol		393,1489,1605, 2628,2994
			Lowering temp.	581
		Acetone/water		3348
		Benzene/methanol	SEC, styragel	1519,2419
		Toluene/methanol		2993,2997
	Thermal diffusion	Benzene		1724
Poly(*tert*-butyl methacrylate) *Poly(1-tert-butoxycarbonyl)-1-methylethylene*				
	Chromatography	Tetrahydrofuran	SEC	3109
			SEC, styragel	1685
			SEC, μ styragel 30°C	3358
			SEC, ultrastyragel	1577
	Fractional precipitation	Acetone/methanol		1777
		Toluene/methanol, toluene/methanol + water		1577
	Sedimentation velocity	Butyl acetate	20–21°C	292
Poly(2-*tert*-butylphenyl methacrylate) *Poly(1-(2-tert-butyl phenoxyl carbonyl)-1-methylethylene))*				
	Fractional precipitation	Benzene/methanol		3232
Poly(*p*-*tert*-butylphenyl methacrylate)				
	Fractional precipitation	Acetone/2-propanol		990,991
Poly(carbethoxyphenyl methacrylamide) *[Poly(1-(Carbethoxyphenylimino carbonyl)-1-methylethylene)]*				
	Sedimentation velocity	Ethyl acetate	20°C	923
Poly(4-cetyloxycarbonylphenyl methacrylate)				
	Fractional precipitation	Benzene/methanol		3275
Poly(chloresteryl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	1377
Poly(2-chlorophenyl methacrylate)				
	Fractional precipitation	Benzene/isopropanol		2396
Poly(4-chlorophenylmethacrylate) *[Poly(1-4-chlorophenyloxycarbonyl) 1-methylethylene]*				
	Fractional precipitation	Chloroform/methanol		3231
Poly(cyclohexyl methacrylate)	Chromatography	Toluene	SEC, styragel, 80°C	1180
	Fractional precipitation	Dioxane/methanol	25°C	1180
			Lowering temp.	2144
		Tetrahydrofuran/methanol		1605
Poly(1-(2-*N*-cyclohexyl-*N*-methyl-carbamoyloxy) ethyl) methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(cyclohexyl thiolmethacrylate)				
	Fractional precipitation	Toluene/methanol		1186
Poly(decahydro-β-naphthyl methacrylate)				
	Fractional precipitation	Dioxane/methanol	25°C	1181
Poly(*n*-decyl methacrylate)	Fractional precipitation	Toluene/methanol		3599

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(*n*-docosyl methacrylate)	Fractional precipitation	Toluene/methanol		3599
Poly(dodecyl methacrylate)	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	2285
	Fractional precipitation	Toluene/methanol		2285
Poly(2,3-epoxypropyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, silica gel, 25°C	2295
	Fractional precipitation	Benzene/methanol		3232
	Sedimentation velocity	Heptane–acetone	Theta-solvent	1544
Poly(2-(*N*,*N*-diethyl carbamoyloxy)-2-methyl-ethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2668
Poly(ethyl methacrylate) *[Poly-(1-(ethoxycarbonyl)-1-methyl ethylene)]*				
	Chromatography	Tetrahydrofuran	SEC, styragel	2824
	Fractional precipitation	Acetone/acetone + water system		351,1608
		Acetone/acetone–water (4 : 1)	Lowering temp.	582,1583
		Benzene/methanol		2459
		Benzene/*n*-hexane		3362,3363
		Benzene/petroleum ether		2628
		Methanol/water, chloroform/methanol		2460
Poly(ethyl methacrylate)-d_{10}	Chromatography	Tetrahydrofuran	SEC, styragel predeuterated	1226
Poly(1-(2-(*N*,*N*-diethylcarbamoyloxy)ethylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(*N*-ethylcarbazol-3-yl)methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3000
Poly(ethylene glycol methacrylate)				
	Fractional precipitation	Ethanol/methanol (0.7/1), *n*-heptane–benzene (1 : 1)	30°C	369,372,799
		Ethanol/*n*-heptane–benzene (1 : 1)	30°C	369
Poly(ferrocenylethyl methacrylate) *(Poly-(1-(ferrocenylethoxycarbonyl)-1-methylethylene))*				
	Chromatography	Tetrahydrofuran	SEC	2612
Poly(ferrocenylmethyl methacrylate) *(Poly-(1-(ferrocenylmethoxycarbonyl)-1-methylethylene))*				
	Chromatography	Dimethylformamide	SEC, styragel	2615
		Tetrahydrofuran	SEC	2609,2610,2614, 2615,3247
Poly(11-(hexadecyldimethylammonio)-undecyl methacrylate)				
	Chromatography	Chloroform + 0.005 M tetrabutylammonium bromide	SEC, μ-styragel and ultrastyragel	376
Poly(*n*-hexyl methacrylate) *(Poly(1-(hexyl-oxycarbonyl)-1-methylethylene)*				
	Fractional precipitation	Acetone/ethanol	Lowering temp.	583
Poly(2-hydroxyethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1122
	Fractional precipitation	Benzene : ethanol (1 : 1)/*n*-heptane	30°C	910
		Methanol/*n*-heptane–benzene (1 : 1)		1496
Poly(*N*-(2-hydroxyethyl)phthalimido methacrylate) *[Poly(1-(phthalimedoethoxycarbonyl)-1-methylethylene)]*				
	Fractional precipitation	Chloroform/petroleum ether	20°C	3595
Poly(*N*-(2-hydroxypropyl) methacrylamide)				
	Chromatography	Tris buffer solution (pH = 8.3 in 0.5 M sodium chloride)	SEC, Sepharose	3088
	Fractional precipitation	Methanol/acetone	40°C	374
Poly[1-(5-indanyloxy carbonyl)-1-methylethylene)] *Poly(5-indanyl methacrylate)*				
	Fractional precipitation	Toluene/ethanol		998
Poly(isobornyl methacrylate)	Fractional precipitation	Toluene/methanol		1187
Poly(isobutyl methacrylate) *(Poly-(1-(isobutoxycarbonyl)-1-methylethylene))*				
	Fractional precipitation	Acetone/methanol	30°C	3334,3335,3574
		Toluene/methanol		2998
Poly(isooctyl methacrylate) *(Poly-(1-(isooctyloxycarbonyl)-1-methylethylene))*				
	Sedimentation velocity	Heptane/acetone	Theta-solvent	1544
Poly(5-*p*-menthyl methacrylate) *(Poly(1-(5-p-menthyloxycarbonyl)-1-methylethylene))*				
	Fractional precipitation	Benzene/methanol		3232
Poly(methacrylamide)	Fractional precipitation	Formamide/methanol	25°C	3211
Poly(methacrylic acid) *[poly(1-carboxy-1-methylethylene)]*				
	Electrophoresis	Water (sodium phosphate, dibasic)	Stereoregular separation	162

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional precipitation	Methanol/butyl acetate–2-pentanone (10 : 1)		1361
		Methanol/diethyl ether		3012
		Methanol/ethyl acetate + acetic acid		115,335,929, 2377,2378
		Methanol/ethyl ether	25°C	904,1598,2153
		Methanol/methyl isobutyl ketone		3464
	Sedimentation equilibrium	Methanol		517
Poly-*N*-[4-(methacryloyloxy)phenyl]-2-(4-methoxy phenyl)acetamide				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 25°C	971
Poly(2-methoxyethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, silica gel	3388
	Fractional precipitation	Toluene/ethanol	27°C	3074
Poly-*N*-[4-[[4-methoxyphenyl)acetyl]oxyphenyl]methacrylamide]				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 20°C	971
Poly[*trans*-11{4-[5-(4-methoxyphenyl)-1,3-dioxan-2-yl]-2,6-dimethylphenoxy}undecyl methacrylate]				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1381
Poly(4-methoxyphenyl methacrylate) *(Poly(1-(methoxyphenoxycarbonyl)-1-methylethylene)*				
	Chromatography	GPC		3454
Poly(2,2-dimethyl-1,3-dioxolan-4-yl)methyl methacrylate				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	2274
Poly(methyl methacrylate) *Poly(1-(methoxycarboonyl)-1-methylethylene)*				
	Chromatography	1,2,4-Trichlorobenzene	SEC, styragel, 145°C	572
		2,2,2-Trifluoroethanol	SEC, 50°C	2671,2672
		2-Ethoxyethanol	SEC, silica gel	577
		Acetone	Activated carbon + super cel	601
			SEC	2158,2159
			TLC	2210
		Acetone/methanol	Precipitation chromatogr. silanated glass beads	1951
			Precipitation chromatogr., periodic temp. changes	2634,2637
		Acetonitrile/*n*-butyl chloride		91
		Benzene/cyclohexane, heptane/ethylacetate, cyclohexane/ethylacetate, benzene/cyclohexane/ethylacetate	ATLC, oligomers	356
		Benzene/methanol	Precipitation chromatogr.	215,710,1175
		Butanone/butanone–70% ethanol		3440
		Chloroform	SEC, preparative	3138
			SEC, silica gel, 25°C	2211
			SEC, styragel, 33°C	60,188,707,2094
		Chloroform/methanol	Precipitation chromatogr.	397
			TLC	1419
		Dimethylformamide	SEC, styragel, 70°C	357,3402
		Dioxane	ThFFF	1686
		Ethyl acetate	TLC	2210
		Methylene chloride	SEC, μ-styragel, 32°C	60
		Petroleum ether : tetrahydrofuran	HPLC, gradient	356
		Tetrahydrofuran		730,2811
			Perdeuterated, SEC, Zorbax	974
			SEC	59,60,167,229, 284,298,357,441, 758,1383,1387, 2103,2150,2151, 2601,2671,2873, 2874,3024,3109,3426
			SEC, silanated silica gel, 25°C	3079
			SEC, styragel, poreglass, 25°C	2801
			SEC, styragel, 25°C telechelic	2442
			SEC, μ-styragel, 25°C	1602
			SEC, μ-styragel, 25°C, isotactic and syndiotactic samples	1601

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			SEC, μ-styragel, Isotactic (99%), syndiotactic (92%)	1606
			Syndiotactic	3439
		Tetrahydrofuran : triethylamino (9 : 1)	SEC, μ-styragel, 35°C	670
		Trichloroethylene	SEC, 23°C	3195
		Xylene	SEC, syndiotactic	304
	Field flow	Tetrahydrofuran	Thermal	1146
	Fractional precipitation	Acetone/Aq. acetone		251
		Acetone/methanol		368,373,605,916, 1467,1491,1603,1605, 2873,2999,3049,3521
		Acetone/methanol–water (1 : 1)		605,915
		Acetone/*n*-heptane		1318
		Acetone/*n*-hexane	Summative method	331,1718,2062
		Acetone/petroleum ether	20°C	851
		Acetone/shellsolve	Low MW	605,915
		Acetone/water		273,580,605,915, 949,1415,2905,3607
		Aq. acetone solutions	Lowering temp.	251
		Benzene–chloroform (3 : 1)/petroleum ether		2148
		Benzene/cyclohexane		850,851,1205,1679
		Benzene/isopropyl alcohol		1599,1600
		Benzene/methanol		166,303,727,953, 1175,1466,1547,1604, 2317,2419,2533,2535, 2600,2770,2771,2772, 2773,3138,3606
			Isotactic	2036
			Isotactic (99%), syndiotactic (92%)	1606
			Isotactic and syndiotactic samples	1601
			Isotactic atactic	1602
		Benzene/*n*-hexane	25°C	74,909,949,1205, 1363,1785,1992,2250, 3256,3362,3363
		Benzene/petroleum ether	25°C	367,368,662,663, 2685,3137,3253
		Benzene/shellsolve		605,915,1786
		Butanone–ethanol/cyclohexane		3440
		Butanone/methanol		518,1773
		Butanone/*n*-hexane		518
		Carbon tetrachloride/shellsolve		605,915,916
		Chloroform/*n*-heptane	Lowering temp.	2987
		Chloroform/petroleum ether		132,3238
		Dioxane/*n*-heptane	30°C, imidized	3141
		Methyl ethyl ketone/methanol		589
		Toluene/methanol–water		2109
		Toluene/petroleum ether		640
	Fractional solution	Acetone/methanol	Column extraction	742,2635,2638,2906
		Acetone/*n*-hexane	Column extraction, 20°C glass beads, analytical and preparative	2302
		Benzene/cyclohexane	Column extraction	2906
		Benzene/methanol		2421
			Column extraction	215
		Butanone/cyclohexane : methanol		3440
		Chloroform/methanol	Column extraction	397
		Chloroform/petroleum ether	Film extraction	935
		Toluene/methanol, benzene/methanol		2350
		Toluene/petroleum ether		831
	Sedimentation velocity	Acetone	Ultracentrifuge	1680
		Ethyl acetate	Ultracentrifuge, 20°C	852,853

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Ethyl acetate/acetone	Ultracentrifuge, 20°C	1679
		Nitromethane	Ultracentrifuge, Θ-temp. 28°C	2769
	Thermal diffusion	Acetone		931
		Benzene	Plate type apparatus	1726,1727
		Toluene		1863,1868
	Turbidimetric titration	Acetone/water		58,1012,1219
		Benzene/cyclohexane		664
		Benzene/methanol		1991
		Butanone/water–methanol (3 : 1)		58
		Chloroform/methanol		1991
Poly(2-(4-methyl-1-piperazinylcarbonyloxy)ethylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 26°C	2668
Poly(2-(4-methyl-1-piperazinylcarbonyloxy)-2-methylethylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(dimethylamino) ethyl methacrylate				
	Chromatography	Tetrahydrofuran : triethylamino (9 : 1)	SEC, μ-styragel, 35°C	670
Poly(1-(2-(*N*,*N*-dimethylcarbamoyloxy)ethylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(2-(*N*,*N*-dimethylcarbamoyloxy)-2-methylethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(*p*-methylphenyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	3454
Poly(2,5-dimethylpyrazolyl methacrylate)				
	Fractional precipitation	Acetone/*n*-hexane	20°C	2960
Poly(2-morpholinocarbonyloxy)ethylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 26°C	2668
Poly(1-naphthyl methacrylate)	Chromatography	*n*-Butyl acetate	SEC, bioglass	143
		Tetrahydrofuran	SEC, 40°C	2402
Poly(2-[(3,5-dinitrobenzoyl)oxy]ethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3000,3001
Poly(1-(1-nonyloxy-4-phenoxycarbonyl)phenyl methacrylate)				
	Fractional precipitation	Benzene/acetone		476
Poly(octadecyl methacrylate)	Fractional precipitation	Toluene/methanol		2750
Poly(*n*-octyl methacrylate)	Chromatography	Tetrahydrofuran	SEC, styragel	2824
	Fractional precipitation	Toluene/ethanol		2628
Poly(3-(8-oxyl-7,7,9,9-tetramethyl-2,4-dioxo-1,3,8-triazaspiro(4,5)-dec-3-yl)propyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 22°C	1582
Poly(pentachlorophenyl methacrylate)				
	Fractional precipitation	Toluene/petroleum ether		259
Poly(1,2,2,6,6-pentamethyl-4-piperidyl methacrylate) *Poly(1-methyl-1-(1,2,2,6,6-pentamethyl-4-piperidyl)oxycarbonyl ethylene)*				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 22°C	1582
Poly(phenyl methacrylate)	Chromatography	Tetrahydrofuran/water	SEC, styragel	989
		Toluene	SEC, styragel, 80°C	1180
	Fractional precipitation	Acetone/isopropanol	25°C	1180
Poly(*N*-phenylmethacrylamide) *(Poly-1-(phenyliminocarbonyl)-1-methylethylene))*				
	Fractional precipitation	Acetone/benzene		2853
Poly(diphenylmethyl methacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	766
Poly(propionyloxyethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1496
Poly(propyl methacrylate)	Fractional precipitation	Sodium chloride 1.0 N (water)/ methanol–isopropanol (1 : 1) Sodium sulfonate salt		3143
Poly(*n*-stearyl methacrylate)	Fractional precipitation	Toluene/methanol		3598,3599
Poly(tetrahydrofuran methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	954
Poly(tetrahydrofurfuryl methacrylate)				
	Fractional precipitation	Acetone/benzene	25°C	3575
Poly(4-(1,1,3,3-tetramethylbutyl)phenylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	989
	Fractional precipitation	Benzene/methanol		2446
Poly(2-thiophene methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	993

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional precipitation	Benzene/methanol		993
Poly(2,4,5-trichlorophenyl methacrylate) *Poly(1(2,4,5-trichlorophenoxycarbonyl)-1-methylethylene)*				
	Fractional precipitation	Benzene/methanol		1182,2396
Poly(*n*-tridecyl methacrylate)	Fractional precipitation	Toluene/methanol		3599
Poly(2-trimethylammonium ethyl methacrylate chloride)				
	Chromatography	Nitric acid (0.1 M) + sodium nitrate (0.1 M)/water		3080,3081
	Sedimentation velocity	Sodium chloride 0.1 N	25°C	3081
Poly(triphenylmethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2453
Poly(trityl methacrylate)	Fractional precipitation	Hexamethyl phosphotriamide–benzene (40 : 60)/petroleum ether		2394
1.5. OTHER α- AND β-SUBSTITUTED POLY(ACRYLICS) AND POLY(METHACRYLICS)				
Poly(di-*n*-alkyl itaconates)	Fractional precipitation	Benzene/methanol	Poly dimethyl, diethyl, di-propyl itaconates	755
Poly(di-*n*-amyl itaconate) *[Poly(1-(n-amyl-oxycarbonylmethyl)-1-(n-amyloxycarbonyl)ethylene]*				
	Turbidimetric titration	Acetone/methanol	30°C	3368
		Benzene/methanol	30°C	3368
		Butanone/methanol	30°C	3368
		Chloroform/methanol	30°C	3368
		Ethyl acetate/methanol	30°C	3368
		Toluene/methanol	30°C	3368
Poly(di-benzyl itaconate)	Chromatography	Benzene/methanol	Precipitation chromatogr., glass beads, grad. temp.	3373
	Fractional precipitation	Isobutyl methyl ketone/methanol	25°C	3554
Poly(*tert*-butyl crotonate)	Chromatography	1,1,3,3,3,-hexafluoro-2-propanol	SEC, μ-styraged, analytical	3324
		Carbon dioxide/methylene dichloride	SFC, non-bonded silica gel, 160°C, 20 MPa.	3324
		Chloroform	SEC, styragel, preparative, oligomers	3324
	Fractional precipitation	Toluene/methanol		2408
Poly(di-*n*-butyl itaconate)	Chromatography	Benzene/methanol	Precipitation chromatogr., glass beads, grad. temp.	3370
		Tetrahydrofuran	SEC, ultrastyragel	1365
	Fractional precipitation	Benzene/methanol		1365
	Turbidimetric titration	Acetone/methanol	30°C	3368
		Acetone/water	30°C	3368
		Benzene/methanol	30°C	3368
		Butanone/methanol	30°C	3368
		Chloroform/methanol	30°C	3368
		Ethyl acetate/methanol	30°C	3368
		Toluene/methanol	30°C	3368
Cholesteryl vinyl succinate	Chromatography	Tetrahydrofuran	SEC	2424
Poly(dicyclohexyl itaconate)	Fractional precipitation	Toluene/methanol	25°C	3371
Poly(di-*n*-decyl itaconate) *Poly(1-(n-decyloxycarbonylmethyl)-1-n-decyloxycarbonyl)ethylene)*				
	Chromatography	Benzene/methanol	Precipitation chromatogr.	3370
	Turbidimetric titration	Benzene/methanol	30°C	3368
		Chloroform/methanol	30°C	3368
		Toluene/methanol	30°C	3368
Poly(mono-*n*-decyl itaconate)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2691
	Fractional precipitation	Butanol/methanol:water mixtures (2 : 1)		1912,2691
Poly[1-(decyloxycarbonylmethyl)-1-(methoxycarbonyl)ethylene] *Poly(methyl decyl itaconate)*				
	Fractional solution	Chloroform/ethanol:methanol (1 : 1)		1914
Poly(di-*n*-dodecyl itaconate) *Poly(1-(n-dodecyloxycarbonyl methyl)-1-n-decyl-oxycarbonyl)ethylene*				
	Fractional precipitation	Benzene/methanol		3371
Poly(mono-*n*-dodecyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2691

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional precipitation	Butanol/methanol–water mixture (2 : 1)		1913
		Butanol/methanol : water (2 : 1)		2691
Poly(1,1-(diethoxycarbonyl)ethylene)				
	Chromatography	Chloroform	SEC	1460
	Fractional precipitation	Tetrahydrofuran/water	50°C	1460
Poly(ethyl cyanoacrylate)	Fractional precipitation	Methylene chloride/methanol		781
Poly(di-*n*-ethyl itaconate)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	1365
	Fractional precipitation	Benzene/methanol		1365
	Turbidimetric titration	Acetone/water, benzene/*n*-heptane, butanone/*n*-heptane, butanone/mineral spirits, ethanol/water	30°C	3368
Poly(mono-*n*-ethyl itaconate)	Fractional precipitation	Methanol–acetone (1 : 1)/diethyl ether		997
Poly(di-*n*-heptyl itaconate)	Turbidimetric titration	Benzene/methanol, butanone/methanol	30°C	3368
Poly(di-*n*-hexadecyl itaconate) *Poly(1-(n-hexadecyloxycarbonylmethyl-1-(n-hexadecyloxycarbonyl)ethylene*				
	Fractional precipitation	Benzene/methanol		3374
	Turbidimetric titration	Benzene/methanol, butanone/methanol, chloroform/methanol, ethyl acetate/methanol, toluene/methanol	30°C	3368
Poly(1-(*n*-diicosayloxy-carbonylmethyl)1-(diicosayloxycarbonyl)ethylene *Poly(diicosayl itaconate)*				
	Fractional solution	Benzene/methanol	Column elution	3374
Poly(methyl butacrylate)	Fractional solution	Acetone/methanol, benzene/*n*-hexane	Column elution	1456
Poly(methyl-*n*-decyl itaconate)	Chromatography	Tetrachloroethane–phenol (3:1)/*n*-hexanol	SEC, μ-styragel	2691
	Fractional precipitation	Butanol/methanol:water (2 : 1)		2691
Poly(methyl-*n*-dodecyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2691
	Fractional precipitation	Butanol/methanol:water (2 : 1)		2691
Poly(di-*n*-methyl itaconate)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	1365
	Fractional precipitation	Acetone/methanol		2674
		Benzene/methanol		1365
	Turbidimetric titration	Acetone/methanol	30°C	3368
		Acetone/water	30°C	3368
		Benzene/water	30°C	3368
		Benzene/*n*-hexane	30°C	3368
		Butanone/cyclohexane	30°C	3368
		Butanone/methanol	30°C	3368
		Butanone/*n*-hexane	30°C	3368
		Chloroform/methanol	30°C	3368
Poly(di-*n*-octadecyl itaconate) *Poly(1-(n-octadecyloxycarbonylmethyl-1-octadecyloxycarbonyl)ethylene)*				
	Fractional precipitation	Benzene/methanol		3374
Poly(di-*n*-octyl itaconate)	Turbidimetric titration	Benzene/methanol, butanone/methanol, chloroform/methanol, ethyl acetate/methanol, toluene/methanol	30°C	3368
Poly(di-*n*-phenyl ethyl itaconate)				
	Chromatography	Benzene/methanol	Precipitation chromatogr., glass beads, temp. grad. 18–40°C	3373
Poly(diphenyl itaconate)	Chromatography	Benzene/methanol	Precipitation chromatogr., glass beads, temp. grad. 20–40°C	3372
Poly(di(phenyl-*n*-propyl) itaconate) *Poly(1-phenylpropyloxycarbonylmethyl)-1-(phenylpropyloxycarbonyl)ethylene)*				
	Chromatography	Benzene/methanol	Precipitation chromatogr., glass beads, temp. grad. 18–40°C	3373
Poly(di-*n*-propyl itaconate)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	1365
	Fractional precipitation	Benzene/methanol		1365
	Turbidimetric titration	Acetone/water	30°C	3368

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Ethanol/water	30°C	3348
Poly(di-*n*-tetradecyl itaconate) *Poly(1-n-tetradecyloxycarbonylmethyl)-1-(tetradecyloxycarbonyl)ethylene)*				
	Fractional precipitation	Benzene/methanol		3374
Poly(di-*n*-undecyl itaconate)	Turbidimetric titration	Benzene/methanol	30°C	3368
		Chloroform/methanol	30°C	3368

1.6. POLY(VINYL ETHERS)

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly[5-[[[2′,5′-bis[4″-*n*-alkoxybenzoyl]oxy]benzyl]oxy]carbonyl]bicyclo[2.2.1]hept-2-enes				
	Fractional precipitation	Tetrahydrofuran/hexane		2676
Poly(allyloxyethylene) *Poly(allyl vinyl ether)*				
	Chromatography	Tetrahydrofuran	SEC μ-bondagel	2989
Poly(butoxyethylene)	Fractional precipitation	Benzene/methanol		2977
Poly(2-chloro-4-methylpenthyl 4′[[8-vinyl oxy]octyl]oxy]biphenyl-4-carboxylete)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C, (r,s)	2569
Poly(2-chloroethoxyethylene)	Chromatography	Chloroform	SEC, styragel	1300
Poly(hexadecyloxyethylene)	Fractional precipitation	*n*-Heptane/acetone		1760
Poly(isobutoxyethylene)	Chromatography	Chloroform	SEC, styragel	2212
		Tetrahydrofuran	SEC μ-styragel	2856
			SEC, styragel	1244,1827
	Extraction	Acetone, benzene, ethyl ether, methylene chloride	Oppanol C	1972
	Fractional precipitation	Toluene-butanone (1 : 1)/ethanol	Lowering temp.	2865
Poly(isobutyl propenyl ether) *[Poly(1-isobutoxy-2-methylethylene)]*				
	Chromatography	Chloroform	SEC, styragel	1299
Poly(isobutyl vinyl ether)	Chromatography	Chloroform		1597,1692
			SEC, styragel	1569
		Toluene, chloroform	SEC, styragel, analytical and preparative	584
Poly(isopropyloxyethylene)	Extraction	Acetone, benzene, ethyl ether, methylene chloride		1972
Poly 5-[[[*n*-[(4′-methoxy-4-biphenyl)oxy]alkyl]-oxy]carbonyl]bicyclo [2.2.1]hept-2-enes				
	Chromatography	Tetrahydrofuran	SEC, styragel	1744
Poly(methoxyethylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2857
	Fractional precipitation	Benzene/*n*-hexane, *n*-heptane or decane		2025
		Chloroform/heptane		247
		Methanol	Lowering temp. 65 to 25°C and to 3°C	3352
		Toluene/heptane		246
		Water	Raising temp.	2025
	Fractional solution	Toluene/petroleum ether	Continous extraction (CPF)	2587
Poly(vinyl isobutyl ether) see Poly(isobutoxyethylene)				
Poly(vinyl methyl ether) see Poly (methoxyethylene)				

1.7. POLY(VINYL ALCOHOL), POLY(VINYL KETONES), POLY(VINYL HALIDES), POLY(VINYL NITRILES)

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acrylonitrile)	Chromatography	Chloroform	SEC, styragel	1781
		Dimethylacetamide	SEC, styragel	330,1965
		Dimethylformamide	SEC	985,1846
			SEC, Merck gel	1461
			SEC, Sephadex	1781
			SEC, styragel, 70°C	1142
	Fractional precipitation	Dimethyl sulfoxide–aq. hydrochloric acid/toluene	35°C	1715
		Dimethyl sulfoxide/toluene	35°C	946,947,1414, 1554,1558,1716
		Dimethylformamide	110–90°C	2888
		Dimethylformamide/ethanol	pH 6.0, ageing period	2173
		Dimethylformamide/lauric alcohol		3071
		Dimethylformamide/ligroin	50–60°C	1111
		Dimethylformamide/*n*-heptane	60°C	267,339,383,594, 945,948,1371, 1626,2167

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Ethanol/water	30°C	3348
Poly(di-*n*-tetradecyl itaconate) *Poly(1-n-tetradecyloxycarbonylmethyl)-1-(tetradecyloxycarbonyl)ethylene)*				
	Fractional precipitation	Benzene/methanol		3374
Poly(di-*n*-undecyl itaconate)	Turbidimetric titration	Benzene/methanol	30°C	3368
		Chloroform/methanol	30°C	3368
1.6. POLY(VINYL ETHERS)				
Poly[5-[[[2′,5′-bis[4″-*n*-alkoxybenzoyl]oxy]benzyl]oxy]carbonyl]bicyclo[2.2.1]hept-2-enes				
	Fractional precipitation	Tetrahydrofuran/hexane		2676
Poly(allyloxyethylene) *Poly(allyl vinyl ether)*				
	Chromatography	Tetrahydrofuran	SEC μ-bondagel	2989
Poly(butoxyethylene)	Fractional precipitation	Benzene/methanol		2977
Poly(2-chloro-4-methylpenthyl 4′[[8-vinyl oxy]octyl]oxy]biphenyl-4-carboxylete)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C, (r,s)	2569
Poly(2-chloroethoxyethylene)	Chromatography	Chloroform	SEC, styragel	1300
Poly(hexadecyloxyethylene)	Fractional precipitation	*n*-Heptane/acetone		1760
Poly(isobutoxyethylene)	Chromatography	Chloroform	SEC, styragel	2212
		Tetrahydrofuran	SEC μ-styragel	2856
			SEC, styragel	1244,1827
	Extraction	Acetone, benzene, ethyl ether, methylene chloride	Oppanol C	1972
	Fractional precipitation	Toluene-butanone (1 : 1)/ethanol	Lowering temp.	2865
Poly(isobutyl propenyl ether) *[Poly(1-isobutoxy-2-methylethylene)]*				
	Chromatography	Chloroform	SEC, styragel	1299
Poly(isobutyl vinyl ether)	Chromatography	Chloroform		1597,1692
			SEC, styragel	1569
		Toluene, chloroform	SEC, styragel, analytical and preparative	584
Poly(isopropyloxyethylene)	Extraction	Acetone, benzene, ethyl ether, methylene chloride		1972
Poly 5-[[[*n*-[(4′-methoxy-4-biphenyl)oxy]alkyl]-oxy]carbonyl]bicyclo [2.2.1]hept-2-enes				
	Chromatography	Tetrahydrofuran	SEC, styragel	1744
Poly(methoxyethylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2857
	Fractional precipitation	Benzene/*n*-hexane, *n*-heptane or decane		2025
		Chloroform/heptane		247
		Methanol	Lowering temp. 65 to 25°C and to 3°C	3352
		Toluene/heptane		246
		Water	Raising temp.	2025
	Fractional solution	Toluene/petroleum ether	Continous extraction (CPF)	2587
Poly(vinyl isobutyl ether) see Poly(isobutoxyethylene)				
Poly(vinyl methyl ether) see Poly (methoxyethylene)				
1.7. POLY(VINYL ALCOHOL), POLY(VINYL KETONES), POLY(VINYL HALIDES), POLY(VINYL NITRILES)				
Poly(acrylonitrile)	Chromatography	Chloroform	SEC, styragel	1781
		Dimethylacetamide	SEC, styragel	330,1965
		Dimethylformamide	SEC	985,1846
			SEC, Merck gel	1461
			SEC, Sephadex	1781
			SEC, styragel, 70°C	1142
	Fractional precipitation	Dimethyl sulfoxide–aq. hydrochloric acid/toluene	35°C	1715
		Dimethyl sulfoxide/toluene	35°C	946,947,1414, 1554,1558,1716
		Dimethylformamide	110–90°C	2888
		Dimethylformamide/ethanol	pH 6.0, ageing period	2173
		Dimethylformamide/lauric alcohol		3071
		Dimethylformamide/ligroin	50–60°C	1111
		Dimethylformamide/*n*-heptane	60°C	267,339,383,594, 945,948,1371, 1626,2167

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Dimethylformamide/*n*-heptane–ether (1/1)		1285,3131
		Hydroxyacetonitrile–ethanol/benzene		1714
		Hydroxyacetonitrile–ethanol/toluene	35°C	1714
		Nitric acid 60%/*n*-butanol	5°C	945
	Fractional solution	Dimethylformamide/*n*-butylacetate	90°C, film extraction	935
		Dimethylformamide/*n*-heptane	Extraction	1800
	Sedimentation velocity	Dimethylformamide		2046
	Thermal diffusion	Dimethylformamide		1862,1863,1868
	Turbidimetric titration	Dimethylformamide/dioxane–heptane (1/1)		2477
Poly(*tert*-butyl vinyl ketone)	Fractional precipitation	Acetone/methanol		1140
Poly(chlorotrifluoroethylene)	Fractional precipitation	Dichlorobenzotrifluoride/diethyl phthalate (3/1)	Solvent volatilization, 150°C, Kel-F	1618,2449
Poly(α-chlorovinyl acetic acid) *Poly((carboxychloromethyl)ethylene)*				
	Fractional precipitation	Methanol/water		1719
Poly(diketene)	Extraction	Acetone, dioxane		959,1635
		Ethyl ether, acetone benzene, toluene	Boiling	3564
		Methanol, ethyl ether, benzene, acetone	Boiling	3529
Poly(isopropenyl methyl ketone) *Poly(1-acetyl-1-methylethylene)*				
	Chromatography	Tetrahydrofuran	SEC	1979
Poly(methyl vinyl ketone) *Poly(acetylethylene)*				
	Extraction	Acetone	Sol. and insol.	3249
Poly(phenyl vinyl ketone) *Poly(benzoylethylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	260,1095,3251
	Extraction	Acetone	Sol. and insol.	3249
Poly(trifluoroethylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	486
Poly(vinyl alcohol) *Poly(hydroxyethylene)*				
	Brownian diffusion	Water		924
	Chromatography	Acetonitrile + 50 mM lithium chloride		2409
		Sodium nitrate 0.25 M/sodium phosphate (monobasic) 0.01 M	SEC, aquagel-OH	2121
		Water	SEC	1806
			SEC, aquagel-OH	2122
			SEC, spheron	150
			SEC, TSK gel	150,1224
	Extraction	Foam method amorphous–crystalline		1412,1674
	Fractional crystallization	Water	Stirring	3535,3536,3537
	Fractional precipitation	Water/1-propanol	25°C	2430
		Water/acetone		754,759,1861,3127
		Water/acetone–propanol		3222
		Water/*n*-propanol		2090,2429,2815, 3493,3535
	Fractional solution	Water/methyl acetate : methanol (3 : 1)	Film extraction	934
		Water/*n*-propanol	65°C	295
	Thermal diffusion	Water		931,1861,1863
Poly(vinyl chloride)	Chromatography	Benzene/tetrahydrofuran (6/4)	SEC, 25°C	1984
		Cyclohexanone/methanol	Precipitation chromatogr., 25–60°C	671
		Hexamethyl phosphoramide	SEC, styragel, 103°C	2050
		Tetrahydrofuran	SEC	1032
			SEC, μ-styragel, 25°C	416,2311
			SEC, Porous silica gel, 25°C	1742,1885,1974
			SEC, styragel, 25°C, 30°C, analytical	5,90,284,540,543, 880,932,1035,1087, 1088,1165,1314,1315, 1641,1745,2389,2474, 2677,2769,2822,2922, 3170,3228,3239,3354

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			SEC, styragel, 35°C, preparative	1229
			SEC, ultrastyragel, 35°C	824
	Extraction	Acetone, chloroform, tetrahydrofuran	Hot and cold	2455
		Acetone–methanol mixtures		416
		Benzene, chloroform, acetone, tetrahydrofuran and cyclohexanone	Selective extraction	1886
		Dioxane, tetrahydrofuran, cyclohexanone	At several temp.	2050
		Mixtures, ethyl alcohol, butanone, tetrahydrofuran, chloroform		1922
	Extraction (CPF)	Tetrahydrofuran/water		1032
	Field flow	Water + 0.1% FL-70 tensoactive	Sedimentation, latex beads	1902
	Fractional precipitation	Acetone + chlorobenzene + cyclohexane/methanol		2167
		Cyclohexanone/ethylene glycol		981,1886,2132,2308
		Cyclohexanone/methanol		432,443,1091, 1164,2168
		Cyclohexanone/methanol–water		3442,3585
		Cyclohexanone/*n*-butanol		782
		Liquid ethylene at 132 bar and 80°C	Releasing pressure	3298
		Tetrahydrofuran/ethanol		1316
		Tetrahydrofuran/methanol		288,1091,3443
		Tetrahydrofuran/water		90,170,244,370, 371,921,1035,1317, 1717,1741,1782,1886, 2132,2251,2342,2588, 2591,2592,3133, 3353,3378
	Fractional solution	Cyclohexanone/ethylene glycol	Column extraction	981,983
		Cyclohexanone/methanol	Film extraction	1171
		Methyl isobutyl ketone		1860
		Tetrahydrofuran/water	44°C	3069
		Water/acetone	Continous method	1015
	Sedimentation analysis	Cyclohexanone		1805
	Thermal diffusion	Cyclohexanone		1011,1020,1170
	Turbidimetric titration	Cyclohexanone/*n*-heptane–carbon tetrachloride (9 : 1)	2478	
Poly(vinyl fluoride)	Fractional precipitation	Dimethylformamide/water		3573
Poly(vinyl methyl ketone)	Extraction	Acetone	Soluble and insoluble	3249
Poly(vinylidene fluoride) *Poly(1,1-difluoroethylene)*				
	Chromatography	Dimethylacetamide	SEC, styragel	3446
	Fractional precipitation	Acetophenone/*o*-dichlorobenzene	136 and 158°C	3446
		Dimethylformamide/aq. acetic acid		40
		Tetrahydrofuran/petroleum ether		1607
	Fractional solution	Acetophenone		2359
		Chloroform, petroleum ether, carbon tetrachloride		418
	Freeze-extraction	Dioxane	Separation according degree of crystallinity	3509

1.8. POLY(VINYL ESTERS)

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(vinyl acetate)	Chromatography	Acetonitrile + 50 mM aq. lithium chloride		2409
		Benzene/isopropanol	Activated carbon + supercel	601
			Precipitation chromatogr. large scale, 28–60°C	501
		Dimethylformamide	SEC, styragel	2418

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Methyl ethyl ketone	SEC, silica gel	1453
		Tetrahydrofuran	SEC, styragel	284,407,496,681, 826,1087,1088,1910, 2389,2417,2418,2860
			SEC, ultrastyragel	2037
		Toluene	SEC, preparative	149
		Trichlorobenzene	SEC	3401
	Distribution between immiscible liquids	Benzene–methanol–water	Countercurrent	2754
	Fractional precipitation	Acetone/*n*-heptane	35°C, branched	1322,1323
		Acetone/*n*-hexane	25°C	286,909,2249,2980
		Acetone/*n*-pentane		1865
		Acetone/petroleum ether		2198,2706,3126
		Acetone/water		315,937,2217,2336, 2418,2468
		Acetone/water–methanol (1 : 1)		1148,1149,1576,3405
		Benzene/cyclohexane	25°C	2535
		Benzene/isopropanol		832
		Butanone/cyclohexane	25°C	2524
		Chlorobenzene/cyclohexane		2524
		Dioxane/isopropanol		832
		Dioxane/*n*-heptane	25°C	2524
		Ethyl acetate/cyclohexane	25°C	1696,2524
		Methanol/water	35°C, branched	310,311,1955
		Methanol/water, chloroform/methanol		2460
		Methyl acetate/petroleum ether		937
	Fractional solution	Methyl and ethyl acetate/petroleum ether	Film extraction	295,933,935
		Methyl isobutyl ketone		1860
		Tetrahydrofuran/methanol–water (1 : 1)	25°C	496
		Water/acetone		1004
	Selective adsorption	Acetone	Carbon	1575
	Thermal diffusion	Benzene		1865
		Chloroform		1865
		Dioxane		1865
		Ethyl acetate		1865
		Isoamyl acetate		1865
		Methanol		1865
		Toluene		1863,1865
	Turbidimetric titration	Acetone/water		58,2270
Poly(vinyl *p*-trimethyl silyl benzoate)				
	Fractional precipitation	Benzene/methanol		1351
1.9. POLY(STYRENES)				
Poly(*p*-aminostyrene)	Chromatography	Tetrahydrofuran	SEC	3520
Poly(*p*-bromostyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
		Tetrahydrofuran	SEC, μ-styragel	2013
Poly(*p*-*tert*-butylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel, 45°C	1811
		Tetrahydrofuran/water	SEC, styragel	989
Poly(*p*-chloro-α-methylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	158,1911
Poly(*m*-chlorostyrene)	Fractional precipitation	Benzene/methanol	35°C	2087
Poly(*o*-chlorostyrene)	Fractional precipitation	Benzene/methanol	35°C	2088
Poly(*p*-chlorostyrene)	Chromatography	Butanone	SEC, styragel	1296
		o-Dichlorobenzene	SEC, styragel	1242
		Tetrahydrofuran	SEC, μ-styragel	1666,2013
	Fractional precipitation	Benzene/methanol		210,354,1282,1459, 1808,2089,2227
		Butanone/methanol		3135
Poly(*N*,*N*,*N*′,*N*′,-tetraethyl-4-isopropenylphenylphosphosnous diamide)				
	Chromatography	Tetrahydrofuran + 2% *N*-methylpyrrolidine)	SEC	1585

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(*p*-fluoromethylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel	138
Poly(*p*-fluorostyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
Poly(4-hydroxystyrene)	Chromatography	Tetrahydrofuran	SEC, styragel	3566
Poly(*p*-isopropyl-α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2013
			SEC, styragel, 25°C	1918,2007,2008
		Toluene	SEC, μ-styragel, preparative	2008
Poly(*p*-methoxystyrene) *Poly((p-methoxyphenyl)ethylene)*				
	Chromatography	Butanone	SEC, styragel	1296
		Chloroform	SEC, styragel	1734
		o-Dichlorobenzene	SEC, styragel	1242
		Tetrahydrofuran	SEC, μ-styragel	2013
	Fractional precipitation	Butanone/ethanol	Column extraction, 25°C glass beads	524,2619
	Turbidimetric titration	Benzene : butanone (3 : 1)/ethanol		1152
Poly(methyl 4-vinylbenzoate)	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1309
Poly(α-methylstyrene) *[Poly(p-methoxyphenyl)ethylene)]*				
	Chromatography	Benzene/*n*-hexane	Precipitation chromatogr., 10–58°C	3527
		Carbon/tetrachloride/heptane (2 : 1)	TLC, silical gel	978
		GPC, modified silica gel 40°C		2667
		Tetrahydrofuran		2108
			SEC, μ-styragel, 25°C	1661,2013
			SEC, modified silica gel 40°C	2667
			SEC, styragel	558,835,955,1245, 1609,1614,1631,1917, 1918,2420,2767, 3504,3527
		Toluene	SEC, styragel	1042
	Coacervation	Toluene/methanol		471
	Fractional precipitation	Benzene/methanol		642,655,944, 1613,2810
		Cyclohexane	Low temp. 21.4 to 10.4°C	2407
		Methyl ethyl ketone – benzene (6 : 1)/methanol		1139
		Toluene/methanol		2405,2810
	Fractional solution	Cyclohexane	Column extraction, increasing temp., glass beads	944,2407,3527
	Sedimentation velocity	Cyclohexane	35°C	942,2116,3527
	Turbidimetric titration	Cyclohexane/*n*-octanol		2702
		Methylcyclohexane	Lowering temp.	634,2660
Poly(2,4,6-trimethylstyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
Poly(2,4-dimethylstyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
	Fractional precipitation	Benzene/methanol		3392
Poly(2,6-dimethylstyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
Poly(*m*-methylstyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
	Fractional precipitation	Benzene/methanol	35.8°C	553
Poly(*o*-methylstyrene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
Poly(*p*-methylstyrene)	Chromatography	Butanone	SEC, styragel	1296
		o-Dichlorobenzene	SEC, styragel	1242
Poly(β-methylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel	2420
Poly(styrene)	Brownian diffusion	Benzene, cyclohexane		2079
	Chromatography	1,2,4-Trichlorobenzene	SEC, styragel, 145°C	572,2729
			Syndiotactic, 145°C	1693
		1,2-Dichlorobenzene	SEC, 135°C, isotactic	1957
		1,2-Dichloroethylene, perchloroethylene, tetrahydrofuran, ethylbenzene, *n*-dodecane/tetrahydrofuran, cyclohexane/1,2-dichloroethylene	ThFFF	3008
		Acetone and acetone/ tetrahydrofuran (7 : 3)	TLC, gradient elution	2480
		Acetone/chloroform	TLC	2093

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Acetone/chloroform mixture (8:2)	TLC, constant elution	2480
		Acetone/methanol	TLC	2093
		Benzene	SEC, 205°C Supercritical fluid chromatogr. 41–62 bar	1495
			SEC, ethylene dimethacrylate gel	1291
			SEC, styragel	984,1263, 1732,1984
		Benzene, acetone butanone, ethanol	TLC, gradient conc.	1571
		Benzene, carbon tetrachloride, methanol, petroleum ether		67
		Benzene/hexane (34.7/65.3)	TLC, gradient conc., Θ-temp. = 25°C	2481,2483
		Benzene/1,2-dichloroethane, ethylbenzene/*n*-dodecane, carbon tetrachloride/*n*-dodecane, tetrahydrofuran/*n*-dodecane	ThFFF	2791
		Benzene/ethanol	Precipitation chromatogr.	216,426,889, 1515,1950,2149, 2457,2458,2563, 2871,2904
		Benzene/methanol	Precipitation chromatogr. gradient, glass beads	75,363,473, 1730,1867,2892
		Butanone	SEC, porous glass	2485
			SEC, spheron	1070
			SEC, styragel, 25°C	951,1296,2064, 2854,3152
		Butanone/acetone mixture (4.5/5.5)	TLC, silica gel	3148
		Butanone/ethanol	Charcoal	3555
			Precipitation chromatogr.	182,423,424, 425,426,1344, 1518,2134,2146, 2563,2875,2876, 2879,3304
		Butanone/methanol (89.3/10.7)	Precipitation chromatogr.	1113,3516
			SEC, styragel, 22°C	3035
		Carbon tetrachloride	Liquid adsorption, silica gel, oligomers	3169
			SEC	620
		Chloro-aromatic solvents	SEC	2243
		Chlorobenzene	SEC, 25°C	410
		Chloroform	Liquid adsorption, silica gel, oligomers	3169
			SEC	3428
			SEC, bondagel	2705
			SEC, styragel, 30°C	189,674,708, 1781,2015,2300, 2512,3344
		Chloroform, tetrahydrofuran, cyclohexane, acetone, di-isopropyl ether, isooctane, acetonitrile, methanol		2843
		Chloroform/cyclohexane (3/1)	SEC	746,747
		Chloroform/isopropanol (9/1)	SEC, Lichrospher	1065
		Chloroform/methanol (99/1)	SEC, styragel	82
		Chloroform/*n*-hexane (8/2)	SEC	2489
		Cyclohexane	Phase distribution chromatogr. polystyrene-glass beads	522,523, 1123,1124,2080, 2903
		Cyclohexane/benzene (14/3), Cyclohexane/benzene (32/68)	TLC, silica gel	978,3148
		Cyclohexane/*n*-propanol	Precipitation chromatogr., 20–70°C	2134

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Dichloroethane and dichloroethane/isopropanol (6 : 4)	SEC, 22°C	3119
		Dimethylformamide	SEC, Sephadex	1781
			SEC, styragel, 50°C	2300,3308
		Dioxane	SEC, porous glass	2485,2485
			ThFFF	1686
		Dioxane/2-propanol (55/45)	TLC	2484
		Dioxane/methanol (71.4/28.6)	TLC, gradient conc., Θ-temp. = 25°C	2481,2484
		Ethyl benzene/cellosolve	ThFFF	1054
		Ethyl ether	TLC	2026
		Light petroleum/methylene chloride (3/7)	TLC	2026
		m-Cresol	SEC, 100°C	361
		Methylene chloride	TLC	2026
		o-Dichlorobenzene	SEC, 130°C, styragel	189,235,332, 709,1251,1252
		Pentane/dioxane	Supercritical fluid chromatogr., oligomers	2872
		Pentane/methanol (95 : 5)	Supercritical fluid chromatogr., 220°C oligomers	1707
		Tetrachloroethylene	SEC, styragel	2182
		Tetrahydrofuran	Refractive index, light scattering and viscosity detectors	1463
			SEC	62,63,229, 291,332,380, 381,474,497, 618,715,747, 797,837,955, 1087,1264,1265, 1384,1388,1884, 1985,1988,2061, 2150,2151,2158, 2469,2475,2476, 2490,2508,2553, 2894,2963,3313
			SEC, ultrastyragel, oligomers	1851
			SEC, μ-styragel	66,493,988, 1197,2026,2092, 2104,2395,2680
			SEC, μ-styragel, styragel, 30°C	2106
			SEC, μ-styragel, 30°C, three-four and six arms	2561
			SEC, silica beads, 30°C, ring-shaped PS	3596
			SEC, silica gel, porous glass, porous silica etc.	576,989,1258, 1469,1473,1885, 2276,2485,2667, 3313,3345, 3393,3463
			SEC, silica-C8	2723
			SEC, styragel	283,284,619, 1027,1295,1302, 1308,1772,1779, 1874,1998,2010, 2147,2485
			SEC, styragel preparative	1702,3100
			SEC, styragel, 1,2-dicarboethyl-terminated	3589
			SEC, styragel, 22, 25, 28, 40 and 50°C	17,64,235, 379,798,887, 1289,1334,1853, 2100,2156,2157, 2228,2389,2788, 3023,3024, 3087,3445

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			SEC, styragel, 35°C, 12-and 18-arm star	2777
			SEC, ultrastyragel, 35°C	824
		Tetrahydrofuran/acetone	Column elution	822
		Tetrahydrofuran/*o*-Dichlorobenzene	SEC, styragel	299
		Tetrahydrofuran/water	Reversed phase, silica-phenyl, gradient, oligomers	1851
			Reversed-phase, silica-C8	2723
		Toluene	SEC, μ-styragel, 25°C	565
			SEC, modified silica gel	1257
			SEC, porous glass	621
			SEC, styragel	1866
			SEC, styragel, 25°C, 45°C, 89°C and so on	79,454,462, 622,698,746, 1042,1702,1825, 1828,1933,1936, 2243,2511,3551
		Toluene/ethanol	Precipitation chromatogr.	2149,2228,2907
		Toluene/isopropanol	Precipitation chromatogr.	1379
		Trichlorobenzene	SEC, 23°C	3195
			SEC, bioglass	621
			SEC, styragel, 130°C	1380,3462
		Trichloroethylene	SEC, 23°C	3195
		Water, methanol, tetrahydrofuran	Hydrodynamic, nonporous PS spheres, latex PS	2728
			Hydrodynamic, stainless-steel column, capillary, latex PS	2727,2728
	Coacervation	Benzene/methanol		1120
		Butanone/*n*-butanol		1120
		Chloroform/*n*-butanol		1120
		Toluene/*n*-butanol		1120
	Extraction	Butanone	Stereospecific	1701
		Butanone, ethyl ether, tetrahydrofuran, ethyl acetate, benzene and toluene	Cold and hot	3511
		Butyl acetate/*n*-propanol (7 : 3)	Increasing temp.	1699
	Field flow	Ethylbenzene		435,1048,1053
		Tetrahydrofuran	Thermal	1146
		Water	Latex	2766
		Water + FL-70 tensoactive	Sedimentation, cyclicla-field, latex beads	1903
		Water + tensoactive	Sedimentation, 25°C, latex	1475
	Flow birefringence	Toluene, 1-methylnaphthalene, decaline		2388
	Fractional precipitation	Acetone–butanone/methanol		1234
		Acetone/methanol–water		913,3040,3502
			Anionic, monodisperse, 30°C	3556
		Benzene–tetrahydrofuran/methanol	Comb-shaped	2406
		Benzene/butanol	30°C	1417
		Benzene/ethanol		463,1452
		Benzene/methanol		68,176,293,314,373, 404,409,473,497,726, 784,858,859,943,1302, 1444,1695,1696,1698, 1730,1796,1836,2004, 2317,2351,2357,2516, 2524,2589,2600,2683, 2775,2776,2813, 2965,3051,3126, 3243,3254,3491, 3606

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			Macrocyclic	2120
			Oligomers	1753
		Benzene/*n*-propanol mixtures	Solvent volatilization, 30°C	1415
		Butanone		326
		Butanone/isopropanol	30°C	887
		Butanone/methanol		23,864,913, 1168,1193,1490, 1624,1908,1916, 2145,2468,3338, 3448,3449
			Star and comb-shaped	68,499,2775,2776,3556
		Butanone/*n*-butanol + 2% water	Solvent volatilization	603,1093,1115
		Carbon tetrachloride/ethanol		762
		Carbon tetrachloride/methanol		1504
		Chlorobenzene/cyclohexanol	Isotactic, 8°C	3325
		Chloroform/methanol		2987
		Cyclohexane	Changing temp.	1444,2092
		Ethane (supercritical)	Oligomers	1621
		Ethyl acetate/ethanol	20°C	919
		Liquid ethylene at 131 and 80°C	Pressure release	3298
		Methyl acetate	120°C, isothermal at LCST with pressure variation	2323
		Methyl ethyl ketone/benzene		1139
		Methylcyclohexane	Lowering temp. atactic	1556,1561,1566
		Methylene chloride/butanone	Stereoregular	1909
		o-Dichlorobenzene/ poly(oxyethylene) 400	Isotactic, 50°C	2341
		Toluene/ethanol		1137
			50°C, deuteriated isotactic	1138
		Toluene/methanol		1193,1525,1526, 1527,1818,2366, 2406,2473
			Ring-shaped PS	3596
		Toluene/*n*-decane		2656
		Toluene/petroleum ether		1208
		Toluene/poly(oxyethylene)	Isotactic	1622,1623
	Fractional solution	Acetone, benzene, toluene	Extraction, isotactic	1957
		Acetone/methanol – water		67
		Benzene/ethanol	Column extraction	35,3304
		Benzene/methanol		321,1217,1218
			12-and 18-arm star	2777
		Butanone, benzene, toluene	Extraction, isotactic	86
		Butanone/ethanol	Column extraction, glass beads	30,108,2877
		Butanone/ethanol, cyclohexanone/1-propanol	Column	2136
		Carbon disulfide/petroleum ether	Film extraction	935
	Membrane diffusion	Benzene, cyclohexane		2155
		Toluene	Maranyl	1119
	Random	Water	Latex	1055
	Sedimentation density gradient	Carbon tetrachloride, cyclohexanol		1281
	Sedimentation equilibrium	Butanone	20°C	1858
		Cyclohexane	35°C	498,2115,2893
		Methylcyclohexane	75°C	498
	Sedimentation velocity	Bromoform		2985
		Butanone	Ultracentrifuge	273,1624,3409,3410
		Cyclohexane	35°C	1020,1444,1767, 1971,2092,2443, 2654,2894,2965, 3412,3428,3503
			Ultracentrifuge, 25°C	147,444,445
		Ethyl acetate	Ultracentrifuge	1624
		Ethylene bromide		2985

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Toluene	23.5°C	503
	Thermal diffusion	Butanone		3164
		Dioxane, ethylbenzene, pyridine, styrene, *o*-xylene, toluene		839
		Toluene		1053,3203
		Toluene, butyl acetate		1330,1863,1868,3164
	Thermal field flow	Benzene	Two field thermal flow	487
		Ethylbenzene		2886,3319,3340
		Tetrahydrofuran		3340
		Tetrahydrofuran, dimethylformamide		114
		Toluene		1053,1687,3203
		Water, glycerol, water/ ethylene glycol or silicone oil		2520
	Turbidimetric titration	Benzene/5%water + methanol		2688
		Benzene/benzene–methanol		2799
		Benzene/ethanol	Star-branched	2688,2799,2923
		Benzene/isopropanol		833
		Benzene/methanol		58,664,1104, 1225,1697,1706, 2131,2688, 2799,2923
		Benzene/*n*-propanol		2923
		Butanone/ethanol	Star-branched	453
		Butanone/isopropanol	30°C	257,3317
		Butanone/water–acetone		1275
		Butanone/water–methanol (3 : 1)		58
		Chloroform/isopropanol	30°C	1522
		Cyclohexane–toluene/ethanol		2688
		Cyclohexane/ethanol		2688,2923
		Cyclohexane/methanol		2923
		Cyclohexane/*n*-propanol		2923
		Cyclohexanol	Lowering temp.	17,2234
		Dioxane/methanol		2688
		Dioxane/water		2688
		Methylcyclohexane	Lowering temp., anionic	2767,3051
			temp.	2717
		Toluene/methanol		2075
		Toluene/*n*-butanol	Lowering temp.	273
	Ultrafiltration	Chloroform	Regenerated cellulose membrane	3090
	Zone melting	Benzene		1948,1949
		Cyclohexane		2796
		Naphthalene		2551
Poly(styrenesulfonates)	Chromatography	Tetrahydrofuran	SEC, styragel	163
	Field flow	Buffer solutions	Normal (NIFFF)	3408
		Water at 100°C, benzene	Sodium salt	289
	Gel electrophoresis	Sodium acetate buffer pH = 5.0	Poly(acrylamide)gel, 25°C	560
Poly(styrenesulfonic acid), ammonium salt				
	Fractional solution	Water	Ion exchange resins	1221
Poly(styrenesulfonic acid) tri-*n*-butylammonium salt				
	Chromatography	Tetrahydrofuran – lithium nitrate	SEC, styragel	2984
	Field flow	Water + 0.02 M triethanolamine + 0.1 M potassium chloride		1049
Poly(styrenesulfonic acid), sodium salt				
	Chromatography	Sodium nitrate (water) 0.1 M	SEC, silica gel	2762
		Tetrahydrofuran–dimethylformamide–lithium nitrate	SEC, styragel	2984
	Fractional precipitation	Sodium iodide 4 N aq./9 N aq. sodium iodide		2048

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(2-*p*-styryl-2-oxazoline)	Chromatography	Dimethylformamide + 0.4 M triethylamine	SEC, styragel, 50°C	2213
Poly(*p*-trimethylsilyl-α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, shodex	555
Poly(*p*-trimethylsilylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel	556
Poly[vinyl benzyl-*p*-poly(ethylene oxide)]				
	Chromatography	Tetrahydrofuran	SEC, styragel, macromer	1448
Poly[2-(4-vinylphenyl)-4,4-dimethyl-2-oxazoline]				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1309
1.10. OTHER COMPOUNDS				
Poly(1,2-acenaphthylene)	Chromatography	Nitrobenzene	SEC, styragel, 25°C	1337
		Tetrahydrofuran	SEC, μ-styragel	19,2921, 3052,3078
	Fractional precipitation	Benzene/methanol	20°C	19,218,221, 2220,3050
		Benzene/*n*-hexane	20°C, preparative	218
Poly(9-acrydinylethylene)	Chromatography	Hydrochloric acid 0.02 M	Sephadex G-25, SEC	1343
Poly(2-acrylamido-2-methyl propane)				
	Chromatography	Calcium chloride 6 water (3.0 M aqueous)/2-propanol		1106
Poly(allylbenzene)	Chromatography	*o*-Dichlorobenzene	SEC, styragel	375
	Extraction	Acetone, ethyl ether, benzene		3218
		Butanone, toluene	Hot	684
Poly(allyloxyisophthaloyloxymethyl)ethylene *[Poly(diallyl phthalate)]*				
	Chromatography	Tetrahydrofuran	SEC, styragel	355
Poly(*N*-allylstearamide) see Poly((stearoyliminomethyl)ethylene)				
Poly(6-amino-9-purinyl)ethylene) *[Poly(9-vinyladenine)]*				
	Chromatography	Water – 0.05 triethylammonium bicarbonate	Gel filtration	1637
	Electrophoresis	Sodium phosphate, monobasic monohydrate, sodium phosphate dibasic heptahydrate + sodium dodecyl sulfate (Gel buffer)	Poly(acrylamide)gels	2607
Poly(anethole) *Poly(4-methoxybenzyl)ethylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	2774
Poly(9-anthracenylethylene) *Poly(9-vinylanthracene)*				
	Chromatography	*n*-Butyl acetate	SEC, bioglass	143
Asphaltenes	Chromatography	Benzene/methanol (9/1)	SEC	70
Poly(4-benzoylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel	2828
Poly(benzyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly(4-biphenylethylene) *Poly(4-vinylbiphenyl)*				
	Chromatography	Toluene	SEC, 70°C	1268
Brominated 1,1,2,2-poly(propadiene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	3349
Poly(3,6-dibromocarbazolylethylene) *Poly(N-vinyl-3,6-dibromocarbazole)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	227,1364
	Fractional precipitation	Dimethylacetamide – benzene (1:1)/cyclohexane	25°C	223,226
Poly(butyl allyl oxalate) *Poly(butoxyoxaloyloxymethylethylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	3538
Poly(4-*tert*-butyl dimethyl silyloxystyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1306
Poly(butyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly(*tert*-butyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	
Poly(carbazolylethylene) *Poly(N-vinylcarbazole)*				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1103,3194
			SEC, 25°C, styragel	1294,1298,1915, 3010,3151
	Coacervation	Benzene/methanol		1838
	Fractional precipitation	Benzene/methanol		1127,2331,3010, 3194,3301,3302,3303
			25°C	1103

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Chlorobenzene/methanol		1101
		m-Di-chlorobenzene/methanol		1101
		Tetrahydrofuran/water		2331,3301
Poly(carboxychloromethylethylene)				
	Fractional precipitation	Methanol/water		1719
Poly(cinnamoyl ethylene) *[Poly(vinylcinnamate)]*				
	Fractional precipitation	Chlorobenzene/ethanol		3268
Poly(1-cyano-2-phenylvinylene) *[Poly(phenylpropiolonitrile)]*				
	Chromatography	Benzene/methanol	Column elution	1479
Poly(1-(3-cyanopropyl)acrylonitrile) [Poly-(α-methyleneglutaronitrile)]	Fractional precipitation	Dimethyl sulfoxide/toluene – ethyl ether		970
Poly(4,6-decadiyne-1,10-diolbis((*n*-butoxycarbonyl)methylurethane) *Poly(butoxycarbonylmethyliminocarbonyloxypropyldiacetylene)*				
	Chromatography	Methylene dichloride, chloroform	SEC	2928,2929
Poly(5,7-decadiyne-1,12-diolbis((*n*-butoxycarbonyl)methylurethane)				
	Chromatography	Chloroform	SEC, styragel	2444
Poly((1-ethyl-4-pyridinium bromide)ethylene)				
	Sedimentation analysis	Water = 0.1 N KBr	25°C, ethyl bromide, salt	2315
Poly(ethyl allyl oxalate) *Poly(ethoxyoxaloyloxymethyl)ethylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	3538
Poly((9-ethyl-3-carbazolyl)ethylene) *Poly(N-ethyl-3-vinyl carbazole)*				
	Chromatography	Chloroform	SEC, styragel, 40°C	3167
Poly(diethyl fumarate)	Chromatography	Tetrahydrofuran	SEC, styragel, 38°C	2085
	Fractional precipitation	Tetrahydrofuran/methanol	30°C	2085
Poly(ethyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly(*N*,*N*-diethyl-4-vinylbenzenesulfonamide)				
	Chromatography	Dimethylformamide, tetrahydrofuran	SEC, styragel, 40°C	1436
Poly(*m*-diethynyl-*p*-diethynyl phenylene)				
	Chromatography	*o*-Dichlorobenzene	SEC, 120°C	3459
Poly(2-diferrocenyl-furylmethylene)				
	Fractional precipitation	Dioxane/isopropanol and water		2383
Poly(ferrocenylethylene)	Chromatography	Hexamethyl phosphoramide	SEC, styragel	3025
		Tetrahydrofuran	SEC	2609,2610
	Fractional precipitation	Benzene/methanol	30°C	2838
Poly(fluorenylethylene) *Poly(2-vinylfluorenone)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	3546
Poly(2,4-dihydroxy-4-vinylbenzophenone)				
	Chromatography	Tetrahydrofuran	SEC, styragel	171
Poly(1-(4-hydroxyphenylethylene)) *Poly(4-vinyl phenol)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	1306
Poly(imidazolylethylene) *Poly(N-vinylimidazole)*				
	Fractional precipitation	Ethanol/acetone		859
		Methanol/toluene		3144
		n-Butyl alcohol/*n*-hexane		3144
Poly(1-indolylethylene) *[Poly(vinyl indole)]*				
	Fractional precipitation	Acetone/ethanol	20°C	774
Poly(β-iodophenylacetylene)	Fractional solution	Benzene/methanol	Film	569
Poly(2-isopropenylbenzooxazole)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1438
Poly(diisopropyl fumarate)	Chromatography	Tetrahydrofuran	SEC, styragel, 38°C	2085
	Fractional precipitation	Tetrahydrofuran/methanol	30°C	2085
Poly(isopropyl *tert*-butyl fumarate)				
	Chromatography	Tetrahydrofuran	SEC, 38°C	3569
Poly(isopropyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly((1-methoxy-4-naphthyl)ethylene) *Poly(1-methoxy-4-vinylnaphthalene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	1445
Poly[(8-methoxycarbonyloctyl)ethylene] *Poly(methyl allyl axalate)*				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	274
Poly((methoxyoxaloyloxymethyl)ethylene) *Poly(methyl allyl oxalate)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	3538
Poly(methyl allyl fumarate)	Chromatography	Tetrahydrofuran	SEC, styragel	3315

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly((2-methyl-5-pyridyl)ethylene) *[Poly-2-methyl-5-vinylpyridine)]*				
	Fractional precipitation	Methanol/ethyl ether–benzene (4 : 1)		3260
		Methanol/water		2207
	Fractional solution	Cyclohexane/*n*-heptane	Column elution, 70°C ballotini	982
Poly(methyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly((dimethylheptylsilyl)ethylene)				
	Chromatography	Cyclohexane	Column extraction with gradient, glass beads	1672
Poly(*N*-methylmaleimide)	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly((dimethylpentylsilyl)ethylene)				
	Chromatography	Cyclohexane/ethyl alcohol	Column extraction with gradient, glass beads	1672
Poly((dimethylphenylsilyl)ethylene)				
	Chromatography	Benzene/acetone	Column extraction with gradient, glass beads	1672
Poly(3,5-dimethylpyrazolylethylene)				
	Fractional precipitation	Acetone/water	11°C	2960
Poly(neopentyl vinylcarbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly(octyloxyoxaloyloxymethylethylene) *Poly(octyl allyl oxalate)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	3538
Perfluoro poly(oxyethylene)	Chromatography	1,2,2-Trichlorotrifluoroethane	SEC, styragel, 27°C	647
	Fractional solution	Anhydric carbonic	Supercritical fluid extraction	647
Perfluoro poly(oxytrimethylene)	Chromatography	1,1,2-Trichlorotrifluoroethane	SEC, styragel, 27°C	647
	Fractional solution	Anhydric carbonic	Supercritical fluid extraction	647
Poly(phenyl acetylene) *Poly(phenylvinylene)*				
	Chromatography	Methylene dichloride	SEC, μ-styragel	676
		Toluene	SEC, styragel	1340
	Fractional solution	Toluene/methanol		340
Poly(phenyl vinyl carbonate)	Chromatography	Tetrahydrofuran	SEC	1098
Poly(diphenyl butadiine)	Fractional precipitation	Acetone/methanol	20°C	2188
Poly((propoxyoxaloyloxymethyl)ethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3538
Poly((3-pyrenyl)ethylene) *Poly(3-vinylpyrene)*				
	Fractional precipitation	Tetrahydrofuran/methanol		3011
Poly (2-pyridyl)ethylene)	Chromatography	Dimethylformamide	SEC, styragel, 50°C	1319,2133
		Dimethylformamide/methanol mixtures	SEC, porous glass	2135
	Fractional precipitation	Benzene/*n*-hexane		775,1404
		Butanone/ligroin	30°C	123
		Tetrahydrofuran/*n*-heptane		776,1960,3382
	Fractional solution	Benzene/*n*-heptane	Column elution	1036
		tert-Butanol/benzene	Column extraction	3048
Poly (4-pyridyl)ethylene)	Chromatography	Methanol/ethyl ether (5/95)	TLC, silica gel	1545
	Fractional precipitation	Chloroform/petroleum ether		1983
		Methanol/ethyl acetate		1935,2404
		Methanol/toluene	15°C	306
		Nitromethane/benzene		895
		tert-Butanol/benzene		895
Poly(*N*-pyrrolidonylethylene) *Poly(vinylpyrrolidone), Poly((2-oxopyrrolidin-1-yl)ethylene)*				
	Chromatography	Water	SEC, crosslinked dextran with epichlorohydrin	964
			SEC, Sephadex	1690
			SEC, TSK gel	1224
	Fractional precipitation	Chloroform/diethyl ether		2545
		Chloroform/ethyl ether		41,1501
		Chloroform/petroleum ether		2163
		Ethanol/benzene		1501
		Ethanol/petroleum ether		2886
		Methanol/ethyl ether		2172
		Water/acetone	25°C	491,531,753, 972,1501,2886
	Fractional solution	Acetone	Extraction	2172
		Water/organic acids	25°C	2931

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Sedimentation	Water	Ultracentrifuge	2172
	Sedimentation velocity	Sodium acetate solution/water (0.1 M)	25°C	2545
	Thermal diffusion	Water		1861,1864
		Water and ethanol		1863
	Turbidimetric titration	Methylene dichloride		1057
		Water/acetone	25°C	1501
		Water/ammonium sulfate solutions	25°C	1501
		Water/sodium sulfate solution		491,531,1274, 1275,2885
	Ultrafiltration	Water	Amicon and diaflo membranes	183
Poly((stearoyliminomethyl)ethylene)				
	Chromatography	Benzene/ethanol (2/20%)	Liquid precipitation, silica gel, gradient	1513
Poly(1,6-di-*p*-toluene sulfonyloxy-2,4-hexadiyne) *Poly(2,4-hexadiyn-1,6-bis(p-toluenesulfonate)*				
	Chromatography	Dimethylformamide	SEC	2528
Poly((1,2,5-trimethyl-4,4′-hydroxypyridinium chlorideethynyl)ethylene) *Poly(1,2,5-trimethyl-4-vinylethylpyperidol-4-hydrochloride)*				
	Fractional precipitation	Methanol/ethyl ether	25°C	272
Poly(4-trimethylammoniomethyl-phenylethylene chloride) *Poly(4-vinylbenzyltrimethylammonium chloride)*				
	Chromatography	Water	TSK, gel, SEC, 25°C	1301
Poly(1-trimethylsilyl-1-propyne)				
	Chromatography	Chloroform	SEC	2065
Poly(trimethylsilyethylene) *Poly(vinyltrimethylsilane)*				
	Fractional precipitation	Toluene/methanol		793
	Fractional solution	Benzene–cyclohexane (85 : 15)/isopropanol	Column elution, glass beads	2358
		Benzene/acetone	Column elution, gradient elution and temp.	1672
Poly(vinyl cyclohexane)	Fractional solution	Butanone, benzene, toluene	Extraction, isotactic	86
Poly(vinyl fumarate)	Fractional precipitation	Ethanol/diethyl ether		3090
Poly(vinyl-2-phenothiazine) *Poly(phenothiazinyl)ethylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	1009
Poly(2-vinylbenzoxazole)	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1438
Poly(α-vinylnaphthalene)	Chromatography	Toluene	SEC, 70°C	1268
Poly(β-vinylnaphthalene)	Chromatography	Toluene	SEC, 70°C	1268
	Fractional precipitation	Benzene/methanol		856
Poly(*N*-vinylphathalamide)	Chromatography	*m*-Cresol	SEC, 125°C	702
Poly(4-vinylpyridene)	Chromatography	Dimethylformamide: triethylamine : pyridene (8 : 1 : 1)	SEC, μ-styragel, 45°C	669
	Fractional precipitation	Ethanol/ethyl ether		3234
Poly(vinylpyrrolidone)	Fractional precipitation	Water/acetone		699
	Sedimentation velocity	Phosphate buffer pH = 7		2887
	Ultrafiltration	Water		1927

1.11. RANDOM AND ALTERNATING COPOLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acenaphthylene-*alt*-methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	168
Poly[(1-acetoxymethyl)styrene-*co*-4-hydroxystyrene]				
	Chromatography	Tetrahydrofuran	SEC, styragel	920
Poly(acrylamide-*co*-acrylic acid)				
	Chromatography	Sodium sulfate 0.1 M dimethylformamide (85 : 15)	SEC, CPG corning	1700
Poly(acrylamide-*co*-allylamine)	Extraction	Methanol, acetone	Homopolymers extraction	8
Poly(acrylamide-*co*-*N*,*N*-dimethylacrylamide)				
	Chromatography	Aq. 0.1 M sodium sulfatedimethylformamide (85 : 15)	SEC	2114
Poly(acrylamide-*co*-*N*-(1,1-dimethyl-3-oxybutyl)acrylamide)				
	Chromatography	Aq. 0.1 M sodium sulfate-dimethylformamide (85 : 15)	SEC	2114

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acrylamide-*co*-Na-maleinate)				
	Fractional precipitation	Water/acetone		2320
		Water/acetone + water		2319,2320
		Water/ethyl alcohol + water		2319
		Water/methanol		2320
		Water/methanol + water		2320
Poly(acrylamide-*co*-methyl acrylate)				
	Chromatography	Dioxane	SEC, μ-styragel, random	2470
Poly(acrylamide-*co*-*p*-nitrophenyl acrylate)				
	Fractional precipitation	Methanol/dimethyl sulfoxide		823
Poly(acrylamide-*co*-potassium salt of vinylamidoamber acid) *(Poly(acrylamido-co-(3-amino-4-oxo-1-heptanoic acid)*				
	Fractional precipitation	Water/acetone–methanol		2321
Poly(acrylic acid-*co*-ethyl acrylate)				
	Fractional precipitation	Dioxane/*n*-hexane	25°C	3142
		Isopropanol/*n*-heptane	Random	3046
Poly(acrylic acid-*co*-maleic anhydride)				
	Extraction	Acetone	Poly(acrylic acid) homop.	825
Poly(acrylic acid-*co*-phenyl isopropenylketone) after methylation with diazomethane				
	Chromatography	Benzene	SEC, poragel	2142
Poly(acrylonitrile-*alt*-styrene)	Acetone/methanol		598	
Poly(acrylonitrile-*co*-butadiene)	Chromatography	Benzene/methanol		2892
		Chloroform	SEC, styragel	2891
		Chloroform/*n*-hexane	Normal phase, CP-AN gel, gradient	136
		Methylene chloride	Modified copolymer, SEC, μ-styragel	1919
		Toluene/methanol	Perbuan, charcoal	1857
	Fractional precipitation	Benzene/methanol		2625,2626
		Butanone/methanol		2626
	Sedimentation equilibrium	Butanone/cyclohexane (47.5/52.5)		2891
	Turbidimetric titration	Dimethylformamide/dibutyl ether		1333
Poly(acrylonitrile-*co*-butyl methacrylate)				
	Fractional precipitation	Butanone/methanol		135
Poly(acrylonitrile-*co*-chloroprene)				
	Turbidimetric titration	Dimethylformamide/dibutyl ether		1058,1333
Poly(acrylonitrile-*co*-2-(*N*,*N*-dimethylcarbamoyloxyethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(acrylonitrile-*co*-ethyl methacrylate)				
	Fractional precipitation	Acetone/water	25°C	829
Poly(acrylonitrile-*co*-methyl acrylate)				
	Coacervation	Dimethyl sulfoxide/toluene		1567
	Fractional precipitation	Dimethylformamide/*n*-heptane–ethyl ether (1/1)		3132
		Dimethylformamide/petroleum ether – methyl cyclohexanone – dioxane (6 : 4 : 1)		2888
	Turbidimetric titration	Dimethylformamide/benzene		604
Poly(acrylonitrile-*co*-α-methylstyrene)				
	Fractional precipitation	Chloroform/methanol		1859
Poly(acrylonitrile-*alt*-propylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1952
Poly(acrylonitrile-*co*-sodium methallylsulfonate)				
	Chromatography	Dimethylformamide – sodium nitrate		773
Poly(acrylonitrile-*co*-styrene sulfonic acid)				
	Turbidimetric titration	Dimethylformamide/dibutyl ether		1333
Poly(acrylonitrile-*co*-vinyl acetate)				
	Turbidimetric titration	Dimethylformamide/dibutyl ether		1058
Poly(acrylonitrile-*co*-vinyl acetate-*co*-methyl vinylpyridine)				
	Fractional precipitation	Dimethylformamide/*n*-hexane-ethyl ether (2 : 1)		643

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acrylonitrile-*co*-vinyl acetate-*co*-α-methylstyrene)				
	Fractional precipitation	Tetrahydrofuran/*n*-heptane	70°C	878
	Fractional solution	Dimethylformamide/*n*-heptane	Column extraction with gradient	878
Poly(acrylonitrile-*co*-vinyl chloride)				
	Fractional precipitation	Acetone/methanol		2916
Poly(acrylonitrile-*co*-vinylidene chloride)				
	Fractional precipitation	Tetrahydrofuran/*n*-heptane		3413
	Turbidimetric titration	Dimethylformamide/benzene		604
Poly[4-[acryloyloxy-*n*-alkoxy-4′-cyanobiphenyl-*co*-4-[acryloyloxy-*n*-alkoxy-4′-methoxy azobenzene]				
	Chromatography	Chloroform	SEC	1409
Poly(allylsilane-*co*-propylene)	Fractional precipitation	Xylene	Lowering temp. 82–0°C	1945
Poly(benzyl methacrylate-*co*-cyclohexylmethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, shodex	992
Poly(butadiene-*co*-acrylic acid-*co*-acrylonitrile)				
	Chromatography	Acetone/methanol–water (2 : 3)	Precipitation chromatogr., temp. gradient 42–2°C	1876,1877
		Chloroform	SEC	1876,1877
Poly(butadiene-*co*-4-chlorostyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2718
Poly(butadiene-*co*-2-(*N,N*-dimethylcarbamoyloxy)ethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(butadiene-*co*-α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC	830
Poly(butadiene-*co*-propylene)	Fractional precipitation	Benzene/butanone		3096
		Benzene/methanol		3096
Poly(butadiene-*co*-vinyl isopropyl ether)				
	Fractional precipitation	Benzene/methanol		3322
Poly(1-butene-*co*-1-butenylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 30°C	2105
Poly(1-butene-*co*-propylene)	Extraction	Octane	20–110°C	2800
	Fractional solution	Diethyl ether, *n*-hexane, *n*-heptane, *n*-octane	Extraction	1947
		Tetralin	Column elution, increasing temp.	3016
	TREF	Xylene	Column elution, 20–125°C	1537
Poly(*n*-butyl acrylate-*co*-2-(*N,N*-dimethylcarbamoyioxy)ethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(*n*-butyl acrylate-*alt*-propylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1952
Poly(di-*n*-butyl itaconate-*stat*-mono butyl itaconate)				
	Fractional precipitation	Acetone/petroleum ether		270
Poly(*n*-butyl methacrylate-*co*-glycidylmethacrylate-*co*-methacrylic acid				
	Fractional precipitation	Dioxane/water		3039
Poly(*tert*-butyl methacrylate-*co*-methacrylic acid)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1850
Poly(*n*-butyl methacrylate-*co*-1-naphthyl methacrylate)				
	Chromatography	Tetrahydrofuran	Random, SEC, 40°C	2402
Poly(*n*-butyl acrylate-*co*-2-hydroxyethylmethacrylate)				
	Chromatography	Dimethylformamide	SEC	3355
Poly(*n*-butyl acrylate-*co*-vinyl acetate)				
	Chromatography	Tetrahydrofuran	SEC	826
Poly(butylene adipate-*co*-succinate)				
	Chromatography	Tetrahydrofuran	SEC	2241
Poly(*N*-butylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(*N*-*sec*-butylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(*N*-*tert*-butylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(*p*-*tert*-butylstyrene-*co*-α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2681
Poly(*p*-*tert*-butylstyrene-*co*-vinylpyrrolidone)				
	Fractional precipitation	2-Propanol/petroleum ether, benzene/methanol, benzene/petroleum ether		2689

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(α-chloroacrylate-*co*-methacrylonitrile)				
	Chromatography	Dimethylformamide	SEC, μ-styragel	562
	Fractional precipitation	Acetonitrile/methanol		562
Poly(2-chloroethyl vinyl ether-*co*-*p*-methoxystyrene)				
	Chromatography	*o*-Dichlorobenzene	SEC, styragel	1242
Poly(chloroprene-*co*-dichlorobutadiene)				
	Fractional precipitation	Benzene/methanol	20°C	1038
Poly(4-chlorostyrene-*co*-chloroprene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2718
Poly(4-chlorostyrene-*co*-isoprene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2718
Poly(4-chlorostyrene-*co*-methyl acrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	952
Poly(4-chlorostyrene-*co*-methyl methacrylate)				
	Fractional precipitation	Benzene/methanol	Random	2226
Poly(*N*-cyclohexylmaleimide-*alt*-di-*n*-butylitaconate)				
	Chromatography	Tetrahydrofuran	SEC, 38°C	2849
Poly(*N*-cyclohexylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(1-dodecene)-*alt*-maleic acid mono {2-[2-[2-[2-[2-[2-[2-methoxyethoxy) ethoxy) ethoxy) ethoxy) ethoxy ethyl} ester)				
	Chromatography	Dimethylacetamide + lithium bromide 0.25%		817
Poly(1-dodecene-*co*-1-octadecene)				
	Fractional solution	Benzene/ethanol	Precipitation chromatogr. 73–23°C, column extraction glass beads	905
Poly(ethyl acrylate-*co*-2-hydroxyethyl methacrylate)				
	Chromatography	*N,N*-Dimethylformamide	SEC	3355
Poly(ethyl acrylate-*co*-methyl acrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3143
Poly(ethyl acrylate-*alt*-propylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1952
Poly(ethyl methacrylate-*co*-butyl methacrylate)				
	Chromatography	Dichloroethylene/ethanol	Liquid absorption, silica gel, gradient	2280
Poly(ethyl methacrylate-*co*-2-hydroxyethyl methacrylate)				
	Fractional precipitation	Dimethylformamide/water		587
Poly(3-ethyl-1-pentene-*co*-3-methyl-1-pentene)				
	Extraction	Boiling ethyl ether and toluene		3577
Poly(9-ethyl-3-vinyl carbazole-*co*-(*trans*-1-(3-vinyl-9-carbazolyl-2-(9-carbazolyl) cyclobutane))				
	Chromatography	Chloroform	SEC, 40°C	1427
Poly(ethyl vinyl ether-*co*-maleic anhydride)				
	Fractional precipitation	Acetone/*n*-decane	Random	2969
Poly(ethylene-*co*-butadiene)	Fractional solution	Ethyl ether, *n*-pentane, *n*-hexane	Extraction, boiling points	2369
Poly(ethylene-*co*-1-butene)	Chromatography	*o*-Dichlorobenzene	SEC	1338,1339,1831,1982
		Tetrahydrofuran	SEC, ultrastyragel	2784
		Tetrahydrofuran	SEC	3168
		Trichlorobenzene	SEC, styragel, 135°C	3480
	Coacervation	Dibutyl phthalate/decalin (60/40)	Lowering temp.	3480
	Extraction	Diisopropyl ether, *n*-hexane, cyclohexane		1830
	Fractional solution	2-Ethoxy ethyl acetate/decalin	Column extraction, 130°C glass heads	3480
	TREF	Chloronaphthalene	LLDPE	1648
		Xylene		2348
			105–25°C	394
Poly(ethylene-*co*-carbon monoxide)				
	Chromatography	1,2,4-Trichlorobenzene	SEC, styragel, 135°C	1086
Poly(ethylene-*co*-1-decene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-3,7-dimethyl-1-octene)				
	Chromatography	Acetone, acetone/*n*-pentane, *n*-pentane, *n*-pentane /cyclohexane, cyclohexane	Chromatography on optically active polymeric support	596
	Fractional precipitation	Toluene/isopropanol	30°C	596

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(ethylene-*co*-1-dodecene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-1-heptene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-1-hexene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
		o-Dichlorobenzene	SEC, μ-styragel, 140°C	2130
	Fractional crystallization	1,2,4-Trichlorobenzene	CRYSTAF	1675
	Fractional solution	Xylene	Column elution, increasing temp.	1540
	TREF	Xylene		2130
Poly(ethylene-*co*-hexene)	Chromatography	1,2,4-Trichlorobenzene	SEC, 145°C	1693
	TREF	Xylene	105–25°C	394
Poly(ethylene-*co*-isopropenylcarborane)				
	Fractional solution	Xylene – ethyl cellosolve mixtures	Column elution, 126°C	2825
Poly(ethylene-*co*-isopropylidene-3a,4,7,7a-tetrahydroindene)				
	Chromatography	Trichlorobenzene	SEC, 130°C	532
Poly(ethylene-*co*-methyl acrylate)				
	Fractional solution	Chlorodifluoromethane	Supercritical fluid fractionation	2127
		Propane	Supercritical fluid conditions	2127
		Propane, propylene, butane, 1-butene, chlorodifluoromethane	Supercritical conditions	2659
		Propane – chlorodifluoromethane	Supercritical conditions	2127
Poly(ethylene-per-α-methylstyrene)				
	Fractional precipitation	Benzene/methanol		3154
Poly(ethylene-*co*-methyl thioglycolate pentenamer)				
	Chromatography	Trichlorobenzene	SEC, styragel, 135°C	2832
Poly(ethylene-*co*-1-nonene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-1-octadecene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-1-octene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
	TREF	1,2,4-Trichlorobenzene		1256
			25, 55, 70, 80, 95°C	729
		Chloronaphthalene	LLDPE	1648
Poly(ethylene-*co*-1-pentene)	Chromatography	1,Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-propylene)	Chromatography	1,2,4-Trichlorobenzene	145°C	1693
			SEC, 135°C	3085
		o-Dichlorobenzene	SEC, 135°C, 130°C	211,532,1216,1339, 1465,1639,2436
			SEC, styragel	3321
		Trichlorobenzene	SEC, 140°C	2186
	Cross-Fractionation	*o*-Dichlorobenzene		3321
	Extraction	*n*-Heptane		282
		Xylene	Diff. temp.	1538
	Fractional precipitation	Benzene/butanone		3096
		Butyl ether/*n*-butanol	120°C	937
		Diphenylmethane	Decreasing temp.	600
		Iso-octane/ethanol	25°C	532
		Toluene/methanol	30°C	451
		Xylene/dimethylformamide	85°C	937
	Fractional solution	Toluene/*n*-butanol	58°C	1033
		Xylene/cellosolve	Column elution, 126°C, sand	1639
		Xylene/ethylene glycol	110°C, column extraction	1033
		Xylene/ethylene glycol monobutyl ether	Column elution	1733
	TREF	*o*-Dichlorobenzene	Glass beads	3321
		Trichlorobenzene	140–30°C	3026
		Xylene		1060,1538,2186
			Column elution, 20–125°C	1537
	Turbidimetric titration	1-Chloronaphthalene/20% dimethyl phthalate		1413
		Chlorobenzene/butanol		1333
		n-Heptane + propanol	Lowering temp. 80–25°C	976
		n-Heptane/propanol		975
Poly(ethylene-*co*-propylene-*co*-methylcyclopentadienyl-5-endonorborn-2-enylmethane)				
	Fractional precipitation	Toluene/methanol		534
Poly(ethylene-*co*-propylene-*co*-dicyclopentadiene)				
	Fractional precipitation	Hexane/methanol : acetone (30 : 70)		1362
Poly(ethylene-*co*-propylene-*co*-diene)				

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Chromatography	1,2,4-Trichlorobenzene	SEC, styragel, 135°C	3379
		o-Dichlorobenzene	SEC, styragel	1043
	Fractional precipitation	Diphenylmethane	Stirring, decreasing temp.	579
Poly(ethylene-*co*-propylene-*co*-ethylidene norbornene)				
	Fractional precipitation	Hexane/methanol : acetone (30 : 70)		1362
Poly(ethylene-*co*-propylene-*co*-1-isopropylidene-3a,4,7,7a-tetrahydroindene)				
	Chromatography	Trichlorobenzene	SEC, 130°C	532
Poly(ethylene-*co*-1-tetradecene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-1-tridecene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-1-undecene)	Chromatography	1-Chloronaphthalene	SEC, porous silica 150°C	1399
Poly(ethylene-*co*-vinyl acetate)	Chromatography	Butyl acetate/amyl acetate (5/1)	TLC	2805
		Ethyl acetate	TLC	2805
		Tetrahydrofuran	SEC, μ-styragel, 20°C	1430
		Trichlorobenzene	Temperature-rising elution (TREF), 20°C/h, chromosorb	3474
	Fractional precipitation	Acetone/methanol	30°C	2823
		Acetone/*n*-hexane		286
		Benzene/isopropyl alcohol	25°C	2027
		Carbon tetrachloride/methanol	25.2°C	1430
	Fractional solution	Acetone, heptane, toluene	Extraction	1114
		Butanone – methanol mixtures	Column elution, 56.5°C	2823
		Xylene/ethylene glycol monoethyl ether	125°C	2823
		Xylene/methanol		2823
	Thermal field flow	Tetrahydrofuran, toluene, chlorobenzene	40–60°C	1497
	TREF	Chloronaphthalene	HP-EVA	1648
	Turbidimetric titration	1-Chloronaphthalene/20% dimethyl phthalate		1413
Poly(ethylene-*co*-vinyl ferrocene)				
	Fractional solution	Xylene – ethyl cellosolve	128°C, column elution	2825
Poly(ethylethylene-*co*-maleic anhydride)				
	Sedimentation equilibrium	Dimethylformamide	20°C	399
Poly(*N*-ethylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(fluoroalkyl acrylate-*co*-hydroxyethyl methacrylate)				
	Extraction	Ethyl ether, methanol		3534
Poly(*N*-formylacrylamide-*co*-methyl methacrylate)	Chromatography	Dimethylformamide	SEC, Merc gel	3225
Poly(glycidyl methacrylate-*co*-2-hydroxypropylene dimethyl acrylate)				
	Chromatography	Water : methanol (1 : 1)	SEC, 40°C, silica gel	3111
Poly(hydroxyethyl acrylate-*co*-butylmethacrylate-*co*-acrylic acid)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 30°C, analytical and preparative	512
Poly(isobutene-*co*-isoprene)	Fractional precipitation	Toluene–acetone (9 : 1)/acetone		3230
Poly(isobutene-*co*-α-pinene)	Chromatography	Tetrahydrofuran	SEC	1651
Poly(isobutyl vinyl ether-*co*-α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	3235
Poly(*N*-isobutylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(isopropenylethylene-*co*-2-methylbutene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 30°C	2105
Poly(maleic acid-*alt*-hex-1-ene)				
	Fractional precipitation	Acetone/diethyl ether		2040
Poly(maleic anhydride-*alt*-oxypropylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1829
Poly(maleic anhydride-*co*-vinyl ethyl ether)				
	Fractional precipitation	Butanone/cyclohexane		884
Poly(maleic anhydride-*co*-*N*-vinylpyrrolidone)				
	Fractional precipitation	Water/acetone		675
Poly(2-(mercaptobenzimidazolyl)ethyl vinyl ether-*co*-vinyl chloride)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2486
Poly(2-(mercaptobenzothiazolyl)ethyl vinyl ether-*co*-vinyl chloride)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2486

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(2-(mercaptobenzoxazolyl)ethyl vinyl ether-*co*-vinyl chloride)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2486
Poly(methacrylonitrile-*co*-methyl-2-chloroacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	561
Poly(methacrylonitrile-alt-α-methylstyrene)				
	Fractional solution	Acetone/methanol	Column elution	599
Poly(4′-methoxy-phenyl 4-((acryloyloxy)alkoxy)-benzoate-*co*-poly(4′-methoxy-4-((acryloyloxy)alkoxy) azobenzene				
	Chromatography	Chloroform	SEC, styragel, analytical and preparative	1408
Poly(*N*-(1-methoxycarbonyl methyl)maleimide-*co*-phenylmaleimide)				
	Chromatography	Tetrahydrofuran	SEC	1532
Poly(methoxyphenyl-4-oxybenzoyl methacrylate-*stat*-4-cyanophenyl-4-oxybenzoyl methacrylate)				
	Chromatography	Chloroform	SEC	2141
Poly(*p*-methoxystyrene-*co*-9-*N*-vinyl carbazole)				
	Fractional precipitation	Toluene/*n*-amyl alcohol	25°C, analytical	219
Poly(methyl acrylate-*co*-methyl-α-bromoacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	159
Poly(*N*,*N*-dimethyl-*N*,*N*-diallylammonium chloride-*co*-acrylamide)				
	Fractional precipitation	Water/acetone		899
Poly(4-methyl-1-hexene-*co*-4-vinylpyridine)				
	Fractional solution	Boiling methanol, acetone, cyclohexane	Extraction	513
Poly(dimethyl itaconate-*co*-vinylidene dichloride)				
	Chromatography	Chloroform	SEC, μ-styragel	561
Poly(methyl methacrylate-*co*-acrylonitrile)				
	Extraction	Chloroform, dimethylformamide/methanol		528
		Chloroform, benzene/methanol		529
	Fractional precipitation	Acetone/methanol		1591,2971
			30°C	2018
		Acetonitrile/di-isopropyl ether		1590,2018
		Acetonitrile/methanol		1592,2018
		Dimethylformamide/*n*-hexane	60°C	2253
		Dimethylformamide/*n*-hexane – ether (2 : 1)		617
	Turbidimetric titration	Dimethylformamide/benzene		604
Poly(methyl methacrylate-*co*-benzyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 35°C	1776
Poly(methyl methacrylate-*co*-*n*-cetyl methacrylate)				
	Fractional precipitation	Benzene/methanol		296
Poly(methyl methacrylate-*co*-2,2-dichloroethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	1092
Poly(methyl methacrylate-*co*-2,4-dichlorostyrene)				
	Chromatography	Chloroform, tetrahydrofuran	SEC, styragel	2493
Poly(methyl methacrylate-*co*-4-(1,1-dicyano ethylazo)benzyl methacrylate)				
	Chromatography	Dimethylformamide	SEC	2423
Poly(methyl methacrylate-*co*-*N*,*N*-dimethylacrylamide)				
	Chromatography	Dioxane	SEC, μ-styragel	2470
Poly(methyl methacrylate-*co*-2-dimethylamino methyl methacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	561
Poly(methyl methacrylate-*co*-2-*N*,*N*-dimethylcarbamoyloxy)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(methyl methacrylate-*co*-2-*N*,*N*-dimethylcarbamoyloxy) ethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(methyl methacrylate-*co*-dimsyl methacrylate)				
	Fractional precipitation	Chloroform/petroleum ether		131
Poly(methyl methacrylate-*co*-dimsyl sodium modified methyl methacrylate)				
	Fractional precipitation	Chloroform/petroleum ether	25°C	132
Poly(methyl methacrylate-*co*-ethyl acrylate)				
	Fractional precipitation	Acetone/water		1063
		Chloroform/methanol		1991
		Chloroform/*n*-hexane		1991

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(methyl methacrylate-*co*-ethylene dimethacrylate)				
	Fractional solution	Butanone/ethanol	Column extraction, 35°C	1548
Poly(methyl methacrylate-*co*-ethyleneglycol dimethylacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	730
Poly(methyl methacrylate-*co*-glycidyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2537
Poly(methyl methacrylate-*co*-2-hydroxyethyl methacrylate)				
	Chromatography	Dimethylformamide	SEC	3355
		Tetrahydrofuran	SEC, styragel	1920
	Fractional precipitation	Dimethylformamide/water	35°C	586
Poly(methyl methacrylate-*co*-methacrylic acid)				
	Fractional precipitation	Acetone – dimethylformamide (19 : 1)/petroleum ether – acetone (4 : 1)		2316
		Acetone/Methylene chloride–hexane (1 : 2)	25°C	2959
		Acetone/petroleum ether – acetone (4 : 1)		2318
		Dioxane/dioxane – benzene		2316
		Dioxane/dioxane – benzene (1 : 2)	Random	271
Poly(methyl methacrylate-*co*-methyl acrylate)				
	Chromatography	Toluene/butanone		2293
	Fractional precipitation	Acetone/methanol		1773
Poly(methyl methacrylate-*co*-methyl-α-chloroacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	159
Poly(methyl methacrylate-*co*-methyl-β-chloroacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	561
Poly(methyl methacrylate-*co*-methyl-2-chloroacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	561
Poly(methyl methacrylate-*co*-methyl α-(trifluoromethyl) acrylate)				
	Chromatography	Tetrahydrofuran	SEC, 30°C, 40°C random	1446
Poly(methyl methacrylate-*co*-methyl-α-(trifluoromethyl) acrylonitrile)				
	Chromatography	Tetrahydrofuran	SEC, 30°C, 40°C	1446
Poly(methyl methacrylate-*co*-methyl vinyl ketone)				
	Chromatography	Tetrahydrofuran	SEC	85
Poly(methyl methacrylate-*co*-2-methyl-5-vinylpyridine)				
	Fractional precipitation	Acetone/*n*-heptane		1720
Poly(methyl methacrylate-*co*-*N*-methylacrylamide)				
	Chromatography	Dioxane	SEC, μ-styragel	2470
Poly(methyl methacrylate-*co*-methylene thiophenyl methacrylate)				
	Cross-Fractionation	Chloroform/ethyl ether and dimethylformamide/ water + 0.5 N ammonium chloride		401
Poly(methyl methacrylate-*co*-3-oximino-2-butanone methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	403
Poly(methyl methacrylate-*co*-1-oxyl-2,2,6,6-tetramethyl-4-oxy piperdineacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 22°C	1582
Poly(methyl methacrylate-*alt*-propylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1952
Poly(methyl methacrylate-*co*-tributyltin methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	2518
Poly(methyl methacrylate-*co*-vinyl acetate)				
	Turbidimetric titration	Benzene/methanol		56
Poly(methyl methacrylate-*co*-vinyl chloride)				
	Turbidimetric titration	Tetrahydrofuran/petroleum ether		3323
Poly(methyl methacrylate-*co*-vinyl-2-phenothiazine)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1009
Poly(methyl methacrylate-*co*-1-vinyl-2-pyrrolidone)				
	Chromatography	Dioxane	SEC, μ-styragel	2470
Poly(methyl methacrylate-*co*-vinylferrocene)				
	Chromatography	Toluene	SEC, styragel, 25°C	756
Poly(methyl methacrylate-*co*-vinylidene dichloride)				
	Chromatography	Chloroform	SEC, μ-styragel	561
		Tetrahydrofuran	SEC, Porasil	2725

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(methyl methacrylate-*co*-2-vinylnaphthalene)				
	Chromatography	Tetrahydrofuran	SEC, sephacryl	2586
Poly(methyl methacrylate-*co*-4-vinylpyridine)				
	Chromatography	Dioxane	SEC, μ-styragel	2470
Poly(2,4-dimethyl-2,7-octadiene-*co*-3-methyl butene)				
	Extraction	*n*-Heptane		2599
Poly(*N*,*N*-dimethylacrylamide-*co*-2-(*N*-ethyl perfluorooctanesulfonamido) ethyl acrylate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 20°C	3506
Poly(methyl acrylate-*co*-vinylidene chloride)				
	Chromatography	Tetrahydrofuran	SEC, Porasil	2725
Poly(methyl-12-acryloxystearate-*co*-vinyl chloride)				
	Fractional precipitation	Tetrahydrofuran/methanol		588
Poly(1,1-dimethylethylene-*co*-maleic anhydride)				
	Sedimentation equilibrium	Dimethylformamide	20°C	399
Poly(*N*-methylmaleimide-*alt*-isobutene)				
	Chromatography	Chloroform	SEC, μ-styragel, 38°C	772
Poly(*N*-(*p*-methylphenylboryl)amino ethyl methacrylate-*co*-*N*-vinylpyrrolidone)				
	Chromatography	Water random	SEC, Acrylex	1743
Poly(1-naphthyl methacrylate-*co*-9-vinyl anthracene)				
	Chromatography	*n*-Butyl acetate	SEC, bioglass	143
Poly(1-octadecene-*alt*-maleic anhydride)				
	Chromatography	Dimethylacetamide + lithium bromide 0.25%		817
Poly(1-octene-*co*-hexanol)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2699
Poly(1-octene-*co*-β-5-hexenyl-9-borabicyclo-[3.3.1]nonane)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2699
Poly(1-octene-*co*-β-7-octenyl-9-borabicyclo-[3.3.1]nonane)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2699
Poly(1-octene-*co*-poly(β-5-pentenyl-9-borabicyclo-[3.3.1]nonane)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2699
Poly(3,7-dioxaperfluoro-1-octene-*co*-vinylidene fluoride)				
	Fractional solution	Hexafluorobenzene/*n*-hexane		849
Perfluoro poly(oxyethylene-*co*-perfluoro oxymethylene)				
	Chromatography	1,1,2-Trichlorotrifluoroethane	SEC, styragel, 27°C	647
	Fractional solution	Anhydric carbonic	Supercritical fluid extraction	647
Poly(perfluoromethylvinyl ether-*co*-vinylidene fluoride)				
	Chromatography	Ethyl acetate/cyclohexane gradient	Precipitation chromatogr., 20°C, glass beads	848
	Fractional precipitation	Ethyl acetate/cyclohexane		848
Poly(diphenyl methyl methacrylate-*co*-trityl methacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	766
Poly(propylene-*co*-6-*tert*-butyl-2-(1,1-dimethyl hept-6-enyl)-4-methylphenol)				
	Chromatography	1,2,4-Trichlorobenzene	SEC	3477
Poly(propylene-*co*-tetrafluoroethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	2082
	Fractional solution	Butyl acetate	Column elution, rising temp. 8–52°C	902
Poly(propylene-*co*-vinyl chloride)				
	Chromatography	Tetrahydrofuran	SEC, styragel	464
Poly(styrene-*co*-acrylamide)	Fractional precipitation	Dioxane : water (10 : 1)/diethyl ether		2948
Poly(styrene-*co*-acrylic acid)	Chromatography	Tetrahydrofuran	SEC, μ-styragel, ultrastyragel	3054
	Fractional precipitation	Dioxane/diethyl ether : *n*-hexane (1 : 1)		2948
Poly(styrene-*co*-acrylonitrile)	Chromatography	2,2,4-Trimethylpentane/toluene	Precipitation chromatogr.	1072
		Benzene/butanone	TLC	2439
		Butanone	TLC	3178
		Butanone/chloroform	Column elution	3178
		Butanone/cyclohexane		2892
		Chloroform	SEC, styragel	1781
		Dimethylformamide	SEC, Sephadex	1781
		Heptane/methylene chloride, heptane/methylene chloride + methanol, heptane + methylene chloride/methanol + methylene chloride	Liquid precipitation, styragel, silica-ODS, silica gel gradient	2913

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Hexane/tetrahydrofuran	Normal phase, silica, gradient	1078
			Reverse phase, silica-C18, gradient	1078
		Methylene chloride/carbon tetrachloride (5 : 2) gradient:acetonitrile	Gradient TLC	979
		Tetrahydrofuran	SEC, μ-styragel	1072
			SEC, styragel	986
		Tetrahydrofuran + methanol: isooctane/tetrahydrofuran + methanol	Liquid precipitation, silica gel, silica-ODS, silica-CN, gradient	1075
		Tetrahydrofuran/methanol	Precipitation chromatogr.	1072
		Toluene and toluene/acetone	Two stages TLC, silica gel	760
	Coacervation	Acetone/methanol		1966,1967
		Benzene/triethylene glycol	60°C	1966,1967
		Methylene chloride/methanol		1967
		Methylene chloride/triethylene glycol	25°C	1966,1967
	Cross-Fractionation	Ethylene – ethylenecyanohydrin and butanone – cyclohexane		3177
		n-Hexane/tetrahydrofuran + 10% methanol	Precipitation chromatogr. lichrospher Si, gradient	1073
		Tetrahydrofuran	SEC, Lichrospher	1073
		Tetrahydrofuran/*n*-hexane	Turbidimetric titration	1073
	Fractional precipitation	Butanone/cyclohexane	35°C, fractionation by chemical composition	3171,3179
		Butanone/methanol		317
		Chloroform/methanol		2017,2719,2970, 3175,3576
		Dimethylformamide/cyclohexane	58°C	1818
		Methyl ethyl ketone/cyclohexane		1499
		Methyl ethyl ketone/methanol		2947
		Methylene chloride/methanol		977
		Tetrahydrofuran/petroleum ether		2918
		Toluene	Lowering temp. 66.0–2.5°C chemical composition	3174
	Fractional solution	Acetone/methanol	Column elution	598,1966,1967
		Benzene	Extraction	598
		Benzene/triethylene glycol	60°C	1967
		Butanone/cyclohexane	Column elution	2892,3179
		Cyclohexane, toluene, benzene, dimethylformamide		3176
		Dimethylformamide/toluene/ *n*-propanol		2437
		Methanol/butanone	Column elution, celite	1034
		Methylene chloride		1966
		Methylene chloride/methanol	30°C	1967
		Methylene chloride/triethylene glycol	25°C	1967
	Sedimentation velocity	Acetone		3122
	Turbidimetric titration	Dimethylformamide/benzene		604
Poly(styrene-*co*-acrylonitrile-*co*-methyl methacrylate)				
	Fractional precipitation	Butanone/methanol		1551,1552,3360,3361
Poly(styrene-*co*-di-*n*-alkyl itaconates) (General)				
	Fractional solution	Benzene/methanol	Column extraction	3369
Poly(styrene-*co*-β-angelicalactone) *Poly(5-methyl-2H,5H-furanone-2)-co-styrene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	1305
Poly(styrene-*co*-benzylstyrene)	Chromatography	Tetrahydrofuran	SEC, styragel	1439
Poly(styrene-*co*-bisacrylic acid phenyl esters)				
	Fractional precipitation	Toluene/methanol		1530,1531
Poly(styrene-*co*-*p*-bromostyrene)				
	Fractional precipitation	Chloroform/petroleum ether		1288
Poly(styrene-*co*-butadiene)	Chromatography	Benzene/ethanol	Precipitation chromatogr.	624

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Chloroform/*n*-hexane	Normal phase, AN-gel, gradient	2844
		Methylene chloride	Modified, SEC, μ-styragel	1919
		o-Dichlorobenzene	SEC, 80°C	2541
		Tetrahydrofuran	SEC, styragel	1783,2541,2677, 2834,3313
		Toluene	SEC, 85°C	211
		Toluene/methanol	Charcoal	1857
		Toluene/*n*-butanol, isooctane, *n*-heptane	Precipitation chromatogr., 85–25°C	1867
	Density gradient technique	Carbon tetrachloride/ cyclohexane	Ultracentrifuge	3059
	Fractional demixing	Dimethylformamide/heptane, dimethylformamide/ methylcyclohexane, dimethylformamide/cyclohexane, dimethylformamide/isooctane		1817
	Fractional precipitation	Benzene/acetone		1233
		Benzene/methanol		842,1096,1345,3544
		Hexane + methanol/toluene, acetonitrile/toluene		1934
		Toluene/ethanol		384,732,1005,1505
	Fractional solution	*n*-Hexane/dimethylformamide/ dioxane	Two layer extraction	1428
	Membrane diffusion	*n*-Heptane		431,2779
	Sedimentation velocity	Acetone/isopropanol (61/39)		2623
		Methyl/*n*-propyl ketone		1345
		n-Octane	$\Theta = 21°C$	1543,2623
		n-Propyl ketone	21°C	1346
	Turbidimetric titration	Methylene chloride/methanol		1333
Poly(styrene-*co*-*n*-butyl acrylate)				
	Chromatography	Chloroform/ethanol	Liquid absorption, silica gel, 40–30°C, gradient	2281
		Chloroform, chloroform : ethanol	Liquid absorption, silica gel, isotactic and gradient	2278
	Fractional solution	Butanone/methanol	Precipitation chromatogr., glass beads temp. grad.	2020
Poly(styrene-*co*-*n*-butyl methacrylate)				
	Chromatography	Chloroform, chloroform : methanol	Liquid absorption, silica gel, isotactic and gradient	2278
		Chloroform/ethanol	Liquid adsorption chromatogr., silica, 40–70°C, gradient	2281
		Tetrahydrofuran	SEC, μ-styragel, 25°C	705
			SEC, styragel	2824
		Tetrahydrofuran/*n*-heptane	SEC	187
	Fractional precipitation	Acetone/methanol, benzene/ methanol		2628
		Butanone/methanol		3055
		Methyl ethyl ketone/methanol		2948
Poly(styrene-*co*-*p*-*tert*-butylstyrene)				
	Fractional solution	Toluene/methanol	Extraction	2498
Poly(styrene-*co*-1-chloro-1,3-butadiene)				
	Chromatography	Tetrahydrofuran – cyclohexane	SEC	1731
Poly(styrene-*co*-*m*,*p*-chloromethylstyrene)				
	Fractional precipitation	Methylene chloride/methanol		134
Poly(styrene-*co*-2,4-dihydroxy-4-vinylbenzophenone-*stat*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	171
Poly(styrene-*co*-dimethylitaconate)				
	Chromatography	Benzene/methanol	Precipitation chromatogr. gradient 50.0 – 20.0°C	3367
Poly(styrene)-*co*-poly(*p*-[(*tert*-dimethylsilyl)oxy]styrene)				
	Chromatography	Tetrahydrofuran	SEC	3594
Poly(styrene-*co*-*N*-(2,4-dinitrophenylhydrazon methylene)acrylamide)				
	Chromatography	Dimethylformamide	SEC, Merckgel	3225

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene-*co*-1,1-diphenylethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2710
Poly(styrene-*co*-divinylbenzene)				
	Chromatography	*N,N*-Dimethylformamide/lithium bromide	SEC, styragel	392,908
		o-Dichlorobenzene	SEC, 40°C	80
		Tetrahydrofuran	SEC, styragel	2327
			SEC, styragel, 45°C	2063,3038
	Fractional precipitation	Acetone – dioxane (1 : 1)/methanol		3205
		Acetone–dioxane/butanone		3205
		Benzene/methanol		2066
	Sedimentation velocity	Cyclohexane		2081,3283
		n-Octane	21°C	2622
Poly(styrene-*co*-ethyl acrylate)	Chromatography	Chloroform, chloroform: methanol		2278
		Chloroform/ethanol	Liquid adsorption chromatography, silica, gradient, 40–70°C	2281
Poly(styrene-*alt*-ethyl methacrylate)				
	Fractional precipitation	Benzene/petroleum ether		2628
Poly(styrene-*co*-ethyl methacrylate)				
	Chromatography	Chloroform, chloroform : methanol	Liquid absorption, silica gel, isotactic and gradient	2278
		Chloroform/ethanol	Liquid adsorption, silica gel, gradient, 40–30°C	2281
		Isooctane:methanol (99 : 1)/tetrahydrofuran	Normal phase, silica, gradient	1078
		Methanol/tetrahydrofuran	Reverse phase, silica C-18, gradient	1078
		tert-Butanol/benzene	SEC, μ-styragel, 25°C	705
		Tetrahydrofuran	SEC, styragel	2824
		Tetrahydrofuran/dichloroethylene	Liquid adsorption, silica gel, gradient	689
	Fractional precipitation	Butanone/methanol		2628
Poly(styrene-*co*-ethylene)	Chromatography	1,2,4-Trichlorobenzene	SEC, 135°C	3508
Poly(styrene-*co*-2-ethylhexyl acrylate-*co*-glycidyl acrylate)				
	Fractional precipitation	Butanone/petroleum ether followed by methanol		2716
Poly(styrene-*co*-*p*-fluoromethylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	138
Poly(styrene-*co*-*p*-fluorostyrene)				
	Extraction	Butanone, *n*-heptane, tetrahydrofuran	Boiling	2498
	Fractional precipitation	Tetrahydrofuran/methanol		2498
Poly(styrene-*co*-*N*-formylacrylamide)				
	Chromatography	Dimethylformamide	SEC, Merckgel	3225
Poly(styrene-*co*-glycidyl methacrylate)				
	Field flow	Water + tensoactive	Sedimentation, 21°C, latex	1475
Poly(styrene-*co*-1-heptene)	Fractional solution	Benzene/*n*-hexane	Column extraction, 45°C Ballotini	181
Poly(styrene-*co*-4-hydroxystyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3566
Poly(styrene-*co*-*p*-iodostyrene)	Chromatography	Benzene/methanol	Precipitation chromatogr.	411,412
			SEC	411
Poly(styrene-*co*-isobutene)	Chromatography	Tetrahydrofuran	SEC	1658
	Fractional solution	Benzene/isopropanol, cyclohexane/*n*-propanol, cyclohexane/isopropanol	25°C, column elution	692
Poly(styrene-*co*-isooctyl methacrylate)				
	Sedimentation velocity	Butanone/methanol	Theta-solvent	1544
Poly(styrene-*co*-isoprene)	Fractional precipitation	Benzene/methanol		3539
Poly(styrene-*co*-*n*-lauryl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	705
Poly(styrene-*co*-*p*-*N*-laurylaminostyrene)				
	Fractional precipitation	Butanone/*n*-butanol	Preferential evaporation	2415

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene-*alt*-maleic anhydride)				
	Chromatography	Dimethylformamide + lithium bromide 0.05 M	SEC, μ-bondagel, 40°C	2943
		Tetrahydrofuran	SEC, μ-styragel	2943
	Fractional precipitation	Acetone/benzene		884,1736
		Acetone/petroleum ether	32°C	2410
		Benzene/petroleum ether		845
Poly(styrene-*co*-methacrylic acid)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	927
	Fractional precipitation	Benzene/methanol	Random	968
Poly(styrene-*co*-methacrylonitrile)				
	Fractional precipitation	Acetone/methanol		599
	Fractional solution	Acetone/methanol	Random	599
Poly(styrene-*co*-2-methoxyethyl methacrylate)				
	Chromatography	Isooctane + tetrahydrofuran + methanol/isooctane + tetrahydrofuran + methanol	Liquid precipitation, silica gel, silica-CN, gradient	1077
		Tetrahydrofuran	SEC	1079
	Cross-Fractionation	Benzene/cyclohexanol and butanone/methanol		3075
	Extraction	Dimethylsulfoxide/ tetrachloroethane	Partition between immiscible liquids	2629
	Fractional demixing	Dimethylsulfoxide/ tetrachloroethane		2631
	Fractional precipitation	Benzene/cyclohexane		3076
		Butanone–methanol	By chemical comp.	3075
		Butanone–*n*-heptane (2 : 1)/*n*-heptane–ethanol (2 : 3)	By MW	3075
		Butanone/methanol		3076
		Ethyl acetate/di-isopropyl ether	By MW	3075
Poly(styrene-*co*-*p*-methoxystyrene)				
	Fractional solution	Butanone/ethanol	25°C, column elution random	2618
Poly(styrene-*alt*-methyl acrylate)				
	Chromatography	Dimethylformamide	SEC, styragel	1407
Poly(styrene-*co*-methyl acrylate)				
	Chromatography	Butanone	TLC, silica alumina	1418
		Butanone/methanol	Precipitation chromatogr., glass beads, temp. grad.	2020
		Carbon tetrachloride/methyl acetate		3184
		Carbon tetrachloride/methyl acetate mixtures by gradient	TLC, silica gel	3183
		Chloroform	SEC	3184
			SEC, styragel, 30°C, preparative, analytical	3187
		Chloroform, chloroform:ethanol		2278
		Chloroform/ethanol	Liquid adsorption chromatogr., silica, 40–70°C, gradient	2281
		Dichloromethane + methanol + heptane/dichloromethane + methanol		3044
		Tetrahydrofuran	SEC, styragel, 25°C	3180
		Tetrahydrofuran/cyclohexane		3185
			Liquid adsorption chromatogr., poly methacrylate gel gradient	3187
			Normal phase, silica-CN, gradient	3186
		Toluene/butanone		2293
	Cross fractional precipitation	Acetone/acetonitrile and *n*-butyl chloride/cyclohexane		3173
	Fractional precipitation	Butanone/methanol–water		1418,2078

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Chloroform/cyclohexane, 2-hydroxyethyl methyl ether/ methanol		3182
Poly(styrene-*co*-3-methyl-1-butene)				
	Fractional precipitation	Carbon tetrachloride		2499
Poly(styrene-*co*-4-methyl-1-hexene)				
	Fractional solution	Ethyl acetate, ethyl ether, cyclohexane, chloroform	Extraction	2942
Poly(styrene-*co*-methyl methacrylate)				
	Chromatography	1,2-Dichloroethane : ethanol	Liquid adsorption, silica gel, gradient	2282
		Chloroform	SEC, styragel, preparative and analytical	731
		Chloroform + 1% ethanol	SEC, styragel	2277
		Chloroform + ethanol mixture (gradient)	HPLC, liquid adsorption, silica gel	2277
		Chloroform/ethanol	Liquid adsorption, silica, gradient (40–30°C)	2281
			Liquid adsorption, silica, gradient, (10–80°C)	2279
		Chloroform/*n*-hexane, tetrahydrofuran/*n*-hexane	Normal phase, AN gel, silica gel, gradient styragel, MAN, AN, silica,	2845
		Iso-octane/tetrahydrofuran	Precipitation chromatography, gradient, silica	1074
		Isooctane/tetrahydrofuran	Reverse phase, silica C-18, gradient	1078
		Isooctane/tetrahydrofuran: methanol (9 : 1)	Normal phase, silica, gradient	1078
		Methyl acetate/carbon tetrachloride	Liquid adsorption, silica gel, gradient	3181
		Methylene chloride + methanol + *n*-heptane/methylene chloride + methanol		3044
		Methylene chloride/acetonitrile	Reverse phase, styragel, gradient	2846
		Tetrahydrofuran-isooctane/ tetrahydrofuran	Liquid precipitation, silica gel, gradient	1075
		Tetrahydrofuran/acetonitrile	Reversed phase, silica-phenyl, silica-ODS, gradient	3188
		Tetrahydrofuran/cyclohexane	Normal phase, silica-amino, silica-CN, gradient	3188
		Tetrahydrofuran/dichloroethylene	Liquid adsorption, silica gel, gradient	689
	Coacervation	Acetone/methanol	30°C, Column extraction	1968,1969
		Benzene/methanol	Precipitation chromatogr., 40–15°C	9
		Benzene/petroleum ether	Precipitation chromatogr., 40–15°C	9
		Benzene/triethylene glycol	50°C, Column extraction	1968,1969
		Carbon tetrachloride/methanol	30°C, Column extraction	1968,1969
		Dimethylformamide	SEC, styragel, 80°C	382
		Methylene chloride/methanol	25°C, Column extraction	1968,1969
		Tetrahydrofuran	SEC, styragel	1968
	Fractional precipitation	Acetone–methanol/diethyl ether – petroleum ether		2947
		Acetone/acetonitrile	25°C	3173
		Benzene/methanol	30°C	176,3013
			Crosslinked with formaldehyde	2641
		Butanone/isopropyl ether		693,1766,1768, 2719,3084
		Butanone/methanol		1769
		n-Butyl chloride/cyclohexane		3173
		Toluene/acetonitrile		1812
		Toluene/methanol		2948
		Toluene/*n*-hexane–methanol		1812
	Turbidimetric titration	Acetone/water		803,907

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Benzene/methanol		2552
		Butanone/2-propanol		1355
		Butanone/methanol–water (1 : 3)		2552
		Tetrahydrofuran/*n*-hexane	20°C	1074
Poly(styrene-*co*-methyl methacrylate-*alt*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	974
Poly(styrene-*co*-perdeuterated methyl methacrylate-*alt*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, Zorbax	974
Poly(styrene-*co*-4-methyl-1-pentene)				
	Fractional precipitation	Carbon tetrachloride/methanol		2499
	Fractional solution	Benzene/*n*-hexane	Column extraction, 45°C Ballotini	181
Poly(styrene-*co*-α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2681
			SEC, styragel	1574
		Toluene	SEC, styragel	30
Poly(styrene-*co*-*o*-methylstyrene)				
	Extraction	Toluene/methanol		2498
Poly(styrene-*co*-*p*-methylstyrene)				
	Fractional precipitation	Benzene/methanol		497
Poly(styrene-*co*-2-methylethyl methacrylate)				
	Fractional solution	Tetrachloroethylene/dimethyl sulfoxide		2631
Poly(styrene-*co*-α-methylstyrene)				
	Fractional precipitation	Toluene/methanol		1139
Poly(styrene-*co*-octadecene)	Fractional solution	Benzene/*n*-hexane	Column extraction, 45°C Ballotini	181
Poly(styrene-*co*-octyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2824
	Fractional precipitation	Toluene/methanol		2628
Poly(styrene-*co*-oxybutylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 35°C	2712
	Fractional precipitation	Tetrahydrofuran/methanol, tetrahydrofuran/ethanol (6 : 4), benzene/cyclohexane, benzene/diethyl ether	2712	
	Fractional solution	Cyclohexane, water:ethanol (4 : 6), water	Homopolymers separation	2712
Poly(styrene-*co*-oxyethylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 35°C	2712
	Fractional precipitation	Tetrahydrofuran/methanol, tetrahydrofuran/ethanol (6 : 4), benzene/cyclohexane, benzene/diethyl ether	Homopolymers separation	2712
	Fractional solution	Cyclohexane, water:ethanol (4 : 6), water		2712
Poly(styrene-*co*-oxypropylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 35°C	2712
	Fractional precipitation	Tetrahydrofuran/methanol, tetrahydrofuran/ethanol (6 : 4), benzene/cyclohexane, benzene/diethyl ether	Homopolymers separation	2712
	Fractional solution	Cyclohexane, water:acetone (4 : 6), water		2712
Poly(styrene-*co*-2,3,4,5,6-pentafluorostyrene)				
	Chromatography	Methylene dichloride	SEC, ultrastyragel	2428
Poly(styrene-*co*-(*p*-perfluoroalkylethyleneoxymethyl)styrenes)				
	Chromatography	Chloroform	SEC, μ-styragel	1352
Poly(styrene-*co*-phenyl vinyl ketone)				
	Chromatography	Tetrahydrofuran	SEC	1095
Poly(styrene-*co*-stilbene)	Chromatography	Tetrahydrofuran	SEC, styragel	2710
Poly(styrene-*co*-tetraethylene glycol dimethylacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2956
Poly(styrene-*co*-tetramethyldisilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2708
	Fractional precipitation	Toluene/methanol		2708
Poly(styrene-*co*-*p*-vinyl benzyl chloride)				
	Chromatography	Chloroform	SEC, styragel	3344
		Tetrahydrofuran	SEC	497

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene-*co*-vinyl chloride)				
	Chromatography	Dimethylformamide	SEC, 45°C, porous silica	3442
Poly(styrene-*co*-vinyl phenyl sulfoxide)				
	Chromatography	Tetrahydrofuran	SEC, TSK gel	1620
Poly(styrene-*co*-*p*-vinyl-*trans*-stilbene)				
	Chromatography	Chlorobenzene	SEC, 25°C	410
Poly(styrene-*co*-*p*-vinylbenzophenone-*p*-*tert*-butyl perbenzoate)				
	Chromatography	Methylene dichloride	SEC, μ-styragel	1155
Poly(styrene-*co*-vinylbenzophenone)				
	Chromatography	Dimethylformamide, tetrahydrofuran	SEC, μ-styragel	957
Poly(styrene-*co*-vinylborazine)	Chromatography	Tetrahydrofuran	SEC	3089
Poly(styrene-*co*-4-vinylpyridine)				
	Extraction	Boiling methanol, butanone	Polystyrene homopolymers	513
		Boiling, acetone, methylene dichloride, chloroform		513
Poly(styrene-*co*-1,3-vinyltoluene)				
	Fractional precipitation	Methyl ethyl ketone/butanol	40°C	2224
Poly(styrene-*co*-*m*-vinyltoluene)				
	Fractional precipitation	Butanone/*n*-butanol	Solvent volatilization random	1228
Poly(tetrafluoroethylene-*co*-trifluoronitrosomethane)				
	Fractional precipitation	Halocarbon 113/acetone		2286
Poly(*p*-vinylbenzophenone-*co*-vinylferrocene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2828
Poly(vinyl acetate-*co*-2-*N*,*N*-dimethylcarbamoyloxyethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(vinyl acetate-*co*-maleic anhydride)				
	Fractional precipitation	Acetone/petroleum ether	Butyl ester lactonized copolymer random	2268
Poly(vinyl acetate-*co*-vinyl caprolactam)				
	Fractional precipitation	Acetone/water		571
Poly(vinyl acetate-*co*-vinyl chloride)				
	Chromatography	Tetrahydrofuran	SEC	564,1470,1472
	Fractional precipitation	Tetrahydrofuran/water	25°C	564
	Fractional solution	Acetone/methanol–acetone (3 : 2), cyclohexanone/*n*-heptane (3 : 2)/*n*-heptane	Column extraction	1542
Poly(vinyl acetate-*co*-vinylidene cyanide)				
	Fractional precipitation	Nitromethane/methanol–water (1 : 1) + methanol	50°C	3545
Poly(vinyl acetate-*co*-2-methyl-5-vinylpyridine)				
	Fractional precipitation	Acetone/ethanol:hexane		2948
Poly(vinyl acetate-*co*-vinyl alcohol)				
	Chromatography	Acetonitrile + 50 mM aqueous lithium chloride	SEC, vinyl alcohol copolymers gel, 50°C	2409
Poly(vinyl alcohol-*co*-ethylene carbonate)				
	Fractional precipitation	Methanol/water		133
		Tetrahydrofuran/ethyl ether		133
		Tetrahydrofuran/*n*-hexane		133
Poly(vinyl carbazole-*alt*-diethyl fumarate)				
	Fractional solution	Benzene/methanol		2996
Poly(vinyl chloride-*co*-1-thiophenylethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2166
Poly(vinyl chloride-*co*-vinyl stearate)				
	Chromatography	Tetrachloroethylene	SEC	2181
Poly(vinyl chloride-*co*-vinylidene chloride)				
	Chromatography	Tetrahydrofuran	SEC, porasil	2725
Poly(divinyl ether-*co*-maleic anhydride)				
	Fractional precipitation	Acetone/*n*-hexane	Cyclocopolymer	61
Poly(vinyl-2-pyridine-*co*-vinyl-4-pyridine)				
	Fractional precipitation	Tetrahydrofuran–methanol/*n*-heptane	20°C	1134
Poly(vinylamine-*co*-*N*-vinylpyrrolidone)				
	Fractional precipitation	Methanol/acetone + ethyl ether		1135

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(divinylbenzene-*co*-methacrylate)				
	Fractional precipitation	Benzene/methanol		563
Poly(divinylbenzene-*co*-vinylpyridene)				
	Chromatography	Benzene	SEC, styragel	2327
Poly(4-vinylpyridine-*co*-*tert*-butyl methacrylate)				
	Chromatography	Dimethylformamide/triethylamine/ pyridine (8 : 1 : 1)		669
Poly(vinylpyrrolidone-*co*-diamyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-diethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-dimethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-dipropyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monomethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monoamyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monoethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monopropyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
1.12. BLOCK COPOLYMERS				
Poly(acrylamide)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Water/methanol followed by water		3020
Poly(acrylamido-2-methylpropane-sulfonic acid)-*block*-poly(styrene)-*block*-poly(2-acrylamido-2-methyl propane-sulfonic acid)				
	Extraction	Hot cyclohexane, methanol–ethyl ether (5 : 3), benzene	Triblock	1752
Poly(acrylate)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Chloroform/methanol	25°C	25
Poly(acrylonitrile)-*block*-poly(methyl methacrylate)				
	Extraction	Acetone, dimethylformamide		2958
Poly(acrylonitrile)-*block*-poly(styrene)				
	Chromatography	Benzene	TLC, homopolymer sep.	2379
		Chloroform/dimethylformamide (18/2)	TLC, homopolymer sep.	2379
		Dimethylformamide	SEC, macroporous glass	2379
			SEC, styragel	2379
Poly(acrylonitrile)-*block*-poly(ethylene glycol)-*block*-poly(acrylonitrile)				
	Fractional precipitation	Dimethylformamide/water	Chemical separation	2326
Poly(γ-benzyl-L-glutamate)-*block*-poly(styrene)				
	Extraction	Cyclohexane, butanone–isopropanol (2 : 8)	Scrambled type	2011
		Dimethylformamide/formic acid, dimethylformamide/ cyclohexane	Homopolymer	783
	Fractional precipitation	Dimethylformamide–ethyl acetate–cyclohexane (1 : 2 : 3)/methanol		783
Poly(butadiene)-*block*-poly(acrylonitrile)				
	Fractional precipitation	Isooctane-isoamyl alcohol (1 : 1)	Lowering temp.	2955
Poly(butadiene)-*block*-poly(ethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1239
Poly(1,3-butadiene)-*block*-poly(2-isoprenylnaphthalene)				
	Chromatography	Tetrahydrofuran	SEC	846
Poly(1,2-butadiene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly(1,4-butadiene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly(butadiene)-*block*-poly(styrene)				
	Chromatography	Benzene	TLC, to separate homopolymer	2379
		Chloroform	SEC, styragel	3427

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(divinylbenzene-*co*-methacrylate)				
	Fractional precipitation	Benzene/methanol		563
Poly(divinylbenzene-*co*-vinylpyridene)				
	Chromatography	Benzene	SEC, styragel	2327
Poly(4-vinylpyridine-*co*-*tert*-butyl methacrylate)				
	Chromatography	Dimethylformamide/triethylamine/ pyridine (8 : 1 : 1)		669
Poly(vinylpyrrolidone-*co*-diamyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-diethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-dimethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-dipropyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monomethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monoamyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monoethyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
Poly(vinylpyrrolidone-*co*-monopropyl itaconate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2692
1.12. BLOCK COPOLYMERS				
Poly(acrylamide)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Water/methanol followed by water		3020
Poly(acrylamido-2-methylpropane-sulfonic acid)-*block*-poly(styrene)-*block*-poly(2-acrylamido-2-methyl propane-sulfonic acid)				
	Extraction	Hot cyclohexane, methanol–ethyl ether (5 : 3), benzene	Triblock	1752
Poly(acrylate)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Chloroform/methanol	25°C	25
Poly(acrylonitrile)-*block*-poly(methyl methacrylate)				
	Extraction	Acetone, dimethylformamide		2958
Poly(acrylonitrile)-*block*-poly(styrene)				
	Chromatography	Benzene	TLC, homopolymer sep.	2379
		Chloroform/dimethylformamide (18/2)	TLC, homopolymer sep.	2379
		Dimethylformamide	SEC, macroporous glass	2379
			SEC, styragel	2379
Poly(acrylonitrile)-*block*-poly(ethylene glycol)-*block*-poly(acrylonitrile)				
	Fractional precipitation	Dimethylformamide/water	Chemical separation	2326
Poly(γ-benzyl-L-glutamate)-*block*-poly(styrene)				
	Extraction	Cyclohexane, butanone–isopropanol (2 : 8)	Scrambled type	2011
		Dimethylformamide/formic acid, dimethylformamide/ cyclohexane	Homopolymer	783
	Fractional precipitation	Dimethylformamide–ethyl acetate–cyclohexane (1 : 2 : 3)/methanol		783
Poly(butadiene)-*block*-poly(acrylonitrile)				
	Fractional precipitation	Isooctane-isoamyl alcohol (1 : 1)	Lowering temp.	2955
Poly(butadiene)-*block*-poly(ethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1239
Poly(1,3-butadiene)-*block*-poly(2-isoprenylnaphthalene)				
	Chromatography	Tetrahydrofuran	SEC	846
Poly(1,2-butadiene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly(1,4-butadiene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly(butadiene)-*block*-poly(styrene)				
	Chromatography	Benzene	TLC, to separate homopolymer	2379
		Chloroform	SEC, styragel	3427

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Chloroform/carbon tetrachloride, tetrahydrofuran/methanol	TLC, silica gel gradient elution	1769
		Cyclohexane–chloroform	TLC, concentration gradient	780
		Methanol, acetone, butanone, ethyl acetate, tetrahydrofuran, chloroform, toluene, etc.	TLC, silica gel	1769
		o-Dichlorobenzene	SEC	83
			SEC, styragel, 135°C	2365
		Tetrahydrofuran	SEC	542,2795
			SEC, macroporous glass	2379,2834,3287
			SEC, styragel	1770,2379,2541
		Toluene	HP SEC	237
			SEC, 45°C	1788
			SEC, macroporous glass	2379
			SEC, styragel	2379
	Fractional precipitation	Benzene/butanone and cyclohexane/isooctane	Cross fractionation	3172
		Benzene/methanol		3558
	Fractional solution	Benzene	Extraction	2472
	Sedimentation velocity	*n*-Heptane	25°C	3047
		n-Octane/cyclohexane (3/1)	21°C	2627
Poly(butadiene)-*block*-poly(styrene-*co*-acrylonitrile)				
	Chromatography	Tetrahydrofuran	SEC	1801
Poly(1-butene)-*block*-poly(propylene)				
	Fractional solution	Tetraline	Column extraction, increasing temp.	630
Poly(butyl acrylate)-*block*-poly(methyl methacrylate)				
	Fractional solution	*n*-Butanol/methanol		1150
Poly(*n*-butyl acrylate)-*block*-poly(vinyl chloride)				
	Chromatography	Dimethylformamide	SEC, porous silica, 45°C	3442
	Fractional precipitation	Tetrahydrofuran/ethanol	25°C	3442
Poly(*tert*-butyl methacrylate)-*block*-poly(dimethylamino)ethyl methacrylate				
	Chromatography	Tetrahydrofuran:triethylamine (9 : 1)	SEC, μ-styragel, 35°C	670
Poly(*tert*-butyl methacrylate)-*block*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC	3109
			SEC, styragel, 25°C	3107
Poly(*n*-butyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2011
	Extraction	Isopropanol, cyclohexane	Scrambled type	2011
Poly(*tert*-butyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Trichloroethylene	35°C	714
Poly(*n*-butyl methacrylate)-*block*-poly(vinyl chloride)				
	Fractional precipitation	Tetrahydrofuran/methanol–acetone (9 : 1)	25°C	3442
Poly(*tert*-butyl-4-vinylbenzoate)-*block*-poly(*tert*-butyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	3419
Poly(*tert*-butylacrylate)-*block*-poly(styrene)-*block*-poly(*tert*-butylacrylate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 30°C	2099
Poly(*p*-*tert*-butylstyrene)-*block*-poly(isobutylene)-*block*-poly(*tert*-butylstyrene)				
	Chromatography	Tetrahydrofuran	SEC	1667
Poly(*p*-chlorostyrene)-*block*-poly(*n*-hexadecyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2012
Poly(*p*-chlorostyrene)-*block*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		2440
Poly(*p*-chlorostyrene)-*block*-poly(styrene)-*block*-poly(*p*-chlorostyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2967
Poly(4-cyanostyrene)-*block*-poly(*tert*-butyl methacrylate)-*block*-poly(4-cyanostyrene)				
	Chromatography	Dimethylformamide	SEC	1437
Poly(cyclohexyl methacrylate)-*block*-poly(styrene)				
	Extraction	Acetone, cyclohexane	Scrambled type	2011
Poly(*n*-dodecyl methacrylate)-*block*-poly(ethyl methacrylate)				
	Fractional precipitation	Tetrahydrofuran/methanol		2952
		Tetrahydrofuran/methanol-2-propanol		2952
Poly(ethyl acrylate)-*block*-poly(vinyl chloride)				
	Fractional precipitation	Tetrahydrofuran/methanol		3442

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(ethyl methacrylate)-*block*-poly(*n*-hexyl methacrylate)				
	Fractional precipitation	Tetrahydrofuran/methanol–water		2952
Poly(ethyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2011
	Extraction	Butanone/isopropanol (2 : 8), cyclohexane		2011
Poly(ethyl methacrylate)-*block*-poly(*N*-vinylcarbazole)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2012
Poly(ethylene)-*block*-poly(propylene)				
	Fractional precipitation	Cyclohexane/isopropyl alcohol		2554
Poly(ethylene-*co*-propylene)-*block*-poly(vinylcyclohexane)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly(ethylene)-*block*-poly(vinylcyclohexane)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly(ethylene-*co*-propylene)-*block*-poly(propylene)				
	Chromatography	*o*-Dichlorobenzene	SEC, shodex, 140°C	770
Poly(2-ethylhexyl acrylate)-*block*-poly(vinyl chloride)				
	Fractional precipitation	Tetrahydrofuran/ethanol–*n*-hexane (2 : 1)	25°C	3442
Poly(ferrocenylmethyl methacrylate)-*block*-poly(acrylonitrile)				
	Chromatography	Dimethylformamide, tetrahydrofuran	SEC, styragel	2615
Poly(ferrocenylmethyl methacrylate)-*block*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran, dimethylformamide	SEC, styragel	2615
Poly(hexadecyl methacrylate)-*block*-poly(*p*-methoxystyrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2012
Poly(*n*-hexyl methacrylate)-*block*-poly(lauryl methacrylate)				
	Fractional precipitation	Benzene/methanol		29
Poly(*n*-hexyl methacrylate)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Benzene/methanol	20°C	29
Poly(dihydronaphthalene)-*block*-poly(styrene)				
	Extraction	Ethyl acetate, butanone		538
Poly(isobutene)-*block*-poly(indene)				
	Fractional solution	Butanone, *n*-hexane, methylene dichloride, dioxane	Extraction	2386
Poly(isobutene)-*block*-poly(indene)-*block*-poly(isobutene)				
	Fractional precipitation	Benzene-*n*-pentane/butanone		3495
Poly(isobutene)-*block*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran,	SEC, styragel	1655
	Extraction	*n*-Hexane, 1-nitropropane, *n*-pentane	Tris-stars	1659
Poly(isobutene)-*block*-poly(styrene)				
	Chromatography	Benzene/isopropanol, cyclohexane/iso-propanol	Precipitation chromatogr., thermal gradient	695
		Tetrahydrofuran	SEC, styragel	1653
	Extraction	Butanone, *n*-pentane, acetone		1655
		Butanone, *n*-pentane, *n*-heptane		1064
	Fractional precipitation	Benzene/isopropanol, cyclohexane/*n*-propanol		695
Poly(isobutyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2011
	Extraction	Acetone, cyclohexane	Scrambled type	2011
Poly(isobutyl vinyl ether)-*block*-poly(isobutylene)				
	Chromatography	Tetrahydrofuran	SEC	1188
Poly(isobutyl vinyl ether)-*block*-poly(*p*-methoxystyrene)				
	Chromatography	Butanone	SEC	1297
Poly(isobutylene)-*block*-poly(amide)				
	Chromatography	Tetrahydrofuran	SEC	3584
Poly(isobutylene)-*block*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	3129
Poly(isobutylene)-*block*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC	1927

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(isodecyl methacrylate)-*block*-poly(styrene)				
	Extraction	Isopropanol–butanone (8 : 2), cyclohexane	Scrambled type	2011
Poly(isoprene)-*block*-poly(*tert*-butylacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3312
Poly(isoprene)-*block*-poly(2,6-dihydroxypropyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, 40°C	2273
Poly(isoprene)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Benzene/methanol		1163
Poly(isoprene)-*block*-poly(α-methylstyrene)-*block*-poly(isoprene)				
	Chromatography	Chloroform/*n*-hexane (7/10)	TLC	2379
		Toluene	SEC, styragel	2379
Poly(isoprene)-*block*-(novolac resins)				
	Turbidimetric titration	Acetone/water		1775
Poly(1,4-isoprene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	*cis*, SEC, phenogel, 25°C	1022
Poly(isoprene)-*block*-poly(styrene)-*block*-poly(isoprene)				
	Chromatography	Tetrahydrofuran, chloroform	SEC, μ-styragel, end functionalized	2606
Poly(isoprene)-*block*-poly(styrene)-*block*-poly(isoprene)-*block*-poly(4-vinylbenzyldimethylamine)-*block*-poly(isoprene)				
	Chromatography	Tetrahydrofuran (5% *N,N*-dimethylbenzylamine)	SEC, styragel	2209
Poly(isoprene)-*block*-poly(4-vinyl pyridine)				
	Chromatography	Toluene	SEC, 70°C	1269
Poly(2-isoprophenylbenzoxazole)-*block*-poly(*tert*-butyl methacrylate)-*block*-poly(2-isoprophenylbenzoxazole)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1438
Poly(2-isoprophenylbenzoxazole)-*block*-poly(styrene)-*block*-poly(2-isoprophenylbenzoxazole)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1438
Poly(isopropyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel scrambled type	2011
	Extraction	Cyclohexanol, cyclohexane, or acetonitrile, isopropanol, methyl isobutyl ketone, methyl isobutyl ketone/acetone		2011
Poly(4,4′-isopropylidenediphenyl carbonate)-*block*-poly(styrene)				
	Fractional precipitation	Chloroform/heptane, benzene/cyclohexane		736
		Chloroform/heptane, benzene/heptane	Multiblock	737
Poly(lauryl methacrylate)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Benzene/methanol, benzene/methanol–isopropanol (1 : 1), benzene/methanol–*n*-heptane (1 : 1)	20°C	29
Poly(methacrylic acid)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1596
	Extraction	Benzene, followed by methanol		1596
Poly(*p*-methoxystyrene)-*block*-poly(cyclohexene oxide)				
	Chromatography	Carbon tetrachloride/tetrahydrofuran	TLC, silica gel, gradient	1152
	Turbidimetric titration	Benzene, butanone (3 : 1)/ethanol		1152
Poly(methyl acrylate)-*block*-poly(vinyl chloride)				
	Fractional precipitation	Tetrahydrofuran/methanol–water (1 : 1)	25°C	3442
Poly(methyl methacrylate)-*block*-poly(*tert*-butyl acrylate)				
	Chromatography	Tetrahydrofuran		3357
Poly(methyl methacrylate)-*block*-poly(*tert*-butyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	2503
Poly(methyl methacrylate)-*block*-poly(α-chloroacrylate)				
	Fractional precipitation	Chloroform–acetone (1 : 2)/methanol		2462
	Fractional solution	Chloroform/acetone mixtures	Selective solution pf homopolymers, extraction	2462

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Turbidimetric titration	Dimethylformamide/*n*-dibutyl ether	20°C	2462
Poly(methyl methacrylate)-*block*-poly((dimethylamino)ethyl methacrylate)				
	Chromatography	Tetrahydrofuran : triethylamine (9 : 1)	SEC, μ-styragel, 35°C	670
Poly(methyl methacrylate)-*block*-poly(ethylene)-*block*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	3107
Poly(methyl methacrylate)-*block*-poly(α-methylstyrene)-*block*-poly(methyl methacrylate)				
	Chromatography	Chloroform	SEC, styragel, preparative	633
Poly(methyl methacrylate)-*block*-poly(*n*-octadecyl methacrylate)				
	Fractional precipitation	Benzene/methanol	20°C	29
Poly(methyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Acetone/water	Precipitation chromatogr.	248
		Benzene, followed by chloroform–methanol (6 : 13)	TLC	2379
		Benzene, methanol	TLC, silica gel	3578
		Benzene/methanol	Precipitation chromatogr.	2233
			TLC	1570
		Carbon tetrachloride, butanone	TLC	1771
		Nitroethane/acetone	TLC, silica gel	1572
		Tetrahydrofuran	SEC	250,2011,2443
			SEC, silanized glass beads	193
	Extraction	Acetone, tetralin		2233
		Acetone, tetralin, cyclohexane, acetonitrile		3316
		Butanone/isopropanol (3 : 7), cyclohexane	Scrambled type	2011
		Cyclohexane, acetonitrile, benzene, methanol–acetonitrile (1 : 1)		2307
	Field flow	Cyclohexane, acetonitrile		2958
	Fractional precipitation	1-Chlorobutane/*n*-hexane		1771
		Benzene–acetone (1 : 1)/petroleum ether		3316
		Benzene–chlorobenzene (1 : 1)/petroleum ether		926
		Benzene–chlorobenzene (1 : 1)/methanol		165
		Benzene/cyclohexane		1355
		Benzene/methanol		1355,1415,2233
			Column extraction	472
		Butanone/diisopropyl ether	30°C	1784
		Chloroform/methanol		3020
	Turbidimetric titration	Acetone/water		2131
		Benzene/methanol	25°C	1415
		Butanone/isopropanol		1355
		Butanone/water–methanol (3 : 1)		2233
Poly(methyl methacrylate)-*block*-poly(styrene)-*block*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	777
Poly(methyl methacrylate)-*block*-poly(tetrafluoroethylene)				
	Extraction	Butanone, butanone/ethyl ether (1 : 5)		3444
	Turbidimetric titration	Acetone, water		2131
Poly(methyl methacrylate)-*block*-poly(vinyl acetate)				
	Turbidimetric titration	Acetone/water		2552
Poly(methyl methacrylate)-*block*-poly(vinyl chloride)				
	Chromatography	Dimethylformamide	SEC, porous silica, 45°C	3442
	Fractional precipitation	Tetrahydrofuran/methanol–acetone (9 : 1)	25°C	3442
Poly(2-methyl-2-oxazoline)-*block*-poly(styrene)				
	Extraction	Water, methanol, ethanol, diethyl ether, tetrahydrofuran, chloroform		2954

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(methyl vinyl ether)-*block*-poly(isobutyl vinyl ether)-*block*-poly(methyl vinyl ether)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2857
Poly(*p*-*N*,*N*-dimethylaminostyrene)-*block*-poly(methacrylic acid)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2284
Poly(2-*N*,*N*-dimethylcarbamoyloxyethyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 28°C	2668
Poly(α-methylstyrene)-*block*-poly((dimethylamino)ethyl methacrylate)				
	Chromatography	Tetrahydrofuran : triethylamine (9 : 1)	SEC, μ-styragel, 35°C	670
Poly(α-methylstyrene)-*block*-poly(isobutyl vinyl ether)-*block*-poly(α-methylstyrene)				
	Extraction	2-Propanol		2855
Poly(α-methylstyrene)-*block*-poly(isobutylene)-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC	1926
			SEC, μ-styragel	1656
	Extraction	*n*-Hexane, 1-nitropropane		1659
Poly(α-methylstyrene)-*block*-poly(isoprene)-*block*-poly(α-methylstyrene)				
	Chromatography	Toluene	SEC, 70°C	885
	Sedimentation analysis	Cyclohexane		885
		Tetrahydrofuran		885
Poly(α-methylstyrene)-*block*-poly(propylene sulfide)-*block*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 45°C	2289
Poly(α-methylstyrene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, ultra styragel, 25°C	1676
	Density gradient technique	Bromoform/benzene	Ultracentrifuge	2695
	Fractional precipitation	Benzene/methanol		1787
		Butanone–benzene (6 : 1)/methanol + 0.01% calcium chloride		165
Poly(4-octylstyrene)-*block*-poly(2,6-dihydroxypropyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, 40°C	2273
Poly(oxyethylene)-*block*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	3107
Poly(oxyethylene)-*block*-poly(styrene)				
	Chromatography	Ethyl acetate/methanol	TLC, cellulose F	3306
		Tetrahydrofuran	SEC, styragel, 40°C	2352,3306
Poly(phenyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel scrambled type	2011
Poly(diphenyl methyl methacrylate)-*block*-poly(trityl methacrylate)				
	Chromatography	Chloroform	SEC, μ-styragel	766
Poly(propylene)-*block*-poly(ethylene-*co*-propylene)-*block*-poly(propylene)				
	Chromatography	*o*-Dichlorobenzene	SEC, shodex, 140°C	770
Poly(styrene)-*block*-poly(butadiene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, star shaped	1503
			SEC, 40°C	3572
	Cross-Fractionation	Tetrahydrofuran	SEC	1331
		Tetrahydrofuran/methanol	Turbidimetric titration	1331
	Fractional precipitation	Benzene/methanol	Star copolymers A2B	1405
Poly(styrene)-*block*-poly(butadiene)-*block*-poly(styrene)				
	Chromatography	GPC, spherical silica		3296
		Methylene chloride	SEC, μ-styragel	1919
		Tetrahydrofuran	SEC, silica gel	1031
			SEC, styragel	1166
		Toluene	SEC, 45°C	1788,2941
	Sedimentation analysis	Tetrahydrofuran/allyl alcohol	30°C	3295
Poly(styrene)-*block*-poly(butadiene)-*block*-(urea)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C star branched	84,318,2669
	Sedimentation velocity	Tetrahydrofuran/ethanol	25°C, several compositions	2669
Poly(styrene)-*block*-poly(butadiene)-*block*-poly(4-vinylpyridine)				
	Chromatography	Tetrahydrofuran	SEC, styragel	117
Poly(styrene)-*block*-poly(*tert*-butyl acrylate)				
	Chromatography	Tetrahydrofuran	SEC	3389
Poly(styrene)-*block*-poly(*tert*-butyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	2703
			SEC, styragel, 25°C	3006,3007
	Fractional precipitation	Tetrahydrofuran/methanol		3007

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene)-*block*-poly(*tert*-butylacrylate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 30°C	2099
Poly(styrene)-*block*-poly(*tert*-butylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	2703
Poly(styrene)-*block*-poly(*tert*-butylstyrene)-*block*-poly(styrene)				
	Chromatography	*n*-Hexane, butanone, dimethylformamide	TLC	327
Poly(styrene)-*block*-poly(*p*-chlorostyrene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2967
Poly(styrene)-*block*-poly(2-cinnamoylethyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1151
			SEC, styragel	3155
Poly(styrene)-poly(2,3-dihydroxypropyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, 40°C	2273
Poly(styrene)-*block*-poly(ethene-*co*-butene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-bondagel	650
	Fractional precipitation	Cyclohexane/1-propanol	25°C	650
Poly(styrene)-*block*-poly(ethylene-*co*-butene)				
	Fractional precipitation	Toluene : cyclohexane (3 : 1)/methanol		1195
Poly(styrene)-*block*-poly(ethylene/butylene)-*block*-poly(styrene)				
	Chromatography	4-methyl-2-pentane	SEC	3380
Poly(styrene)-*block*-poly(*p*-hydroxystyrene)				
	Chromatography	Tetrahydrofuran		3594
Poly(styrene)-*block*-poly(isoprene)				
	Chromatography	1,2-Dichloroethane	SEC, 25°C	2630
		Base lubricating oil	Hydrogenated, SEC, styragel, 50°C	2664
		Methylene chloride	Modified, SEC, α-styragel	1919
		Tetrahydrofuran	SEC, μ-styragel, 30°C	2605
			SEC, 42°C	661
			SEC, styragel	1062,2102
			Star copolymers, SEC, styragel	318
		Toluene	SEC (multiblocks)	1320,2266
			SEC, styragel, 35°C (multiblocks)	632
	Fractional demixing	Dimethylformamide/ methylcyclohexane	Hydrogenated, diblock	2629
	Fractional precipitation	Benzene/methanol	25°C	650
			One, two, three and four arms	2663
			Star copolymers A2B	1405
	Sedimentation analysis	Carbon tetrachloride/cyclohexane	Multiblocks	2598
	Turbidimetric titration	Acetone/methanol		1775
		Toluene/methanol		2870
Poly(styrene)-*block*-poly(isoprene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 30°C	2605
			SEC, styragel	1166,1728
		Tetrahydrofuran, chloroform	SEC, μ-styragel, end functionalized	2606
		Toluene	Hydrogenated, SEC, styragel	2941
Poly(styrene)-*block*-poly(isoprene)-*block*-poly(4-vinylpyridine)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1977
Poly(styrene)-*block*-poly(2-isoprophenylbenzoxazole)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1438
Poly(styrene)-*block*-poly(methacrylic acid)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	2703
	Fractional precipitation	Benzene/methanol		2016
Poly(styrene)-*block*-poly(metal methacrylate)				
	Fractional precipitation	Benzene/methanol	Ionomers	741
Poly(styrene)-*block*-poly(methacrylic acid)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	2703
	Sedimentation velocity	Dioxane : water (80 : 20)		2682
Poly(styrene)-*block*-poly([6-[4-(4-methoxyphenyl) phenoxy] hexylmethacrylate]				
	Chromatography	Tetrahydrofuran	SEC	3513
Poly(styrene)-*block*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, 40°C	3572

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Extraction	Cyclohexane, acetonitrile, benzene		2600
Poly(styrene)-*block*-poly(methyl methacrylate)-*block*-poly(*n*-butyl methacrylate)				
	Fractional precipitation	Tetrahydrofuran/petroleum ether		1253
Poly(styrene)-*block*-poly(methyl methacrylate)-*block*-poly(styrene)				
	Chromatography	Benzene/butanone	TLC, silica gel	1572
		Carbon tetrachloride/methyl acetate	TLC, silica gel	1572
		Dimethylformamide	SEC, macroporous glass	2379
		Nitroethane/acetone	TLC, silica gel	1572
		Toluene	SEC, styragel	2379
	Fractional precipitation	Benzene, chlorobenzene/ petroleum ether		1194
Poly(styrene)-*block*-poly((dimethylamino)ethylmethacrylate)				
	Chromatography	Tetrahydrofuran : triethylamine (9 : 1)	SEC, μ-styragel, 35°C	670
Poly(styrene)-*block*-poly(dimethylsiloxane)				
	Chromatography	Tetrachloroethylene	SEC, μ-styragel	802
	Fractional precipitation	Tetrahydrofuran/methanol	Macrocycles	3560
Poly(styrene)-*block*-poly(oxyadipoyloxy-1,4-dichlorophenyleneisopropylidene-1,4-dichlorophenylene)				
	Fractional precipitation	Methylene dichloride/*n*-hexane		1873
Poly(styrene)-*block*-poly(vinyl chloride)				
	Fractional precipitation	Tetrahydrofuran/methanol		1892,3442
Poly(styrene)-*block*-poly(4-vinyl-*N*-ethyl pyridinium bromide)				
	Sedimentation	Water–methanol–0.01 M lithium bromide	25°C	2945
	Sedimentation velocity	Water 0.1 M potassium bromide		2944
Poly(styrene)-*block*-poly[(3-vinyl phenyl)methoxy(-*tert*-butyldimethylsilane)]-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC	1310
Poly(styrene)-*block*-poly(*N*-vinylcarbazole)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2012
	Extraction	Cyclohexane, toluene	Scrambled type	2012
Poly(styrene)-*block*-poly(2-vinylpyridene)-*block*-poly(butadiene)				
	Chromatography	Tetrahydrofuran	SEC	3429
Poly(styrene)-*block*-poly(2-vinylpyridine)				
	Chromatography	Tetrahydrofuran		2909
	Fractional precipitation	Benzene/*n*-heptane		1131,1132
Poly(styrene)-*block*-poly(4-vinylpyridine)				
	Chromatography	Tetrahydrofuran	SEC, 40°C	1441,1442
		Tetrahydrofuran, dimethylformamide	SEC, styragel, 60°C (THF), 70°C (DMF)	113
	Fractional precipitation	Benzene/*n*-heptane		1133
	Thermal field flow	Tetrahydrofuran, dimethylformamide		114
Poly(styrene-*co*-maleic anhydride)-*block*-poly(butadiene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1802
Poly(2-vinyl naphthalene)-*block*-poly(vinyldiphenyl anthracene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3043
Poly(vinylcyclohexane)-*block*-poly(ethyl ethylene)				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1022
Poly[2-(4-vinylphenyl)-4,4-dimethyl-2-oxazoline]-*block*-poly(styrene)-*block*-poly[2-(4-vinylphenyl)-4,4-dimethyl-2-oxazoline]				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1309
Poly(4-vinylpyridine)-*block*-poly(styrene)-*block*-poly(4-vinylpyridine)				
	Chromatography	Tetrahydrofuran	SEC, 40°C	1441,1442
Poly(4-vinylpyridine)-*block*-poly(2-vinylpyridine)				
	Fractional precipitation	Tetrahydrofuran–methanol/ *n*-heptane	20°C	1134

1.13. GRAFT COPOLYMERS

Poly(acrylamide)-*graft*-poly(vinyl alcohol)				
	Turbidimetric titration	Formic acid/butanone		1173
		Water/ethanol		1173
Poly(acrylic acid)-*graft*-poly(tetramethylene oxide)				
	Chromatography	Tetrahydrofuran	SEC	3196

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acrylonitrile)-*graft*-poly(methyl methacrylate)				
	Extraction	Benzene		2949
Poly(acrylonitrile)-*graft*-poly(styrene)				
	Fractional solution	Toluene–dimethylformamide		1494
Poly(*N*-acryloyl pyrrolidone-*co*-acrylamide)-*graft*-poly(2-pyrrolidone)				
	Extraction	Boiling water		3540
Poly(*N*-acryloyl pyrrolidone-*co*-acrylonitrile)-*graft*-poly(2-pyrrolidone)				
	Extraction	Boiling water		3540
Poly(*N*-acryloyl pyrrolidone-*co*-methyl methacrylate)-*graft*-poly(2-pyrrolidone)				
	Extraction	Boiling water		3540
Poly(β-alanine)-*graft*-poly(acrylic acid)				
	Turbidimetric titration	Formic acid 85%/ethanol		1173
Poly(butadiene)-*graft*-poly(acrylate)				
	Chromatography	Tetrahydrofuran	SEC	1386
Poly(butadiene)-*graft*-poly(methacrylate)				
	Chromatography	Tetrahydrofuran	*cis*	1386
Poly(butadiene)-*graft*-poly(styrene)				
	Chromatography	Tetrahydrofuran	*cis*	1386
			SEC, styragel	492,3285
		Toluene	SEC, styragel	2360
	Extraction	Butanone		3565
		Cyclohexane–acetone, toluene		1390
	Turbidimetric titration	Benzene/acetone–methanol (9 : 1)		192
Poly(butadiene)-*graft*-poly(styrene-*co*-acrylonitrile)				
	Chromatography	Tetrahydrofuran		1250
Poly(butadiene)-*graft*-poly(vinyl chloride)				
	Chromatography	Tetrahydrofuran	SEC	3,1891
	Extraction	*n*-Pentane		3197
Poly(*n*-butyl acrylate)-*graft*-poly(methyl methacrylate)				
	Extraction	Acetonitrile		2427
Poly((*n*-butyl acrylate-*co*-styrene)-*graft*-poly(oxyethylene))				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, macromer	2726
Poly(butyl acrylate)-*co*-poly(styrene)-*graft*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, macromer	2726
Poly(butyl methacrylate)-*graft*-poly(methacrylate)				
	Fractional precipitation	Acetone/methanol–water (1 : 1)		1249
Poly(butyl methacrylate)-*graft*-poly(styrene)				
	Fractional precipitation	Acetone/water–methanol (50 : 50)		1249
		Benzene/methanol		1249
Chlorinated poly(cyclopentadiene)-*graft*-poly(butadiene)				
	Chromatography	Tetrahydrofuran	SEC, lichrospher, 40°C	1290
Chlorinated rubber-*graft*-poly(ethyl methacrylate)				
	Fractional precipitation	Butanone/methanol		2707
Chlorinated rubber-*graft*-poly(methyl acrylate)				
	Fractional precipitation	Butanone/methanol		2707
Chlorinated rubber-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Butanone/methanol		2707
Poly(chloroprene)-*graft*-poly(isobutene)				
	Fractional precipitation	Benzene–butanone (1 : 4)/methanol		1721
Poly(chloroprene)-*graft*-(poly(isobutene-*block*-α-methylstyrene))				
	Extraction	*n*-Pentane, and tetrahydrofuran–ethyl acetate		1660
		n-Pentane, ethyl ether, butanone, tetrahydrofuran/ethyl ether, tetrahydrofuran/butanone		1664
Poly(chloroprene)-*graft*-poly(isobutyl vinyl ether)				
	Extraction	*n*-Pentane		1654
	Fractional precipitation	Tetrahydrofuran/butanone		1654
Poly(chloroprene)-*graft*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1662
	Extraction	Butanone, acetone/*n*-pentane (6 : 4), 1-nitropropane		1662

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(*p*-chlorostyrene)-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		2206
Chlorosulfonated poly(ethylene)-*graft*-poly(methyl methacrylate)				
	Extraction	Acetonitrile		2848
Poly(4-(1,1-dicyanoethylazo)benzyl methacrylate)-*graft*-poly(methacrylonitrile)				
	Chromatography	Dimethylformamide	SEC, fractogel	2423
Poly(4-(1,1-dicyanoethylazo)benzyl methacrylate-*co*-methyl methacrylate)-*graft*-poly(styrene)				
	Chromatography	Dimethylformamide	SEC, fractogel	2423
Poly(*N*-eosin vinylamine hydrochloride)-*graft*-poly(acrylamide)				
	Fractional precipitation	Water/acetone		3020
Poly(*N*-eosin vinylamine hydrochloride)-*graft*-poly(acrylic acid)				
	Fractional precipitation	Water/acetone		3020
Poly(*N*-eosin vinylamine hydrochloride)-*graft*-poly(acrylonitrile)				
	Fractional precipitation	Water/acetone		3020
Poly(*N*-eosin vinylamine hydrochloride)-*graft*-poly(styrene)				
	Fractional precipitation	Water/acetic acid		3020
Poly(ethyl-α-chloroacrylate)-*graft*-poly(vinyl acetate)				
	Fractional precipitation	Acetone/ethanol		3019
		Butanone/methanol–water (1 : 1)		3019
Poly(ethylene)-*graft*-poly(acrylamide)				
	Extraction	Water		2651
Poly(ethylene)-*graft*-poly(acrylic acid)				
	Extraction	Water		262
	Fractional precipitation	Xylene/methanol	130°C	2753
Poly(ethylene)-*graft*-poly(1,2-epoxy-3-butene)				
	Extraction	Chloroform		2310
Poly(ethylene-*co*-vinylacetate)-*graft*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2258
Poly(ethylene)-*graft*-poly(2,3,4,5,6-pentafluorostyrene)				
	Extraction	Acetone		3483
Poly(ethylene-*co*-propylene)-*graft*-poly(butadiene)				
	Chromatography	Toluene	SEC	78
			SEC, styragel	78
Poly(ethylene-*co*-propylene-*co*-1,4-hexadiene)-*graft*-poly(isobutene)				
	Extraction	*n*-Pentane, 3-pentanone		1650
Poly(ethylene-*co*-propylene-*co*-hexadiene)-*graft*-poly(styrene-*graft*-poly(α-methylstyrene))				
	Extraction	Acetone, *n*-pentane		1650
Poly(ethylene-*co*-propylene)-*graft*-poly(styrene)				
	Chromatography	Toluene	SEC, styragel	78
Poly(ethylene-*co*-propylene)-*graft*-poly(styrene-*co*-acrylonitrile)				
	Fractional precipitation	Tetrahydrofuran		772
Poly(ethylene)-*graft*-poly(styrene)				
	Extraction	Benzene		1553,3483
	Fractional precipitation	Toluene/methanol	90°C	559
Poly(ethylene-*co*-vinyl acetate)-*graft*-poly(styrene)				
	Fractionation by solvent mixing	Dimethylformamide/ methylcyclohexane		1818
Poly(ethylene-*co*-vinyl acetate)-*graft*-poly(styrene-*co*-acrylonitrile)				
	Cross fractionation by solvent mixing	Perchloroethylene/propylene carbonate (0.6 : 0.4)	Three layers	1818
	Extraction	Dimethylformamide/ methylcyclohexane	Lowering temp. and solvent demixing	1818
Poly(ethylene-*co*-propane-*co*-diene)-*graft*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	151
Poly(ethylene-*co*-propene-*co*-diene)-*graft*-poly(methyl methacrylate)				
	Chromatography	Isooctane/tetrahydrofuran		151
		Tetrahydrofuran	SEC, μ-styragel	151
Poly(fluoroalkyl acrylate)-*graft*-(poly(methyl methacrylate))				
	Extraction	Ethyl ether, methanol	Macromer	3534
Poly(hydroxyethyl methacrylate-*graft*-methyl methacrylate)				
	Extraction	Ethyl ether, methanol	Macromer	3534
Poly(isobutene oxide)-*graft*-poly(styrene)				
	Extraction	Benzene		2463

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(isobutene)-*graft*-poly(styrene)				
	Chromatography	Benzene–cyclohexane/isopropanol	Precipitation chromatogr.	694
		Cyclohexane/*n*-propanol	Precipitation chromatogr.	545
	Extraction	Butanone, cyclohexane		395
		n-Hexane, cyclohexane		2930
	Fractional precipitation	Cyclohexane/*n*-propanol		545
	Turbidimetric titration	Toluene/methanol		1778
Poly(isobutylene-*co*-isoprene)-*graft*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC	593
Poly(isoprene)-*graft*-poly(styrene)				
	Chromatography	Toluene	SEC, styragel, 82°C, 35°C	489,492,1183
Poly(1,3-diisopropenylbenzene)-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		1976
Poly(*p*-isopropylstyrene)-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Benzene/methanol		2077
Poly(methyl acrylate)-*graft*-poly(methyl methacrylate-d 5 sub)				
	Chromatography	Chloroform	SEC, styragel	2094
Poly(methyl acrylate)-*graft*-poly(styrene)				
	Fractional precipitation	Chloroform/methanol		3021
Poly(methyl acrylate-*co*-styrene-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Chloroform/methanol		3022
Poly(methyl acrylate)-*graft*-poly(vinyl chloride)				
	Fractional precipitation	Benzene/methanol		2707
Poly(methyl methacrylate)-*graft*-poly(butadiene)				
	Extraction	Petroleum ether, cyclohexane, acetone		490
Poly(methyl methacrylate)-*graft*-poly(β-hydroxybutyrate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 35°C	1776
Poly(methyl methacrylate)-*graft*-poly(isobutene)				
	Chromatography	Benzene	SEC	1665
	Extraction	Butanone, cyclohexane		395
Poly(methyl methacrylate)-*graft*-poly(isoprene)				
	Turbidimetric titration	Methylene dichloride + HCl/methanol + HCl		1333
Poly(methyl methacrylate)-*graft*-poly(isopropylstyrene)				
	Fractional precipitation	Benzene/isopropanol		833
Poly(methyl methacrylate)-*graft*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, permagel + ultrastyragel, 30–45°C	3005
	Extraction	Ethyl ether, methanol	Macromer	3534
Poly(methyl methacrylate)-*graft*-poly(oxypropylene)				
	Fractional precipitation	Toluene/*n*-heptane	25°C	2041
Poly(methyl methacrylate)-*graft*-poly(stearyl methacrylate)				
	Chromatography	Chloroform	Macromer, SEC, styragel	1447
Poly(methyl methacrylate)-*graft*-poly(styrene)				
	Chromatography	Tetrahydrofuran/acetonitrile	Reversed phase, silica-C18(subindice), gradient	3189
			SEC, μ-styragel	3190
		Tetrahydrofuran/*n*-heptane	HPLC reverse and normal phase mode	3147
		Tetrahydrofuran : acetonitrile gradient	HPLC (octadecyl modified silica), adsorption, composition	3190
	Extraction	Ethyl ether, acetonitrile, benzene		2205
	Fractional precipitation	Benzene–chlorobenzene (1 : 1)/methanol		570
		Benzene–acetone (1 : 1)/methanol + 0.1 M calcium chloride		109
		Benzene–chlorobenzene (1 : 1)/petroleum ether		109,973,1997
		Benzene/methanol		1249
		Benzene/petroleum ether		1249

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Butanone/methanol–water (1 : 1)		2722,3019
		Chloroform/methanol		3017,3021
	Turbidimetric titration	Benzene–chlorobenzene (1 : 1)/ petroleum ether		2200
Poly(methyl methacrylate)-*graft*-poly(vinyl acetate)				
	Chromatography	Acetone/acetone–water	Precipitation chromatogr., 45–15°C	1212
	Fractional precipitation	Acetone/methanol		1249,3017,3019
		Acetone/water–methanol (50 : 50)		1249
	Fractional solution	Acetone/water	Column extraction	57
Poly(methyl methacrylate)-*graft*-poly(vinyl chloride)				
	Fractional precipitation	Dioxane/methanol		3017
Poly(dimethyl vinyl siloxane)-*graft*-poly(acrylonitrile)				
	Extraction	Dimethylformamide, boiling benzene		268
Poly(α-methylstyrene)-*graft*-chlorobutyl rubber				
	Chromatography	Tetrahydrofuran	SEC, styragel	1662
	Extraction	*n*-Pentane, butanone, nitropropane		1662
Poly(α-methylstyrene-*co*-1,3-diisopropenylbenzene)-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		1976
Poly(phenyl vinyl sulfide)-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Benzene/methanol		1747
Poly(phthalimidoacrylate-*co*-styrene)-*graft*-poly(oxyethylene)				
	Chromatography	Water–methanol	SEC	308
Poly(propylene)-*graft*-poly(butyl acrylate)				
	Extraction	Acetone		1462
Poly(propylene)-*graft*-poly(*N,N*-dimethylaminoethyl methacrylate)				
	Chromatography	Xylene/*n*-octanol	Column extraction, 126°C	1462
	Extraction	Acetone		1462
Poly(propylene)-*graft*-poly(styrene)				
	Chromatography	Benzene/methanol	Precipitation chromatogr. temp. gradient, glass beads	900,901
		Chloroform/isopropanol	Column elution	900,901,1521
	Extraction	Benzene		738
	Turbidimetric titration	Benzene/methanol		900,1522
Rubber-*graft*-poly(methyl methacrylate)				
	Extraction	Acetone		194
		Petroleum ether, acetone		108
	Fractional precipitation	Acetone/*n*-hexane		1718
Poly(styrene-*co*-maleic anhydride)-*graft*-poly(acrylonitrile)				
	Fractional solution	Aq. acetone, tetrahydrofuran, dimethylformamide	Extraction	2730
Poly(styrene)-*graft*-poly(ethyl acrylate)				
	Extraction	Cyclohexane, ethyl ether, acetonitrile		1393
Poly(styrene-*alt*-maleic anhydride)-*graft*-poly(ethylene oxide)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	818
Poly(styrene-*co*-maleic anhydride)-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Acetone/methanol		2730
Poly(styrene-*co*-maleic anhydride)-*graft*-poly(vinyl chloride)				
	Extraction	Butanone, ammonium hydroxide		1888
Poly(styrene)-*graft*-poly(methyl methacrylate)				
	Extraction	Cyclohexane, acetonitrile, benzene		3512
Poly(styrene)-*graft*-poly(*tert*-oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC	1480
Poly(styrene-*co*-1-phenyl-2-(3-vinylphenylthiodiazene)-*graft*-poly(acrylonitrile)				
	Extraction	Chloroform, nitromethane/water, dimethylformamide		2422
Poly(styrene)-*graft*-poly(styrene-*co*-methyl methacrylate)				
	Fractional precipitation	Benzene/methanol		94
Poly(styrene)-*graft*-poly(vinyl acetate)				
	Fractional precipitation	Butanone/methanol		3017

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene-*co*-vinyl benzyl chloride)-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		497
Poly(styrene-*co*-vinylbenzophenone)-*graft*-poly(acrylonitrile)				
	Chromatography	Dimethylformamide	SEC	957
Poly(styrene-*co*-vinylbenzophenone)-*graft*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	957
Poly(tetrafluoroethylene-*co*-perfluorovinyl ether)-*graft*-poly(acrylic acid)				
	Extraction	Water		1261
Poly(tetrahydrofuran-*block*-ε-caprolactone)				
	Chromatography	Tetrahydrofuran	SEC	2413
Poly(tetrahydrofuran)-*graft*-poly(styrene)				
	Fractional precipitation	Tetrahydrofuran/isopropanol	Lowering temp.	2447
Poly(vinyl acetate)-*graft*-poly(methyl methacrylate)				
	Chromatography	Butanone/carbon tetrachloride (8/2)	TLC, silica gel	1357
		Methanol/water (9/1)	TLC, silica gel	1357
	Fractional precipitation	Acetone/methanol–water (1 : 2)		3017
Poly(vinyl acetate)-*graft*-poly(styrene)				
	Chromatography	Methanol–water (9 : 1)/chloroform		1357
	Fractional precipitation	Benzene/petroleum ether		1249
Poly(vinyl alcohol)-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Benzene/*n*-butanol		2814
Poly(vinyl alcohol)-*graft*-poly(styrene)				
	Chromatography	Benzene/methanol/butanone	Silica gel, column adsorption	1356
Poly(vinyl benzoate)-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Acetone/methanol		3018
Poly(vinyl benzoate)-*graft*-poly(vinyl acetate)				
	Fractional precipitation	Acetone/methanol–water		3018
Poly(vinyl chloride)-*graft*-poly(ethyl methacrylate)				
	Extraction	Acetone		546
	Fractional precipitation	Butanone/methanol		2707
		Dioxane/methanol		3017
		Tetrahydrofuran–acetone (1 : 3)/ methanol–water (4 : 1)		360
Poly(vinyl chloride)-*graft*-poly(glycidyl methacrylate)				
	Extraction	Butanone, isopropanol		2715
Poly(vinyl chloride)-*graft*-poly(isobutene)				
	Chromatography	Tetrahydrofuran	SEC	3
	Extraction	*n*-Pentane		1156,3197
Poly(vinyl chloride)-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Butanone/methanol		2707
Poly(vinyl chloride)-*graft*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3237
	Extraction	Benzene		3237
Poly(vinyl chloride)-*graft*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1652
	Extraction	Benzene, toluene toluene/dichloroethane		546
	Fractional precipitation	Benzene/methanol		973,2206
		Tetrahydrofuran/methanol		1869
		Tetrahydrofuran/petroleum ether		1652,1869
		Tetrahydrofuran/water		1869
Poly(vinyl chloride)-*graft*-poly(styrene-*co*-acrylonitrile)				
	Extraction	Toluene/dichloroethane mixtures		546
Poly(*N*-vinylcarbazole)-*graft*-poly(isoprene)				
	Chromatography	Tetrahydrofuran	SEC	1434
Poly(2-vinylpyridine)-*graft*-poly(acrylonitrile)				
	Fractional solution	Ethanol	Extraction	1493
		Ethanol/dimethylformamide		1493
Poly(2-vinylpyridine)-*graft*-poly(vinyl acetate)				
	Extraction	Benzene, water		3161
Poly(2-vinylpyridine)-*graft*-poly(vinyl alcohol)				
	Extraction	Benzene, water		3161

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
1.14. MIXTURE OF POLYMERS				
Poly(butadiene) + poly(α-methylstyrene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.34 : 0.66)	25°C	1816
Poly(butadiene) + poly(styrene-*co*-acrylonitrile)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.43 : 0.57)	25°C	1816
Poly(butadiene) + poly(vinyl chloride)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.4 : 0.6), (0.3 : 0.7)		1816
Poly(1-butene) + poly(propylene)				
	Fractional solution	Tetralin	Column elution increasing temp.	3016
Chlorinated poly(vinyl chloride) + poly(vinylchloride)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.4 : 0.6)	25°C, < 35% Chlorinated	1816
Poly(ethylene) + poly(ethylene)	TREF	Chloronaphthalene	HP-LDPE/LLDPE (ethylene-*co*-1-butene)	1648
Poly(ethylene) + poly(ethylene-*co*-propylene-*co*-diene)				
	TREF	Chloronaphthalene	EPDM	1648
Poly(ethylene) + poly(ethylene-*co*-vinylacetate)				
	TREF	Chloronaphthalene	LLDPE(ethylene-*co*-1-octene) + HP-EVA	1648
Poly(ethylene) + poly(isobutylene)				
	TREF	Chloronaphthalene		1648
Poly(ethylene) + poly(oxyethylene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8)		1816
Poly(ethylene) + poly(propylene)				
	Chromatography	1,2,4-Trichlorobenzene	SEC, 145°C	572
	Fractional crystallization	Perchloroethylene	Stirring	2560
	Fractional solution	Tetralin	Column elution increasing temp.	3016
Poly(ethylene) + poly(vinyl acetate)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.3 : 0.7)	25°C, LLDPE	1816
Poly(ethylene-*co*-propylene)-*block*-poly(ethylene) + poly(ethylene-*co*-propylene)-*block*-poly(ethylene)-*block*-poly(ethylene-*co*-propylene) mixture				
	Chromatography	Tetrahydrofuran	SEC, phenogel, 25°C	1021
	Fractional precipitation	Cyclohexanone + toluene/methanol		1021
Poly(ethylene-*co*-propylene) + poly(styrene-*co*-butylacrylate)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8)		1816
Poly(*p*-iodostyrene) + poly(vinyl acetate)				
	Extraction	Benzene		750
Poly(isobutylene) + poly(α-methylstyrene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.32 : 0.68)		1816
Poly(isobutylene) + poly(oxyethylene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8)	25°C	1816
Poly(isobutylene) + poly(styrene-*co*-butylacrylate)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8)	25°C, 72% S	1816
Poly(isoprene)-*block*-poly(*tert*-butylacrylate) + poly(isoprene)				
	Fractional precipitation	Toluene/methanol	20°C	3312
Poly(*p*-methoxystyrene) + poly(cyclohexane)				
	Chromatography	Carbon tetrachloride/ tetrahydrofuran	TLC, silica gel, gradient	1152
	Turbidimetric titration	Benzene : butanone (3 : 1)/ethanol		1152
Poly(methyl methacrylate) + poly(iminoadipoyliminohexamethylene) *(Nylon 66)*				
	Density gradient technique	Dichloroacetic acid/methanol		1350
	Extraction	Chloroform		1350

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TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional precipitation	Dichloroacetic acid/methanol		1350
		Formic acid/methanol		1350
		m-Cresol/methanol		1350
	Turbidimetric titration	*m*-Cresol/methanol		1350
Poly(methyl methacrylate) + poly(lauryl methacrylate)				
	Fractional precipitation	Benzene/methanol	20°C	29
Poly(methyl methacrylate) + poly(*n*-hexyl methacrylate)				
	Fractional precipitation	Benzene/methanol	20°C	29
Poly(dimethylsiloxane) + poly(ethylene-*co*-vinylacetate)				
	Fractional demixing	Methanol : heptane (0.48 : 0.52)	25°C, 70% VA	1816
Poly(dimethylsiloxane) + poly(α-methylstyrene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.4 : 0.6)	25°C	1816
Poly(dimethylsiloxane) + poly(oxyethylene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8), methanol : heptane (0.28 : 0.72)	25°C	1816
Poly(dimethylsiloxane) + poly(vinyl chloride)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.4 : 0.6), (0.3 : 0.7)	25°C	1816
Poly(methacrylic acid)-*block*-poly(2-vinyl pyridine) + poly(2-vinyl pyridine)				
	Extraction	Methanol	Homopolymer	3082
Poly(methacrylic acid)-*block*-poly(2-vinyl pyridine) + poly(methacrylic acid)				
	Extraction	Acetonitrile	Homopolymer	3082
Poly(propylene) + poly(ethylene-propylene) rubber				
	Fractional precipitation	1,2,4-Trichlorobenzene	TREF	2185
Poly(propylene) + poly(ethylene-*co*-propylene) + poly(ethylene)				
	TREF	Trichlorobenzene	Chromosorb P, analytical and preparative, impact-resistane PP	2184
Poly(styrene) + poly(butadiene)	Chromatography	Tetrahydrofuran		2795
Poly(styrene) + poly(dimethylsiloxane)				
	Chromatography	Toluene	SEC, 20°C	701
Poly(styrene) + poly(ethylene)	Chromatography	1,2,4-Trichlorobenzene	SEC, styragel, 145°C	572
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.24 : 76), (0.25 : 0.75)		1816
Poly(styrene) + poly(ethylene-*co*-propylene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8)	25°C (53% PE-47% pp)	1816
Poly(styrene) + poly(ethylene-*co*-propylene-*co*-dicyclo pentadiene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.2 : 0.8)	25°C (50% PE-43% PP-7% DCP)	1816
Poly(styrene) + poly(ethylene-*co*-vinylacetate)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.3 : 0.7)	25°C 8.5% VA	1816
Poly(styrene) + poly(isobutylene)				
	Fractional demixing	Dimethylformamide : methylcyclohexane (0.24 : 0.76)	45°C	1816
Poly(styrene)-*block*-poly(isoprene) + poly(styrene)				
	Fractional precipitation	Cyclohexane/1-propanol, dioxane/1-propanol		650
Poly(styrene) + poly(methyl methacrylate)				
	Chromatography	Toulene	SEC + adsorption (separation mixtures)	1477
		Toulene, tetrahydrofuran	SEC/adsorption, (separation) mixtures	1478
		Trichloroethylene	SEC, 23°C	3195
	Fractional precipitation	Benzene/methanol	30°C	176
		Tetrahydrofuran	SEC	1898
	Turbidimetric titration	Benzene/methanol	25°C	1415
Poly(styrene) + poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	348
Poly(styrene) + paraffin	Fractional solution	Chloroform	Column extraction	1732
Poly(styrene) + poly(vinyl acetate)				
	Extraction	Methanol		750

TABLE 1. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene) + poly(vinyl chlroide)				
	Extraction	Cyclohexane		750
Poly(vinyl acetate) + poly(vinyl chloride)				
	Extraction	Tetrahydrofuran		750
Poly(vinyl alkyl ether) + poly(cyclic ethers)				
	Extraction	*n*-Heptane, acetone		2644

TABLE 2. MAIN-CHAIN CARBOCYLIC POLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
2.1. POLY(PHENYLENES)				
Poly(2,5-dialkoxy phenylene)	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	3305
Poly(anthracene)	Extraction	Benzene, acetone, etc.		1304
	Fractional precipitation	Benzene/methanol		307,1128
Poly(benzene-*co*-anthracene)	Extraction	Benzene,bromobenzene		307
Poly(bromophenylenes) oligomers				
	Fractional solution	Dioxane/water		2914
Poly(*p*-dichloromethylbenzene-*co*-benzene)				
	Chromatography	Chloroform	SEC	1117
Poly(*p*-dichloromethylbenzene-*co*-diphenylmethane)				
	Chromatography	Chloroform	SEC	1118
Poly(cumarone-*co*-indene)	Fractional precipitation	Benzene–ethyl acetate/methonal		3587
Poly(ethynylene-phenyleneethynylene)				
	Chromatography	*o*-Dichlorobenzene	SEC, 120°C	3459
Poly(7,16-dihydroheptacenes)	Chromatography	Tetrahydrofuran	SEC, analytical and preparative	2840
Poly(indene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3202
Poly(bis-indenylene)	Chromatography	Benzene	SEC	2393
		Tetrahydrofuan	SEC, μ-styragel	2678
Poly(1,3-diisopropenylbenzene)	Chromatography	Tetrahydrofuran	SEC, styragel	1976
Poly(1,4-diisopropenylbenzene)	Chromatography	Tetrahydrofuran	SEC, styragel	1976
Poly[(2-methoxycarbonyl)phenylene-1,4-diyl]				
	Chromatography	Tetrahydrofuran	SEC	552
Poly(dimethylbiphenylene)	Chromatography	Chloroform	SEC, styragel	1797
Poly(phenylenes)	Fractional precipitation	Toluene/cyclohexane		537
Poly(1,4-phenylene(methylmethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	541
Poly(diphenylmethylene)	Fractional precipitation	Benzene/methanol		3332
Poly(divinylbenzenes)	Chromatography	Tetrahydrofuran	SEC, TSK gel	2403
2.2. FORMALDEHYDE RESINS				
Phenolic resin (General)	Fractional precipitation	Acetone, tetrahydrofuran/water		3091,3092
Poly(ureas) - General	Fractional precipitation	Phenol–tetrachloroethane (1 : 1)/ethanol-*n*-heptane		2550
Poly(dibenzothiophenolformaldehyde)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1061
p-tert-Butylphenolformaldehyde				
	Chromatography	Tetrahydrofuran	SEC, styragel	2416
p-Cresol–formaldehyde	Chromatography	Tetrahydrofuran	SEC, Merck gel	414
	Fractional precipitation	Benzene/methanol, Benzene/petroleum ether		1670
		Dimethylformamide/water		3213
		Dioxane, dichloroethane, trichloroethylene/methanol, ethanol,*n*-propanol, *n*-butanol, ethyl ether, formamide		3390

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TABLE 2. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Tetradydrofuran–methanol(1 : 2) water		1670
		Tetrahydrofuran/petroleum ether		1670
		Toluene/petroleum ether		1670
Formaldehyde – sodium napthalene sulfonate				
	Fractional precipitation	Water/acetone		2572
Poly(*p*-hydroxybenzoic acid-*co*-*p*-bromophenol-*co*-formaldehyde)				
	Fractional precipitation	Methanol/water	Random copolymer	550
Melamine – formaldehyde resins	Chromatography	Dimethylformamide	SEC	415
			SEC, Merck gel	413,417
Methylphenol derivatives – formaldehyde				
	Chromatography	Benzene/acetic acid/water (80 : 24 : 3)	Paper chromatogr., 15°C	891
Phenol–formaldehyde	Chromatography	Benzene – acetic acid – water	Paper partition	891,2558
		Tetrahydrofuran	SEC, μ-styragel	175,788,3098
			SEC, Merck gel	414
			SEC, styragel	1432,1562,2239, 2790,3407
	Coacervation	Ethanol or dioxane/salts in water		481
		Methanol, ethanol, *n*-propanol, novolac, dioxane/carbon dioxide, water solution		482
	Fractional precipitation	Acetone–methanol/petroleum ether		527
		Acetone/petroleum ether	30°C	1562
		Acetone/water		
		Dioxane, dichloroethane, trichloroethylene/methanol, ethanol, *n*-propanol, *n*-butanol, ethyl ether, formamide		527,3212,3213,
		Methanol/water		481
	Turbidimetric titration	Acetone/diluted sulfuric acid		526
		Methanol/diluted sulfuric acid		526
		Toluene/*n*-hexane, toluene/methanol		11
Phenolated phenanthrene – formaldehyde				
	Chromatography	Dichloroethane	SEC, styragel, analytical and preparative	1277
		Tetrahydrofuran	SEC, styragel, analytical and preparative	1277
Poly(phenol)s	Chromatography	Water, methanol	SEC	3485
Poly(diphenyl ether-*co*-formaldehyde)				
	Fractional precipitation	Benzene/methanol	30°C	2397
Resorcinol–formaldehyde	Chromatography	Tetrahydrofuran	SEC, oligomers	1348
Urea–formaldehyde	Chromatography	Tetrahydrofuran	SEC	1349,1617
	Fractional precipitation	Diemthyl sulfoxide/acetone		1617
		Ethanol–water(1 : 1)/methanol		3391

TABLE 3. MAIN-CHAIN HETEROATOM POLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
3.1. POLY(OXIDES)				
Poly(acetaldehyde), see Poly(oxyethylidene)				
Poly(acrolein)	Chromatography	Tetrahydrofuran	SEC,Styragl	1144
Poly(aldehydes) general	Extraction	Boiling acetone, diisopropyl ether, benzene	Amorphous + crystalline	2368

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TABLE 2. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Tetradydrofuran–methanol(1 : 2) water		1670
		Tetrahydrofuran/petroleum ether		1670
		Toluene/petroleum ether		1670
Formaldehyde – sodium napthalene sulfonate				
	Fractional precipitation	Water/acetone		2572
Poly(*p*-hydroxybenzoic acid-*co*-*p*-bromophenol-*co*-formaldehyde)				
	Fractional precipitation	Methanol/water	Random copolymer	550
Melamine – formaldehyde resins	Chromatography	Dimethylformamide	SEC	415
			SEC, Merck gel	413,417
Methylphenol derivatives – formaldehyde				
	Chromatography	Benzene/acetic acid/water (80 : 24 : 3)	Paper chromatogr., 15°C	891
Phenol–formaldehyde	Chromatography	Benzene – acetic acid – water	Paper partition	891,2558
		Tetrahydrofuran	SEC, μ-styragel	175,788,3098
			SEC, Merck gel	414
			SEC, styragel	1432,1562,2239, 2790,3407
	Coacervation	Ethanol or dioxane/salts in water		481
		Methanol, ethanol, *n*-propanol, novolac, dioxane/carbon dioxide, water solution		482
	Fractional precipitation	Acetone–methanol/petroleum ether		527
		Acetone/petroleum ether	30°C	1562
		Acetone/water		
		Dioxane, dichloroethane, trichloroethylene/methanol, ethanol, *n*-propanol, *n*-butanol, ethyl ether, formamide		527,3212,3213,
		Methanol/water		481
	Turbidimetric titration	Acetone/diluted sulfuric acid		526
		Methanol/diluted sulfuric acid		526
		Toluene/*n*-hexane, toluene/methanol		11
Phenolated phenanthrene – formaldehyde				
	Chromatography	Dichloroethane	SEC, styragel, analytical and preparative	1277
		Tetrahydrofuran	SEC, styragel, analytical and preparative	1277
Poly(phenol)s	Chromatography	Water, methanol	SEC	3485
Poly(diphenyl ether-*co*-formaldehyde)				
	Fractional precipitation	Benzene/methanol	30°C	2397
Resorcinol–formaldehyde	Chromatography	Tetrahydrofuran	SEC, oligomers	1348
Urea–formaldehyde	Chromatography	Tetrahydrofuran	SEC	1349,1617
	Fractional precipitation	Diemthyl sulfoxide/acetone		1617
		Ethanol–water(1 : 1)/methanol		3391

TABLE 3. MAIN-CHAIN HETEROATOM POLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
3.1. POLY(OXIDES)				
Poly(acetaldehyde), see Poly(oxyethylidene)				
Poly(acrolein)	Chromatography	Tetrahydrofuran	SEC,Styragl	1144
Poly(aldehydes) general	Extraction	Boiling acetone, diisopropyl ether, benzene	Amorphous + crystalline	2368

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Methanol, chloroform	Amorphous + crystalline	938
		Propio-,butyr, isobutyr-, and isovaleraldehydes	Amorphous + crystalline	2368
Poly(β-allyloxypropionaldehyde)				
	Chromatography	Tetrahydrofuran	SEC, styragel	137
Poly(aryl ether isoquinoline)s	Chromatography	Chloroform	SEC, μ-styragel	3004
Poly(1-butene oxide), see Poly(oxy(ethylethylene)				
Poly(epichlorohydrin), see Poly(oxy(chloromethyl)ethylene)				
Poly(epoxides)	Chromatography	Benzene	SEC, styragel	1263
Poly(ether ether ketimine)	Chromatography	Tetrahydrofuran	SEC,μ-styragel, 35°C	2778
	Fractional precipitation	Benzene/*n*-hexane	20–35°C	2778
Poly(ethylene oxide), see Poly(oxyethylene)				
Poly(glutaraldehyde)	Chromatography	Dimethylformamide	SEC, styragel	2038
Methyl [poly(ether ether ketone)]				
	Fractional precipitation	*N*-Methyl-2-pyrrolidone + chloroform/methanol	Hot dissolved in NMP and diluted in chloroform	3417
Poly(2-methyl-1,4,6-trioxa-spiro-(4,4)-nonane)				
	Chromatography	Tetrahydrofuran	SEC,μ-styragel	3226
Poly(*cis*-1,4-bis((methylsfulfonyl)methyl) cyclohexane),(*trans*-1,4-bis(methylsulfonyl)methyl)cyclohexane)				
	Chromatography	Chloroform	SEC, styragel, 40°C	2566
Poly[1,3-bis(1-naphthoxy)benzene]				
	Chromatography	Chloroform	SEC, styragel, 40°C	2567
Poly[2,2′-bis(1-naphthoxy)biphenyl]				
	Chromatography	Chloroform	SEC, styragel, 40°C	2567
Poly[4,4′-bis(1-naphthoxy)biphenyl]				
	Chromatography	Chloroform	SEC, styragel, 40°C	2567
Poly(oxadiazo-3,5-diyl-perfluoroethylidene-*block*-oxyperfluoropropylene)				
	Chromatography	1,1,2-Trichloro-1,2,2-trifluoroethane (Halocarbon 113)	SEC, porous silica	1765
Poly(oxy-2-butenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	2324
Poly(oxy(*tert*-butyl)ethylene)	Fractional crystallization	Benzene	80°C, lowering temp.	53
	Fractional precipitation	Benzene/methanol		764
Poly(oxy(4-chlorobutyl)ethylene)				
	Cromatography	Tetrahydrofuran	SEC, styragel	2966
Poly(oxy(2-chloroethyl)ethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2966
Poly(oxy(chloromethyl)ethylene)				
	Extraction; precipitation	Acetone(cold), acetone/methanol, methanol/water		1431
Poly(oxy(3-chloropropyl)oxirane)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2966
Poly(oxy-2-cyanoethyloxymethylene)				
	Fractional solution	Acetone, dimethylformamide		3097
Poly(oxy-1,2-cyclohexylene)	Chromatography	Tetrahydrofuran		1240,1241
	Fractional precipitation	Benzene/methanol	25°C	2128
Poly(oxy-1,4-cyclohexylene) *(poly(1,4-cyclohexane oxide)*				
	Chromatography	*m*-Cresol-chlorobenzene (1 : 1)	SEC, 25°C	3073
		Tetrahydrofuran	SEC,μ-styragel	319
Poly(oxy-3,5-dimethyl-1,4-cyclohexylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1754
Poly(oxy-2,6-dimethyl-1,4-phenylene)				
	Chromatography	Carbon tetrachloride/methanol (98/2)	TLC, silica gel	2785
		Chloroform	SEC, styragel	120,3219
		Dimethyl sulfoxide	SEC	1932
		Methylene dichloride	TLC, silica gel	2785
		o-Dichlorobenzene	SEC, 80°C	1391
			SEC, styragel, 140°C	3320
		Tetrahydrofuran	SEC	2724,3460
			SEC, μ-styragel	2564
			SEC, μ-styragel, 40°C	230
		Toluene	SEC	31
	Fractional precipitation	Benzene/methanol		120

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Chloroform/methanol	20°C, preparative	217,1871,2504
		Ethylene dichloride/nitromethane		3061
		Toluene/methanol	20°C, preparative	217,220,1871
		Toluene/petroleum ether		152
	Fractional solution	Chloroform/acetone		3320
		Chloroform/methanol	Column extraction	456
	Stirring fractionation	Dioxane		31
	Turbidimetric titration	Chloroform/ethanol	25°C	456
Poly(oxy-1,1-dimethyltrimethylene) *[(Poly(2,2-dimethyloxacyclobutane)]*				
	Chromatography	Tetrahydrofuran		1758
Poly(oxy-2,2′-dimethytrimethylene) *Poly(3,3′-dimethyloxetane)*				
	Fractional precipitation	Chlorobenzene/ethanol		1099
		Cyclohexane/ethanol	30°C	2577,2579
Poly(oxy-2,6-diphenyl-1,4-phenylene)				
	Chromatography	Benzene	50°C	2981
		Methylene dichloride	25°C	1517
		Tetrahydrofuran		1087
Poly(oxy(ethylethylene) *poly(1-butene oxide)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	27,1889,2009
		Trichlorobenzene	SEC, 90°C	389
	Fractional precipitation	Benzene/methanol		389
Poly(oxy(2-hydroxytrimethylene)oxy-1,4-phenyleneiopropylidene-1,4-phenylene)				
	Chromatography	Chloroform	SEC,μ-styragel	455
		Chloroform/ethanol (2/1)	SEC, Sephadex	245
		Tetrahydrofuran	SEC, butyl methacrylate gel	1843
			SEC, styragel	819,847,1843
	Fractional solution	Chloroform/*n*-hexane	Column extraction	2322
Poly(oxy-3-methyl-3-chloromethyltrimethylene)				
	Sedimentation velocity	Butanone	21°C	36
Poly(oxy-2-methyl-1,4-cyclohexylene)				
	Chromatography	Tetrahydrofuran	SEC	1754,1755
Poly(oxy(1-methyl)trimethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1756,1757,2441
Poly(oxy(2-methyl)trimethylene)				
	Fractional precipitation	Chloroform/methanol	25°C	2739
Poly(oxy-4-phenylazo-1,2-phenylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2312
Poly(oxydecamethylene)	Fractional precipitation	Benzene/methanol		3523
Poly(oxyethylene)	Chromatography	Acetone	SEC, Sephadex, 50°C	1520
		Benzene	SEC, styragel	1263
		Butanone/water (1/1)	TLC, kieselgel	465
		Chloroform/ethanol (10/1)	TLC, alumina	978
		Chloroform/pyridine(5/7)	TLC, silica gel	978
		Dimethylacetamide	SEC, 74°C	1813,1822
		Dimethylacetamide	GLC of trimethylsilyl ether derivatives, low MW	898
		Ethylene glycol/methanol (4/1)	TLC, gradient const.	2480
		Methanol followed by methanol/dimethylformamide (4/1)	Gradient elution, TLC	2480
		o-Dichlorobenzene	SEC	3437
			SEC, 130°C	1251,1252
		Pyridene–water (0.1 : 10)	TLC, silica gel	978
		Tetrahydrofuran	SEC	27,1264,1265
			SEC, 24.9°C	566
			SEC, butyl methacrylate-*co*-triethylene glycol methacrylate gel	2003
			SEC, PS-PSOE network	269
			SEC, styragel, 25°C	667,1683, 2049,3034
			Tosylated, SEC, ultrastyragel	3112
			Tosylated, SEC, μ-spherogel	3112

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			Tosylated, SEC, μ-styragel	3112
		Toluene	SEC, butyl methacrylate-*co*-triethylene glycol methacrylate gel	2003
			SEC, TSK gel	1224
		Trichloroethylene	SEC, 23°C	3195
		Water	SEC, TSK gel	1224,3557
			SEC, aquagel-OH	2121
			SEC, modified glass beads	1611,1612
		Water, water/methanol (80:20), (60:40), dimethylformamide	SEC, poly(acrylamide gel)	719
	Extraction	Water/chloroform–benzene	Distribution between two immiscible liquid countercurrent	520
		Water/*n*-hexane	Distribution between two immiscible liquid countercurrent	520,521
	Field flow	Methanol		1689
	Fractional crytallization	Benzene/isooctane		388
		Ethanol		1237
	Fractional precipitation	Benzene/ethyl ether	20°C	1528,1529
		Benzene/isooctane		16,52,264,265, 266,353,388,391, 1820,1986,2290, 3062,3063,3064, 3065,3066
			37°C	3086
			65°C, low MW	734
		Benzene/isooctane (68/32)	Lowering temp.	2731
		Benzene/isooctane (7/3)	Lowering temp.	263
		Benzene/*n*-heptane		1237,2757,2807
		Benzene/*n*-hexane	Low temp.	180
		Chloroform/*n*-hexane		172
		Isopropanol/*n*-heptane		2757
		Toluene/isooctane		1987
		Touene/*n*-hexane	60°C	720
		Water(0.375 M sodium percarbonate)	LCST, raisng temp., star	3557
		Water, potassium sulfate	Lowering temp.	792
	Fractional solution	Benzene/*n*-heptane	Low MW	721
	Sedimentation equilibrium	Aq. 0.1–hydrochloric acid	Ultracentrifuge, 25°C	398
	Sedimentation velocity	Aq. 0.1–hydrochloric acid	Ultracentrifuge, 25°C	398
	Turbidimetric titration	Benzene/isooctane		16
		Benzene/*n*-heptane	35°C	1236
		Chloroform/*n*-hexane		833
		Isooctane/benzene (100/48)	Lowering temp.	1237
Poly[oxyethyleneoxyethyleneoxyethyleneoxy(1,4′-biphenylyl)-2,4-phenyl] butane				
	Chromatography	Tetrahydrofuran	SEC, styragel,40°C	2571
Poly(oxyhexamethylene)	Fractional precipitation	Benzene/methanol	40°C	2032
		Butanone	30°C, phase separation at 28°C	3522
		Dioxane/methanol	54°C	2031
		Tetrahydrofuran/methanol	40°C	2028,2031,2033,2734
Poly(oxymethylene(2-hydroxy-5-methyl-1,3-phenylene) methylene)				
	Fractional precipitation	Benzene/petroleum ether	35°C	1524
Poly(oxymethylene) *Poly(formaldehyde)*				
	Chromatography	1,1,1,3,3,3-Hexafluoro-2-propanol	SEC	1222
		Dimethylacetamide	SEC, styragel, 150°C diol, diacetate and diethyl ether ends	610
		Dimethylformamide	SEC	419
	Extraction	Dimethylformamide	Lowering temp. fractional	757,2461
		o-Dichlorobenzene	150–164°C	2002
	Fractional crystallization	*p*-Chlorophenol	Stirred, 60°C	1712,1713
		Phenol	Lowering temp. diacetate	3072
	Fractional precipitation	Dimethylformamide	Lowering temp.	757
			Methoxy capped, 123.5–106°C	1327

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional solution	Phenol/ethyl cellosolve	Column extraction, Kieselite	1535,1713
		Tetrachloroethane–phenol (3 : 1)/*n*-hexanol	120°C	1129
			Column extraction, 130°C	1129
	Turbidimetric titration	Dimethylformamide	Lowering temp.	3359
Poly(oxymethylene oxy tetramethylene) *Poly(1,3-dioxepane)*				
	Fractional precipitation	Benzene/methanol	30°C	2035
Poly(oxymethyleneoxyethylene) *Poly(1,3-dioxolane)*				
	Chromatography	Benzene	SEC	1640
		Tetrahydrofuran	SEC, styragel	1807
		Water and water + Sodium chloride 0.1N	SEC	290
	Fractionation precipitation	Benzene/*n*-hexane–ethanol		34
		Chlorobenzene	Lowering temp.	2735
		Chloroform/*n*-hexane–methanol	25°C	32,33
		Dichloroethane/methanol	Lowering temp.	121
Poly(oxymethyleneoxymethylene-1,4-phenymethylene)				
	Fractional precipitation	Chlorofrom/methanol		2737
Poly(oxymethyleneoxytetramethylene)				
	Fractional separation	Benzene/methanol		1002
Poly(oxyoctadecylethylene)	Extraction	Boiling methylene dichloride		107
		Fractional precipitation dichloride/*n*-hexanol	Methylene	107
Poly(oxyoctamethylene)	Fractional precipitation	Benzene/methanol		2029,2030,2574
Poly(oxyphenylethylene)	Fractional precipitation	Benzene/isooctane	25°C	53
		Toluene/*n*-hexane	30°C	2091
Poly(oxypropylene) *Poly(propylene oxide)*				
	Chromatography	Acetone	TLC	3330
		Aq. 0.3 M sodium hydroxide	SEC, 25°C Polyurethane gel	3326
		Aq. 1.0 M sodium chloride	SEC, 25°C PMMA gel	3326
		Benzene	Membrane chromatogr.	2155
			SEC, styragel	3307
		Benzene,*n*-heptane	Extraction from an active support	961
		Butanone	TLC	3330
		Chlorobenzene	Membrane chromatogr.	2155
		Chloroform	SEC, styragel, preparative	1435
		Chloroform	SEC, phenogel, oligomers	3227
		Ethyl acetate	TLC	3330
		Ethyl acetate + water	TLC, silica gel	3326
		Ethyl acetate/water, ethyl acetate/butanone	Column, elution, silica gel	3326
		Isooctane	SEC, Merck gel, 95–96°C	77
		Methanol	Column elution, silica gel	3326
		Methanol/water	Precipitation chromatogr. 20–60°C	2889
		Tetrahydrofuran	SEC	3156
			SEC, styragel	27,1435,1780, 2150,2161,2540, 2541,2889, 3336,3337
			SEC, styragel, 40°C, stereoregular-*trans*	76
		Toluene	SEC	2889
	Distribution between immiscible liquids	Water/chloroform–benzene	Countercrurrent	520
		Water/*n*-hexane	Countercurrent	5,507,-521
	Extraction	Acetone	0°C(D,L)	3250
			Tacticity	1307
		Acetone(cold), acetone/methanol, methanol/water	Amorphous + crystalline	1431
		Acetone (0°C), *n*-hexane (− 78°C)	Optically active	1422,1423, 1424,1425
		n-Hexane	− 78°C(D-L)	1423

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional crystallization	Acetone, *n*-hexane	Lowering temp.	3307
		Isooctane	40°C	51
			Lowering temp.	49,385,387,2655
			Lowering temp.	76
	Fractional precipitation	Acetone	Lowering temp. 0°C to − 78°C crystalline + amorphous(D, L comp.)	960 960
		Isooctane	Lowering temp.	3311
	Fractional solution	Acetone	0°C, crystalline + amorphous	962
		Acetone/isopropyl ether	Column extraction, alumina	2288
		Ethanol/water	Column extraction	627
		Isooctane		390,606
			60°C, lowering temp.	49
		Isooctane/octamethyl tetrasiloxane	Amorphous, extracted with isooctane at 40°C, crystalline fractionated at 70,74°C	51
		Isopropanol/water	70°C, 74°C	50
		Methanol/water	25°C	50
Poly(oxytetramethylene)	Chromatography	Acetone/water		1844,2431
		Butanone	SEC, styragel	3125
		Dimethyformamide	SEC, Merckogel PVA gel	1790
		Methanol–water mixtures	Dicarbamates, HPLC, 35°C	92
		Tetrahydrofuran	SEC (Low MW)	1220
			SEC, styragel	92,672,1746, 1840,1841,3125
			SEC, ultrastyragel, 30°C	567
		Toluene	SEC, Styragel	329
		Toluene, ethyl benzene, ethyl acetate, dioxane, tetrahydrofuran, cyclohexane, methyl ethyl ketone, benzene	ThFFF	3339
	Distribution between immiscibe liquids	Cyclohexane–toluene (9 : 1)/ water–methanol		1509
	Extraction	Isopropanol/water	Continuous extraction	345
		Water/acetone	Mixtures	1844
	Fractional precipitation	Acetone	Lowering temp.	2786
		Benzene/methanol		43,861,862
		Benzene/*n*-hexane	60°C	180
			Lowering temp.	179
		Toluene/methanol		2005
	Fractional solution	Butanone	Column, elution, silica gel	1840,1841
		Ethyl ether/petroleum ether	22°C	1396
		Hydrocarbons, alcohols, water		2296
		Isopropanol/water	50 C, low MW	344
	Sedimentation velocity	Ethyl acetate–*n*-hexane (22.3 : 77.7)	30°C	3531
	Turbidimetric titration	Ethanol/water		2005
Poly(oxytrifluoropropylene) *Poly(trifluoropropylene oxide)*				
	Coacervation	Acetone/toluene–water (1 : 25)	30°C	1691
Poly(oxytrimethylene)	Chromatography	Chloroform	SEC, μ-styragel, 35°C	2687
	Fractional precipitation	Acetone/water		2578,3134
Perfluoropoly(ether) copolymer	(General)			
	Fractional precipitation	CFC 113/methanol		2831
Perfluoropoly(oxyalklenes)	Chromatography	Delifrene-LS/methanol	Oligomers	1923
	Fractional precipitation	Delifrene-LS/methanol	Oligomers	1923
Poly(2-phenoxymethyl-1,4,6-trioxa-spiro-4,4-nonane)(polymer derived from :)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3226
Poly(phenyl glycidyl ether)	Chromatography	Butanone,butanone + *n*-heptane	Adsorption chromatogr. silica gel, 20°C	1834
		Tetrahydrofuran	SEC, styragel	1834
Poly(2-phenyl-1,4,6-trioxa-spiro-(4,4)-nonane)(polymer from :)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3226

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(prophyrin oxide)s	Chromatography	Chloroform	SEC, μ-styragel	2859
Poly(tetrahydrofuran)	Chromatography	Chloroform	SEC, ultrastyragel	3553
Poly(thio-2,2′-dimethyltrimethylene)				
	Fractional precipitation	Benzene/methanol	25°C	1882,1883
Poly(triazine-2,4 diyl-perfluoroethylidene-block-oxyperfluoropropylene)				
	Chromatography	1,1,2-Trichloro-1,2,2,-trifluo roethane(Halocarbon 113)	SEC, porous silica	1765

3.2. POLY(CARBONATES)

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(carbonates) (general) poly(oxycarbonyloxy .....)				
	Fractional precipitation	Methylene chloride/*n*-heptane		3216
	Turbidimetric titration	Chloroform/methanol		1804
Poly(carbon dioxide)-*alt*-(oxypropylene); poly(oxypropylene)				
	Chromatography	Tetrahydrofuran		28
Poly(2,4-hexadiyn-1,6-ylene carbonate)				
	Chromatography	Terahydrofuran	SEC, styragel	1814
Poly(bis(4-hydroxyphenyl)isopropylidene; di(4-hydroxyphenyl)ethylene)-*alt*-phosgene)				
	Turbidimetric titration	Methylene dichloride/methanol		1740
Poly(bis(4- hydroxyphenyl)isopropylidene; diethylene glycol)-*alt*-phosgene)				
	Chromatography	Tetraydrofuran	SEC, μ-styragel	1999
Poly(bis(4-hdroxyphenyl)isopropylidene; (4-hydroxy-3,5-dichlorophenyl) isopropylidene)-*alt*-phosgene)				
	Turbidimetric titration	Methylene dichloride/methanol		1740
Poly(bis(hydroxyphenyl)isopropylidene; di(4-hydroxyphenyl)sulfone-*alt*-phosgene)				
	Turbidimetric titration	Methylene dichloride		1740
Poly(bis(4-hydroxyphenyl)isopropylidene terephthalic acid)-*alt*-phosgene				
	Chromatography	Tetrahydrofuran	SEC, zorbax	2045
Poly(bis(4-hydroxyphenyl)isopropylidene;terephthalic acid)-*alt*-phosgene)				
	Chromatography	*o*-Dichlorobenzene	SEC, styragel	2662
Poly(oxybutane oxyadipoyl)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, oligomers	3121
Poly(oxycarbonyloxy-1,4-phenylene isopropylidene-1,4-phenylene)				
	Chromatography	Methylene chloride/diethylene glycol	Continous fractionation (counter current extraction) >25°C	3443
		Methylene dichloride	SEC, ultrastyragel	173
			SEC, μ-styragel	1906
			SEC, styragel	4,1321,3562
		Methylene dichloride/ *n*-heptane		3291,3292,3293
		Tetrahydrofuran	SEC, μ-styragel	65,174,177, 231,458,683,806, 854,2171,3443
			SEC, ultrastyragel, 35°C	824
	Extraction	Hot benzene	Low MW	1906
	Extraction (CPF)	Methylene chloride–diethylene glycol	Continous operation	3443
	Fractional precipitation	1-2-Dichloroethane/isooctane	50°C	231
		Chloroform/methanol	23°C, 25°C	539,1068,2254, 2256,2257
		Chloroform/*n*-octane		1068
		Methylene chloride–cresol/ petroleum ether	– 20°C	1975
		Methylene chloride/methanol	0, 20, 25, 30°C	1068,1353,1975,3009
		Methylene chloride/*n*-heptane		312
		Methylene chloride/*n*-octane	25°C, 30°C	1068
		Methylene chloride/petroleum ether	25°C	1975
		Methylene dichloride/methanol		173
		Tetrachloroethane/paraffin oils	25°C	1975
	Fractional solution	Methylene dichloride/*n*-hexane		1069
	Turbidimetric titration	Dioxane–tetralin (7 : 10)/cyclohexane/decalin(1 : 1))		2297
		Methylene dichloride/methanol		1069
Poly(oxycarbonyloxy-1,4-phenylene-1-cyclohexylene-1,4-phenylene)				
	Fractional precipitation	Methylene dichloride/methanol		999

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxycarbonyloxytrimethylene) *Poly(trimethylene carbonate)*				
	Chromatography	Tetrahydrofuran	SEC	1795
Poly[oxythiocarbonyloxy-1,4-phenylene (methyl) phenylmethylene-1,4-phenylene]				
	Fractional precipitation	Chloroform/methanol		996
Poly[2,2-propane-bis(4-phenylthiocarbonate)]				
	Fractional precipitation	Chloroform/methanol		994
3.3. POLY(ESTERS)				
Poly(esters) (general)	Chromatography	Chloroform/ethanol, ethyl ether/water	Paper chromatogr., oligomers from aliphatic and armoatic diacids and glycols	122
		Ethanol-cyclohexane(3 : 7)/ cyclohexane	Precipitation chromatogr.	2646
Poly(adipic acid-*co*-ethylene glycol), see Poly(oxyethyleneoxyadipoyl)				
Poly(adipic acid-co-poly(ethylene glycol)				
	Fractional precipitation	Acetonitrile/isopropyl ether		833
		Chloroform/*n*-hexane		833
	Fractional solution	Butanone	Column extraction, silica gel	3559
Poly(adipic acid-*co*-glycerol)	Fractional precipitation	Benzene/petroleum ether		527
Poly(adipic acid-*alt*-(propylene glycol, ethylene glycol)				
	Chromatography	Toluene/ethanol (93 : 7), toluene/ethanol (90 : 10)		3331
Alkyd resins	Turbidimetric titration	Acetone/water		1454
		Butanone/methanol		2768
		Dioxane/water		1454
Poly(benzene-1,3,5-triacetic acid-*co*-decamethylene glycol)				
	Chromatography	Benzene	SEC	1541
	Sedimentation velocity	Butanone	Ultracentrifuge	3105
Poly(ω-caprolactone), see Poly(oxy(1-oxohexamethylene)				
Poly(diethylene glycol-1,4-*trans*-cyclohexanedicarboxylate)				
	Fractional precipitation	Chloroform/methanol	35°C	2745
Poly(ethylene terephthalate), see Poly(oxyethyleneoxyterephthaloyl)				
Poly(2,4-hexadiyn-1,6-ylene adipate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1814
Poly(β-hydroxyalkanoate)s	Chromatography	Chloroform	SEC, styragel + ultrastyragel	1678
			SEC, ultrastyragel	1254
Poly(1,2-dihydroxybenzene phthalate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3384
Poly(1,3-dihydroxybenzene phthalate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3384
Poly(1,4-dihydroxybenzene phthalate)				
	Chromatography	Tetrafydrofuran	SEC, μ-styragel, 25°C	3384
Poly(4-hydroxybutyrate)	Chromatography	Chloroform	SEC, ultrastyragel, 25°C	2
Poly(β-hydroxybutyrate)	Chromatography	Chloroform	SEC, ultrastyragel, (S)-hydroxybutyrate	3592
			SEC, μ-styragel, 40°C, [(R)-3-hydroxybutyrate]	1458,1549
	Extraction	Acetone	Syndiotactic, (R, S)-hydroxybutyrate	1326
	Fractional precipitation	Chloroform/methanol	(S)-hydroxybutyrate	3592
		Methylene chloride/diethyl ether	β-D,L-hydroxybutyrate	1794
Poly(11-hydroxyundecanoic acid) see Poly(oxy (1-oxoundecamethylene))				
Poly((isophthalic acid maleic anhydride)-*alt*-propylene glycol)				
	Chromatography	Acetone/*n*-heptane	Precipitation chromatogr., 27–50°C	502
Poly((isophthalic terephthalic acid (1 : 1))-*alt*-bis(4-hydroxyphenyl)isopropylidene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	1843
Poly(lauric acid-*co*-glycerol)	Fractional precipitation	Toluene/*n*-heptane	Alkyd resin	2329
Poly((maleic anhydride; phthalic anhydride)-*alt*-(ethylene glycol; cyclohexanol))				
	Fractional precipitation	Acetone/petroleum ether		1593
Poly(1-(6-[4-(4-methoxyphenoxycarbonyl)phenoxy]hexyloxycarbonyl)-1-methylethylene))				
	Chromatography	Tetrahydrofuran	SEC	930
	Fractional precipitation	Chloroform/methanol		2380

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxy-2(4-(carbazol-9-yl)butyl)trimethyleneoxyadipoyl)				
	Fractional precipitation	Tetrahydrofuran/*n*-hexane		3166
Poly(oxy-2(4-(carbazol-9-yl)butyl)trimethyleneoxysebacoyl)				
	Fractional precipitation	Tetrahydrofuran/*n*-hexane		3166
Poly(oxy-2(4-(carbazol-9-yl)butyl)trimethyleneoxysuccinyl)				
	Fractional precipitation	Tetrahydrofuran/*n*-hexane		3166
Poly((oxy-2′,5′ -dihexyl-*p*-terphenyl-1,4-oxy-2-2-dihexyl terephthaloyl)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 25°C	1546
Poly(oxy(1,4-dimethyltetramethylene)oxysebacoyl)				
	Chromatography	Chloroform	SEC, styragel	2426
Poly(oxy(2,2′-methylethyltrimethylene)oxysebacoyl)				
	Chromatography	Chloroform	SEC, styragel	2426
Poly(di-(4-oxy-3-methylphenyl-2,2-propane oxy terephthaloyl))				
	Fractional precipitation	Phenol : tetrachloroethylene (3 : 1)/heptane		2549
Poly(oxy(1-oxy2,2-dimethyl-3-isopropylidenyl)trimethylene)				
	Chromatography	Chloroform	SEC, styragel	2493
		Tetrahydrofuran	SEC, styragal	2493
Poly(oxy(1-oxo-2-dimethyletylene)				
	Chromatography	Hexafluoroisopropanol	SEC, μ-styragel	2616
Poly(oxy(1-oxo-2,2-dimethyltrimethylene) *(Poly(pivalolactone))*				
	Chromatography	*m*-Cresol	SEC, 120°C, 112°C	396
Poly(oxy(1-oxo-3-ethyltrimethylene) *Poly(β-ethyl-β-propiolactone)*				
	Fractional precipitation	Chloroform/ethyl ether	Crystalline/amorphous	3191
Poly(oxy(1-oxo-2-methylethylene)) *Poly(D,L-lactic acid)*				
	Chromatography	Tetrahydrofuran	SEC, 30°C	3342
Poly(oxy(1-oxo-3-methyltrimethylene) *Poly(α-methyl-β-propiolactone), Poly(α-butyrolactone)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	3548,3549
	Fractional precipitation	Chloroform/acetone	Crystalline /amorphous	3191
		Chloroform/chloroform–propylene glycol (1 : 2)		2208
Poly(oxy-1-oxo(2-(1,2,3,-tetrahydro-5-methyl-2,4-dioxo-1-pyrimidinyl)methyltrimethylene)				
	Chromatography	Dimethylformamide	SEC, Sephadex	1228
Poly(oxy(1-oxoethylene) *Poly(glycolate)*				
	Chromatography	Hexafluoroisopropanol	SEC, μ-styragel	2616
Poly(oxy(1-oxohexamethylene)	Chromatography	Methylene chloride	SEC, ultrastyragel, 25°C	1793
		o-Dichlorobenzene	SEC, 135°C	2713
		Tetrahydrofuran	SEC, shodex	863
			SEC, μ-styragel	2869
			SEC, styragel	860,2024
			SEC, ultrastyragel	794,795,796
	Fractional precipitation	Benzene/isooctane	34°C	2583
		Benzene/*n*-heptane		1738
		Benzene/petroleum ether	25°C	668
			Oligomers	1160
		Butanone/*n*-hexane	Oligomers	1160
	Fractional solution	Benzene/isooctane mixtures	Column extraction, temp.	2583
	Sedimentation velocity	Benzene	30°C	437
	Turbidimetric titration	Benzene/petroleum ether	Oligomers	1160
Poly(oxy(1-oxopentamethylene) *Poly(β-valerolactone)*				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2711
Poly(oxy(1-oxotrimethylene) *Poly(β-propiolactone)*				
	Chromatography	*m*-Cresol	SEC, styragel, 100°C	3430
	Fractional precipitation	Chloroform/petroleum ether	30°C	668
		Chloroform/toluene	Lowering temp.	2781
Poly(oxy(1-oxoundecamethylene)				
	Fractional precipitation	Benzene/methanol	55°C	1953
Poly(oxy-1-oxo(2(1,2,3,4-tetrahydro-2,4-dioxo-1-pyrimidinyl)methyltrimethylene)				
	Chromatography	Dimethylformamide	SEC, Sephadex	1228
Poly(oxy(1,1,2,2-tetramethyl(ethylene-oxysebacoyl)				
	Chromatography	Chloroform	SEC, styragel	2426
Poly(oxy-2″,3″,5″-triphenyl-*p*-quinquophenyl-4,4″″-oxy-2,5-diphenyl terephthaloyl)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 25°C	1546
Poly(oxy-2″,3″,5″-triphenyl-*p*-terphenyl-4,4″″-oxy-2,5-diphenyl terephthaloyl)				
	Chromatography	Tetrahydrofuran	SEC, ultastyragel, 25°C	1546

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxyadipoyloxydecamethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1512
Poly(oxybutyleneoxy adipoyl) *Poly(butylene adipate)*				
	Chromatography	Tetrahydrofuran	SEC	2241
			SEC, ultrastyragel, oligomers	3121
Poly(oxycarbonyl-1,2-phenylene) *Poly(2-hydroxy-benzoate)*				
	Chromatography	*m*-Cresol/chlorofrom (15/85)	SEC, styragel, 38°C	2806
Poly(oxycarbonyl-1,3-phenylene) *Poly(3-hydroxybenzoate)*				
	Chromatography	Chloroform	SEC, Styragel	1791
Poly(oxycarbonyl-1,4-phenylene-*co*-oxycarbonyl-2,6-naphthylene)				
	Chromatography	3,5-bis(Trifluoromethyl)/decalin	SEC, 60°C	1819
	Fractional precipitation	3,5-bis(Trifluoromethyl)phenol/ decalin	90°C	1803,1819
Poly(oxycarbonyl-1,4-phenylene-isopropylidene-1,4-phenyleneoxycarbonyl-1,4-phenylene-1,6-indanylene)				
	Chromatography	Cyclohexane/dioxane	Precipitation chromatogr., thermal gradient, acid wahed glass beads	3045
Poly(oxycarbonyl-1,4-phenyleneoxytherephthaloyloxy-1,4-phenylenecarbonyloxydecamethylene)				
	Fractional precipitation	Trifluoroacetic acid/*o*-xylene		3277
	Sedimentation velocity	Trifluoroacetic acid	25°C	3277
Poly[2,2-bis(4-oxycyclohexyl)propane adipate]				
	Chromatography	Methylene dichloride		1003
Poly(oxydecamethyleneoxysebacoyl)				
	Fractional solution	Benzene/ethanol	Column elution	3157
		Tetrachloroethane/*n*-heptane	Column elution	3157
Poly(di(oxethylene)oxyadipoyl)	Chromatography	*n*-Hexane–butanone–ethanol	Column extraction, silica gel	890
	Extraction	Butanone/*n*-hexane	Oligomers, column extraction	1159
	Turbidimetric titration	Butanone/petroleum ether		1159
Poly(oxyethylene oxyethyleneethyleneoxyadipoyl)				
	Chromatography	Tetrahydrofuran	SEC, ultratyragel, oligomers	3121
Poly(di(oxyethylene)oxyterephthaloyl)				
	Fractional precipitation	Chloroform/ethanol	30°C	1944,2738,2744
Poly(oxyethyleneoxyadipoyl)	Fractional crytallization	Ethanol	Hot	1324
	Fractional precipitation	Benzene/petroleum ether		2693
		Chloroform/petroleum ether		1594
Poly(di(oxethylene)oxycarbonyl-1,4-cyclohexylenecarbonyl)*trans*				
	Chromatography	Methylene dichloride	SEC, styragel	893
Poly(oxyethyleneoxycarbonyl-1,4-phenyleneoxyethylenoxy-1,4-phenylene carbonyl)				
	Fractional precipitation	1,1,2,2-Tetrachloroethane/*n*-heptane, *o*-chlorophenol(3 : 2)	20°C	1560
Poly(di(oxyethylene)oxyisophthaloyl)				
	Fractional precipitation	Chloroform/methanol	30°C	2740
Poly(oxyethyleneoxyisophthaloyl)				
	Chromatography	Tetrahydrofuran	SEC, 37°C	333
	Fractional precipitation	Tetrachloroethane/*n*-heptane		3515
Poly(oxyethyleneoxyphthaloyl)	Fractional precipitation	Ethylene dichloride/petroleum ether		1303
Poly(oxyethyleneoxysebacoyl)	Chromatography	Tetrahydrofuran	SEC, 37°C	333
	Fractional precipitation	Hot methanol		1324
Poly(oxyethyleneoxysuberoyl)	Chromatography	Tetrahydrofuran	SEC, 37°C	333
	Fractional precipitation	Hot methanol		1324
Poly(oxyethyleneoxysuccinoyl)	Chromatography	*m*-Cresol	SEC, styragel, 100°C	3431
Poly(oxyethyleneoxyterephthaloyl) *Poly(ethylene terephthalate)*				
	Chromatography	Chloroform/ethanol (94/6)	TLC, Kiesselgel oligomers	761
		m-Cresol	SEC	804
			SEC, styragel, 125°C	1278
		Methylene dichloride/ hexafluoroispropanol (70/30)	SEC, styragel	1894
		Nitrobenzene/tetrachloroethylene (5/95)		2521
			SEC, styragel 100°C	3310
		o-tert-Butylphenol	SEC, styragel, 110°C	2792
		Tetrahydrofuran	Samples were dissolved in phenol–tetrachloroethane- (3 : 2) SEC, 37°C	333

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			SEC, μ-styragel, 40°C, PET oligomers	2972
			SEC, oligomers	2972
			SEC, styragel, 40°C, analytical and preparative, oligomers	2972
		Trifluoroacetic, acid/ chloroform(10 : 90)eluent *o*-Chlorophenol	SEC, 50°C	2162
		Trifluoroacetic acid chloroform(20 : 80) solvent	Charcoal	450
	Coacervation	Phenol–tetrachloroethane/*n*-heptane		3290
	Distribution between immiscible liquids	*m*-Cresol/petroleum ether		3300
	Extraction	Hot chloroform	Oligomers	1906
		Methylene chloride–ethanol (4 : 6)		475
	Fractional precipitation	1,1,2,2-Tetrachloroethane/*n*-heptane, *o*-chlorophenol (3 : 2)	20°C	1560
		Dimethylformamide	Lowering temp.	3300
		m-Cresol/ligroin (b.p. 100°C)	50°C	3300
		o-Chlorophenol/*n*-heptane		2160,2162,2242, 2247,2255
		Phenol–1,2,4-trichlorobenzene/ *n*-heptane		3140
		Phenol–tetrachloroethane(1 : 1)/ ligroin	25°C	3400
			65°C	1111
		Phenol–tetrachloroethane/*n*-heptane		1023,1024,1278,2712
		Phenol/cyclohexane	70°C	1723
	Fractional solution	Phenol–tetrachloroethane(3 : 2)/ *n*-nonane	Film extraction, 95°C	935
		Phenol/*n*-heptane	56°C	2506
	Turbidimetric titration	Phenol–tetrachloroethane/*n*-heptane		2006
Poly(tri(oxyethylene)oxyterephthaloyl)				
	Fractional precipitation	Chloroform/methanol	30°C	2741
Poly(oxyhexamethylene oxy-4,4′-biphenyleneoyl)				
	Chromatography	Phenol + tetrachloroethane	SEC, 50°C	3214
Poly(oxyhexamethyleneoxy)(α,α-dibutyl)sebacoyl)				
	Fractional precipitation	Benzene/methanol		241,3481
	Fractional precipitation	Benzene/methanol		241,3481
Poly(oxyhexamethyleneoxysebacoyl)				
	Chromatography	Chloroform	SEC, styragel	2426
	Fractional solution	Benzene/methanol, tetrachloroethane/*n*-heptane	Column elution	3157
	Turbidimetric titration	Carbon tetrachloride/*n*-heptane	20°C	1763
Poly(oxyhexane oxyadipoyl)	Chromatography	Tetrahydrofuran	SEC, styragel, oligomers	3121
Poly(oxyisophthaloyloxy-1,4-phenylene-(2-phenyl)phthalimidine-1,4-phenylene)				
	Fractional precipitation	Tetrachloroethane/tetrahydrofuran		790
	Sedimentation velocity	Tetrahydrofuran	20°C	790
Poly(oxyisophthaloyloxy-1,4-phenylene-phthalidylidene-1,4-phenylene)				
	Chromatography	Tetrachloroethane/ethanol	Precipitation chromatogr., 15–65°C	789
	Extraction	Phenol–tetrachloroethane(1 : 3)/ *n*-heptane		789
	Turbidimetric titration	Tetrachloroethane/ethanol		789
Poly(oxyneopentyleneoxyadipoyl)				
	Fractional precipitation	Chloroform/hexane		2742
Poly(oxypropyleneoxyisophthaloyl)				
	Fractional precipitation	Chloroform/methanol	30°C	2576
Poly(oxypropyleneoxyterephthaloyl)				
	Chromatography	Chloroform	SEC, styragel or bio-beads	337
		Tetrahydrofuran	SEC, styragel or bio-beads	337
	Extraction	Methylene dichloride/ethanol (4/6)	Cyclic oligomers	475
	Fractional precipitation	Chloroform/methanol	30°C	2576
Poly(oxysebacoyloxydecamethylene)				
	Turbidimetric titration	Carbon tetrachloride/*n*-heptane	20°C	1763

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxysuccinoyloxyhexamethylene)				
	Chromatography	Butanone–cyclohexane	Precipitation chromatogr., 70–27°C and 70–40°C	1210
		Butanone–cyclohexane		1210
		(3 : 1)/cyclohexane		1210
		Butanone (1 : 4)	Precipitation chromatogr., 27–70°C	2321
Poly(oxytartaroyloxyhexamethylene)				
	Chromatography	Benzene	Urea	1671
Poly(oxyterephthaloyloxy(3-methylphenylene)isopropylidene-1,4-(3-methylphenylene) *Poly(arylate)*				
	Fractional precipitation	Dichloroethane/*n*-hexane		3244
Poly(oxyterephthaloyloxy-1,4-chlorophenyleneisopropylidene-1,4-chloro/phenylene)				
	Chromatography	Chloroform		343
		Tetrahydrofuran	SEC, styragel, 25°C	1843
	Fractional precipitation	Dichloroethane/*n*-hexane		3244
Poly(oxyterephthaloyloxy-1,4-phenylenefluoren-9-ylidene-1,4-phenylene) *Poly(arylate)*				
	Fractional precipitation	Carbon tetrachloride–phenol (3 : 1)/*n*-heptane		791
		Dichloroethane/*n*-hexane		3025
Poly(oxytetramethyleneoxyadipoyl) *Poly(tetramethylene adipate)*				
	Chromatography	Benezene–ethanol (3 : 1)	TLC, silica gel	3327
		Tetrahydrofuran	SEC, 37°C	333
Poly(oxytetramethyleneoxyterephthaloyl) *Poly(tetramethylene terephthalate)*				
	Chromatography	Chloroform–*n*-hexane(10 : 5)		812
		and chloroform–*n*-hexane(10 : 3)	Cyclic oligomers extracted with *o*-dichlorobenzene, TLC, silica gel	
		Hexafluoroisopropanol		3014
		n-Hexane–dioxane (7 : 3)	HPLC, lichrosorb, cyclic oligomer, extracted with *o*-dichlorobenzene	812
	Extraction	Methylene dichloride–ethanol (4 : 6)	Cyclic oligomers	475
	Fractional precipitation	1,1,2,2-Tetrachloroethane–phenol/*n*–heptane		1354,2303
Poly(oxytrimethyleneoxysuccinyl) *Poly(trimethylene succinate)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	1512
Poly(phenylhydroquinone-*co*-terephthalic acid)				
	Fractional solution	*o*-Dichlorobenzene : *p*-chlorobenzene (50 : 50)/methanol	23°C	1798
Poly(phthalic acid-*alt*-pentaerythrytol)				
	Fractional precipitation	Acetone	Lowering temp.	364
Poly(phthalic anhydride-*alt*-(coconut oil;glycerol))				
	Fractional precipitation	Acetone/water	Alkyd resin	896
Poly(phthalic anhydride-*alt*-glycerol)				
	Fractional precipitation	Acetone/water	Alkyd resin	897
		Butanone–acetone/methanol		362
		Butanone–acetone/methanol–water		362
Poly(phthalic anhydride; lauric acid)-*alt*-glycerol)				
	Fractional precipitation	Toluene/*n*-heptane		2339
Poly(phthalidylidene-1,4-phenylene oxy-1,4-phenylene carbonyl-1,4-phenyleneoxy-1,4-phenylene)				
	Fractional precipitation	*N,N*-Dimethyformamide/ethanol		3499
Poly(pivalolactone) see Poly(oxy(1-oxo-2,2-dimethyltrimethylene)				
Poly(sebacic acid-*alt*-(hexanediol;hexanetriol)				
	Fractional precipitation	Benzene/methanol		242
Poly(sebacic, adipic, tartaric acid)-*alt*-(1,6-hexanediol-1,10-decanediol)				
	Fractional precipitation	Benzene/methanol		240,3481
	Fractional solution	Benzene/methanol		240,3481
Poly(succinic acid-*co*-hexanediol) see Poly(oxysuccinoyloxyhexamethylene)				
	Fractional precipitation		Benzene/methanol	242
Poly((succinico;pimelic acid)-*alt*-(hexanediol)				
Poly(terephthalic acid-*co*-ethylene glycol) see Poly(oxyethyleneoxyterephthaloyl)				
Poly(ditrimethylene glycol terephthalate)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	3068
	Fractional precipitation	Toluene/methanol		1102

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
3.4. POLY(URETHANES) AND POLY(UREAS)				
Poly(urethanes) (General)	Fractional precipitation	Acetone, benzene, ethyl acetate, chloroform and their mixtures with DMF, dimethylformamide/di-*n*-pentyl ether		2992
Poly(poly(caprolactone)-*co*-4,4′diphenylmethane diisocyanate-*co*-2,4-butanediol)				
	Fractional precipitation	Dimethylacetamide/diphenyl ether		2991
Poly(poly(caprolactone)-*co*-4,4′diphenylmethane diisocyanate-*co*-ethylene diamine)				
	Fractional precipitation	Dimethylacetamide/*n*-heptane–ethyl ether		2842
Poly((caprolactone)-*co*-trimethylol ethane-*co*-4,4′-diphenylmethane diisocyanate-*co*-ethylene diamine)				
	Fractional precipitation	Dimethylacetamide/*n*-heptane–ethyl ether		2842
Poly(poly(caprolactone)diol-*co*-4,4′-diphenylmethane diisocyanate-*co*-1,5-pentanediol)				
	Fractional precipitation	Dimethylformamide/dimethylformamide–water(4 : 1)	30°C	2935
Poly((ethylene diamine-*co*-2,4-toluenediisocyanate)-*co*-poly(tetramethylene oxide))				
	Chromatography	Dimethylformamide + 0.01 M lithium bromide		2505
Poly(ethylene diamine-*co*-2,4-toluenediisocyanate-*co*-poly-(oxytetramethyleneoxyadipoyl)				
	Chromatography	Dimethylformamide + 0.01 M lithium bromide	SEC	2505
Poly[4,4′-diisocyanodiphenylmethane-*co*-2,4-hexadene-1,6-diol-*co*-poly(propylene glycol)]				
	Chromatography	Tetrahydrofuran	SEC, styragel	1382
Poly(oxycarbonyloxy-1,4-phenyleneureylene-1,4-phenyleneureylene-1,4-phenylene)				
	Turbidimetric titration	Dimethylformamide		1739
Poly(oxycarbonyloxy-1,4-phenyleneureylene-1,5-naphthyleneureylene-1,4-phenylene)				
	Turbidimetric titration	Dimethylformamide		1739
Poly(oxycarbonyloxy-1,4-phenyleneureylene-1,4-phenylenemethylene-1,4-phenyleneureylene-1,4-phenylene)				
	Turbidimetric titration	Dimethylformamide		1739
Poly(oxycarbonyloxy-1,4-phenyleneureylene-1,4-toluylene ureylene 1,4-phenylene)				
	Turbidimetric titration	Dimethylformamide		1739
Poly(oxycarbonyloxy-1,4-phenyleneureylenehexamethyleneureylene-1,4-phenylene)				
	Turbidimetric titration	Dimethylformamide		1739
Poly(oxycarbonyl(phenylimino)ethylene)(Poly(*N*-phenylethylenimine-*alt*-carbon dioxide)				
	Extraction	Methanol	Homopolymer	3029
Poly(poly(oxyethyleneoxyadipoyl)-*co*-4,4′-diphenylmethane diisocyanate-*co*-1,4-butanediol)				
	Fractional precipitation	Dimethylformamide/dibutyl ether		2991
Poly(oxyethyleneoxycarbonylimino-1,4-phenylene-methylene-1,4-phenylene)				
	Extraction	Dimethylformamide/acetone	30°C	254
	Fractional solution	Dimethylformamide/acetone		255
Poly(poly(oxypropylene)-*co*-toluene diisocyanate)				
	Fractional solution	Benzene/isooctane	Column extraction, 34°C	1421
Poly(oxytetramethylene oxycarbonylimino hexamethyleneiminocarbonyl)				
	Fractional precipitation	Benzene/2,2,4-trimethylpentane	25°C	42
Poly(poly(oxytetramethyleneoxyadipoyl)-*co*-4,4′-diphenylmethanediisocyanate-*co*-1,4-butenediol)				
	Fractional precipitation	Dimethylformamide/dibutyl ether		2991
Poly(poly(oxytetramethyleneoxyadipoyl)-*co*-toluylenediisocyanate)				
	Chromatography	Ethyl acetate	SEC, styragel, 20°C	3328
Poly(oxytetramethyleneoxycarbonylimino-2,4-toloyleneiminocarbonyl)				
	Chromatography	Dimethylformamide + lithium bromide (0.01%)	SEC, μ-styragel	2704
Poly(oxytetramethyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)				
	Chromatography	Tetrahydrofuran	SEC, styragel	488
Poly(oxytetramethyleneoxycarbonyliminohexamethyleneiminocarbonyl)				
	Chromatography	Formic acid/water (88%)	Paper partition chromatogr.	157
	Fractional solution	*m*-Cresol/*n*-hexane		2400
Poly(ureylene(1-ethoxycarbonyl)pentamethylene) *Poly(urea of ethyl ester* L*-lysine)*				
	Coacervation	Trichloroethane–phenol/*n*-heptane		1764

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
3.5. POLY(AMIDES) AND POLY(IMINES)				
Poly(amido amine)	Chromatography	Dimethylformamide		2130
Poly((6-aminocaproic acid; adipic acid)-*alt*-hexamethylenediamine)				
	Fractional precipitation	Phenol/water	70–90°C	243
Poly(butylimino carbonyl)	Fractional precipitation	Carbon tetrachloride/methanol		1227
Poly((*N-tert*-butylimino)ethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 20°C	1089
Poly(butyliminocarbonyl) *[Poly(butylisocyanate)]*				
	Chromatography	Benzene	SEC	468
	Fractional precipitation	Cabon tetrachloride/methanol		3264
		Tetrachloroethane/methanol		2978,3274
	Sedimentation analysis	Carbon tetrachloride		468
Poly(ε-caprolactam) see Poly(imino(1-oxohexamethylene))				
Poly(caprolactam-*co*-hexamethylenediamine-*co*-adipic acid-*co*-azelaic acid)				
	Extraction	Methanol/water mixtures	35°C	2543
	Turbidimetric titration	Methanol/water mixtures		2543
Poly(ethylimino-*trans*-fumaroylethylamino-1,4-(2-methyl)phenylene-methylene-1,4-(2-methyl)phenylene)				
	Fractional precipitation	Dimethylformamide/water		876
		Methanol/water		876
	Turbidimetric titration	Dimethylformamide/water		875
Poly((R)-1-deuterio-*n*-hexyl isocyanate)				
	Chromatography	Chloroform	SEC, styragel, 40°C analytical and preparative	2452
Poly(*n*-hexyl isocyanate)	Fractional precipitation	Chloroform/methanol		787
	Sedimentation equilibrium	Hot hexane, hot benzene, hot hexafluoroisopropanol, *m*-cresol	Ultracentrifuge, 25°C	2851
Poly(hexyliminocarbonyl) *Poly(hexylisocyanate)*				
	Chromatography	Chloroform	SEC, styragel, 40°C	1451
	Coacervation	Tetrachloromethane/methanol		358
		Toluene/methanol	25°C	300,301
	Fractional precipitation	Benzene/methanol		1500
		Carbon tetrachloride/methanol		1451,1810,2309, 2787,3068
	Sedimentation equilibrium	Hexane	25°C	1451
Poly(imino(1-oxodecamethylene)) *[Nylon 10]*				
	Distribution between immiscible liquids	Phenol/water	70°C	1368
Poly(imino(1-oxododecamethylene)) *[Nylon 2]*				
	Chromatography	Benzyl/alcohol	SEC	2522
		Hexamethylphosphotriamide	SEC, styragel, 85°C	2507
		Methylene dichloride	SEC, μ-styragel	1465
		Tetrahydrofuran	SEC	834
	Turbidimetric titration	*m*-Cresol/*n*-heptane		2287
Poly(imino(1-oxohexamethylene)) *[Nylon 6]*				
	Chromatography	Benzyl alcohol	SEC, lichrospher, 100°C	2523
			SEC, 100°C	2522
		Formic acid/water	Paper partition, 20°C	157
		Hexamethylphosphortriamide	SEC, 85°C	2507
		Hydrochloric and 0.1M	SEC, biogel	320
		m-Cresol	SEC, 105°C, 133°C	235,236
			SEC, styragel, 112°C	616
		Methylene chloride	SEC, μ-styragel	1465
		Phenol–ethanol–water(1 : 2.6 : 1.6)	SEC, Sephadex	3422
		Phenol–*n*-propanol (7 : 3)	SEC, 65°C	2523
		Trifluoroethanol	SEC, styragel	2098
	Distribution between immiscible liquids	Phenol/water	Continuous	807
	Fractional crystallization	Phenol–tetrachloroethane (1 : 1)/ethanol–*n*-heptane	25°C, stirred	328
	Fractional precipitation	Formic acid–water (85 : 15)–5% lithium chloride/water–5% lithium chloride	Amorphous	325

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		m-Cresol/cyclohexane		1516
		m-Cresol/ethyl ether	26°C	1192
		m-Cresol/ligroin		1111,1125, 2548,3294
		Phenol–tetrachloroethylene (1 : 1)/*n*-heptane	25°C	2694
		Phenol/methanol–water		1821
		Phenol/water	70°C	3482
	Fractional solution	Conc. formic acid	20–90°C	666
		Formic acid/propyl acetate	Film extraction	935
		Phenol/ethylene glycol/water	Coacervation	3289
		Phenol/water mixtures	Column extraction, 70°C	1010,2096
		Water–methanol (81.5 : 18.5)/phenol	Column extraction, linear and branched	2097
	Sedimentation equilibrium	Formic acid–water (85%) + 2M potassium chloride	25°C	2893
	Sedimentation velocity	Hexafluoroisopropanol		2542
	Summative precipitation	Formic acid (85%) water		638
	Thermal diffusion	Formic acid–water 90%		1863
	Turbidimetric titration	Formic acid/dibutyl ether		1274
		Hydrochloric acid/Aq. ammonium sulfate		2642
		m-Cresol–isobutanol–petroleum ether (1 : 9) petroleum ether–tetrachloroethane (9 : 1)		1110
		m-Cresol/*n*-heptane		2548
		m-Cresol/petroleum ether		665
		Phenol 94%/50% methanol		1011
		Phenol–water–96% ethanol (1 : 1 : 1)/46% ethanol		214
Poly(imino(1-oxooctamethylene)) *[Nylon 8]*				
	Chromatography	Methylene dichloride	SEC, μ-styragel	1465
	Fractional solution	Phenol/water–methanol	Coacervation, 25°C	525
Poly(imino(1-oxotetramethylene) *[Nylon 4]*				
	Chromatography	*m*-Cresol	SEC, 90°C	1385
		Methylene dichloride	SEC, μ-styragel	1465
	Fractional precipitation	*m*-Cresol–benzene(6 : 1)/*n*-heptane		2764
Poly(imino(1-oxoundecamethylene) *[Nylon 11]*				
	Chromatography	Benzyl alcohol	SEC, μ-styragel	2953
		Hexamethyl phosphotriamide	SEC, 85°C	2507
		Methylene dichloride	SEC, μ-styragel	1465
	Fractional precipitation	*m*-Cresol/ethyl alochol or *n*-heptane		3192
Poly(iminoperchloroterephthaloyliminohexamethylene) *Poly(hexamethylene perchloroterephthalamide)*				
	Fractional precipitation	*m*-Cresol/cyclohexane		1875
Poly(imino-1,4-phenyleneimino-terephthaloyl)				
	Chromatography	Sulfuric acid 90%	Preparative SEC, silica gel	128
		Sulfuric acid 96%	SEC	130
		Tetrahydrofuran	SEC, Shodex	2432
Poly(imino-1,3-phenyleneimino-isopthaloyl) *Poly(m-phenylene isophthalamide)*				
	Fractional precipitation	Dimethylformamide + 5% lithium chloride/dioxane		3276,3385
	Sedimentation velocity	Dimethylformamide + lithium chloride	Ultracentrifuge	2375
Poly(imino-1,4-phenylenecarbonylhydroazoterephthaloyl) *Poly(terephthalamide-p-benzohydrazide)*				
	Fractional precipitation (50 : 30–50 : 70)/dimethyl	Dimethylsulfoxide : dichloromethane sulfoxide	25°C, the precipitate is redisolved by temp. lowering	2816
Poly(iminoadipoyl iminodecamethylene)*[Nylon 610]*				
	Distribution between immiscible liquids	Phenol/water	Continuous, Nylon 610	807
Poly(iminoadipoyl iminohexamethylene) *[Nylon 66]*				
	Chromatography	Formic acid–water (88%)	Partition chromatogr. 20°C	157
		Hexafluoroisopropanol	SEC, styragel	1395
		Methylene dichloride	SEC, μ-styragel	1465

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Distribution between immiscible liquids	Phenol/water	Continous, Nylon 66	807
	Fractional precipitation	*m*-Cresol/cyclohexane		1375,1516
		Phenol/water	Nylon 66	3165
	Sedimentation gradient	Carbon tetrachloride, *m*-cresol, cyclohexane	Ultracentrifuge	3204
	Turbidimetric titration	*m*-Cresol/cyclohexane	Nylon 66	1376
		m-Cresol/*n*-heptane		2287
Poly(iminocarbonyl(3-carboxybiphenyl)4,4′-ylenecarbonylimino-1,4-phenylenemethylene-1,4-phenylene)				
	Fractional precipitation	*m*-Cresol/cyclohexane		3128
Poly(iminocarbonyl-1,4-(2,5-methoxycarbonyl)phenylenecarbonylimino-1,4-(3-phthalidyl)phenylene-methylene-1,4-phenylene)				
	Fractional solution	Trichloroethylene-phenol-*n*-heptane		2232
Poly (iminocarbonyl-1,4-phenylene) [Poly(*p*-benzamide)]				
	Chromatography	Sulfuric acid 92%	SEC, preparative, silica gel	129,130
Poly(iminocarbonyl-1,4-phenyleneiminocarbonyl tetramethylene)				
	Fractional precipitation	Dimethylacetamide/Lithium chloride/propionic acid		39
Poly(iminoethylene)	Chromatography	Water	SEC, Sephadex	2673
		Water 0.109 N sodium chloride	SEC, biogel	1369
	Curtain electrophoresis	Acetic acid–water		2584
Poly(iminohexamethylene iminosebacoyl)				
	Chromatography	Formic acid–water (88%)	Paper partition	157
		Methylene dichloride	SEC, μ-styragel	1465
	Mechanical fractionation	Tyler screens	Interfacial condensation	2272
Poly(iminoisophthaloyl iminodecamethylene)				
	Turbidimetric titration	*p*-Cresol/acetone		3033
Poly(imino(1-oxohexamethylene)*co*-imino(1-oxododecamethylene) *Poly(6-caprolactam-co-12-dodecanelactam)*				
	Fractional precipitation	*m*-Cresol/*n*-heptane		44
Poly(iminoterepthaloylimino-2-methyl-4,4-dimethylhexamethylene)				
	Fractional precipitation	Dimethylformamide/ethyl acetate		1283
Poly(iminoterepthaloylimino-3-methyl-4,4-dimethylhexamethylene)				
	Chromatography	Methylene dichloride	SEC, μ-styragel	1465
Poly(iminoterepthaloylimino-2-phenylenefluorene-9-ylidene-1,4-phenylene)				
	Fractional precipitation	Dimethylformamide/acetone		2765
		Dimethylformamide/acetone–ethanol (2 : 1)		2765
Poly(iminoterephthaloylimino-1,4-phenylenephthalidylidene-1,4-phenylene)				
	Coacervation	Dimethylformamide (3% HCl 1 N)/ethanol		2374
		Dimethylformamide (acidified HCl)/ethanol		2376
	Fractional precipitation	Dimethylformamide/acetone		2765
		Dimethylformamide/acetone–ethanol (2 : 1)		2765
Poly(iminotetramethylene iminoisophthaloyl)				
	Turbidimetric titration	Cresol/acetone		3033
Poly(isopropylmethacrylamide)	Fractional precipitation	Ethanol/diethyl ether		3207
Poly(*trans*-2,5-dimethyl-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)				
	Chromatography	Dichloroethylene/cyclohexane	Column elution, 30°C	2240
Poly(4,4′-methylenedianiline-*co*-1-chloro 2,3-epoxypropane) *(epoxy resin)*				
	Chromatography	Acetonitrile–water gradient silica gel, preparative	HPLC reverse phase, graft	1145
		Tetrahydrofuran	SEC, styragel, preparative	1145
Poly[(dimethylimino) decamethylene bromide]				
	Fractional solution	Ethylene glycol monoethyl ether/diisopropyl ether		2899
Poly(*trans*-2,5-dimethylpiperazinediylisophthaloyl)				
	Fractional precipitation	Chloroform–1–5%phenol/*n*-hexane		2292
		Methylene chloride–ethanol, (10%) *n*-hexane		1694,2802
		Methylene chloride-methanol (85 : 15) *n*-hexane)		2291
	Sedimentation equilibrium	*N*-methylpyrralidone	25°C	1694

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxysebacoyloxyethylene iminoterephthaloyliminoethylene)				
	Chromatography	Methylene dichloride	SEC,μ-styragel	1465
Poly(oxysuccinoyloxyethylene iminoterephthaloyliminoethylene)				
	Chromatography	Methylene dichloride	SEC,μ-styragel	1465
Poly(oxyterephthaloyloxyethylene iminoterephthaloyl iminoethylene)				
	Chromatography	Methylene dichloride	SEC, μ-styragel	1465
Poly(oxytetramethyleneoxysuccinoyl iminohexamethylene iminosuccinoyl)				
	Chromatography	Methylene dichloride	SEC, μ-styragel	1465
Poly(oxytetramethyleneoxyuccinoyl iminododecamethylene iminosuccinoyl)				
	Chromatography	Methylene dichloride	SEC, μ-styragel	1465
Poly(phenylcarbamoyl)iminoethylene) *Poly(1-(N-phenylcarbamoyl) aziridine)*				
	Chromatography	Tetrahydrofuran	SEC, styragel	119
Poly[*N*,*N*′-(*p*-phenylene)-3,3′,4,4′-biphenyl tetracarboxylic acid diamide]				
	Chromatography	Dimethylpyrrolidone	SEC, μ-styragel, 60°C	3114
Poly(*m*-phenyleneisophthalamide)				
	Chromatography	*N*-methyl-2-pyrrolidone,*N*,*N*, dimethylacetamide		1847
Poly(*N*-phenylnorbornene-5,6-dicarboximides)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	144
Poly(piperazine-1,4-diyl-ethylene) *Poly(ethylene-co-piperazine)*				
	Fractional precipitation	Water/acetone		2675
Poly(piperazine-2,4-diyl-sebacoyl)				
	Mechanical fractionation	Tyler screens	Interfacial condensation	2272
Poly(quaterthienyl-*N*-dodecyl pyrrole)				
	Chromatography	Tetrahydrofuran		2515
Poly(terephthalic acid-4-iminobenzohydrazide)				
	Fractional solution	Dimethylsulfoxide/ethyl acetate		1799
Poly(1,2,6,7-tetrahydrobenzo(1,2-C : 4,5-C′) dipyrrole-2,6-diyl-terephthaloyl)				
	Chromatography	*m*-Cresol	SEC, styragel, 95°C	763
Poly(1,2,6,7-tetradhydrobenzo(1,2-C : 4,5-C′) dipyrrole-2,6-diyl-sebacoyl)				
	Chromatography	*m*-Cresol	SEC, styragel, 95°C	763
Poly(1,2,6,7-tetrahydrobenzo(1,2-C : 4,5-C′)dipyrrole-2,6-diyl-carbonyl-1,4-phenyleneoxy-1,4-phenylenecarbonyl)				
	Chromatography	*m*-Cresol	SEC, styragel	763
Poly(1,2,6,7-tetrahydrobenzo(1,2-C : 4,5-C′)dipyrrole-2,6-diyl-adipoyl)				
	Chromatography	*m*-Cresol	SEC, styragel, 95°C	763
Poly(1,2,6,7-tetrahydrobenzo(1,2-C : 4,5-C′)dipyrrole-2,6-diyl-isophthaloyl)				
	Chromatography	*m*-Cresol	SEC, styragel, 95°C	763
Poly(*tert*-thienyl-*N*-dodecyl pyrole)				
	Chromatography	Tetrahydrofuran		2515
3.6. POLY(AMINO ACIDS)				
Poly(γ-benzyl-L-glutamate) *poly(imino(1-(2-benzyloxycarbonylethyl)-2-oxo-ethylene)*				
	Chromatography	Dimethylformamide	SEC	2330
		m-Cresol	SEC, 100°C	1030
		m-Cresol-chlorobenzene/benzoic acid	SEC	405
		Methylene dichloride/methanol	Precipitation chromatogr.	636,637,1085
		Tetrahydrofuran	SEC, styragel	3528
	Dialysis	Dioxane		2203
	Fractional precipitation	Dichloroethane/petroleum ether		3257,3258,3229
		Dioxane/ethanol		88
		Methylene dichloride/methanol		406
	Fractional solution	Formic acid, ethanol (hot)	Extraction	2203
Poly(γ-benzyl-D-glutamate-*co*-benzyl-L-glutamate)				
	Fractional precipitation	Methylene dichloride/methanol		1248
	Sedimentation equilibrium	Dimethylformamide	Ultracentrifuge	1248
Poly(γ-benzyl-L-glutamate-*N*-carboxy anhydride)				
	Fractional precipitation	Methylene dichloride/methanol	25°C	3528
Poly(*N*-carbobenzoxy-L-lysine)-*co*-poly(1-lysine-γ-methyl-L-glutamate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2812
	Fractional precipitation	Dimethylformamide/ethyl ether		2812
Poly(carbobenzoxy-L-lysine-*co*-styrene)				
	Fractional precipitation	Chloroform–hexamethylphosphor-triamide/methanol		334

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Casein-*graft*-poly(vinyl acetate)	Extraction	Acetone	cambiar de grupo?	2225
Deoxyribonucleic acid	Sedimentation velocity	Sodium dodecyl sulfate	Ultracentrifuge	2976
Fibrinogen	Sedimentation	Buffer solution	20°C	841
		Phosphate buffer		840
Gelatin	Coacervation	Water/ethanol		2652,3067
Gelatin-*graft*-poly(methyl acrylate)	Extraction	Tetrahydrofuran		2325
Poly(glutamate, sodium salt)	Chromatography	Sodium nitrate (water) 0.1 M	SEC, silica gel	2762
Poly(L-glutamic acid)	Fractional precipitation	Dimethyl sulfoxide/2-propanol		1673
Glycogen	Sedimentation	Water		434
Heparin	Fractional precipitation	Water/ethanol		821,987
Poly(L-histidine) *Poly(imino-1-(4-imidazolylmethyl)-2-oxo-ethylene)*	Chromatography	Lithium chloride 0.5 M + 1 M HCl pH = 2.35 buffer	Gel filtration, Dextran gel	2215
Poly(*N*-super-5-(4-hydroxbutyl)-L-glutamine-L-lysine)	Fractional precipitation	Methanol/ethyl ether		811
Poly(hydroxybutylglutamine)	Fractional precipitation	Methanol/ethyl ether		2780
Poly(hydroxybutylglutamine-*co*-L-arginine)	Fractional precipitation	Methanol–1 M aq. sodium chloride (9 : 1)/ethyl ether		1751
Poly(hydroxybutylglutamine-*co*-glycine)	Fractional precipitation	Methanol/ethyl ether		89
Poly(hydroxybutylglutamine-*co*-L-serine)	Fractional precipitation	Methanol/ethyl ether		1394
Poly(hydroxybutylglutamine-*ran*-L-leucine)	Fractional precipitation	Methanol/ethyl ether		69
Poly(*N*-super-5-omegahydroxyethyl-L-glutamine)	Chromatography	Water	SEC, Sephadex, preparative	2095
Poly(*N*-super-5-(3-hydroxypropyl)-L-glutamine	Chromatography	Water	SEC	2454
Poly(hydroxypropyl glutamine-*co*-L-alanine)	Fractional precipitation	Methanol/ethyl ether		2621
Poly(hydroxypropyl glutamine-*co*-hydroxybutylglutamine)	Fractional precipitation	Methanol/ethyl ether		3395
Poly(hydroxypropyl glutamine-*co*-L-leucine)	Fractional precipitation	Methanol/ethyl ether		69
Poly(hydroxypropyl glutamine)	Fractional precipitation	Methanol/ethyl ether		3395
Poly(imino(1-(2-*N*-benzylcarbamoylethyl)-2-oxoethylene-*block*-poly(butadiene)	Extraction	Methanol–water (1 : 1)		2580
	Fractional precipitation	Hexamethylphosphortriamide/acetone		2580
Lactoglobulin	Salt fractionation	Ammonium sulfate solution 2.19 M		3215
Poly(α epsilon-l-lysine)	Chromatography	Dimethylformamide + 1% lithium chloride		24
Poly(lysine-*co*-lactic acid)	Chromatography	Chloroform	SEC	228
Poly(ε-c-L-lysyl-γ-benzyl-L-glutamate)	Chromatography	Tetrahydrofuran	SEC, styragel	2464
Poly(L-lysyl-L-valyl-L-lysine)	Chromatography	Water, 0.1 M potassium phosphate dibasic and monobasic		597
Poly(γ-methyl-D-glutamate-*co*-γ-methyl-L-glutamate)	Fractional precipitation	Methylene dichloride/methanol		1248
	Sedimentation equilibrium	*m*-Cresol		1248
Poly(γ-methyl-D,L-methylglutamate-*block*-poly(butadiene)-*block*-poly(γ-methyl-D,L-glutamate)	Fractional precipitation	*n*-Hexane–chloroform/ethanol		1248
Polypeptides from (L-,D-Lysine + L-tyrosine)	Fractional precipitation	Water + 0.1 *N* chloride acid/0.1 M sodium citrate		2165
Poly(L-proline)	Chromatography	Water	SEC	980
	Sedimentation velocity	Propionic acid	20°C	515
Proteins	Chromatography	Hexafluoroisopropanol	Silk	1464
	Fractional precipitation	Ethanol	Blood plasma, large scale	1921
Poly(sarcosine)	Centrifugation	Dioxane/water	Precipitation chromatogr.	511

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Silk fibroin	Chromatography	Formic acid 99.3% + 4.5% LiCl	SEC, bioglass, 30°C	3229
	Fractional precipitation	LiBr 9.3 M/aq. rivanol (6,9-diamino-2-ethoxy-acridine lactate)	4°C	3229
		Lithium sulfocyanide/water		2986
Poly(*N*-tosyl-L-tyrosine-formal)	Fractional precipitation	Acetone/water		2946
3.7. POLY(SULFIDES), POLY(SULFONES), POLY(SULFONAMIDES)				
Poly(1-(*n*-alkylthio)-1-propynes)	Chromatography	Chloroform	SEC, styragel	2068
Poly(1-butenesulfone) see Poly (sulfonylethylethylene)				
Poly(3-*n*-dodecylthiophene-2,5-diyl)	Extraction	Hexane, acetone, methylene dichloride		3526
Poly(1,2-epithiopropane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3436
Poly(ether sulfone)	Chromatography	*N*-methyl-2-pyrrolidine	SEC	1995
Poly(2,5-ethylene (thiene [3,2-b] thiophenediyl) ethylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(2,5-ethylenethiophenediylethylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(5,5′-ethynylene-2,2′-bithiophenediylethynylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(2,5-ethynylene-3-butylthiophenediylethynylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(2,5-ethynylene-3-hexylthiophenediylethynylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(2,5-ethynylene-3-methylthiophenediylethynylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(2,5-ethynylene-3-octylthiophenediylethynylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(2,5-ethynylene-3-phenylthiophenediylethynylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(3-hexylthiophene)	Chromatography	Tetrahydrofuran	SEC	1260,1336
Poly(3-*n*-hexylthiophene-2,5-diyl)	Extraction	Hexane, acetone, methylene dichloride, tetrahydrofuran		3526
Poly[2,5-(3-methyl thieno [3,2-b] thiophenylene)]	Chromatography	Chloroform	SEC, styragel	2798
Poly(3-octylthiophene)	Chromatography	Tetrahydrofuran		1939
Poly(oxy-1,4-phenylene sulfonyl-1,4-phenylene)	Chromatography	Chloroform	SEC, styragel	3571
		N-methypyrrolidone + lithium bromide 0.1 M	SEC, Shodex, 25°C	549
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-(2-chloromethyl)-phenylene-isopropylidene-1,4-phenylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2564
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-(2-vinyl)-phenyleneisopropylidene-1,4-phenylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2564
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)	Chromatography	Chloroform	SEC, μ-styragel	455,1280,2927
		Dimethylacetamide, dimethylformamide	SEC	2927
		Tetrahydrofuran	SEC, μ-styragel	2564,2565
			SEC, styragel	2927
	Fractional precipitation	Cholorobenzene/isopropanol		1157
		Dimethylsulfoxide	80°C, lowering temp.	54
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-(2-ethynyl)phenyleneisopropylidene-1,4-phenylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2564
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylene(1-methylethylidene)-1,4-phenylene)	Chromatography	Tetrahydrofuran	SEC	3468
Poly(oxyethylenethioethylene)	Fractional precipitation	Chloroform/*n*-hexane		2436
Poly(phenylene sulfide)	Chromatography	1-Chloronaphthalene	SEC, μ-styragel, 210°C	1370
		1-Cycolhexyl-2-pyrrolidone + 20 nM lithium chloride, 1-chloronaphthalene	SEC, styragel, 210°C	
		α-Chloronaphthalene	SEC, 210°C	3248

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(styrene sulfonic acid)	Chromatography	Water	SEC	691
Poly(sulfide rubber)s	Chromatography	Dioxane	Column elution, silica gel	1037
Poly(sulfonyl-1,2-cyclohexylene)	Fractional precipitation	Benzene/methanol		873
Poly(sulfonyl-1,2-cyclopentylene)	Fractional precipitation	Dioxane/methanol		873
Poly(sulfonyl-1-methyl-1-propylethylene)	Fractional precipitation	Acetone/methanol	Lowering temp.	238
Poly(sulfonyl-1,4-phenylenesulfonylimino-(ethoxycarbonyl)pentamethyleneimino)	Fractional precipitation	Dimethylformamide/ethanol		258
Poly(sulfonyl-1,4-phenyleoxy-1,3-propylenoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(sulfonyl-phenylethylene)	Fractional precipitation	Tetrahydrofuran/methanol	40°C	844
Poly(sulfonylbutylethylene) *Poly(hexene-1-sulphone)*	Fractional precipitation	Acetone/methanol	Lowering temp.	238,239,1455
Poly(sulfonylethylethylene)	Chromatography	Tetrahydrofuran	SEC 40°C	446
	Fractional precipitation	Acetone/methanol	Lowering temp.	447
Poly(tetrathioethylene)	Chromatography	Dioxane		1029
Poly(2,5-thieno [3,2-b]thiophenylene)	Chromatography	Chloroform	SEC, styragel	2798
Poly(1,4-bis(2-thienyl)-2,5-didodecyloxyphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(1,4-bis(2-thienyl)-2,5-dieicosinoxyphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(1,4-bis(2-thienyl)-2,5-diheptoxyphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(1,4-bis(2-thienyl)-2,5-dihexadecyloxyphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(1,4-bis(2-thienyl)-2,5-dihexylphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(1,4-bis(2-thienyl)-2-dodecyloxy-5-methoxyphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(1,4-bis(2-thienyl)-2-heptoxy-5-methoxyphenylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2794
Poly(thio-*tert*-butylethylene)	Fractional precipitation	Benzene/methanol		800
Poly(thio-1,2-cyclohexylene)	Chromatography	Tetrahydrofuran	SEC, styragel	1090
Poly(thio-2,5-dimethyl-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio(1-methyltrimethylene)	Chromatography	Benzene	SEC, 45°C	1573
Poly(thio-1,4-phenyleneoxy-1,10-decyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenyleneoxy-1,7-heptyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenyleneoxy-1,6-hexyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenyleneoxy-1,8-octyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenyleneoxy-1,5-pentyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenylene)	Chromatography	1-Chloronaphthalene	SEC, 210°C, porasil and μ-bondagel	3060
		Dimethylsulfoxide	SEC, Sephadex only DMSO soluble fraction	1366
		N-Methyl-2-pyrrolidone	SEC, Asahipac, 25°C	3525
	Fractional precipitation	Toluene, chloronapthalene	Rising temp.	1961
Poly(thio-1,4-phenyleneoxy-1,4-bytyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenyleneoxy,1,2-ethyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, 25°C	3525
Poly(thio-1,4-phenyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC, Asahipac, 25°C	3525
Poly(thio-1,4-phenyleneoxy-1,3-propyleneoxy-1,4-phenylene)	Chromatography	*N*-Methyl-2-pyrrolidone	SEC	

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(thio-2,3,5,6-tetramethyl 1,4-phenylene)				
	Chromatography	*N*-methyl-2-pyrrolidone	SEC, Asahipac, 25°C	3525
Poly(thiohexamethylene)	Fractional precipitation	Benzene/methanol	40°C	2575,2829
Poly(thiomethylethylethylene)	Chromatography	Tetrahydrofuran	SEC, styragel	2696
Poly(thiophene)	Chromatography	Chloroform	Chloroform soluble fraction SEC, Ja-gel	507
		Chloroform–*n*-hexane–acetone (20 : 5 : 2)		
		n-Hexane–chloroform–Butanone (30 : 6 : 11)	Chloroform soluble fraction, TLC, silica gel coate with poly(acrylamide)	
Poly(thiophene-,5-diylvinylene) *Poly(2,5-thienylenevinylene)*				
	Chromatography	Chloroform	SEC	725
Poly(thiopropylene)	Chromatography	Methylene dichloride	SEC, poragel	3002
	Extraction	Ethyl ether		801
	Fractional precipitation	Benzene/methanol		855,2363
		Carbon tetrachloride/*n*-hexane		2363
Poly(thiotetramethylene)	Fractional pecipitation	Benzene/methanol		2034
Poly(thiotrimethylene)	Fractional precipitation	Chlroform/hexane	50°C	2827,2830
Poly(vinyl phenyl sulfoxide)	Chromatography	Tetrahydrofuran	SEC, TSK gel	1620

3.8. POLY(SILANES) AND POLY(SILOXANES)

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(di-*n*-alkylsiloxane)s	Chromatography	Toluene	SEC, μ-styragel	2495
Poly(2,3-benzo-1-silabutenes)	Chromatography	Tetrahydrofuran	SEC, μ-styragel, analytical and preparative	3199
Poly[(3,4-benzo-1-silacyclo pent-3-en-1-ylene)-*cis* and *trans*-but-2-en-1,4-ylene]				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 20°C	3420
Poly(benzyldimethylvinylsilane)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2471
Poly(di-*n*-butylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly[[(2,2-dichloro-1-oxo-3,4-cyclobutanediyl)]-*cis*-bis(methylene)](methylphenylsilylene)]				
	Chromatography	Tetrahydrofuran	SEC	1899
Poly(chlorophenyl silsesquioxane) *Poly(chlorophenyl siloxane)*				
	Fractional precipitation	Benzene/*n*-heptane	Ladder	95
Poly(dichlorophenyl silsesquioxane)				
	Fractional precipitation	Benzene/*n*-hexane	Ladder	95
Poly(chromium potassium sulfate-*co*-phenyl sodiumoxydihydroxysilane)				
	Fractional precipitation	Carbon tetrachloride/petroleum ether		156
Poly(di-*n*-decylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly(di-*n*-ethylsiloxane)	Chromatography	Toluene	SEC	1729
Poly(ferrooxyhalophenylsilylene)				
	Fractional precipitation	Benzene/petroleum ether		483
Poly(ferrocenyl di-*n*-butylsilane)				
	Chromatography	Tetrahydrofuran + 0.1%	SEC, ultrastyragel	911
		n-tetrabutylammonium bromide	SEC, ultrastyragel	911
Poly(ferrocenyl dimethylsilane)	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	911
Poly(ferrocenyl diethylsilane)	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	911
Poly(ferrocenyl di-*n*-hexyl silane)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	911
Poly(ferrocenyl methyl, propylen 3-trifluoro silene)				
	Chromatography	Tetrahydrofuran + 0.1% *tert-n*-butylammonium bromide	SEC, ultrastyragel	912
Poly(ferrocenyl methyl ferrocenylsilane)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	912
Poly(ferrocenyl methyl 5-norobornylsilane)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	912

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(ferrocenyl methyl, *n*-octadecyl silane)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	912
Poly(ferrocenyl methyl, phenyl silane)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	912
Poly(ferrocenyl methyl, vinyl silane)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	912
Poly(ferrocenyl methylsilane)	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, ultrastyragel	912
Poly(di-*n*-heptylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly(hexamethylcyclotrisiloxane)				
	Chromatography	Chloroform	SEC, 25°C	585
Poly(1,3,5,7,9,11-hexaphenyl-1,3,5,7,9,11-hexacyclohexasiloxane)				
	Fractional precipitation	Benzene/methanol		102
Poly(di-*n*-hexylsilane)	Chromatography	Tetrahydrofuran	SEC	646,2763
Poly(di-*n*-hexylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly(methyl cyclohexylsilylene-*co*-cyclohexylenesilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
Poly(2,2-dimethyl-5,5-diphenyl-1-oxa-2,5-disilacyclopentane) *Poly(oxydimethylsilyleneethylene-diphenylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, porosity glass	3102
Poly(2,5-dimethyl-2,5-diphenyl-1-oxa-,5-disilacyclopentane) *Poly(oxymethylphenylsilylenemethylenemethylpenylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, porosity glass	3102
Poly(1,1-dimethyl-1-germa-*cis*-pent-3-ene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3588
Poly(methyl-*n*-hexylsilylane)	Chromatography	Tetrahydrofuran	SEC	1468
	Fractional precipitation	Cyclohexane/isopropanol		749
Poly(methyl-β-phenethyl-*co*-methylphenyl silylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
Poly(methyl-β-phenethylsilylene-*co*-methyl-*p*-tolylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
Poly(methyl(2-phenylethyl)silylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
Poly(1-methyl-1-sila-*cis*-pent-3-ene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3588
			SEC, ultrastyragel, 20°C	3601
Poly(methyl-3,3,3-trifluoropropylmethylsiloxane)				
	Fractional precipitation	Ethyl acetate/toluene		459
Poly(5-methyl-2,2,5-triphenyl-1-oxa-disilacyclopentane) *Poly(oxydiphenylsilyleneethylenemethylphenylsilyeene)*				
	Chromatography	Tetrahydrofuran	SEC, porosity glass	3102
Poly(1-methyl-1-vinyl-1-silabutene)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 20°C	1930
Poly((3-methylbutenyl)1-silsesquioxane)				
	Fractional precipitation	Benzene/methanol		3270
		Cyclohexane/acetone–methanol (1 : 5)		3270
Poly[(methylchlorosilylene)methylene]				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	161
Poly(methylcyclohexylsilylene)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
	Fractional precipitation	Cyclohexane/isopropanol		749
Poly(methylcyclohexylsilylene-*co*-methyl-*p*-tolylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
Poly(methycylclohexylsilylene-*co*-methylphenylethylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3591
Poly[(methyldeuteriosilylene)methylene]				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	161
Poly(methylethylsiloxane)	Fractional precipitation	Benzene/methanol		1358
Poly(methylphenylsilane)	Fractional precipitation	Toluene/isopropanol		749
Poly(methylphenylsiloxane)	Fractional precipitation	Toluene/methanol		2819
Poly(dimethylsilmethylene)	Chromatography	Toluene	SEC	1924
	Fractional precipitation	Benzene/methanol		1711
Poly(dimethylsiloxane)	Chromatography	Chloroform	SEC, preparative	3514
		Tetrahydrofuran	SEC	3099
			SEC, μ-styragel, 35°C	778

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional precipitation	Benzene/methanol		1358
		Toluene/methanol	25°C	2060
	Fractional precipitation	Andrici carbonic	Supercritical	3593
		Methy ethyl ketone/methanol		3514
		Supercritical	Nitrous oxide	2883
		Toluene/acetone		2143
Poly[(di-methylsilylene)methylene]				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	161
Poly[(methylsilylene)methylene]				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	161
Poly(di-*n*-nonylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly(di-*n*-octylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly(oxy(ditrimethylsiloxy)silylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1533
Poly(oxydichlorophenyl)titano-tetra-(oxyhlorophenylsilylene)				
	Fractional precipitation	Carbon tetrachloride/petroleum ether		155
Poly(1,4-bis-(oxydimethylsilyl)phenylenedimethyl-silane) *Poly(oxydimethylsilyleneoxydimethylsilylene1,4-phenylenedimethylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	2613
Poly(oxydimethylsilylene) *Poly(dimethyl siloxane)*				
	Chromatography	Benzene	SEC, 55°C	967
		Chloroform	SEC, 35°C, 30°C	713,2174
			SEC, styragel, 30°C	2789
		Ethanol/methanol, ethyl ether/ethanol, and ethyl ether	Gradient elution, carbon	197
		n-Heptane/butanone	SEC, μ-styragel, 20°C	494
		n-Hexane/butanone	SEC, μ-styragel, 20°C	494
		o-Dichlorobenzene	SEC, styragel, 87°C	713
		Tetrahydrofuran	SEC, 25°C	1905
		Toluene	Oligomers, SEC	285
			SEC	1328,1649
			SEC, μ-styragel	1890,1896
			SEC, difunctio.	1081
			SEC, octadecyltrichlorosilane modified silica gel	1257
			SEC, styragel, 37°C	1897,3496
			SEC, styragel, preparative	765
		Trichloroethylene	Precipitation chromatogr., temp. gradient, quartz sand, branched polymer	99
			SEC, 25°C, 23°C	2961,3195
	Distribution between immiscible liquids	Methanol/carbon tetrachloride in counter current with cyclohexane		208
	Foam fractionation	Benzene		967
	Fractional precipitation	Benzene/methanol	25°C	322,323,457, 679,1257,1649, 1835,1837,3094
		Cyclohexane–carbon tetrachloride (3 : 1)/methanol		104
		Ethyl acetate/methanol		711,1257,1449,2174
		Toluene/methanol		153
	Fractional solution	Benzene/methanol	Trifunctional star	100
		Cyclohexane–carbon tetrachloride (3 : 1)/methanol	25°C, extraction	967,2585
	Sedimentation velocity	*n*-heptane	20°C	2585
	Turbidimetric titration	Butanone/methanol		2174
		Methyl ethyl ketone/methanol	25°C	706
Poly(oxydimethylsilylene-1,4-phenyleneoxy-1,4-phenylenedimethylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	808
Poly(oxydimethylsilylene-1,4-phenylenedimethylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	808
Poly(oxydiphenylsilylene)	Fractional precipitation	Benzene/methanol		3261,3265

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxydiphenyltitano-tetraoxydiphenylsilylene)				
	Fractional precipitation	Carbon tetrachloride/petroleum ether		155
Poly(oxyhydroxyaluminooxydichlorophenylsilylene)				
	Fractional precipitation	Carbon tetrachloride/petroleum ether		154
Poly(oxyhydroxyaluminooxydiphenylsilylene)				
	Fractional precipitation	Carbon tetrachloride/petroleum ether		154
Poly(oxymethyl-3,3,3-trifluoropropylsilylene)				
	Fractional precipitation	Ethyl acetate/toluene		460
Poly(oxymethylphenylsilylene)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 25°C	2000
	Fractional precipitation	Cyclohexane–carbon tetrachloride (3 : 1)/methanol		104
		Toluene/isopropanol		461,2000
	Fractional solution	Cyclohexane–carbon tetrachloride (3 : 1)/methanol		105
Poly(*n*-pentyl-*n*-alkylsilanes)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1705
Poly(di-*n*-pentylsiloxane)	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2230
Poly(di-*n*-pentylsilyene)	Chromatography	Cyclohexane	SEC, μ-styragel, chiral	925
Poly(1,1-diphenyl-2,2,3,3,4,4-hexamethylcyclotetrasiloxane)				
	Fractional precipitation	Benzene/methanol		97
Poly(1,1-diphenyl-1-sila-*cis*-pent-3-ene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3588
Poly(phenyl siloxane)	Fractional precipitation	Benzene/methanol	20°C	2547
Poly(1-phenyl-1-vinyl-1-silabutene)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 20°C	1930
Poly(diphenylene siloxane)	Fractional precipitation	Benzene/methanol		2604
Poly(*m*-phenylene siloxane)	Fractional precipitation	Benzene/methanol		2604
Poly(*p*-phenylene siloxane)	Fractional precipitation	Benzene/methanol		2604
Poly(*p*-phenylenetetramethyldisiloxane) *Poly(oxydimethylsilyene-1,4-phenylenedimethylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	2613
Poly(phenylmethylsiloxane)	Chromatography	Methanol/tetrahydrofuran	Liquid absorption (HPLC), silica-Csubindice 18, cyclic	602
		Toluene	SEC, styragel, preparative	602
Poly(diphenylsilane)	Chromatography	Tetrahydrofuran	SEC	1510
Poly(phenylsilsesquioxane)	Fractional precipitation	Benzene/methanol		106,1270,2684,3272
		Benzene/*n*-heptane		106
		Benzene/*n*-hexane		95
Poly(1,3-diphenyltetradisiloxane)				
	Fractional precipitation	Benzene/methanol		102
Poly(dipropyl siloxane)	Fractional precipitation	Toluene/methanol		1895
Poly(2,2,5,5-tetramethyl-1-oxa-2,5-disilacyclopentane) *Poly(oxydimethylsilyleneethylene-dimethylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, porasil	3103
Poly(2,2,5-tetramethyl-5-phenyl-1-oxa-2,5-disilacyclopentane) *Poly(oxydimethylsilyleneethylene-methylphenylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, porosity glass	3102
Poly(tetramethyl-*p*-silphenylene siloxane)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2456
Poly(tetramethyl-*p*-silphenylene-siloxane)				
	Fractional precipitation	Benzene/methanol–water		3421
Poly(2,2,5,5-tetraphenyl]-1-oxa-disiiacyclopentane) *Poly(oxydiphenylsilylenethylene-diphenylsilylene)*				
	Chromatography	Tetrahydrofuran	SEC, porosity glass	3102
Poly(1,3,5,7-tetraphenyl-1,3,5,7-tetrachlorocyclotetrasiloxane)				
	Fractional precipitation	Benzene/methanol		102
Poly(1,3,5,7-tetrapheylhexatetrasiloxane)				
	Fractional precipitation	Benzene/methanol		102
Poly[4-([1-trifluoromethyl)alkoxoly(*n*) carbonyl)phenyl 4′-alkoxy(*m*) biphenyl-4-carboxylate siloxane)]				
	Chromatography	Tetrahydrofuran	SEC, styragel	629
Poly[(3,3,3-trifluoropropyl)methyl]silane				
	Chromatography	Tetrahydrofuran	SEC, styragel	940
Poly(1,1,3-trimethyl-1-sila-*cis*-pent-3-ene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3588
			SEC, ultrastyragel, 20°C	2517

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(*p*[bis(trimethylsilyl)methyl]*iso* propenylbenzene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2328
Poly[(*o*-trimethylsilyl)phenyl acetylene]				
	Chromatography	Chloroform	SEC, styragel	2069
Poly(1,3,5-triphenylpentatrisiloxane)				
	Fractional precipitation	Benzene/methanol		102
Poly(bis(undecenyloxy)methylsilane)				
	Chromatography	Tetrahydrofuran	SEC	2110
Poly(1,1-divinyl-1-vinyl-1-silabutene)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 20°C	1930
Poly(divinyltetramethyldisiloxane)				
	Fractional precipitation	Butanone/methanol	25°C	1161

3.9. POLY(PHOSPHAZENES) AND RELATED POLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(aminocarbophosphazenes)	Chromatography	Tetrahydrofuran + 0.1wt.% tetra *n*-butylammonium bromide	SEC, phenogel	47
Poly[bis-(4-biphyloxy)phosphazene)]				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra *n*-butylammonium bromide	SEC, μ-styragel, 35°C	2299
Poly(*bis*-*p*-bromophenyleneoxy)phosphazene				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylmammonium bromide	SEC, μ-styragel, 25°C	2299
Poly(*trans*-2,4-dicarboxy phenoxy-3,4,6,6-tetraphenoxy)cyclotriphosphazene-*alt*-oxy-1,4-phenyleneisopropylidine-1,4-phenyleoxy)				
	Chromatography	Cresol : chloroform (20 : 80)	SEC	2214
Poly(di(*m*-chlorophenoxy)phosphazene)				
	Chromatography	Chloroform	SEC, styragel	1191
Poly(di-(*p*-chlorophenoxy)phosphazene)				
	Fractional precipitation	Dimethylformamide	Lowering temp.	55
Poly(bis-*p*-chlorophenyleneoxy)phosphazene				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylammonium bromide	SEC, μ-styragel, 25°C	2299
Poly(diphenoxy phosphazene)	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylammonium bromide	SEC, μ-styragel, 35°C	2299
Poly(fluoroalkoxyphosphazene)	Fractional solution	1,1,2-Trichloro-1,2,2-trifluoroethane/acetone	Extraction	1190
Poly(dihexoxyphosphazene)	Fractional precipitation	Tetrahydrofuran/ethanol		421
Poly(di-(*p*-isopropylphenoxy)phosphazene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1094
Poly(methyl phenyl phosphazene)				
	Chromatography	Tetrahydrofuran + 0.1 % *n*-tetrabutylammonuium bromide	SEC, μ-styragel, 30°C	3489
Poly(di-(*p*-methylanilino)phosphazene)				
	Fractional precipitation	Tetrahydrofuran/diethylene glycol		2593
Poly(dimethyloxy phosphazene)				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylammonium bromide	SEC, μ-styragel 35°C	2299
Poly(di *p*-methylphenylenoxy phosphazene)				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylammonium bromide	SEC, μ-styragel, 35°C	2299
Poly[bis(β-naphthoxy) phosphazene)				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylammonium bromide	SEC, μ-styragel, 35°C	2299
		Tetrahydrofuran + 0.1 % tetrakis (*n*-butyl ammonium bromide)	SEC, styragel	422
	Fractional precipitation	Tetrahydrofuran/hexane		422

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(octafluroropentoxy-phosphazene)				
	Fractional precipitation	Toluene–tetrahydrofuran (30 : 15)/petroleum ether		874
Poly(diphenoxyphosphazene)	Chromatography	Tetrahydrofuran	SEC, pore glass beads	45
Poly((*p*-phenylazoanilino)phosphazene)				
	Chromatography	Aq. 95% methanol	SEC, styragel	46
Poly((1-phenylazona-phthalene-2-oxy-methylamino)phosphazene)				
	Chromatography	Aq. 95% methanol	SEC, styragel	46
Poly((1-phenylazonapthalene-2-oxytrifluoroethyoxy)phosphazene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	46
Poly(di-(*p*-phenylphenoxy)phosphazene)				
	Fractional precipitation	Dimethylformamide	Lowering temp.	55
Polymer from chromium (II) acetate and potassium diphenylphosphinate				
	Chromatography	Tetrahydrofuran	SEC	733
Poly((2-trifluoroethoxy)(1-difluoro-2,3,4-hexafluoropentoxy) phosphazene) *Phosphonitrilic fluoroelastomers*				
	Chromatography	Dimethylformamide	SEC, styragel	514
	Fractional precipitation	Acetonitrile/benzene		514
Poly(bis-2,2,2-trifluoroethoxy)phenoxy phosphazenes)				
	Chromatography	Tetrahydrofuran + wt.% tetra-*n*-butylammonium bromide	SEC, μ-styragel, 35°C	2299
		Tetrahydrofuran + 0.875 g tetra-*n*-butylammonium bromide/l	SEC, styragel	48
	Fractional precipitation	Tetrahydrofuran/methanol		48
Poly(2,2,2-trifluoroethoxy)phosphazene				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	1937
	Fractional precipitation	Acetone/cycloxhexane	25°C	55
		Methanol	Lowering temp. 40°C to 25°C	55
Poly (urylene-1,4-phenyleneureylenephenylphosphinylidene)				
	Fractional precipitation	Dimemthyl sulfoxide/carbon tetrachloride	25°C	516

3.10. OTHER COMPOUNDS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(2-acrylamido-2-methylpropanesulfonic acid)				
	Fractional precipitation	$CaCl_2 \cdot 6H_2O$ 3.0 M/2-propanol		1105
Poly(5-(1-adamantyloxy-2H-pyrrole-2-one)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3484
Poly(aniline)-*co*-poly(*N*-butyl aniline)				
	Chromatography	*N*-methylpyrrolidone	SEC, trimethylsilyl-branched phase, 25°C	302
Poly(arylate) from: (terephthalic acid chloride + 2-phenyl-bis-(4-hydroxyphenyl)-phthalimidine)				
	Coacervation	Tetrachloroethane–phenol (3 : 1)/ *n*-heptane		867
Poly(dibenzimidazole(2,3-a)(6,7-a)-1,8-dioxo-1,2,7,8-tetrahydro-4,5-benzoph enantroline)				
	Chromatography	Methanesulfonic acid, 96% sulfuric acid	SEC, porous silica	313
Poly(benzo(1,2-d : 5,4-d′) bisoxazole-2,6-diyl-1,4-phenylene)				
	Chromatography	Methanesulfonic acid	SEC	648
Poly(5,5′-dibenzoimidazoie-2,2′-diyl-1,-3-phenylene)				
	Fractional precipitation	Dimethylacetamide/*n*-hexane	61°C	1271
	Sedimentaion equilibrium	Dimethylacetamide	Ultracentrifuge, 40°C	1019
		Dimethylacetamide/lithium chloride/propionic acid	Ultracentrifuge	3466
Poly(*N*-butyl aniline)	Chromatography	*N*-Methylpyrrolidone	SEC, trimethylsilyl-branched-phase, 25°C	573
Poly(chalcones) (General)	Chromatography	Dimethyl sulfoxide	SEC	2014
Poly(cyclodiborozane)s	Chromatography	Tetrahydrofuran	SEC, styragel	591
Poly{*N*-[3,4,5-tris(*n*-dodecan-1-yloxy) phenyl]maleimide}				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	2570
Poly(*N*-dodecyl aniline)	Chromatography	*N*-Methylpyrrolidone	SEC, trimethylsilyl-branched-phase, 25°C	573
Epoxy	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	2275
Poly(ether ester)s	Chromatography	Methylene dichloride	SEC, ultrastyragel	3206
Poly(*N*-ethyl aniline)	Chromatography	*N*-Methylpyrrolidone	SEC, trimethylsilyl-branched-phase, 25°C	573

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(ferrocenediylfurfurylidene)				
	Fractional precipitation	Dioxane/isopropanol–water		2383
Poly(ferrocenylgermanes)	Chromatography	Tetrahydrofuran + 0.1 % tetra-*n*-butylammonium bromide	SEC, ultrastyragel	2557
Poly(5,7-dihydro-1,3,5,7-tetraoxobenzo-(1,2-c : 4,5-c′)dipyrrole-2,6-(1H, 3H)-diyl-1,4-phenylenephthalidylidene-1,4-phenylene)				
	Fractional precipitation	Nitrobenzene/dichloroethane	50°C and 63°C	1762
Poly(2,3-dihydrobenzofuran-2,3-diyl)				
	Fractional precipitation	Benzene/methanol	Optically active	866
Poly(1-isobutyl-2,5-dioxopyrrolidin-3,4-diyl)				
	Fractional precipitation	Benzene/methanol		3262
Poly(2-methoxy-1,3,5-triazine-4,6-diyloxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy)				
	Chromatography	Chloroform	SEC, styragel, 30°C	2957
	Fractional precipitation	1,2-Dichloroethane/methanol	30°C	2957
Poly(*N*-methylaniline)	Chromatography	*N*-Methylpyrrolidone	SEC, trimethylsilyl-branched-phase, 25°C	573
Poly(1,2,4-dimethylphenyl-2,5-dioxopyrrolidin-3,4-diyl)				
	Fractional precipitation	Ethyl acetate/methanol	21°C	3267
Poly(nitrilo-2-methyl-1,4-phenylene nitrilomethylidyne-1,4-phenylenemethylidyne)				
	Chromatography	Sulfuric acid 96%	SEC	2169
Poly(1-octadecyl-2,5-dioxopyrrolidin-3,4-diyl)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	224
	Fractional precipitation	Toluene/methanol	20°C	224
Poly(1,3-dioxa-2-propyl-4,6-cyclohexylene-methylene) *Poly (vinyl butyral)*				
	Chromatography	Tetrahydrofuran	Acetylated, SEC, spherosil	688
	Fractional precipitation	Isopropanol/water		1313
Poly(oxadiazoledily-1,4-phenylenephthalidylidene-1,4-phenylene)				
	Fractional precipitation	Tetrachloroethane–phenol/*n*-heptane		2510,3209
	Sedimentation analysis	Dimethylformamide		2510
Poly(2-oxo-1,3-dioxolan-4,5-diyl) *Poly vinylcarbonato*				
	Fractional precipitation	Dimethylformamide/methanol		2912
		Dimethylformamide/*n*-butanol		2912
Poly(2,5-dioxopyrrolidine-1,3-diylthio-4,4-biphenylenethio-2,5-dioxopyrrolidine-1,4-phenylenemethylene-1,4-phenylene)				
	Chromatography	Dimethylformamide + lithium nitrate	SEC, silica gel	3461
Poly(2,5-dioxopyrrolidine-1,3-diylthio-1,4-phenyleneoxy-1,4-phenyleneoxy-1,4-phenylenethio-2,5-dioxopyrrolidine-1,4-phenylenemethylene-1,4-phenylene)				
	Chromatography	Dimethylformamide + lithium nitrate	SEC, silica gel	3461
Poly(4,4′dioxy-2,2′-dimethylazoxybenzenedodecanedioyl)				
	Chromatography	Chloroform	SEC, styragel, 40°C	2335
Poly(oxybenzoxazole-5,2-diyl-1,4-phenylenephthalidylindene-1,4-phenylenebenzoxazole-2,5-diyl)				
	Fractional precipitation	Tetrachloroethane–phenol/*n*-heptane		2309
Poly(oxyphthalimide-5,2-diyl-1,4-phenylenephthalidylidene-1,4-phenylenephthalimide-2,5-diyl)				
	Fractional precipitation	Tetrachloroethane–phenol/*n*-heptane		3209
Poly(phenol formaldehyde)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	578
Phenol novocal	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	2275
Poly(1-phenyl-2,5-dioxopyrrolidin-3,4-diyl) *Poly[N-phenylmaleimide]*				
	Chromatography	Tetrahydrofuran	SEC, styragel, 38°C	1189
Poly(2,2-(1,4-phenyl)-7,7-hydroxy-bis-(3-pheylquinoxaline)				
	Fractional precipitation	Carbon tetrachloride–phenol/*n*-heptane		3211
Poly(1,4-phenylenemethylene-3,5-pyrazole)				
	Fractional precipitation	Dimethylformamide/benzene	25°C	3233
Poly(*p*-phenylene)s	Chromatography	Chloroform	SEC, styragel, 40°C	2568
Poly(3-phenylquinoxaline-2,7-diyloxy-3-phenylquinoxaline-7,2-diyl-1,4-phenylene)				
	Fractional precipitation	Tetrachloroethane–phenol (1 : 1)/*n*-heptane		3210
Poly(1,4-piperazinediyl-2,5-dioxopyrrolidine-1,3-diyl-hexamethylene-2,5-dioxopyrrolidine-1,3-diyl)				
	Fractional precipitation	Chloroform/acetone		1000
Poly(*N*-propyl aniline)	Chromatography	*N*-Methylpyrrolidone	SEC, trimethylsilyl-branched-phase, 25°C	573
Poly(propyleneglycol)-*co*-di(4-isocyanotophenyl)methane-*co*-pyromellitic dianhydride) *Poly(etherimide)*				
	Chromatography	Dimethylformamide	SEC, styragel	724
Poly(2,4-quinolinediyl-1,4-phenyleneoxy-1,4-phenylene)				
	Fractional precipitation	Chloroform/methanol		3492

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly[1-(3-sulfonatepropyl)-pyridinium-2-yl]-ethylene)] *Poly(2-vinylpyridinium sulfopropylbetaine)*				
	Fractional precipitation	Water/methanol		2238
Poly(1-tolyl-2,5-dioxopyrrolidin-3,4-diyl)				
	Fractional precipitation	Chloroform/methanol	20°C	3266
Poly[(4,4′-trimethylene-bis-(1-methyl piperidine)-*N*-(2,3-butene)di-tetrafluoroborate]				
	Chromatography	Acetonitrile + acetic acid 0.5 M (70 : 30)	SEC, HEMA	2898
	Fractional solution	Ethylene glycol monomethyl ether/diisopropyl ether	Column extraction, CPF	2898
Poly[(4,4′-trimethylene-bis-(1-methyl piperidine)-*N*-(2,3-butene)dibromide]				
	Chromatography	Acetonitrile + acetic acid 0.5 M, (70 : 30)	SEC, HEMA	2898
	Fractional solution	Ethylene glycol monomethyl ether/diisopropyl ether	Column extraction, CPF	2898
Wool-*graft*-poly(*n*-butyl acrylate)				
	Extraction	Benzene or acetone		3356
Wool-*graft*-poly(ethyl acrylate)	Extraction	Benzene		2196
		Benzene or acetone		3356
Wool-*graft*-poly(methyl acrylate)				
	Extraction	Benzene		2192,2195,2197
		Benzene or acetone		3356
Wool-*graft*-poly(methyl methacrylate)				
	Extraction	Benzene		6,2193
		Benzene or acetone		828,3356
Wool-*graft*-poly(methyl acrylate-co-vinyl acetate)				
	Extraction	Benzene		2197
Wool-*graft*-poly(vinyl acetate)	Extraction	Benzene		2189,2195,2197

3.11. RANDOM COPOLYMERS

Poly(acetaldehyde-*co*-chloral)	Fractional precipitation	Chloroform/methanol		1457
Poly(acrolein-*co*-thiophenolmercaptal)				
	Fractional precipitation	Benzene/methanol		2911
Poly(acrylonitrile-*co*-α-hydroxyisobutyric acid anhydrosulfite)				
	Turbidimetric titration	Dimethylformamide/chloroform		1426
Poly(5-(1-adamantyloxy)-2H-pyrrole-2-one-*co*-methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3484
Poly(5(1-adamantyloxy)-2H-pyrrole-2-one-*co*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3484
Poly(*N*-alaninylmaleimide-*co*-methacrylic acid)				
	Chromatography	Dimethylformamide	SEC, μ-styragel, 40°C	1901
Poly(*N*-alaninylmaleimide-*co*-vinyl acetate)				
	Chromatography	Dimethylformamide	SEC, μ-styragel, 40°C	1901
Poly(di-*n*-alkylsiloxane-*co*-di-*n*-hexylsiloxane)				
	Chromatography	Toluene	SEC	2496
Poly(β-allyloxypropionaldehyde-*co*-acrylonitrile)				
	Chromatography	Tetrahydrofuran	SEC, styragel	137
Poly(β-allyloxypropionaldehyde-*co*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	137
Poly(butyleneglycol-*alt*-(terephthalic acid-sebacic acid))				
	Chromatography	*o*-Chlorophenol		2047
Poly(carbon monoxide-*co*-ethylene)				
	Chromatography	Trichlorobenzene	SEC, styragel, 135°C	1108
Poly(carbon monoxide-*co*-vinyl chloride)				
	Chromatography	Carbon tetrachloride–ethyl alcohol(1 : 1) tetrahydrofuran	TLC, gradient elution	1633
Poly(1,3-bis(p-carboxyphenoxy)propane-*co*-sebacic acid)				
	Chromatography	Chloroform	SEC, styragel	685
Poly(3,3-bis(chloromethyl)oxacyclobutane-*co*-β-propiolactone)				
	Chromatography	Chlorobenzene	SEC, styragel	3465
	Fractional precipitation	Ethylene dichloride/ethanol		3124
Poly(cyclohexane oxide-*co*-nitroethylene)				
	Extraction	Benzene		1429

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly[1-(3-sulfonatepropyl)-pyridinium-2-yl]-ethylene)] *Poly(2-vinylpyridinium sulfopropylbetaine)*				
	Fractional precipitation	Water/methanol		2238
Poly(1-tolyl-2,5-dioxopyrrolidin-3,4-diyl)				
	Fractional precipitation	Chloroform/methanol	20°C	3266
Poly[(4,4′-trimethylene-bis-(1-methyl piperidine)-*N*-(2,3-butene)di-tetrafluoroborate]				
	Chromatography	Acetonitrile + acetic acid 0.5 M (70 : 30)	SEC, HEMA	2898
	Fractional solution	Ethylene glycol monomethyl ether/diisopropyl ether	Column extraction, CPF	2898
Poly[(4,4′-trimethylene-bis-(1-methyl piperidine)-*N*-(2,3-butene)dibromide]				
	Chromatography	Acetonitrile + acetic acid 0.5 M, (70 : 30)	SEC, HEMA	2898
	Fractional solution	Ethylene glycol monomethyl ether/diisopropyl ether	Column extraction, CPF	2898
Wool-*graft*-poly(*n*-butyl acrylate)				
	Extraction	Benzene or acetone		3356
Wool-*graft*-poly(ethyl acrylate)	Extraction	Benzene		2196
		Benzene or acetone		3356
Wool-*graft*-poly(methyl acrylate)				
	Extraction	Benzene		2192,2195,2197
		Benzene or acetone		3356
Wool-*graft*-poly(methyl methacrylate)				
	Extraction	Benzene		6,2193
		Benzene or acetone		828,3356
Wool-*graft*-poly(methyl acrylate-co-vinyl acetate)				
	Extraction	Benzene		2197
Wool-*graft*-poly(vinyl acetate)	Extraction	Benzene		2189,2195,2197

3.11. RANDOM COPOLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acetaldehyde-*co*-chloral)	Fractional precipitation	Chloroform/methanol		1457
Poly(acrolein-*co*-thiophenolmercaptal)				
	Fractional precipitation	Benzene/methanol		2911
Poly(acrylonitrile-*co*-α-hydroxyisobutyric acid anhydrosulfite)				
	Turbidimetric titration	Dimethylformamide/chloroform		1426
Poly(5-(1-adamantyloxy)-2H-pyrrole-2-one-*co*-methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3484
Poly(5(1-adamantyloxy)-2H-pyrrole-2-one-*co*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3484
Poly(*N*-alaninylmaleimide-*co*-methacrylic acid)				
	Chromatography	Dimethylformamide	SEC, μ-styragel, 40°C	1901
Poly(*N*-alaninylmaleimide-*co*-vinyl acetate)				
	Chromatography	Dimethylformamide	SEC, μ-styragel, 40°C	1901
Poly(di-*n*-alkylsiloxane-*co*-di-*n*-hexylsiloxane)				
	Chromatography	Toluene	SEC	2496
Poly(β-allyloxypropionaldehyde-*co*-acrylonitrile)				
	Chromatography	Tetrahydrofuran	SEC, styragel	137
Poly(β-allyloxypropionaldehyde-*co*-styrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	137
Poly(butyleneglycol-*alt*-(terephthalic acid-sebacic acid))				
	Chromatography	*o*-Chlorophenol		2047
Poly(carbon monoxide-*co*-ethylene)				
	Chromatography	Trichlorobenzene	SEC, styragel, 135°C	1108
Poly(carbon monoxide-*co*-vinyl chloride)				
	Chromatography	Carbon tetrachloride–ethyl alcohol(1 : 1) tetrahydrofuran	TLC, gradient elution	1633
Poly(1,3-bis(p-carboxyphenoxy)propane-*co*-sebacic acid)				
	Chromatography	Chloroform	SEC, styragel	685
Poly(3,3-bis(chloromethyl)oxacyclobutane-*co*-β-propiolactone)				
	Chromatography	Chlorobenzene	SEC, styragel	3465
	Fractional precipitation	Ethylene dichloride/ethanol		3124
Poly(cyclohexane oxide-*co*-nitroethylene)				
	Extraction	Benzene		1429

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(cyclohexene-*alt*-*N*-ethylmaleimide)				
	Chromatography	Ethanol/cyclohexane	Alternating, SEC *n*-octylporasil, 25°C	3486
Poly(cyclohexene carbonate-*co*-cyclohexene ether)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 35°C	3101
Poly(diketene-*co*-tetrahydrofuran)				
	Extraction	Methanol, benzene		3123
Poly(epichlorohydrin-*co*-styrene)				
	Turbidimetric titration	Benzene/methanol		2177
Poly(ether ketone)s	Chromatography	Tetrahydrofuran	SEC, styragel	1792
Poly(diethylazocarboxylate-*alt*-*N*-vinylcarbazole)				
	Extraction	Acetone or carbon tetrachloride		3288
Poly(ethylene-*co*-e-caprolactone)				
	Chromatography	Tetrahydrofuran	SEC, Shodex	863
Poly(ethylene glycol-*co*-2,2-butyl-hydroxyphenyl)propane-*alt*-terephthalic acid)				
	Extraction	Boiling, ethyl ether, acetone, 1,2-dichloropropane, tetrahydrofuran, 1,2-dichloroethane		1201
Poly(etheylene terephthalate-*co*-caprolactone)				
	Fractional precipitation	Chloroform/methanol		3497
Poly(ferrocenylsilene-*co*-ferrocenylgermane)s				
	Chromatography	Tetrahydrofuran + 0.1 wt.% tetra-*n*-butylammonium bromide	SEC, ultrastyragel	2557
Poly(formaldehyde-*co*-dioxolane)				
	Fractional precipitation	Tetrachloroethane–phenol/cyclohexane		1433
Poly(1,6-hexamethylene diol-*co*-2-methyl-2-ethyl-1,3-propanediol-*alt*-sebacic acid)				
	Chromatography	Chloroform	SEC, styragel	2426
Poly(3-hydroxybutyrate-*co*-hydroxyvalerate)				
	Fractional precipitation	Chloroform/heptane		3567
Poly(3-hydroxybutyrate-*co*-3-hydroxypropianate)				
	Chromatography	Chloroform	SEC, styragel	2968
			SEC, ultrastyragel, 40°C	1826
	Fractional precipitation	Chloroform/*n*-heptane		508
Poly(3-hydroxybutyrate-*co*-4-hydroxypropianate)				
	Chromatography	Chloroform	SEC, ultrastyragel, 40°C	1826
Poly(3-hydroxybutyrate-*co*-3-hydroxyvalerate)				
	Fractional precipitation	Acetone/water		2204
Poly[(*N*-(4-hydroxyphenyl)maleimide)-*alt*-(*p*-trimethylsilyl-α-methylstyrene)]				
	Chromatography	Tetrahydrofuran	SEC, styragel, 40°C	575
Poly(D,L-lactic acid-*co*-glycolic acid)				
	Chromatography	Methylene chloride	SEC	2793
Poly(methyl-2-ethyl-2-thiirane-*co*-thiopropylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2696
Poly(methyl methacrylate-*co*-*p*-cresyl methacrylate)				
	Fractional precipitation	Benzene/methanol	Crosslinked with *p*-cresol formaldehyde resins	2641
Poly(methyl methacrylate-*co*-dithio-3-chlorophenylene dithiophenylene methylenephenylene)				
	Extraction	Acetone and chloroform		1199
Poly(methyl methacrylate-*co*-oxyethylenedithioethylene)				
	Extraction	Acetone, carbon disulfide		1199
Poly(1,4-bis-(di-methylhydroxysilyl)phenylene-*co*-dimethylsiloxane)				
	Fractional precipitation	Benzene/methanol	20°C	98
Poly(methylphenyl phosphazene-*co*-methyl-3-amino phenyl phosphazene)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, μ-styragel, 30°C	3489
Poly(methylphenyl phosphazene-*co*-methyl-3-imino carbonyl ethylene)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, μ-styragel 30°C	3489
Poly(methylphenyl phosphazene-*co*-methyl-3-nitro phenyl phosphazene)				
	Chromatography	Tetrahydrofuran + 0.1% *n*-tetrabutylammonium bromide	SEC, μ-styragel, 25°C	3489
Poly(dimethylsilapropylene-*co*-diphenylsilapropynylenes)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	400

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(dimethylsilylene-*co*-diphenylsilylenes)				
	Fractional precipitation	Tetrahydrofuran/2-propanol		3590
Poly(dimethylsilylene-*co*-methyl-β-phenethylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3590
	Fractional precipitation	Tetrahydrofuran/2-propanol		3590
Poly(dimethylsilylene-*co*-metylcyclohexylsilylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3590
	Fractional precipitation	Tetrahydrofuran/2-propanol		3590
Poly(dimethylsiloxane-*co*-isophorone diisocyanate)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel, 40°C	3604
Poly(dimethylethylsilylene-*co*-phenylmethylsylylene)				
	Chromatography	Tetrahydrofuran	SEC, Shodex	145
Poly(octamethylcyclotetrasiloxane-*co*-octaphenylcyclotetrasiloxane)				
	Chromatography	Benzene	SEC, styragel	103
Poly(octaphenylcyclotetrasiloxane-*co*-octa methylcyclotetrasiloxane)				
	Chromatography	Benzene	SEC, styragel	101
Poly(dioxolane-*co*-tetrahydrofuran)				
	Fractional precipitation	Chloroform/*n*-hexane		3563
Poly(oxyethylene-*co*-oxypropylene)				
	Chromatography	Butanone, water saturated	TLC, silica gel	3329
		Dioxane–water (10 : 1)	TLC, silica gel	3329
		Hexane–butanone methanol (6 : 2 : 1)	TLC, silica gel	3329
	Turbidimetric titration	Dimethylformamide/water		1056
		Methanol/water		1056
Poly(phenyl methacrylate-*co*-methyl methacrylate)				
	Fractional precipitation	Benzene/methanol		995
Poly(*n*-propylmethylsilane-*co*-cyclohexylmethylsilane)				
	Chromatography	Chloroform	SEC, μ-styragel	2858
	Fractional precipitation	Toluene/ethyl acetate	25°C	2858
Poly(*n*-propylmethysilene-*co*-isopropylmethylsilane)				
	Chromatography	Chloroform	SEC, μ-styragel	2858
	Fractional precipitation	Toluene/ethyl acetate	25°C	2858
Poly(*n*-propylmethylsilene-*co*-phenylmethylsilene)				
	Chromatography	Chloroform	SEC, μ-styragel	2858
	Fractional precipitation	Toluene/ethyl acetate	25°C	2858
Poly(silarylene)-*alt*-poly(siloxane)s				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	809
Poly(styrene-*co*-ε-caprolactam)	Chromatography	Tetrahydrofuran	SEC	3533
			SEC, styragel	3532
	Extraction	Benzene and trifluoroethanol		1279
	Fractional precipitation	Benzene/methanol		3532,3533
Poly(styrene-*co*-oxyethylenedithioethylene)				
	Extraction	Cyclohexane and carbon disulfide		1199
Poly(tetrahydrofuran-*co*-1,2-butene oxide)				
	Chromatography	Tetrahydrofuran	SEC	1204
Poly(tetrahydrofuran-*co*-oxyproylene)				
	Chromatography	Tetrahydrofuran	SEC	346,347,349, 350,1204
Poly(tetrahydrofuran-*co*-*n*-propyl glycidyl ether)				
	Chromatography	Tetrahydrofuran	SEC	1204
Poly(tetrahydrofuran-*co*-vinyl butyl ether)				
	Extraction	*n*-Heptane, acetone		2644
Poly(dithiotetramethylene-*co*-methyl methacrylate)				
	Extraction	Acetone and carbon tetrachloride		1199
Poly(dithiotetramethylene-*co*-styrene)				
	Extraction	Cyclohexane and carbon disulfide		1199
Poly(3,3,3-trifluoropropylmethylsilane-*co*-methylpropylsilane)				
	Chromatography	Tetrahydrofuran	SEC	941
3.12. BLOCK COPOLYMERS				
Poly(acetaldehyde)-*block*-poly(oxypropylene)				
	Fractional solution	Methanol, chlorofom	Extraction	939

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(5-(*p*-acrylamidophenyl)-10,15,20-triphenylporphin)-*block*-poly(styrene)				
	Chromatography	Benzene	SEC, bioglass	1223
Poly(acrylonitrile)-*block*-poly(butandiene)-*block*-epoxy resins				
	Turbidimetric titration	Chloroform/methanol		1579
Poly(acrylonitrile)-*block*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3110
Poly(acrylonitrile)-*block*-poly(oxymethylene)				
	Extraction	Acetonitrile		969
Poly(γ-benzyl-L-glutamate)-*block*-poly(butadiene)				
	Extraction	Ethyl acetate–methanol (85 : 15); dimethylformamide		2580
	Fractional precipitation	Chloroform–*n*-heptane (1 : 1)/ methanol		2580
		Chloroform/hexane		2345
Poly(γ-benzyl-D,L-glutamate)-*block*-poly(butadiene)-*block*-poly(γ-benzyl-D,L-glutamate)				
	Fractional precipitation	*n*-Hexane–chloroform/ethanol		1248
Poly(butadiene)-*block*-poly(ε-caprolactam)				
	Extraction	Tetramethylsilane, trifluoroethanol		1279
	Fractional precipitation	*m*-Cresol/cyclohexane		1279
Poly(butadiene)-*block*-poly(methyl-2-ethyl-2-thiirane)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2696
Poly(butadiene)-*block*-poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene-1,4-phenylene-isopropylidene-1,4-phenylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	2653
Poly(butadiene)-*block*-poly(oxymethylene)				
	Extraction	Toluene, acetone, methanol, water		2414
Poly(butadiene-*co*-styrene)-*block*-(epoxy resins)				
	Turbidmetric titration	Chloroform/ethanol		1579
Poly(*n*-butyl isocyanate)-*block*-poly(styrene)				
	Chromatography	Falta disolvent	SEC	1082,1083
Poly(β-butyrolactone)-*block*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3550
Poly(β-butyrolactone)-*block*-poly(oxypropylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3550
Poly(β-butyrolactone)-*block*-poly(propiolactone)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3550
Poly(ε-caprolactam)-*block*-poly(1,4-butyleneglycol-*co*-4,4-diphenylmethanediisocyanate)				
	Fractional precipitation	Dimethylformamide/diamyl ether		2990
Poly(ε-caprolactam)-*block*-poly(isobutene)-*block*-poly(ε-caprolactam)				
	Extraction	*n*-Hexane, 2,2,2 trifluoroethanol		3494
Poly(ε-caprolactam)-*block*-poly(styrene)				
	Fractional precipitation	*m*-Cresol/cyclohexane		1279
	Turbidimetric titration	Toluene/*n*-hexane		1109
Poly(ε-caprolactone)-*block*-poly(lactide)				
	Extraction	Acetone, chloroform		881
Poly(ε-caprolactone)-*block*-poly(D,L-lactide)-*block*-poly(ε-caprolactone)				
	Chromatography	Dimethylformamide	SEC, styragel, 45°C	3036
Poly(ε-caprolactone)-*block*-poly(oxyethylene)				
	Fractional precipitation	Benzene–methanol/isooctane		2581,2582
		Benzene/isooctane		2581,2582
Poly(ε-caprolactone)-*block*-poly(β-propiolactone)				
	Fractional precipitation	Toluene/petroleum ether		1203
Poly(ε-caprolactone)-*block*-(tetrahydrofuran)-*block*-(ε-caprolactone)				
	Chromatography	Tetrahydrofuran	SEC	2412
Expoxide resin-*block*-poly(butadiene-*co*-styrene)				
	Turbidimetric titration	Chloroform/methanol		1580
Poly(ethylene glycol)-*block*-Poly(L-lysine)				
	Centrifugation	Tetrahydrofuran	SEC	1211
Poly(ethylene terepthalate)-*block*-poly(tetramethylene ether)				
	Cross fractional precipitation	Tetrachloroethane–methanol, trichloroethylene–*n*-heptane	20°C	3600
Poly(2,2-bis(4-hydroxyphenyl)propane-*block*-epxoy resin)				
	Chromatography	Tetrahydrofuran		686

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(2,2-bis(4-hydroxyphenyl)propane-*co*-bis(4-hydroxy-2,5-dichlorophenyl)methane-*co*-phosgene), (*block* copolymer)				
	Chromatography	Chloroform	SEC, styragel	2493
		Tetrahydrofuran	SEC, styragel	2493
Poly(isoprene)-*block*-poly(oxytetramethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1
Poly(isoprene)-*block*-(2,4-toluene diisocyanate)				
	Chromatography	Toluene, tetrahydrofuran	SEC	1082
Poly(D,L lactide)-*block*-poly(ethyleneglycol)				
	Chromatography	Tetrahydrofuran	SEC	739
Poly(methyl-2-ethyl-2-thiirane)-*block*-poly(propylene sulfide)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2696
Poly(methyl glycidyl ether)-*block*-poly-(oxytetramethylene)				
	Fractional precipitation	Methanol/water		2645
Poly(methyl methacrylate)-*block*-poly-(oxytetramethylene)-*block*-poly(methylmethacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3108
	Fractional precipitation	Choroform/methanol		3108
Poly(methyl methacrylate)-*block*-(2,4-toluenediisocyanate)				
	Chromatography	Toluene, tetrahydrofuran	SEC	1082
Poly(dimethyl siloxane)-*block*-poly(styrene)				
	Chromatography	Toluene	SEC, 20°C	701
Poly(dimethylsilylene)-*block*-poly(styrene)				
	Chromatography	Tetrahydrofuran	SEC	287,554
		Toluene	SEC, 20°C	701
Poly(dimethylsilylene)-*block*-poly(styrene)-*block*-poly(dimethylsilylene)				
	Chromatography	Toluene	SEC, μ-styragel, 25°C	178
			SEC, styragel	1511
Poly(α-methylstyrene)-*block*-poly-(oxytetramethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2747
Poly(α-methylstyrene)-*block*-poly(propylenesulfide)-*block*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	2747
Poly(1,3-dioxolane)-*block*-poly(p-methoxystyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1410
Poly(oxybutylene)-*block*-poly(oxyethyylene)-*block*-poly(oxybutylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3542
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)-*alt*-poly(isobutene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	1929
Poly(oxydimethylsilylene)-*block*-poly(oxymethylsilylene)				
	Chromatography	Ethyl acetate	SEC, styragel, 30°C	93
Poly(oxyethylene)-*block*-poly(ethyl methacylate)				
	Fractional precipitation	Benzene/2,2,4-trimethylpentane		2951
Poly(oxyethylene)-*block*-poly(isoprene)-*block*-poly(ethylene oxide)				
	Sedimentation equilibrium	Water, chloroform	20°C	2271
	Sedimentation velocity	Water, chloroform	20°C	2271
Poly(oxyethylene)-*block*-poly(isoprene)-*block*-poly(styrene)-*block*-poly(isoprene)-*block*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	1728
Poly(oxyethylene)-*block*-poly(methacrylonitrile)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	3110
Poly(oxyethylene)-*block*-poly(methyl methacrylate)-*block*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC	3109
Poly(oxyethlene)-*block*-poly(α-methylstyrene)				
	Chromatography	Tetrahydrofuran	SEC	1631
Poly(oxyethylene)-*block*-poly(oxybutylene)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3543
Poly(oxyethylene)-*block*-poly(oxyethylene)-*co*-bis(4-isocyanotophenyl)methane-*co*-poly(oxyethyleneoxyadipoyl)-*block*-poly(oxethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	970
Poly(oxyethylene)-*block*-poly(oxyethyleneoxyadipoyl)				
	Fractional precipitation	Benzene/isooctane	35°C	970
Poly(oxyethylene)-*block*-poly(oxyethyleneoxyadipoyl)-1-methyl-2,4-disocyanato-benzene-poly(oxy-ethyleneoxyadipoyl-*block*-polyoxethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 25°C	970
Poly(oxyethylene)-*block*-poly(oxypropylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	26
Poly(oxyethylene)-*block*-poly(oxypropylene)-*block*-poly(oxyethylene)				
	Chromatography	Dimethylformamide + lithium chloride	SEC, silica-Ti-fluoropolymer, 30°C	3424

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TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(oxyethylene)-*block*-poly(isoprene)-poly(styrene)-*block*-poly(styrene)-*block*-poly(oxyethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	1728
Poly(oxyethylene)-*block*-poly(2-vinylpyridine)				
	Chromatography	Dimethylformamide	SEC, styragel	2039
	Fractional precipitation	Benzene/trimethyl-2,2, 4-pentane(isooctane)	35°C	2039
Poly(oxyethyleneoxyadipoyl)-*block*-poly(styrene)-*block*-poly(methyl methacrylate)				
	Fractional precipitation	Tetrahydrofuran/water		1253
Poly(oxymethylene)-*block*-poly(isoprene)				
	Extraction	Toluene, acetone, methanol water		2414
Poly(oxymethylene)-*block*-poly(2-methyl-5-vinylpyiidine)				
	Extraction water	Toluene, acetone, methanol,		2414
Poly(oxymethylene)-*block*-poly(α-methylstyrene)				
	Extraction	Toluene, acetone, methanol		2414
Poly(oxymethylene)-*block*-poly(styrene)				
	Extraction	Toluene, acetone, methanol,water		2414
Poly(oxypropylene)-*block*-poly(oxyethylene)-*block*-poly(oxypropylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3383
Poly(oxypropylene)-*block*-poly-(oxytetramethylene)				
	Chromatography	Tetrahydrofuran	SEC, styragel, 30°C	1761
Poly(oxypropylene)-*block*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		2179
Poly(styrene)-*block*-poly(isoprene)-*block*-poly(ethylene sulfide)				
	Chromatography	Tetrahydrofuran	SEC, styragel	628
Poly(styrene)-*co*-5,10,15,20-tetra(α,α,α,α-*o*-methacrylamidophenyl)porphin)				
	Chromatography	Benzene	SEC, bioglass	1223
Poly(styrene)-*block*-(1-methyl-2,4-diisocyanate cyclohexane)				
	Chromatography	Toluene, tetrahydrofuran		1082
Poly(styrene)-*block*-poly(oxyethylene)				
	Chromatography	Dimethylformamide	SEC, Merck gel	3415
		Tetrahydrofuran	Star polymer	3246
Poly(styrene)-*block*-poly(oxypropylene)				
	Chromatography	Dimethylformamide	SEC, Merck gel	3415
Poly(styrene)-*block*-poly(oxytetramethylene)				
	Chromatography	Dimethylformamide	SEC, Merck gel	3415
		Tetrahydrofuran	SEC, styragel	1,2746,3530
Poly(styrene)-*block*-(2,4-toluene diisocyanate)				
	Chromatography	Toluene, tetrahydrofuran	SEC	1082,1083
Poly(tetrahydrofuran)-*block*-(ε-caprolactone)				
	Chromatography	Tetrahydrofuran	SEC	2411
Poly[γ-(vinyloxy)ethyl cinnamate]-*block*-poly(isobutyl vinyl ether)				
	Chromatography	Ethyl acetate	SEC, styragel	1938

3.13. GRAFT COPOLYMERS

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(acrylic acid)-*graft*-poly(β-alanine)				
	Turbidimetric titration	Formic acid–water (85 : 15)/ethanol		1173
Poly(acrylonitrile)-*graft*-poly(imino-1,3-phenyleneiminoisophthaioyl)				
	Extraction	Dimethylformamide		1587
		Nitromethane/water (5%)		1587
	Fractional precipitation	Dimethylformamide/methanol		1587
Poly(acrylonitrile)-*graft*-poly(iminoadipoyliminohexamethylene)				
	Extraction	Dimethylformamide		1587
Poly(epoxide)-*graft*-poly(organosiloxanes)				
	Turbidimetric titration	Dioxane/water		96
Poly(α-hydroxyisobutyric acid anhydrosulfite)-*graft*-poly(acrylonitrile)				
	Turbidimetric titration	Dimethylformamide/chloroform		1426
Poly(bis(4-isopropylphenoxy)phosphazene)-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/acetone		1067
Poly(methyl methacrylate)-*graft*-poly(imino-1-oxohexamethylene)				
	Extraction	Benzene or acetone		1259
Poly(methyl methacrylate)-*graft*-poly(iminoadipoyliminohexamethylene)				
	Fractional precipitation	Formic acid/methanol		1350
		m-Cresol/methanol		1350

TABLE 3. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Poly(methyl methacrylate)-*graft*-poly(oxy-1-oxo-hexamethylene)				
	Extraction	Benzene		2301
Poly(dimethylsiloxane)-*graft*-poly(methyl methacrylate)				
	Extraction	Dimethylsulfoxide/tetrachlororethane		2630,3077
	Fractional demixing	Dimethyl sulfoxide/ tetrachloroethane		3077
Poly(2-methyl-2-oxazoline)-*graft*-poly(vinyl chloride)				
	Extraction	Methanol		3236
Poly(oxyethylene)-*graft*-poly(*n*-butyl methacrylate)				
	Fractional solution	Benzene/2,2,4-trimethylpentane	Column extraction	3200
Poly(oxyethylene)-*graft*-poly(iminoadipoyliminohexamethylene)				
	Extraction	Methanol		1586
Poly(oxyethylene)-*graft*-poly(methyl methacrylate)				
	Extraction	Ethylacetate, methanol		420
	Fractional precipitation	Chloroform/ethyl ether		3297
Poly(oxyethylene)-*graft*-poly(*n*-propylmethacrylate)				
	Fractional solution	Benzene/2,2,4-trimethylpentane	Column extraction	3200
Poly(oxyethyleneoxycarbonylimino-1,4-phenylenemethyleneiminocarbonyl)-*graft*-poly(acrylonitrile)				
	Extraction	Dimethylformamide/ethanol		14
Poly(oxyethyleneoxyterephthaloyl)-*graft*-poly(vinyl acetate)				
	Extraction	Acetone		870
Poly(oxyethyleneoxyterephthaloyl)-*graft*-poly(oxyethyleneoxysuccinoyl)				
	Chromatography	*o-tert*-Butylphenol	SEC, styragel, 110°C	2792
Poly(oxymethyleneoxyethylene)-*graft*-poly(*p*-methoxystyrene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	1410
Poly(phenyl methyl silylene)-*graft*-poly(tetrahydrofuran)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	1378
Poly(pivalolactone)-*graft*-poly(ethylene-*co*-propylene-*co*-1,4-hexadiene)				
	Chromatography	Tetrahydrofuran	SEC, styragel	3198
	Extraction	Hot hexane, hot benzene, hot hexafluoroisopropanol, *m*-cresol		3198
Poly(propylene)-*graft*-poly(2(2-hydroxy-5-vinylphenyl)2H-benzotriazole)				
	Chromatography	Tetrahydrofuran	SEC	2658
Poly(siloxane)-*graft*-poly(pivalolactone)				
	Chromatography	Methylene chloride/ hexafluoroisopropyl alcohol		3423
Poly(styrene)-*graft*-poly(imino-1-oxohexamethylene)				
	Extraction	Benzene		3483
			$n=4, 6, 10$	877
Poly(styrene)-*graft*-poly(oxyfumaroyloxy-(methylene)$_n$				
	Extraction	Benzene		3483
Poly(styrene)-*graft*-poly(oxymaleoyloxyhexamethylene)				
	Fractional precipitation	Benzene/methanol		2410
		Benzene/petroleum ether		2410
Poly(styrene)-*graft*-poly(siloxane)				
	Turbidimetric titration	Benzene/methanol–acetone (3 : 1)		2178
Poly(vinylpyrrolidone)-*graft*-poly(oxy-(*cis*-2-butenylene)oxycarbonylimino-1, 4-phenylenemethylene-1,4-phenyleneimino-carbonyl)				
	Chromatography	Dimethylformamide	SEC, styragel	820
Poly(vinylprrolidone)-*graft*-poly(oxypropyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl)				
	Chromatography	Dimethylformamide	SEC, styragel	820
Poly(vinylpyrrolidone)-*graft*-poly-(oxytetramethyleneoxycarbonylimino-1,4-phenylenemethylene 1,4-phenyleneiminocarbonyl)				
	Chromatography	Dimethylformamide	SEC, styragel	820

TABLE 4. POLY(SACCHARIDES)

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
4.1. POLY(SACCHARIDES)				
Acetoxy propyl cellulose	Fractional precipitation	Benzene/heptane		2979
Alginates	Centrifugation	Water	Ethylene diammonium alginates	623

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TABLE 4. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
	Fractional precipitation	Water/manganous chloride + calcium chloride	Sodium alginate	2118
		Water/sodium chloride	Sodium alginate	1230
Amilose tributyrate	Fractional precipitation	Toulene/petroleum ether	25°C	657
Amylopectin	Chromatography	Dimethyl sulfoxide	SEC, silica porous gel, 60°C	2817
Amylopectin xanthate	Fractional precipitation	Water/manganous chloride + calcium chloride	Sodium salt	2022
Amylose	Chromatography	Dimethyl sulfoxide	SEC, μ-bondagel	1900
			SEC, Porasil, 30°C	3341
	Fractional precipitation	Acetone/acetone–water (1 : 1)	Acetate	1400
		Acetone/water	Carbanilate	469
		Dimethyl sulfoxide/acetone		1013
		Dimethyl sulfoxide/ethanol		197,652,1013
		Diemthyl sulfoxide/*n*-butanol	25°C	198,199,200,201,202
		Dimethylformamide/methanol + 10% $CaCl_2$	Carbanilate	1401
		Nitromethane/methanol	Acetate	653
		Water/methanol	Glucoamicoethyl	3457
Amylose acetate	Fractional precipitation	Dimethyl sulfoxide/*n*-butanol	25°C	198,199,202, 203,653,654
		Nitromethane/methanol	25°C	653,654
Amylose benzoate	Fractional solution	Nitromethane/methanol	31°C	2525,2526,2527
Amylose triacetate	Fractional precipitation	Nitromethane/methanol		659
Amylose tricarbanilate	Chromatography	Ethanol/water	25°C	2594,2595
	Fractional precipitation	Acetone/methanol	25°C	204,205,206,207
		Dimethylformamide/methanol + 10% $CaCl_2$	20°C	677,1401,1402,2595
	Sedimentation velocity	Dioxane		3104
Amylose tripropianate	Fractional precipitation	Ethyl acetate/methanol	25°C	658
Amylose xanthane	Fractional precipitation	Water 1N sodium hydroxide/methanol	Sodium salt	2021
Arabinogalactam	Chromatography	Water	SEC, Sephadex G-75	3118
Arabinose	Chromatography	Chloroform/acetone, pyridine, glacial acetic acid	Araban acetate, charcoal	1107
	Fractional precipitation	Acetone/petroleum ether	Araban acetate	1107
Carboxymethyl amylose	Chromatography	Sodium chloride 0.5M aq. solution		408,1084
	Fractional precipitation	Sodium chloride 0.5M /acetone		2023
		Water–acetone (7 : 3) + 0.5 % sodium chloride/acetone	30°C, sodium salt	2529,2530,2531
Carboxymethyl cellulose	Fractional precipitation	Water/acetone	Sodium salt	449
		Water/ethanol		1112
Cellulose	Centrifugal sedimentation	Water suspension	Crystals suspension micel sol	1483
	Chromatography	Cadoxen	SEC	294
	Extraction	Iron–sodium tartrate	Active charcoal	1484
			Regenerated fibers	2538
		Water, 0.25% ammonium oxalate and 80% ethanol		1881
	Fractional precipitation	Acetone/acetone–water		2072
		Cadoxen–water (1 : 1)/propanol–water(3 : 1)		2573,2732,2733
		Cadoxen–water/propanol–water	25°C	1176
		Cadoxen/water–glycerol(1 : 1)		377
		Cuene/propanol, cuoxam/propanol	Varying temp.	2988
		Iron-sodium tartrate/mannitol		1487,1488
		Sodium hydroxide 2.0 M/methanol	Rayon summative method	631
		Sulfuric acid (60–65%)/water	– 15°C	2995
	Fractional solution	Cadoxen		1485,1486
		Cuene	Extraction	2306
		Cuoxam		2982
		Iron–sodium tartrate solution/ sodiumchloride 5 *N*	Summative method	1481,1482
Cellulose acetate	Chromatography	1,2-Dichloroethane	SEC, Porasil A, triacetate	3120
		Chloroform–acetone (1 : 1)	Triacetate, calcium silicate as absorbent	2333

TABLE 4. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Methylene dichloride–acetone/methanol	TLC, silica gel for MW distribution	1559
		Methylene dichloride–tetrahydrofuran/methanol	TLC, silica gel for MW distribution	1559
		Methylene dichloride/methanol	TLC, silica gel for acetyl group distribution	1559
		Tetrahydrofuran	SEC	433,2304,3149
			SEC, styragel triacetate	466
	Diffusion into porous charcoal	Acetone, dioxane	Countercurrent	3115,3116
	Fractional precipitation	1-Chloro-2,3-epoxypropane/*n*-hexane	35°C	1565
		Acetone–ethanol (5 : 3)/*n*-hexane	Triacetate	909,2246
		Acetone–water (3 : 1)/water		3070
		Acetone/95% ethanol	Lowering temp.	162,1566,2596, 3037,3113
		Acetone/ethanol	23°C	1564,1568,1750,3153
		Acetone/*n*-heptane–acetone (1 : 1)	Diacetate	1097
		Acetone/water		1097,1169
		Acetone/water followed by acetone/*n*-pentane	Cross fractionation	2780
		Aq. acetone/*n*-heptane–acetone (3 : 1)		2863
		Chloroform–acetone (1 : 1)/petroleum ether	Triacetate, 25°C	1373,1374
		Chloroform–acetone/petroleum ether	25°C	1372
		Chloroform/ethanol	Diacetate	762
		Tetrachloroethylene/ethanol		762
	Fractional solution	Acetone	Adsorption on to activated carbon	2170
		Acetone/methanol	Column extraction	742,743
		Dioxane/*n*-hexane mixtures/dioxane/heptane reflux	Triacetate	656
		Water/water–acetone	Summative	1750
	Sedimentation velocity	Acetone	25°C, diacetate	1097,3410,3411
	Thermal diffusion	Dichloroethane	Triacetate	1862,1863,1868
	Turbidimetric titration	Acetic acid/water		2180
		Acetone/ethanol		1845
		Butanol–ethanol(4 : 1)/95% ethanol		338
		Dimethylformamide/dibutyl ether		1059
Cellulose acetate–butyrate	Fractional precipitation	Acetone/isopropyl alcohol		2269
		Acetone/water–acetone (1 : 1) + 2% salt and then water alone + 2% salt		3139
	Turbidimetric titration	Acetone/ethanol–water (3 : 1)		2267
Cellulose cyanoethyl	Fractional precipitation	Methylene dichloride–methanol (10 : 1)/methanol	21°C	3278
	Sedimentation velocity	Acetone	26°C	3278
Cellulose nitrate	Chromatography	Acetone	Activated carbon	601
			SEC	2158,2159
			SEC, Porasil, 12–13% *N*	438
		Acetone–methanol–chloroform (10 : 10 : 5)	TLC, silica gel, 25°C, TLC, kiseselgur, 25°C	1563
		Acetone/cyclohexane followed by acetone/*n*-methanol	Elution chromatography, starch	439
		Dioxane–methanol–2-propanol (15 : 10 : 1)	TLC, silica gel, 25°C, TLC, Kieselgur, 25°C	1563
		Ethyl acetate	SEC, styragel	1341
		Nitromethane–methanol (2 : 8)	TLC, kieselgur, 25°C	1563
			TLC, silica gel, 25°C, TLC, alumina, 25°C	1563
		Tetrahydrofuran	SEC	2150,2151,2158, 2304,2305,2491
			SEC, μ-styragel	2058

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TABLE 4. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			SEC, μ-styragel,styragel, 23°C	3488
			SEC, porous silica gel	2057
			SEC, styragel	37,810,2154, 2755,2936,2937, 2938,2939 2940, 3404,3432
	Diffusion into porous charcoal	Acetone and dioxane	Countercurrent	3116
	Distribution between immiscible liquids	Cellulose triacetate gel in methyl acetate, water, ethanol, butyl acetate		439
		Fractional precipitation	Acetone–9% water/water	2202,2782,3201
		Acetone–ethanol (5 : 3)/*n*-hexane	Room temp.	885,2245,2248
		Acetone–ethanol (5 : 3)/shellsolv	High MW	1398
		Acetone/acetone–water (1 : 1)		2334,3580,3581,3582
		Acetone/acetone–water (4 : 1) until pure water	0°C, dark	2052,2053,2054,2897
		Acetone/acetone–water mixtures	12–13% *N*	438
		Acetone/ligroin		140
		Acetone/*n*-heptane	Lowering temp.	2987
		Acetone/*n*-hexane		477,703,2633
			25°C	1563
			Low MW	1398
		Acetone/*n*-hexane(1/1)/*n*-hexane		1213
		Acetone/petroleum ether		2334,3399
		Acetone/water	Triangle method	20,703,2051,2125, 2126,3208,3425
		Acetone/water followed by acetone/*n*-heptane	Cross fractionation	15
		Acetone/water–acetone		2056,2562,2908
		Acetone/water–acetone (5 : 1)		2055
		Ethyl acetate/*n*-heptane		2861
	Fractional solution	Acetone/methanol–water	Column extraction	743
		Ethyl acetate/95% ethanol		838,1292
	Membrane diffusion	Acetone		3381
	Sedimentation velocity	Acetone	Ultracentrifuge	2479
	Turbidimetric titration	Acetone/acetone–water	Dinitrate	2448
		Acetone/methanol–water (9 : 1)		2313
		Acetone/water	Dinitrate	2313
Cellulose propionate	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	519
Cellulose tributyrate	Fractional precipitation	Acetone/water		1856
Cellulose tricarbanilate	Chromatography	Acetone	SEC, spherosil	687
		Acetone/water	Sand, gradual increase in temp.	687
		Tetrahydrofuran	SEC	432,2298,3193
			SEC, spherosil	687
	Fractional precipitation	Acetone/1% aq. sodium chloride		432
		Acetone/acetone–water (1 : 1)		1403
		Acetone/methanol		118
		Benzene/methanol		3273
	Fractional solution	Acetone/water		3104
Celllulose tripropionate	Chromatography	Tetrahydrofuran	SEC	433
	Fractional precipitation	Acetone/petroleum ether		869
Cellulose xanthate	Fractional precipitation	Sodium chloride–10% aq. methanol	Viscose fraction	1040
Cyanoethyl (hydroxypropyl)cellulose				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel, 25°C	2107
	Fractional precipitation	Acetone/*n*-heptane		2107
Dextran	Chromatography	Dimethyl sulfoxide/methanol (15%) + ammonium acetate	SEC	2818
		Sodium chloride water 0.5%	SEC, porous glass	232
		Sodium nitrate 0.1 M	SEC, spherosil	2762
		Water	Activated carbon	601

TABLE 4. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
			SEC	1116,1884
			SEC, controlled porous glass	234,816
			SEC, aguapak	378
			SEC, aquagel-OH	2121
			SEC, Porasil	3028
			SEC, porous glass beads bonded with hydrophilic compounds	1611,1612
			SEC, Sephadex, preparative	232,233,234
			SEC, sepharose	233,234
			SEC, sepheron	1070,2617
			SEC, TSK gel	1224
		Water(10 mM sodium chloride)		3343
		Water, cadoxen	SEC	294
		Water/1% diethylene glycol	SEC, porous silica beads	1885
		Water/ethanol	Precipitation chromatogr.	814,815
	Fractional precipitation	Water/95% Ethanol	Acid hydrolyzed	2950
		Water/manganous chloride + calcium chloride	Low MW	127,222, 1028,3046,3605
	Fractional solution	Water–ethanol		2381
	Sedimentation velocity	Water	Ultracentrifuge, 20°C	814
	Turbidimetric titration	Water/ethanol		1130
	Ultrafiltration	Water		2084
			Amicom-XM-4B and UM-1 diaflomembranes	183
Ethyl cellulose	Chromatography	Methylene dichloride	SEC	440
	Fractional precipitation	Acetone/water		2152,3093
		Ethyl acetate –acetone (1 : 4)/water		2862
Poly(2-(diethylamino)ethyl)dextran				
	Chromatography	Water, 0.8M sodium nitrate		1209
Diethylamino amylose hydrochloride				
	Chromatography	Aq. sodium chloride 0.5M	SEC	1084
Poly(2-D-glucopyranosyl-3-oxymethyl)-acrylic acid ethyl ester)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2632
Poly(D-glucose)	Fractional precipitation	Water/methanol	Lowering temp.	2164
Guaran triacetate	Fractional precipitation	Chloroform/ethanol	22.5°C	1737
	Sedimentation velocity	Acetonitrile	25°C	1337
Gum arabic	Fractional precipitation	Aq. sodium chloride 0.5M/acetone		3117
Hemicellulose	Fractional precipitation	KOH 5%/methanol		3309
Hemicellulolse acetate 3309	Fractional precipitation	Chloroform-ethanol (9 : 1)–/*n*-hexane		
Tri-*o*-heptylcellulose	Chromatography	Chlroroform	SEC, preparative	3130
	Fractional precipitation	Benzene/methanol		3130
Hydroxyethyl cellulose	Chromatography	Sodium chloride 0.25M/sodium phosphate 0.005M		2121
	Fractional precipitation	Water/acetone	25°C	448,836
Hydroxyethyl cellulose acetate	Chromatography	Tetrahydrofuran	SEC	3498
2-Hydroxypropyl cellulose, benzoic acid ester				
	Fractional precipitation	Acetone/methanol–water (85 : 15)		316
Hydroxypropy; cellulose	Chromatography	Tetrahydrofuran	SEC, 25°C	3487
	Extraction	Ethanol(anhydrous)–heptane mixtures	13	
	Fractional precipitation	Ethanol/heptane		1759,2761
		Ethanol/*n*-heptane	30°C	3487
o-(2,3-Dihyproxypropyl)cellulose				
	Chromatography	Acetic acid solution (water)	SEC, Tosoh, 25°C	2850
2-Hydroxypropyl cellulose propionic acid ester				
	Fractional precipitation	Benzene/*n*-heptane		3240
Hydroxypropyl lignin	Fractional precipitation	Acetone/hexane		1647
Levan	Chromatography	Dimethyl sulfoxide/methanol (15%) + ammonium acetate	SEC	2818
Lignin	Chromatography	Dimethyl sulfoxide	SEC	3041
			SEC, Sephadex	2111
		Sodium hydroxide 0.10M	SEC, Sephadex	2835

TABLE 4. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
		Sodium hydroxide 0.10M (carbonate-free)	SEC, analytical and preparative	2836
	Fractional precipitation	Sulfuric acid	By pH change and centrifugation	2837
Ligninsulfonic acid, sodium salt				
	Chromatography	Sodium chloride 0.0001M Aq.	SEC, Sephadex G-50	1153,1154
		Water	SEC, 44°C	378
	Extraction	Water/ethanol		879
	Fractional precipitation	Water/ethanol		879
	Fractional solution	Aq. sodium choride/95% ethanol	Brownian diffusion	2219
Poly(3-D-methacryloyl glucomic acid)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2632
Methyl cellulose	Thermal diffusion	Water		2779
Pectins	Fractional precipitation	Ethylene diamine	Amylopectin temp.	3058
	Fractional precipitation	Dioxane/petroleum ether	Propianate, lowering	2502
	Membrane diffusion	Water		931
Pullulan	Field flow	Water		1688
	Fractional precipitation	Water/isopropyl alcohol	Extracellular	1615
Schizophyllan	Chromatography	Sodium hydroxide water 0.01M	SEC, TSK gel	1450
	Fractional precipitation	Water/ethanol, water/acetone		1450
Scleroglucan	Chromatography	Dimethyl sulfoxide/methanol (15%) + ammonium acetate	SEC	2818
Starch	Alkaline leaching	Sodium hydroxide 0.5 M (water)		196
	Aqueous leaching	Water	Several temp. and times	196,650,1121
	Centrifugation	Dilute alkali		249
	Chromatography	Dimethylsulfoxide + 0.03 M aqueous sodium nitrate	SEC, μ-styragel, 80°C	590
		Dimethyl sulfoxide/methanol (15%) + ammonium acetate	SEC	2818
	Extraction	Aq. sodium hydroxide/*n*-butanol		196,248
	Fractional precipitation	Thymol/*n*-butanol		651
Tribenzyl glucan	Sedimentation velocity	Benzene	8°C benzylated lineat α-, 1, 6 glucans	2140
Poly(vinyl galactose ketone)	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2632
Poly(vinyl isopropylidene arabinose ketone)				
	Chromatography	Tetrahydrofuran	SEC, ultrastyragel	2632
Xanthan	Chromatography	Aq. sodium sulfate 0.5M	SEC, preparative	2514
		Sodium nitrate 0.1M + 1% ethylene glycol	SEC, silica gel	1855
		Water + sodium chloride 5 g/l	Surface exclusion chromatography SiC particles, 30°C	1893
	Fractional precipitation	Acetone/0.5M sodium chloride		1178
Xylan	Fractional precipitation	Dimethyl sulfoxide/ethanol		1887
4.2. GRAFT COPOLYMERS				
Acetyl cellulose-*graft*-poly(acrylamide)				
	Extraction	Water, acetone		3160
Amylopectine-*graft*-poly(methyl methacrylate)				
	Extraction	1,2-Dichloroethane		1100
Amylose triacetate-*graft*-poly-(4,4′-diphenylmethane diisocyanate-*co*-poly(butadiene))				
	Chromatography	Chloroform	SEC, μ-bondagel	1978
Amylose-*graft*-poly(4,4′-diphenylmethane diisocyanate-*co*-poly(ethylene-*co*-poly(ethylene-*co*-propylene adipate))				
	Chromatography	Dimethyl sulfoxide	SEC, μ-bondagel	1900
Amylose-*graft*-poly(4,4′-diphenylmethane diisocyanate-*co*-poly(ethylene terephthalate))				
	Chromatography	Dimethyl sulfoxide	SEC, μ-bondagel	1900
Amylose-*graft*-poly(methyl acrylate)				
	Fractional precipitation	Dimethyl sulfoxide/*n*-butanol		2534
Amylose-*graft*-poly(methyl methacrylate)				
	Extraction	1,2-Dichloroethane		1100
Amylose triacetate-*graft*-poly-(4,4′-diphenylmethane diisocyanate-*co*-propylene glycol)				
	Chromatography	Chloroform	SEC, μ-bondagel	1978
Amylose triacetate-*graft*-poly-(2,4-toluene diisocyanate-*co*-poly(butadiene))				
	Chromatography	Chloroform	SEC, μ-bondagel	1978

TABLE 4. *cont'd*

Polymer	Method of fractionation	Solvent or solvent/nonsolvent mixture	Remarks	Refs.
Amylose triacetate-*graft*-poly(2,4-toluene diisocyanate-*co*-poly(oxypropylene)				
	Chromatography	Chloroform	SEC, μ-bondagel	1978
Benzyl cellulose-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/methanol		530
Cellulose-*graft*-poly(acrylamide)				
	Extraction	Dimethylformamide,water cuprammonium	Cellophane	1008
Cellulose-*graft*-poly(acrylonitrile)		Dimethylformamide, water cuprammonium	Cellophane	1008
Cellulose-*graft*-poly(ethyl acrylate)				
	Extraction	Acetone	55°C	1534
		Benzene		2191
Cellulose-*graft*-poly(methyl methacrylate)				
	Extraction	Acetone		1007,1284,1809
		Acetone or benzene	Viscose	827
		Benzene		1041
		Dichloroethane		2187
		Xanthation process		1041
Cellulose-*graft*-poly(styrene)	Extraction	Boiling benzene		2175
		Tetrahydrofuran–water (98 : 2)		1162
	Fractional precipitation	Dioxane/methanol	20°C	2914
Cellulose-*graft*-poly(2-vinylpyridine)				
	Chromatography	Benzene/methanol	Precipitation chromatography, celite, 15–60°C	3447
	Extraction	Benzene		2803
Cellulose nitrate-*graft*-poly(methyl methacrylate)				
	Chromatography	Tetrahydrofuran	SEC, μ-styragel	3057
	Extraction	Benzene, methanol		3057
Cellulose acetate- *graft*-poly(acrylamide)				
	Extraction	Acetone		1008
Cellulose- acetate-*graft*-poly(acrylonitrile)				
	Extraction	Dimethylformamide	Acetylated	2748
		Dimethylformamide–dioxane (3.5 : 2)	Cotton	2748
	Fractional precipitation	Dimethylformamide/chloroform		2748
Cellulose-acetate-*graft*-poly(butyl acrylate)				
	Extraction;precipitation	Acetone/water		1406
		Benzene		1406
	Turbidimetric titration	Actone–*n*-methanol (6 : 4)/ methanol		1406
Cellulose acetate-*graft*-poly(ethyl acrylate)				
	Extraction;precipitation	Acetone/water		1406
		Benzene		1406
	Turbidimetric titration	Acetone–methanol(6 : 4)/methanol		1406
Cellulose-acetate-*graft*-poly(methyl acrylate)				
	Extraction;precipitation	Acetone/water		1406
		Benzene		1406
	Turbidimetric titration	Acetone–methanol (6 : 4)/methanol		1406
Cellulose-acetate-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Pyridine, acetone (95%/–5%)/water		342
Cellulose acetate-*graft*-poly(2-methyl-5-vinylpyridine)				
	Extraction	Acetone, methylene chloride, methanol		1523
Cellulose acetate-*graft*-poly(oxymethylene)				
	Fractional precipitation	Dimethylformamide/ethyl ether		209
Cellulose acetate-*graft*-poly(styrene)				
	Chromatography	Benzene/ethanol	Precipitation chromatogr., celite, 15–60°C	3447
		Chloroform	TLC, silica gel	1357
		Methylene dichloride–methanol (1 : 1)	TLC, silica gel	1357
	Fractional precipitation	Chloroform/*n*-heptane	Triacetylated viscose	2748
		Pyridine/Aq. hydrochloric acid		3547

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TABLE 4. *cont'd*

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Cellulose acetate-*graft*-poly(vinyl acetate)				
	Extraction;precipitation	Methanol; benzene/methanol		509
Cellulose acetate-*graft*-poly(3-vinylpyridine)				
	Extraction	Methanol;acetone–dichloroethane (1:4)		3158
Cellulose acetate-*graft*-poly-(*N*-vinylpyrrolidone)				
	Extraction	Water, acetone		3159
Cotton-*graft*-poly(acrylamide)	Extraction	Water		3414
Cotton-*graft*-poly(glycidyl methacrylate)				
	Extraction	Butanone		3414
Cotton-*graft*-poly(methacrylic acid)				
	Extraction	Water		3414
Dextran-*graft*-poly(acrylamide)	Chromatography	Water (0.5M potassium phthalate)	SEC	2112,3505
Dextran-*graft*-poly(acrylamide-*co*-sodium-2-acrylamido-2-methyl propane sulfonate)				
	Chromatography	Water 0.4M Sodium sulfate	SEC, porous glass	2113
Dextran-*graft*-poly(methyl methacrylate)				
	Extraction	Several solvents		2467
Dextran-*graft*-poly-(*N*-vinylpyrrolidone)				
	Turbidimetric titration	Water/acetone		2962
Ethyl cellulose-*graft*-poly(acrylamide)				
	Extraction	Hot methanol		1008
Ethyl cellulose-*graft*-poly(methyl methacrylate)				
	Fractional precipitation	Acetone/methanol		530
Methyl cellulose-*graft*-poly(acrylonitrile)				
	Extraction	Water	Hot	530
Methylated xylan-*graft*-poly(styrene)				
	Fractional precipitation	Benzene/petroleum ether		2425
Oxycellulose-*graft*-poly(methyl methacrylate)				
	Extraction	Benzene		1041
		Xanthation process		1041
Starch-*graft*-poly(acrylamide)	Extraction	Etahn, 1,2-diol and acetic acid		3003
Starcg-*graft*-poly(acrylonitrile)	Chromatography	Dimethylformamide	SEC, 75°C	1141
	Extraction	Dimethylformamide		1142
		Dimethylformamide, γ butyrolactone, dimethysulfoxide		865
Starch-*graft*-poly(methyl methacrylate)				
	Extraction	Acetone		2190
	Extraction;precipitation	Benzene; Aq. dimethylfomamide/ methanol		530
Starch-*graft*-poly(styrene)	Chromatography	Tetrahydrofuran		1273
Starch-*graft*-poly(vinyl acetate)	Extraction	Water at 100°C;benzene		2194
Tricarbanilated (cellulose)-*graft*-poly(styrene)				
	Fractional precipitation	Dioxane/water		2917
4.3. MIXTURES OF POLYMERS				
Cellulose acetate + poly(oxyethylene)				
	Fractional precipitation	Dimethylformamide/ethyl ether		209

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	Extraction	Water	Hot	530
Methylated xylan-*graft*-poly(styrene)				
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Solvents and Non Solvents for Polymers

Daniel R. Bloch
Lakeshore Research, 5536 W. Branch Trail Racine, WI, USA 53402

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A. INTRODUCTION

The tables contain qualitative solubility data for a selected number of polymers. Since no standard definition for solvent–nonsolvent systems has been used in most of the original sources, the recognition of a certain compound as a solvent or nonsolvent is to some extent influenced by personal interpretation. No attempt has been made to edit the original information. Division into only two classes, solvents and nonsolvents, is dictated by the practical point of view. For more quantitative information, the user is referred to the tables of theta solvents and fractionation of polymers in this Handbook.

The arrangement of polymers into classes is based on chemical structure. Since properties change gradually within a series of homologs, polymers are arranged according to increasing complexity, as regards the size of the monomer unit, and the kind and number of substituents. Only when this principle could not be applied was an alphabetical listing chosen. We believe that a typical solution behavior of similar polymers may be recognized more easily by this arrangement. When formulas are given, they refer to the main structures present in the polymers.

Polymers are named in a manner thought to be most recognizable to the reader. IUPAC or common names (and sometimes both) are used.

The table has nearly doubled in size since the last edition. New polymer categories include copolymers, main-chain carbonyl polymers, block copolymers and dendrimers, emphasizing recently developed materials. Copolymers are generally named with the dominant monomer given first, but the reader should check alternate names, since each polymer is listed only once. Solubility of copolymers generally resemble more or less the properties of the dominating monomer, although they often exhibit higher solubilities than the corresponding homopolymers. The solubility of block copolymers may reflect the solubilizing/dispersing power of one of the polymer segments rather than true solubility of all segments. Dendrimers are shown as the repeating monomer unit, with the terminal unit specified when known.

Solubility normally increases with rising temperature. However, negative temperature coefficients in some solvents are observed. This is particularly true for cellulose and poly(ethylene oxide)s.

Increasing molecular weight generally reduces solubility.

Increased branching increases the solubility compared to a linear polymer of the same molecular weight.

Certain combinations of two or more solvents may become nonsolvents. Conversely, mixtures of two or more nonsolvents may sometimes become solvents. These possibilities should be considered if new solvent–nonsolvent combinations are to be examined. It is recommended that the reader consults the solubility parameter section in this Handbook.

The classification of a certain compound as a nonsolvent does not necessarily imply its ability to act as a precipitant since this is also influenced by the nature of the particular solvent of a solvent–nonsolvent pair. However, most nonsolvents combine both properties.

The list of solvents and nonsolvents for each polymer is arranged alphabetically. If class names are used, they refer to the most common compounds. Less common compounds, although falling into a class already mentioned, are additionally cited.

Water is a nonsolvent for most polymers and is, therefore, often not mentioned or only mentioned if similar polymers or derivatives are water soluble.

The data refer to room temperature unless otherwise stated.

Homologs and closely related compounds generally have similar solubility properties. When specific solvents or nonsolvents are cited, it is done so with the understanding that homologs and compounds with similar structures can be expected to exhibit similar properties.

B. ABBREVIATIONS

bzn.	Benzene
DMA	*N,N*-Dimethylacetamide
DMF	*N,N*-Dimethylformamide
DMSO	Dimethyl sulfoxide
HMPT	Hexamethylphosphoric triamide
TMS	Tetramethylene sulfone
THF	Tetrahydrofuran
W	Water
aqu.	Aqueous
conc.	Concentrated
DS	Degree of substitution
degrad.	Degradation
dil.	Diluted
mol. wt.	Molecular weight
rt	Room temperature
SC	Substituent content
sw	Swelling
temp.	Temperature

C. TABLES OF SOLVENTS AND NONSOLVENTS

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

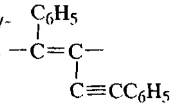
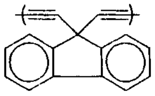
Polymer	Solvents	Nonsolvents	Refs.
1.1. POLY(DIENES), POLY(ACETYLENES) (see also 6.1, 6.2)			
Poly(dienes) unsubstituted			
Poly(allene)	Bzn., halogenated hydrocarbons	Hexane, methanol	1
Poly(1,2-butadiene)	Toluene		2
57% 1,2-	Chloroform		3
Poly(1,3-butadiene)	Higher aliphatic ethers, hydrocarbons, higher ketones, THF	Alcohol, dil. acids, dil. alkalies, hypochlorite solutions, lower ketones and esters, nitromethane, propionitrile, W	4–6
98% *cis*-, 2% 1,2-	Bzn., toluene		7
95% *cis*-, 1% *trans*-	Cyclohexane		7
100% *cis*-	Bzn., heptane/hexane (1/1)		7
97% *trans*-, 3% 1,2-	Cyclohexane, toluene		7
Poly(isoprene),	See Poly(1,3-butadiene)		
cis-, with chlorosulfonylisocyanato groups	Toluene	Diethyl ether, hexane	8
Poly(dienes) substituted			
Poly(2-*tert*-butyl-1,3-butadiene)	Bzn., carbon disulfide, carbon tetrachloride, chloroform, diethyl ether, heptane	Acetone, alcohol	9,10
Poly(dicyclopentadiene)	Toluene	Methanol	11
Poly(5,7-dimethyl-1,6-octadiene)	See Poly(2-*tert*-butyl-1,3-butadiene)		
Poly(1-methoxybutadiene), crystalline		Acetone, bzn., dioxane, heptane, methanol	12
Poly(2-chlorobutadiene), chloroprene	Bzn., carbon tetrachloride, chlorinated hydrocarbons, cyclohexane/toluene, cyclohexanone, dioxane, ethyl acetate, pyridine	Alcohols, aliphatic hydrocarbons, hydrogen fluoride, ketones, mineral oils, nonoxidizing conc. acids incl. hydrogen fluoride, toluene (sw), W	4–7,13
1,4-*cis*-	Bzn., chloroform, ether, hexane, THF	Acetone, ethanol, methanol	14
Poly[2-(chloromethyl)butadiene]	Dichloromethane, THF, toluene	Ethanol, methanol	686
Poly(perfluoro-1,4-pentadiene)	Hexafluorobenzene		
Poly(2,5-diheptyl-1,4-phenylenehexa-1,3,5-triene-1,6-diyl)	Acetone, bzn., chloroform		16
Poly(1,5-pentamethyl-2-enediyl)	Methylene chloride	Methanol	17
Poly(butadiene-*co*-styrene) (7 : 3–95 : 5) Buna-S GR-S SBR rubber	Bzn., cyclohexane, toluene		7
Poly(acetylenes)			
Poly(acetylene)	Aniline, DMF, isopropylamine	Acetone, bzn., carbon tetrachloride, cyclohexane, methanol, methylene chloride, pyridine	18
Poly(phenylacetylene)			
low mol. wt.	Acetone, carbon tetrachloride, methanol		19,20
high mol. wt.	Bzn., cyclohexane (hot), toluene	Methanol	19–21
Poly(diphenyldiacetylene), poly-(1,4-diphenyl-1,3-butadiene), 	Chloroform, cyclohexane, dioxane	Methanol	22
Poly[bis(alkylthio)acetylene]	Aromatic hydrocarbons, halogenated hydrocarbons		23
Poly[3-(*tert*-butoxycarbonylmethyleneiminocarbonyloxy)-8-(5-pyrimidyl)-oct-5-yn-7-ene-1,8-diyl]	Chloroform, hexane, THF		24
Poly[2-(dodecyloxycarbonyl)-1,4-phenyleneethynylene]	THF (hot)	Methanol	25
Poly(9,9-dipropargylfluorene), 	Dichlorobenzene		26
Poly(1-propynyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-2-propynylene)	DMF/pyridine	W	27,247
Poly(ethynylene-1,4-phenyleneoxy-1,4-phenyleneethynylene)	Dioxane, pyridine	Methanol	28
Poly(butadiene-*co*-acrylonitrile)	Acetone, bzn., chloroform		7

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
1.2. POLY(ALKENES)			
Poly(methylene)	See Polyethylene		
Polyethylene			
high density	Above 80°C: 1,2,4-trichlorobenzene, decalin, di-*n*-amyl ether, halogenated hydrocarbons, higher aliphatic esters and ketones, hydrocarbons, xylene	All common organic solvents at room temperature, more polar organic solvents even at elevated temperatures, inorganic solvents	4–7,13, 29,30
low density	As above, but temperature 20–30°C lower, depending on degree of branching	As above	5,7
chlorinated, 40% Cl	At elevated temperature: chlorobenzene, cyclohexanone, tetrachloroethane, tetrahydronaphthalene, toluene, xylene	Acetone, butanol, chloroform, dioxane, MEK, methanol, methyl acetate, THF	31
chlorinated, 60% Cl	At elevated temperature: acetone/carbon disulfide (1/1), aromatic hydrocarbons, chloroform, cyclohexane, THF	Acetone, aliphatic and cycloaliphatic hydrocarbons, ethanol, methanol, methyl acetate	31
chlorosulfonated, 30% Cl, 1.5% S	Chlorinated hydrocarbons, MEK, THF, toluene		32,33
Poly(ethylene *g*-maleic anhydride) (97 : 3)	Toluene, xylene	W	34
Poly(ethylene-*co*-propylene) (3 : 2)	Bzn., xylene (hot)		32
Poly(ethylene-*co*-acrylic acid) (6 : 1)	Xylene		32
Poly(vinyl chloride-*co*-ethylene) (1 : 9)	Cyclohexanone (hot), nitrobenzene/chloroform (1/1)		127
Poly(ethylene-*co*-propylene-*co*-5-methylene-2-norbornene) (40 : 55 : 5), PolyEPDM	1,2,4-Trichlorobenzene		32
Poly(propylene)			5,7
atactic	Bzn., chlorinated hydrocarbons at rt., cyclohexane, diethyl ether, ethylcyclohexane, hydrocarbons, isoamyl acetate, toluene	More polar organic solvents with small hydrocarbon group even at elevated temperature	
isotactic	See Polyethylene		
Poly(1-butene)			7,32
atactic	Bzn., chloroform, decalin, ethylcyclohexane, toluene		
isotactic	See Polyethylene, ethylcyclohexane		7
Poly(isobutene)	Aliphatic ethers, anisole, carbon disulfide, chlorinated hydrocarbons, di(2-chloroethyl) ether, diethylsulfide, higher alcohols, higher esters, hydrocarbons, THF	Lower alcohols, lower ketones and esters, nitromethane, lower organic acids, propionitrile	5,6,13, 30,35
Poly(4-methyl-1-pentene), isotactic	See Polyethylene		
Poly(2-methyl-3-hydroxy-1,4-butylene)	THF		36
Poly(1-hexene)	Chloroform, THF		37
Poly(cyclopentylethylene)	Chloroform, diethyl ether, toluene	Methanol	38
Poly(cyclohexylethylene)			
atactic	Chlorinated hydrocarbons, hydrocarbons, THF	Alcohols, ethers, dioxane, esters, ketones	39
stereospecific	At elevated temperature: bzn., chlorobenzene, decahydronaphthalene, *o*-dichlorobenzene, methylcyclohexane, tetrahydronaphthalene, xylene	Heptane, MEK, nitrobenzene	40
Poly(cyclohexylalkenes)	Chloroform, diethyl ether (partially), toluene	Methanol	41
Poly(cyclohexenylethylene)			
atactic	Aliphatic hydrocarbons	Acetone, ethanol	42
isotactic	Aromatic hydrocarbons, halogenated hydrocarbons (partially)	Acetone, aliphatic hydrocarbons, diethyl ether, ethanol	42
Poly(pentenamer), Poly(cyclopentene) $-\!\!\!\left[CH{=}CH(CH_2)_3\right]\!\!\!-$	Chlorinated hydrocarbons, hydrocarbons	Alcohols, aliphatic ketones, ethers	43
Poly(3,4-dicarboxypent-1-ene-1,5-diyl)	Chloroform, methanol	Diethyl ether	44

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(3,4-dihydroxypent-1-ene-1,5-diyl)	DMSO, methanol	Ethanol	44
Poly(1,1-diphenyl-2-vinylcyclopropane)	Chloroform	Methanol	45
Poly(*p*-anthrylphenylethylene)	Bzn., chlorobenzene, methylene chloride	Methanol, ethanol, hexane, W	46
Poly(1-methylbicyclo-[2.2.1]-hept-2-ene)	Chlorobenzene, *p*-xylene	Methanol	47
Poly(vinylborazine)	Bzn.	Pentane	48
Poly(methylene-*alt*-5-hydroxycyclohexene-1,3-diyl)	Hexanes		49
Poly(ethylene-*co*-1,4-hexadiene) (97 : 3)	Toluene		50
Poly(ethylene-*co*-1-cyano-1,4-butylene) (1 : 2)	Acetone (hot), chloroform, DMA, DMSO	Methanol	51
Poly(isobutylene-*co*-4-methylstyrene) (95 : 5)	Chloroform		52
Poly[hexene-*co*-*N*,*N*-di(isopropyl)amino-1-pentene] (2 : 3)	Hexane		53
1.3. POLY(ACRYLICS), POLY(METHACRYLICS)			
1.3.1. POLY(ACRYLIC ACIDS)			
Poly(acrylic acid)			
atactic	Alcohols, dil. alkali solutions, formamide, DMF, W	Dioxane (hot) (sw), esters, hydrocarbons, ketones	4–6, 13,54
isotactic	Dioxane/water (80/20)	Dioxane	55
Poly(methacrylic acid)			
atactic	Alcohols, aqu. hydrogen chloride (0.002 M, >30°C), dil. aqu. sodium hydroxide, W	Carboxylic acids, esters, hydrocarbons, ketones	4,5
isotactic, syndiotactic	W(partially)		56
Poly(acrylic acid-*co*-9-vinylphenanthrene) (3 : 2)	THF		57
Poly(itaconic acid)	DMF, methanol, W	Acetone, aniline, bzn., carbon disulfide, chloroform, ethanol, ethyl acetate, THF	58
1.3.2. POLY(ACRYLATES)			
General	Aromatic hydrocarbons, chlorinated hydrocarbons, esters, ketones, THF	Aliphatic hydrocarbons, hydrogenated naphthalenes, diethyl ether	
Poly(methyl acrylate)	See General, acetone, bzn., ethyl acetate, glycol ester ethers, phosphorus trichloride	Alcohols, carbon tetrachloride	5,7, 30,59
Poly(ethyl acrylate)	See General, acetone, butanol, bzn., glycol ether, methanol, THF, *p*-xylene	Aliphatic alcohols C>4, cyclohexanol, tetrahydrofurfuryl alcohol	5,7, 30,59
Poly(2-hydroxyethyl acrylate)	Methanol, W		32
Poly(*n*-butyl acrylate)	See General, butanol, turpentine	Cyclohexyl acetate, ethanol, ethyl acetate, methanol	30
Poly(*tert*-butyl acrylate)	Acetone, methanol		7
Poly(4-hydroxybutyl acrylate)	Isopropanol		32
Poly(isobornyl acrylate)	THF		60
Poly(cyclohexyl acrylate)	Bzn., THF, toluene		32
Poly(2-ethylhexyl acrylate)	Esters, ketones, THF, toluene		32
Poly(benzyl acrylate)	Bzn., THF, toluene		32
Poly(5-cyano-3-thiapentyl acrylate)	Acetone, acetonitrile, dioxane, pyridine	Solvents of low solubility parameter	61
Poly[1-(*N*-ethyl-*N*-(1,4,7,10,13-penta-oxacyclopentadecyl)carbamoyl)ethylene]	Bzn., chloroform	Hexane	62
Poly(pentachlorophenyl acrylate)	Bzn., THF	Hexane, methanol, W	63
Poly(4–10,15,20-triphenylporphorin-21H,23H-5-ylphenyl acrylate)	Bzn., chloroform, THF, trifluoroacetic acid	Acetone, ethanol, hexane, methanol, W	64
Poly(vinylcyclohexane-*co*-methyl acrylate) (9 : 1)	THF	W	65
1.3.3. POLY(METHACRYLATES)			
General	Acetic acid, acetone, bzn., chlorobenzene, chloroform, cyclohexanol (hot), cyclohexanone, cyclohexyl acetate, dioxane, 2-ethoxyethanol, ethyl acetate, isobutanol (hot), isobutyric acid, MEK, methylene chloride, xylene	Castor oil, cyclohexane, diethyl ether, ethylene glycol, formamide, gasoline, glycerol, hexane, methanol, nujol	

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TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(methyl methacrylate)			
atactic	See General, ethanol/water, ethanol/carbon tetrachloride, isopropanol/MEK (1/1) above 25°C, formic acid, nitroethane	Butylene glycol, carbon tetrachloride, *m*-cresol, diethyl ether, ethanol (absolute), higher esters, hydrogenated naphthalenes, linseed oil, turpentine	4,5,13, 30,66,67
isotactic	Acetone, acetonitrile, bzn., MEK, THF		7,32
syndiotactic	See isotactic		32
Poly(methyl methacrylate-*co*-2-acrylamido-2-methyl-1-propanesulfonic acid) (95 : 5)	Bzn., toluene		A32
Poly(ethyl methacrylate)	See General, carbon tetrachloride, ethanol (hot), ethyl ether, ethyl acetate, formic acid, isopropanol above 37°C, tetralin, turpentine (hot)	Alcohols, cyclohexane	5,7,67,68
Poly(2-hydroxyethyl methacrylate)	DMF, methanol, methyl Cellosolve®		32
Poly(*n*-propyl methacrylate)	See General, carbon tetrachloride, castor oil (hot), cyclohexane (hot), diethyl ether, ethanol, gasoline (hot), linseed oil (hot), turpentine	Formic acid	67
Poly(*n*-butyl methacrylate) and Poly(isobutyl methacrylate)	See General, carbon tetrachloride, castor oil (hot), cyclohexane, diethyl ether, ethanol (hot), gasoline, hexane, isopropanol above 23.7°C, linseed oil (hot), nujol (hot), turpentine	Ethanol (cold), formic acid	5,13,30, 67–69
Poly(butyl methacrylate-*co*-*i*-butyl methacrylate) (1 : 1)	Acetone, MEK, methylene chloride, THF, toluene		32
Poly(*n*-hexyl methacrylate)	Isopropanol above 33°C, MEK		5
Poly(cyclohexyl methacrylate)	Bzn., dioxane, THF		32
Poly(cyclohexylmethyl methacrylate)	Bzn., THF	Methanol	70
Poly(*n*-octyl methacrylate)	*n*-Butanol, MEK		5
Poly(2-ethylhexyl methacrylate)	Bzn., MEK, THF		32
Poly(*n*-decyl methacrylate)	Bzn., THF		32
Poly(*n*-lauryl methacrylate)	*n*-Pentanol above 29°C, isopropyl acetate, MEK	Ethyl acetate, methanol	5,71
Poly(phenyl methacrylate)	Bzn., MEK, THF, toluene		32
Poly(benzyl methacrylate)	Bzn., chloroform, dioxane, THF		32
Poly(4-*tert*-butylphenyl methacrylate)	Acetone		5
Poly[(4-(*tert*-butyoxycarbonyloxy)phenyl) methacrylate]	Bzn.		696
Poly(bornyl methacrylate)	Bzn.	Methanol	72
Poly(isobornyl methacrylate)	Bzn., THF, toluene		32
Poly[2-(dimethylamino)ethyl methacrylate]	Bzn., toluene		32
Poly[(2-trimethylsiloxy)ethyl methacrylate]	THF		73
Poly[2-(*N*-carbazoyl)ethyl methacrylate], crystalline	Aniline (hot, partially), diphenyl ether (hot), nitrobenzene (hot)	MEK	74
Poly(cyanomethyl methacrylate)	Acetone, acetonitrile, ethyl acetate, THF	Bzn., chloroform, methanol	75
Poly[2-(4-phenylazophenyl)ethyl methacrylate]	THF	Methanol	76
Poly[(methacryloyloxyundecyloxycarbonyldecyl)-2-(trimethylamino)ethyl phosphate]	Ethanol (hot), methanol	Acetone, bzn.	77
Poly[4-(4-methoxyphenyloxycarbonyl) phenoxyhexamethylene methacrylate]	Chloroform, THF, bzn., methylene chloride, *o*-dichlorobenzene,	Hexane, methanol	78
Poly[2-(dimethylamino)ethyl methacrylate-*co*-acrylamide] (4 : 1 to 2 : 3)	W		79
1.3.4. POLY(DISUBSTITUTED ESTERS)			
Poly(dimethyl itaconate)	Acetone, acetonitrile, bzn., DME, furfurol, halogenated hydrocarbons, methyl acetate, nitrobenzene, nitromethane, THF	Aliphatic hydrocarbons, carbon tetrachloride, diisopropyl ether, ethanol, ethyl acetate, methanol, propylene carbonate, toluene, W	80–82
Poly(di-*n*-butyl itaconate)	Acetone, amyl acetate, dioxane, ethanol, halogenated hydrocarbons, hydrocarbons, methyl acetate, THF	Acetonitrile, DMF, furfurol, methanol, nitrobenzene, nitromethane, propylene carbonate	81,82
Poly(diphenyl itaconate)	Bzn., chloroform, dioxane, DMF, ethyl acetate, THF		83

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(diamyl fumarate)	Chloroform, THF, toluene	Hexane, W	84
Poly(methyl *tert*-butyl fumarate)	Bzn., chloroform, methanol, THF	Hexane, W	85
1.3.5. POLY(ACRYLAMIDES), POLY(METHACRYLAMIDES)			
Polyacrylamide	Ethylene glycol (partially), morpholine, W	Alcohols, diethyl ether, DMF, esters, higher glycols, hydrocarbons, nitrobenzene, propylene glycol, THF	4,5,13
Poly(*N*-isopropylacrylamide)	W (cold)	W (hot)	86,87
Poly(*N*,*N*-dimethylacrylamide)	Methanol, W (40°C)	W (sw)	5
Poly(*N*,*N*-diethylacrylamide)	THF		88
Poly[*N*-(1,1-dimethyl-3-oxobutyl) acrylamide]	Butanol, MEK, toluene	W (sw)	89
Poly(2-acrylamido-2-methyl-1-propanesulfonic acid), PolyAMPS	W		32
Poly(*N*-*tert*-butyl-*N*-allylacrylamide)	Chloroform	Petroleum ether	90
Poly(*N*-dodecylacrylamide-*co*-*N*-vinylcarbazole) (15 : 1 to 2 : 1)	Chloroform	Acrylonitrile	91
Polymethacrylamide	Acetone, ethylene glycol, methanol, W	Diethyl ether, hydrocarbons	4,5,13
Poly(*N*-carbazolylcarbonylethylene), Poly(9-acryloylcarbazole)			
atactic	Bzn. (partially)	Methanol	92
tactic	Chloroform (partially), conc. or moderately conc. sulfuric acid		5
Poly(morpholinocarbonylethylene), Poly(*N*-acryloylmorpholine)	DMF		5
Poly(piperidinocarbonylethylene), Poly(acryloylpiperidide)	DMF		5
1.4. POLY(VINYL ETHERS)			
General	Bzn., *n*-butanol, cyclohexanone, halogenated hydrocarbons, MEK	Heptane	
Unsubstituted			
Poly(methoxyethylene), Poly(methyl vinyl ether)			
amorphous	See General, acetone, ethanol, ethyl acetate, methylene chloride, THF, W (cold)	Diethyl ether, ethylene glycol, hexane, W (hot)	4,5,13,30,93–95
crystalline		Acetone, methanol, W	95,96
Poly(ethoxyethylene), Poly(ethyl vinyl ether),	See Poly(methoxyethylene)		
Poly(propoxyethylene), crystalline Poly(propyl vinyl ether)		Acetone, heptane	95
Poly(isopropoxyethylene), crystalline, Poly(isopropyl vinyl ether)	See Poly(propoxyethylene)		
Poly(butoxyethylene), Poly(butyl vinyl ether)	See General, bis(2-ethoxyethyl) ether, cyclohexane, diethyl ether, *n*-heptane	Ethanol, 2-ethoxyethanol	95,97
Poly(isobutoxyethylene), Poly(isobutyl vinyl ether)			
amorphous	See General, aliphatic alcohols C > 2, bis(2-ethoxyethyl) ether, carbon disulfide, cyclohexane, diethyl ether, *n*-heptane, isopropyl acetate, MEK, methylene chloride	Ethanol 2-ethoxyethanol, methanol	4,13,30, 93,98,99
crystalline	Chloroform above 50°C	Heptane, bis(2-ethoxyethyl) ether, bzn. (sw at 20°C), chloroform (sw at 20°C), isopropanol (hot), MEK	95
Poly(*tert*-butoxyethylene), Poly(*tert*-butyl vinyl ether)			
amorphous	Acetone, MEK		95,98
crystalline		Bzn., heptane	95,98
Poly(neopentyloxyethylene), Poly(neopentyl vinyl ether), crystalline		Bzn., heptane	95
Poly(cyclohexyloxyethylene), Poly(cyclohexyl vinyl ether)	Methylene chloride		100
Poly(benzyloxyethylene), Poly(benzyl vinyl ether) atactic	Acetone, bzn., toluene	Ethanol, methanol, W	101

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TABLE 1. *cont'd*

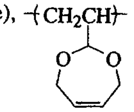
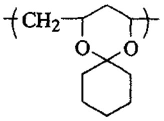
Polymer	Solvents	Nonsolvents	Refs.
Substituted			
Poly(carbomethoxymethoxyethylene)	Chloroform, methylene chloride	Diethyl ether	102
Poly[2-(methoxyethoxy)ethylene], crystalline	W	Diethyl ether	95
Poly[2-(chloroethoxy)ethylene], crystalline		Acetone	95
Poly(2,2,2-trifluoroethoxyethylene), crystalline	Bzn., dioxane, heptane		95
Poly(methyl vinyl ether-*alt*-methyl tricyanoethylenecarboxylate)	DMA, DMF, nitromethane	Diethyl ether	103
Poly(phenyl vinyl ether-*alt*-2-phenyl-1,1-dicyanoethylene)	Acetone, carbon tetrachloride, chloroform, DMF, DMSO, THF	Hexane methanol	104
1.5. POLY(VINYL ALCOHOLS), POLY(ACETALS), POLY(VINYL KETONES)			
Poly(vinyl alcohol)			
atactic	Acetamide, DMF, DMSO (hot), formamide, glycerol (hot), glycols (hot), HMTP, piperazine, triethylenediamine, W	Carboxylic acids, chlorinated hydrocarbons, esters, hydrocarbons, ketones, lower alcohols, conc. aqu. salt solutions, THF	4–6,13, 30,105
syndiotactic	1,3-Propandiol above 160°C, W above 160°C		106
12% acetyl	W (cold)	Carboxylic acids, esters, halogenated hydrocarbons, hydrocarbons, ketones, W (hot)	4
35% acetyl	Alcohols, aqu. sol. of tetraalkyl-ammonium bromide and iodide	W	38
Poly(vinyl alcohol-*co*-ethylene) (1 : 1)	DMF (hot), DMSO (hot)	Methylene chloride, THF	107
Poly(vinyl alcohol-*co*-maleic anhydride) (1 : 1)	Acetone		108
Poly(allyl alcohol)			
lower mol. wt.	Cresol, dioxane, glycerol, methanol, pyridine, THF		13
high mol. wt. (DP>350)	Mixtures of conc. hydrochloric acid and dioxane, methanol, THF	Most organic solvents, W	13
Poly(vinyl formal)	Acetic acid, benzyl alcohol, bzn./alcohol (70/30), carbon tetrachloride/alcohol (70/30), 2-chloroethanol, chloroform, cyclohexanone, dichloroethylene/ diacetone alcohol (50/50), dioxane, DMF, furfurol, THF, toluene	Acetone (sw), aliphatic hydrocarbons, aromatic hydrocarbons (sw), dilute acids, dioxane, esters, ethanol, methanol, pyridine (sw), W	4,6,30
Poly(vinyl acetal)	Acetone, benzyl acetate, bzn./ethanol (1/1), bzn., butanol, carbon tetrachloride, 2-chloroethanol, chloroform, chloroform/methanol (9/1), cyclohexanone, dioxane, ethanol, ethyl acetate, ethylene glycol, THF	Dil. acids, aliphatic hydrocarbons, diethyl ether (sw), pyridine (sw), W	6,30
high degree of acetalization	Acetic acid (glacial), dioxane, ethanol, ethylene dichloride, methanol, nitromethane, pyridine	Acetone, bzn.	4
Poly(vinyl butyral)			
acetalization 70%	Alcohols, cyclohexanone, ethyl glycol acetate, ethyl lactate	Aliphatic ketones, hydrocarbons, methylene chloride, most esters, W	109
acetalization 77%	Acetone, alcohols, cyclohexanone, lower esters, methylene chloride	Higher esters, hydrocarbons, methyl isobutyl ketone	109
acetalization 83%	Alcohols, lower esters, ketones, methylene chloride	Higher esters, hydrocarbons, methanol	109
Poly(vinyl alcohol-*co*-vinyl pentanal)	Bzn., chloroform	Methanol	110
Poly(2-vinyl-4,7-dihydro-1,3-dioxepine), 	Acetone, 2-buten-1,2-diol	W	111
Poly(vinyl cyclohexanone ketal), 	Butanol, chloroform, cyclohexanone, ethanol, ethylene glycol, ethylene chloride, THF	Aliphatic hydrocarbons, carbon tetrachloride (sw), diethyl ether (sw)	30

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(vinyl methyl ketone)	Acetic acid, acetone, chloroform, dioxane, DMF, ethyl acetate, pyridine, THF	Alcohol, carbon tetrachloride, diethyl ether, petroleum ether, W	4,6,13
Poly(methyl isopropenyl ketone)	Acetone, dioxane, esters	Alcohol, petroleum ether, W	6,13
1.6. POLY(VINYL HALIDES)			
Poly(vinyl chloride)			
high mol. wt.	Acetone/carbon disulfide, chlorobenzene, cyclohexanone, cyclopentanone, DMF, DMSO, MEK, nitrobenzene, THF	Acetic anhydride (sw), acetone (sw), nonoxidizing acids, alcohols, conc. alkalies, aniline (sw), carbon disulfide, carboxylic acids, esters, hydrocarbons, nitroparaffins (sw), vinyl chloride	4–7,13, 30,112
lower mol. wt.	Acetone/carbon disulfide, cyclohexanone, 1,2-dichlorobenzene, diisopropyl ketone, dioxane, DMF, ethylene chloride, HMPT, isophorone, mesityl oxide, nitrobenzene, perchloroethylene/acetone, toluene, tricresyl phosphate		4–6,13,30
chlorinated, 63% Cl	Acetone, aromatic hydrocarbons, butyl acetate, chlorobenzene, chloroform, cyclohexanone, dioxane, DMF, DMSO, nitrobenzene, THF	Aliphatic and cycloaliphatic hydrocarbons, carbon tetrachloride, methyl acetate, nitromethane, organic and inorganic acids	6
Poly(vinylidene chloride)	Benzonitrile, butyl acetate, cyclohexanone, 1,2-dichlorobenzene, dioxane, DMA, DMF, NMP, tetrahydrofurfuryl alcohol, tetralin (hot), THF (hot), trichloroethane	Conc. and moderately conc. acids and alkalies (except ammonia), alcohols, carbon disulfide, chloroform, cyclohexanone (cold, sw), dioxane (cold, sw), ethyl bromide, hydrocarbons, phenols, THF (cold, sw)	4,6,30, 113,114
Poly(vinyl bromide)	Cyclohexanone, THF	DMF, ethanol, HMPT, hydrocarbons, methanol	5
Poly(vinyl fluoride)	Cyclohexanone (hot), dinitrile, DMA (hot), DMF, DMSO (hot)	Aliphatic, cycloaliphatic, and aromatic hydrocarbons	115
chlorinated, 30% Cl	DMF	Aliphatic, cycloaliphatic, and aromatic hydrocarbons	115
chlorinated, 60% Cl	Carbon tetrachloride	Aliphatic, cycloaliphatic, and aromatic hydrocarbons	115
Poly(vinylidene fluoride)	γ-Butyrolactone, cyclohexanone, DMA, DMF, DMSO, ethylene carbonate, NMP	Acetone, alcohols, aliphatic and cycloaliphatic hydrocarbons, chlorinated solvents, methyl isobutyl ketone	116–119
Poly(1,2-difluoroethylene)	Acetone, DMF, methyl isobutyl ketone	Ethanol, hydrocarbons, methanol	118
Poly(1-chloro-1-fluoroethylene)	Toluene		120
Poly(chlorotrifluoroethylene)	2,5-Dinitrotrifluorobenzene (130°C), bzn. (200°C), carbon tetrachloride (114°C), cyclohexane (235°C), 1,2-dichlorotrifluorobenzene, HMPT, mesitylene (140°C), toluene (142°C), 1,1,1-trichloroethane (120°C), 1,2,3-trifluoropentachloropentane	Common organic solvents at RT	4,5,13, 121,674
Poly(tetrafluoroethylene)	Perfluorokerosene (350°C), no other solvent known		4,13,122,123
Poly(3,3,3-trifluoropropylene)	Acetone, hexafluorobenzene	Ethanol, hydrocarbons, methanol	124
Poly(hexafluoropropylene)	Hexafluorobenzene, perfluorodibutylamine, perfluorodibutyl ether		125
Poly(3,3,4,4,5,5,5-heptafluoro-1-pentene)	Perfluorohexane		126
Poly(vinylidene chloride cyanide-*alt*-1,3-cyclohexadiene)	Chloroform	Pentane	128
Poly(chlorotrifluoroethylene-*co*-vinylidene fluoride) (3 : 1)	MEK	Amyl acetate	129
Poly(tetrafluoroethylene-*co*-hexafluoropropylene) (4 : 1)	Carbon dioxide (>200°C)		130
Poly[tetrafluoroethylene-*co*-4,5-difluoro-2,2-bis(trifluoromethyl)-1,3-dioxole] (13 : 87 and 35 : 65)	Hexafluorobenzene, perfluorooctane		131

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TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
1.7. POLY(VINYL NITRILES)			
Polyacrylonitrile	Acetic anhydride, γ-butyrolactone, ε-caprolactam, bis(2-cyanoethyl)ether, bis(4-cyanobutyl)sulfone, chloroacetonitrile/water, chloroacetonitrile, cyanoacetic acid, dimethyl phosphite, dimethyl sulfone, dioxanone, DMA, DMF, DMSO, ethylene carbonate, *N*-formylhexamethyleneimine, 2-hydroxyethyl methyl sulfone, *N*-methyl-β-cyanoethylformamide, methylene dithiocyanate, *N*-methyl-α,α,α,-trifluoroacetamide, 1-methyl-2-pyridone, 3-,4-nitrophenol, nitromethane/W (94 : 6), *N*-nitrosopiperidine, 2-oxazolidone, 1,3,3,5-tetracyanopentane, tetramethylene sulfoxide, 1,1,1-trichloro-3-nitro-2-propane, sulfuric acid, nitric acid, *p*-phenol sulfonic acid, conc. aqu. sodium thiocyanate, molten quat. ammonium salts and their aqu. solutions	Acetonitrile (sw), acrylonitrile, alcohols, aliphatic nitro compounds, bis(2-hydroxyethyl) sulfoxide, chlorinated hydrocarbons, 3,4-dimethyl sulfolane, diethyl ether, diethyl sulfone (sw), diethyl sulfoxide, diethylformamide, dimethylmalonitrile, dimethyloxamide, 1,1-dimethylsuccinonitrile, ethylene urea, formamide, hexamethylene dithiocyanate, 1,6-hexanediamine, hydrocarbons, 1-hydroxypropionitrile, ketones, methanol, methoxyacetamide, methoxyacetonitrile, methyl thiocyanate, 1-nitrophenol, propyl formate	5,6,13,132, 133,675
ultrahigh MW	DMF (100°C)		134
Poly(2-fluoroacrylonitrile)	DMF	THF	135
Poly(acrylonitrile-*co*-vinyl acetate) (98 : 2)	DMF		136
Poly(acrylonitrile-*alt*-1,3-isoprene)	1,2-Dichloroethane	Methanol	137
Poly(vinylidine fluoride-*co*-ethyl vinyl ether) (1 : 1)	THF		135
Poly(acrylonitrile-*co*-butadiene) (2 : 3 to 1 : 4)	MEK, THF (partially), toluene		32
Polymethacrylonitrile	Acetic anhydride, acetone, benzonitrile, cyanoacetic acid, cyclohexanone, dinitriles, DMF (>20°C), DMSO, ethylene carbonate, furfural, HMPT, methylene chloride, nitromethane, pyridine	Aliphatic hydrocarbons, alcohols, esters, methacrylonitrile, toluene	4,5
1.8. POLY(VINYL ESTERS)			
Poly(vinyl acetate)			
atactic	Acetic acid, acetone, acetonitrile, allyl alcohol, benzyl alcohol, bzn., carbon tetrachloride/ethanol, chlorobenzene, chloroform, dichloroethylene/ethanol (20/80), 2,4-dimethyl-3-pentanol, dioxane, DMF, DMSO, lower aliphatic esters, ethanol/W, glycol ether esters, glycol ethers, methanol, nitromethane, tetrahydrofurfuryl alcohol, THF, toluene	Dil. acids, dil. alkalies, carbon tetrachloride (sw), carbon disulfide, cyclohexanol, diethyl ether (anhydrous, alcohol free), higher esters C > 5, ethanol (anhydrous, sw), ethylene glycol, saturated hydrocarbons, mesitylene, W (sw)	4,5,13
syndiotactic	Chlorobenzene, chloroform	Acetone, bzn.	106
Poly(vinyl trifluoroacetate)	Acetone, chloroform, ethyl acetate, hexamethyldisiloxane		138
Poly(vinyl propionate)	See Poly(vinyl acetate)		
Poly(vinyl *n*-butyrate)	See Poly(vinyl acetate), amyl alcohol, cyclohexane, hexyl acetate		31
Poly(vinyl isobutyrate)	See Poly(vinyl acetate), amyl alcohol, cyclohexane, hexyl acetate		31
Poly(vinyl pivalate)	Acetone, butanone, bzn., ethyl acetate, toluene	Hexane, methanol, W	139
Poly(vinyl caproate)	Bzn.		5

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(vinyl caprylate)	Acetone, aliphatic and aromatic hydrocarbons	Lower alcohols	4
Poly(vinyl laurate)	Aliphatic and aromatic hydrocarbons	Lower alcohols, acetone	4
Poly(vinyl benzoate),	See Poly(vinyl acetate)		5,87
Poly(vinyl chloroacetate)	Chlorobenzene, chloroform, cyclohexanone, dioxane, ethyl acetate, pyridine	Acetone (sw), saturated hydrocarbons	4
Poly(vinyl acetylacetate)	Acetic acid, acetone, chloroform, dioxane, DMF, ethyl acetate, pyridine, THF, saturated aqu. sol. of magnesium perchlorate	Alcohols, bzn., diethyl ether, W	140
Poly(vinyl-*N*-octadecylcarbamate)	Toluene (hot)		327
Poly(vinyl acetate-*alt*-*N*-alkyl/arylmaleimide)	Bzn., chloroform	Petroleum ether	142
1.9. POLY(STYRENES)			
Poly(styrene)			
atactic	Bzn., carbon disulfide, lower chlorinated aliphatic hydrocarbons, chloroform, cyclohexane (above 35°C), cyclohexanone, cyclohexane/acetone, decahydronaphthalene/diethyl oxalate, dimethyl phthalate, dioxane, ethyl acetate, ethylbenzene, glycol formal, MEK, methylene chloride, NMP, 1-nitropropane, phenol/acetone, phosphorus trichloride, THF, tributyl phosphate	Acetic acid, acetone, alcohols, diethyl ether, diols, ethylene chlorohydrin, glycol ethers, saturated hydrocarbons, isobutyl phthalate, phenol, 1,2,3, 4-tetrafluorobenzene (lower than 10°C), tri(chloroethyl) phosphate, tricresyl phosphate	4,5,7, 13,30,143
isotactic	Bzn., chloroform, *o*-dichlorobenzene, toluene		7
syndiotactic	*n*-Tetradecane/decahydronaphthalene (2/1)		144
Poly(4-acetoxystyrene)	THF	Methanol	144
Poly(α-methylstyrene),	See Polystyrene		
Poly(2-,3-, or 4-chlorostyrene)	MEK, THF, toluene		32
Poly(chloromethylstyrene)	Bzn., THF, toluene		32
Poly(4-cyanostyrene)	Acetone, acetonitrile, DMF, DMSO, nitromethane	Bzn., carbon tetrachloride, ethyl acetate, diethyl ether, hexane, methanol	146
Poly(2-,3-, or 4-bromostyrene)	Bzn., THF		5,32
Poly(4-iodostyrene)	Bzn., dioxane, THF		5,32
Poly(2,5-dichlorostyrene)	Ethyl acetate/ethanol (15/1) toluene		5
Poly(2,4,6-tribromostyrene)	THF		32
Poly(4-hydroxystyrene), Poly(*p*-hydroxyphenylethylene)	Methanol and higher alcohols, methyl acetate, THF, THF/chloroform (1/1)	Chloroform, toluene	147,148
Poly(4-methoxystyrene)	MEK, toluene		5
Poly(2,5-dimethoxystyrene)	Bzn., toluene, chloroform	Hexane, methanol	149
Poly(3,4-dimethoxystyrene)	Chloroform		150
Poly(*tert*-butyl-4-vinyl perbenzoate)	Acetone, bzn., chlorohexane, DMF, methylene chloride	Hexane	141
Poly(4-formylphenyl)ethylene, Poly(*p*-formylstyrene)	THF	Hexane, methanol, W	151
Poly(styrenesulfonic acid)	Ethanol, lower glycols, W		32
Poly(styrene-*co*-styrenesulfonic acid) (95 : 5)	DMF, methylene chloride, THF		152
sodium salt	Lower glycols, W		153
Poly(4-trimethylsilylethynylenestyrene)	THF		154
Poly(styrene-*co*-allyl alcohol) (94 : 6)	Alcohols, aromatic hydrocarbons, esters, THF		32
Poly(styrene-*co*-acrylonitrile) (3 : 2)	Chloroform, MEK, methylene chloride, THF	Methanol	7,32,155
Poly(styrene-*co*-*tert*-butoxycarbonyloxystyrene) (4 : 5)	THF, pyridine	Methanol, W	156
Poly(styrene-*co*-butyl methacrylate) (1 : 1)	MEK, toluene		32
Poly(styrene-*alt*-2,4-diamino-6-vinyl-1,3,5-triazine)	DMSO, hexafluoroisopropanol		157

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(styrene-*co*-maleic anhydride)			
(9 : 1)	Cyclohexane/ethyl acetate (3/2)	Methanol	65
(1 : 1)	Acetone, acetonitrile, MEK		32,158
Poly(styrene-*alt*-maleimide)	THF		157
Poly(styrene-*co*-4-thiomethylstyrene) (95 : 5)	THF	Ethanol, hexane	159
Poly(styrene-*co*-4-vinylpyridine) (1 : 1)	DMF, THF		32

1.10. OTHER COMPOUNDS
(alphabetically ordered)

Polymer	Solvents	Nonsolvents	Refs.
Polyacrolein, (redox polymerization)	Above 60°C: pyridine/water (55/45 to 90/10), above 130°C: nitrobenzene, sat. stannous chloride solution, γ-butyrolactone (160–170°C), ethylene carbonate (130–135°C), DMF (153°C), DMSO (160–170°C), divinyl sulfone (150–155°C), TMS (160–165°C)	Lower alcohols, hydrocarbons, chlorinated hydrocarbons, diethyl ether, esters, aromatic ketones	160,161
Polyacrolein (ionic polymerization), See 3.1.1			
Poly(anthrylethylene)	Methylene chloride	Methanol	15
Poly(*N*-benztriazolylethylene)	Chlorinated hydrocarbons, cyclohexanol, DMF, glacial acetic acid	Alcohols, esters, hydrocarbons, ketones, W	162
Poly(biphenylyethylene)	Bzn., dimethoxyethane, toluene	Methanol	163
Poly(*N*-carbazolyethylene), Poly(*N*-vinylcarbazole)	Benzyl acetate, bzn., chlorobenzene, chloroform, cyclohexanone, dioxane, conc. nitric acid, conc. sulfuric acid, tetrachloroethane	Acetals, alcohols, dil. alkalies, dil. carboxylic acids, chlorohydrin, 1-chlorotoluene (sw), diethyl ether, dimethyltetrahydrofuran, diols, aliphatic esters, glycol monoethers, aliphatic ketones, saturated hydrocarbons, trichloroethylene (sw), W	4,6,13, 30,164
Poly[6-(*N*-carbazolyl)hexylethylene]	Acetone, methanol (partially), NMP (123°C)	Methanol	165,166
Poly(diallyldimethylsilane)	Bzn.		167
Poly(3,6-dichloro-*N*-carbazolylethylene)	Dichloroethane	Methanol	168
Poly(2,4-dimethyl-6-triazinylethylene)	Alcohols, bzn., esters, ketones, W (cold)	Aliphatic hydrocarbons, W (ppt. below 73°C)	169
Poly(diphenylphosphinylideneethylene), Poly(vinyldiphenylphosphine oxide)	Bzn., ethanol, methanol, toluene	Hexane, W	170,171
Poly(diphenylthiophosphinylideneethylene), Poly (vinyldiphenylphosphine sulfide)	Bzn., chloroform	Methanol	171
Poly(2-methyl-5-pyridylethylene)	Methanol, DMF		5
Poly(3-morpholinylethylene)	W		172
Poly(1-nitropropylene)	DMF (partially)		173
Poly(2-pyridylethylene), Poly(2-vinylpyridine)	Acetone, alcohols/water, bzn., chloroform, dioxane, ethanol, glacial acetic acid, aqu. mineral acids, nitroethane, pyridine, THF	Carbon tetrachloride toluene, W (sw)	4,13,35, 174,175
crystalline	Aromatic hydrocarbons (reflux), chlorinated solvents, methanol	Aliphatic hydrocarbons (reflux), diethyl ether, MEK	
Poly(4-pyridylethylene), Poly(4-vinylpyridine)	Acetone/W (1/1), benzyl alcohol, bzn., cyclohexanol, dioxane/W (1/1), ethanol/water (92/8), isopropanol/MEK (86/14), methanol, aqu. mineral acids, nitromethane, pyridine, THF	Acetone, diethyl ether, dioxane, ethyl acetate, MEK, petroleum ether, W	5,13,175
Poly(*N*-pyrrolidonylethylene), Poly(*N*-vinylpyrrolidone)	(solubility depending on small amounts of W): acetone, dil. acids, aromatic alcohols, chloroacetic acid esters, chloroform, chlorohydrins, ethanol, glacial acetic acid, methanol, nitromethane, pyridine	Acetic esters, acetone, acid esters, carbon tetrachloride, 1-chlorotoluene, diethyl ether, hydrocarbons, methoxybutyrate esters, nitomethane/W	4–6,13,30

TABLE 1. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(*N*-1,2,4-triazolylethylene)	Glacial acetic acid, DMF, DMSO, W	Alcohols, chlorinated hydrocarbons, esters, hydrocarbons ketone	162
Poly(*N*-vinylthiopyrrolidone)	DMF	Butanol, hydrocarbons, MEK, W	176
Poly(5-vinyl-1,3-benzodioxole)	Chloroform		150
Poly(2-vinylthiophene)	Chloroform	Methanol	177
Poly(vinyl sulfate)	Aqu. NaCl (0.5 M), W		5
Poly(vinylsulfofluoride)	Acetone, DMF, ethyl acetate, THF	Diethyl ether	13
Poly(vinylsulfonic acid)	Acetone, dioxane, ethanol, W	Esters, hydrocarbons, ketones	4,13,179
sodium salt	Methanol, W, aqu. NaCl (0.5 M)	Acetone, methanol	13,179
Poly(vinyl sulfoxide)	Chloroform, DMSO, methanol, W	Acetone, bzn.	180,181
Poly(vinyl 4-methoxyphenyl sulfoxide)	THF	Diethyl ether	182
Poly(*N*-vinylpyrrolidone-*co*-acrylic acid) (3 : 1 to 1 : 3)	Acetone/W (1/1), isopropanol/W (1/1), NMP	Methanol, MEK, THF	183
Poly(vinyl amine), Poly(aminoethylene)	Butanol, DMSO, ethylene glycol, formamide, methanol, W		179,184,185
Poly(vinylformamide)	DMSO, ethylene glycol (partially), formamide, W	Acetone, isopropanol	179,185
Poly(*N*-vinylpyrrolidone-*co*-1-hexadecene) (1 : 2)	Saturated hydrocarbons	*n*-Propanol, W	186
Poly(vinylnaphthalene)	Bzn., dioxane, THF		32
Poly(*N*-vinylpyrrolidone-*co*-vinyl acetate) (1 : 4 to 3 : 2)	Ethanol, isopropanol		186
Poly(*N*-vinylpyrrolidone-*co*-vinyl alcohol) (13 : 1)	Ethanol	Diethyl ether	187
Poly(*N*-vinylpyrrolidone-*co*-vinyl acetate) (1 : 1)	Isopropanol, W		32,681
Poly(*N*-vinylformamide-*co*-methyl 3-phenyl-2-cyanopropenoate) (1 : 1)	DMF, DMSO (partially), NMP	Chloroform, diethyl ether, ethyl acetate, methylene chloride	697
Poly(2-vinylpyridine-*co*-styrene) (7 : 3)	Bzn., chloroform, MEK, THF		32
Poly(4-vinylpyridine-*co*-styrene) (3 : 2)	DMF, THF		32

TABLE 2. MAIN-CHAIN CARBOCYCLIC POLYMERS

Polymer	Solvents	Nonsolvents	Refs.
2.1. POLY(PHENYLENES)			
Poly(2-hydroxy-1,4-phenylene)	Methylene chloride		188
Poly(dihydroxyl-1,4-phenylene), Polyhydroquinone	DMF (partially)	Acetone, chloroform, ethanol	181
Poly(2,5-di-*n*-butoxy-1,4-phenylene)	1,2-Dichloroethane, methylene chloride, nitrobenzene	Methanol	189
Poly(2,5-di-*n*-decyl-1,4-phenylene)	Toluene	Acetone	190
Poly(*N*,*N*-dimethylaniline)	Acetic acid, chloroform, DMF, ethanol	Aqu. sodium hydroxide	191
Poly(2,1′:4′,1″:4″,1‴-quaterphenylene-1,4), Poly [2-(phenyl-1,4-phenylene-1,4-phenylene)-1,4-phenylene]	Toluene	Methanol	192
Poly(2-benzoyl-1,4-phenylene), Poly(2,5-benzophenone)	*m*-Cresol, DMA, methylene chloride, NMP	Methanol	193,194
Poly(nitrophenylene)		All common organic compounds	195
Poly[2-(4-methylbenzoyl)-1,4-phenylene]	DMA		196
Poly(2,5-dihydroxy-1,4-phenylenethenylene)		Common organic solvents, aqu. potassium hydroxide	197
Poly(1,4-benzophenone-*N*-phenyloxime)	DMA, NMP		194
Poly(2,5-dimethoxy-1,4-phenylenethenylene)	Bromoform	Common organic solvents	197,198
Poly(2,5-dimethyl-1,4-phenylenethenylene) low mol. wt.	Chloroform, 1,2- and 1,4-dichlorobenzene		199
Poly(2,5-dimethyl-1,4-phenylenemethylene) low mol. wt.	Chloroform, 1,2- and 1,4-dichlorobenzene (hot)		199
Poly(1,4-phenyleneethenylene), Poly(phenylenevinylene)	Biphenyl, benzyl benzoate, chlorinated biphenyls, diphenyl ether, nitrobenzene		197,200
Poly(1,4-phenylene-1,2-diphenylethenylene)	Chloroform	Methanol	201
Poly[1,4-phenyleneethenylene-1,4-phenyleneethynylene-2,5-(dodecyloxy)-1,4-phenyleneethynylene]	Chloroform, THF, toluene		202
Poly[3-nitro-1,4-phenyleneethenylene-2-(dihexylamino)-1,4-phenyleneethenylene]	Chloroform, 1,2-dichloroethane, THF		203

TABLE 2. *cont'd*

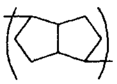
Polymer	Solvents	Nonsolvents	Refs.
Poly(tetramethyl-1,4-phenylenethenylene)		Bzn., 1-chloronaphthalene (sw), ethanol	197
Poly(5-*n*-dodecyloxy-1,4-phenylene)	DMA, DMF		204
Poly(2,5-di-*n*-decyloxy-1,4-phenylene)	THF	Methanol	205
Poly(2,5-di-*n*-decyloxy-4,4′-biphenylylene)	THF	Methanol	205
Poly[2-bis(methoxycarbonyl)-1,4-phenylenethenylene]	Methylene chloride	Methanol	206
Poly[1,4-phenylene-1,2-di(4-phenoxyphenyl)ethenylene]	Chlorobenzene, chloroform, toluene		207
Poly[2-(2-phenylethenyl)-1,4-phenyleneethenylene]	DMF		208
Poly(6-*n*-hexyl-1,4-naphthalenediylethenylene)	Chloroform	Methanol	209
Poly(2,6-naphthalenediylethenylene)	Tetrachloroethylene (partially)		210
2.2. OTHER COMPOUNDS (alphabetically ordered)			
Poly(acenaphthylene)	Bzn., carbon tetrachloride, chloroform, 1,2-dichloroethane (>30°C), THF, toluene	Acetone, acids, alcohols, dimethoxyethane, ethers	4,32,211
Poly[*N*-(3-bromophenyl)norbornenedicarboximide]	1,2-Dichloroethane, methylene chloride	Methanol	212
Poly(1,3-cyclohexadiene)	Bzn., xylene	Methanol	213
Poly(1,3-cyclohexyleneethenylene)	Bzn.	Methanol	214
Poly(1,5-cyclooctadiene)	Aromatic hydrocarbons, chlorinated hydrocarbons, diethyl ether (partially) methanol (oligomers)	Methanol	215
Poly(cyclopentadiene), 	Bzn., chloroform, dioxane, THF	Ether, hexane, methanol, petrol	216
Poly(1,3-cyclophenylenemethylene)	Toluene (hot)		217,218
Poly(*endo*-dicyclopentadiene)	Bzn., carbon disulfide, chlorobenzene	Acetone, hexane, methanol	219
Poly(2,3-dimethoxycarbonyl-2,5-cyclohexadien-1,4-diylethenylene), Poly(dimethyl barrelene-2,3-carboxylate)	Bzn.	Methanol	206
Poly(1,2-dihydronaphthalene)	Bis(phenoxyphenyl) ether (above 290°C)	Amyl acetate, chloronaphthalene, diphenyl ether, tetrachloroethane, tetrahydronaphthalene	220
Poly(dimethylfulvene)	Acetone, bzn., chlorinated hydrocarbons, diethyl ether, hexane	Alcohol	221
Poly(indene)	Aromatic chlorinated hydrocarbons, diethyl ether, dioxane, drying oils, ketones, pyridine	Acids, aliphatic hydrocarbons (sw), alkalies, lower alcohols, W	6
Poly(1-isopropylidene-3a,4,7,7a-tetrahydroindene)	Bzn., carbon disulfide, chloroform, THF	Acetone, cyclohexane, ethanol, hexane	222
Poly[1,4-phenylene-1,2-dicyano-1,2-bis(propoxycarbonyl)ethenylene]	Acetone, acetonitrile, bzn., chloroform, DMF, DMSO, THF	Diethyl ether, hexane, methanol	164

TABLE 3. MAIN-CHAIN CARBONYL POLYMERS

Polymer	Solvents	Nonsolvents	Refs.
Poly(carbonylethylene)	*m*-Cresol		328
Poly(carbonyl-1,2-propylene)	Hexafluoroisopropanol	Methanol	329
Poly(carbonylethylene-*co*-carbonyl-1,2-propylene) (7 : 3)	Cresol, hexafluoropropylene, methylene chloride		330,331
Poly(carbonyl-1-furfuryltrimethylene)	Acetone, dioxane	Chloroform, ethanol, W	332
Poly(carbonylphenylethylene), Poly(carbon monoxide-*co*-styrene)	Chlorobenzene, hexafluoroisopropanol, MEK (hot), methylene chloride	Methanol	333–335
Poly(carbonyl-1-phenyltrimethylene)	Chloroform		336
Poly(carbonyl-1,4-cyclohexan-3-onediyl)	Chloroform	Methanol	337
Poly(carbonyl-1,4-cyclohexan-3-onediylmethylene)	Chloroform		338
Poly[carbonyl-2,3-di(ethoxycarbonyl)bicyclo[2.2.2]hepta-2,5-diene-5,6-diyl]	Acetone, common organic solvents	Alkyl hydrocarbons	339
Poly(carbonyl-4,4′-biphenylylene)		DMA, NMP	194
Poly(carbonyl-1,4-phenyleneoxy-1,4-phenylene)	Chloroform, DMA, 1,1,2,2-tetrachloroethane	MEK, methanol, toluene	340

TABLE 3. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(carbonyl-1,3-phenyleneoxy-1,4-phenylene)	*o*-Chlorophenol		341
Poly[carbonyl-1,4-phenyleneoxy-2-(methoxymethylene)-1,4-phenyleneoxy-1,4-phenylene]	Chloroform, THF		342
Poly(carbonyl-1,3-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenylene), PEKK	Pentafluorophenol (80°)		343,344
Poly(carbonyl-1,4-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenylene), PEKK	Pentafluorophenol		344
Poly(carbonyl-1,3-phenylenecarbonyl-1,4-phenyleneoxy-1,3-phenylenemethylene-1,3-phenyleneoxy-1,4-phenylene)	DMA, DMF, NMP		345
Poly(carbonyl-1,4-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenylene-2-pentylidene-1,4-phenyleneoxy-1,4-phenylene)	DMA	Methanol	346
Poly(carbonyl-1,4-phenyleneoxy-1,4-phenyleneoxy-1,3-pyridinediyloxy-1,4-phenyleneoxy-1,4-phenylene)	DMA		347
Poly(carbonyl-1,4-phenyleneoxy-4,4′-biphenylyleneoxy-1,4-phenylene-*co*-carbonyl-1,4-phenyleneoxy-1,4-phenyleneoxy-1,4-phenylene) (1 : 1 to 1 : 3)	Sulfuric acid, 0.1 wt.%		348
Poly(carbonyl-1,3-phenylenecarbonyl-1,4-phenyleneoxy-1,3-phenylenemethylene-1,3-phenyleneoxy-1,4-phenylene)	DMA, DMSO, NMP		345

TABLE 4. MAIN-CHAIN ACYCLIC HETEROATOM POLYMERS

Polymer	Solvents	Nonsolvents	Refs.
4.1. MAIN-CHAIN –C–O–C– POLYMERS			
4.1.1. POLY(OXIDES)			
Unsubstituted			
Poly(oxymethylene), Polyformaldehyde	At elevated temp.: aniline, benzyl alcohol, benzyl benzoate, bromobenzene, γ-butyrolactone, chlorophenols, diphenyl ether, DMF, ethylene carbonate, formamide, malodinitrile, phenol	Lower alcohols, diethyl ether, lower esters, hydrocarbons	4,224,225
Poly(oxyethylene), Poly(ethylene glycol), Poly(ethylene oxide)	Acetonitrile, alcohols, bzn., chloroform, cyclohexanone, esters, DMF, W (cold), aqu. K_2SO_4 (0.45 M above 35°C), aqu. Mg_2SO_4 (0.39 × M above 45°C)	Aliphatic hydrocarbons, ethers, dioxane (sw), W (hot)	4,5,13
Poly(oxyethylidene), Polyacetaldehyde			
amorphous	Alcohols, aromatic hydrocarbons, chloroform, esters, ketones	Aliphatic hydrocarbons	226
crystalline	Chloroform (partially)	Alcohols, esters, hydrocarbons, ketones	226
Poly(oxypropylene), Poly(1,2-propylene glycol), Poly(propylene oxide), crystalline	Acetone, bzn., chloroform, dioxane, DMF, ethanol, methanol (hot), THF	2-Aminoethanol, diethyl ether (sw), ethyl acetate (sw)	13
Poly(oxypropylidene), crystalline	Chloroform (partially)	Common organic solvents	227
Poly(oxyisopropylidene), Polyacetone	Acetone, chloroform		228
Poly(1,3-dioxolane)	Methylene chloride, W (70°C)		229
Poly(oxytetramethylene), Poly(tetrahydrofuran)	Bzn., chloroform, ethanol, THF	Hexane, methanol, petroleum ether, W	230–233
Poly(oxycyclopentenylene)	Bzn., carbon disulfide, chloroform	Methanol	677
Poly(oxycyclohexenylene)	Aliphatic hydrocarbons, chinese wood oil, methyl acetate, toluene	Acetone, ethanol, 2-ethoxyethanol	13
Poly(oxymethylenecyclopropylidenemethyleneoxyhexamethylene)	Methylene chloride	Hexanes	234
Poly(oxy-1,3-phenylene)	Benzophenone, bzn., diphenyl ether, DMF, DMSO, nitrobenzene, 3-pentanol, pyridine	Methanol	235

TABLE 4. *cont'd*

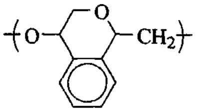
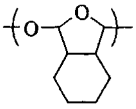
Polymer	Solvents	Nonsolvents	Refs.
Substituted			32,94,236,237
Polyepichlorohydrin, Poly(oxy-3-chloro-1,2-propylene)	Acetone, bzn., chloroform, diethyl ether, MEK, THF, toluene	Methanol	32,94, 236,237
Poly(oxy-2-chloroethylidene)			
amorphous	Chloroform	Methanol	238
crystalline		Chloroform, methanol	238
Poly(oxy-2-methyltetramethylene)	Bzn., Cloroform	Methanol	239
Poly(oxy-2,2,2-trichloroethylidene), crystalline Polychloral		Chloroform, methanol, other common solvents	227
Poly[oxy-2,2-bis(chloromethyl)trimethylene,	Cyclohexanone	Methanol	237,240
Poly(oxy-2,6-dimethyl-1,4-phenylene), Poly(2,6-dimethyl-1,4-phenylene oxide)			241–244
amorphous	α-Pinene (hot)	α-Pinene (cold), methanol, ethanol	241–244
crystalline	Bzn., chlorobenzene, chloroform, toluene	Ethanol, methanol, nitromethane, α-pinene (hot)	241–244
Poly(oxy-2,6-dichloro-1,4-phenylene)	2-Methoxymethanol	Methanol	688
Poly(oxy-1,4-phenylene-1,2-cyclopropylene-1,4-phenyleneoxymethylene)	Chloroform, DMA, NMP	Methanol	245
Poly(oxy-4,4′-biphenylylene-1,2-propylene-1,4-phenyleneoxydodecamethylene)	Chloroform		246
Poly(1-propynylene-1,3-diyloxy-1,4-phenylene-isopropylidene-1,4-phenyleneoxy-2-propynylene 1,3-diyl)	Toluene		247
Poly[oxyethylene-*co*-oxy(chloromethyl)ethylene] (1 : 1)	Chloroform	Methanol	237
Poly[oxy-3,5-bis(4-carboxyphenyl)-1,4-phenylene-*co*-oxy-3,5-bis(phenyl)-1,4-phenylene] (13 : 87 to 62 : 38)	DMF, DMSO	Chloroform, toluene	248
Poly(oxy-1,4-phenyleneisopropylidine-1,4-phenyleneoxy-*alt*-2-hydroxy-1,3-propylene), Poly(Bisphenol A), epoxy resin	Esters, ethers, ketones		249
Polymeric structures, not 100% specific			
Poly(dimethylketene), $\left[\mathrm{OC}(=\mathrm{C(CH_3)_2})\right]$			
low mol. wt.	Diethyl ether	Methanol	250,251
higher mol. wt.	Bzn., carbon tetrachloride	Chloroform (partially)	250, 251
Polyacrolein, (ionic polymerization) $\left[\mathrm{OCH(CH{=}CH_2)}\right]$	Acetone, bzn., dioxane, THF, DMF	Methanol, petroleum ether	252
Polyacrolein, (redox polymerization) see 1.10			
Poly(α-methylacrolein)	Aniline, γ-butyrolactone, DMF, nitrobenzene, pyridine	Alcohols, hydrocarbons	13
Poly[1,2-di(epoxyethyl)benzene], 	Chloroform, THF		253
Poly(phenyl glycidyl ether)	1,2-Dichlorobenzene (hot), DMF (hot), xylene (hot)	Common organic solvents at rt	254
Poly(glutardialdehyde)			
low mol. wt.	Bzn., chloroform, diethyl ether, THF	Petroleum ether, W	133,197, 255,256
high mol. wt.	Methylene chloride, THF, pyridine	Bzn., (partially)	133,197, 255,256
Poly(β-methylglutardialdehyde), low mol. wt.	Chloroform, diethyl ether, dioxane, THF	Petroleum ether, W	255
Poly(β-phenylglutardialdehyde), low mol. wt.	Bzn., chloroform, diethyl ether, THF, dioxane	Petroleum ether, W	255
Poly(*trans*-1,2-cyclohexanedicarb-oxaldehyde), 	Bzn., chloroform, hexane	Methanol	257
Poly(2-formyl-Δ^5-dihydropyran)	Aromatic hydrocarbons, chloroform, pyridine, THF		258

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
4.1.2. POLY(CARBONATES)			
Poly(oxycarbonyloxypropylene)	Dioxane, methylene chloride	Methanol, W	678
Poly(oxycarbonyloxyhexamethylene)	Acetone, bzn., chloroform, toluene	Ethanol, ether	13
Poly(oxycarbonyloxy-2,4-dihydroxy-1,4-butylene)	Methylene chloride	Ethanol	260
Poly(oxycarbonyloxy-1,4-butyleneoxycarbonyloxy-1,4-cyclohexylene)	Chloroform, THF		261
Poly(oxycarbonyloxymethylene-1,2-cylcohex-4-enylenemethylene)	Chloroform		262
Poly(oxycarbonyloxy-1,3-phenylene)		Common organic solvents	13
Poly(oxycarbonyloxy-1,4-phenylene)		Common organic solvents	13
Poly(oxycarbonyloxy-1,4-phenylene-isopropylidene-1,4-phenylene), Poly(Bisphenol A carbonate)	Chloroform, *m*-cresol, cyclohexanone, dioxane, DMF, pyridine, THF	Acetone, carbon tetrachloride, lower esters, hydrocarbons, styrene	13,263–265
chlorinated (8% Cl and more)	Bzn., methyl methacrylate, styrene		265
Poly(oxycarbonyloxy-1,4-phenylene-2-pentylidene-1,4-phenylene)	Bzn., chloroform, ethyl acetate		13
Poly(carbon dioxide-*co*-propylene oxide) (1 : 1)	THF	Methanol	266
Poly(propylene carbonate-*co*-propylene oxide) (9 : 1)	Chlorobenzene		267
Poly(oxycarbonyloxy-1,2-cyclohexyleneoxy-1,2-cylclohexylene)	Methylene chloride, THF	Methanol	268
4.1.3. POLY(ESTERS) (alphabetically ordered)			
Poly(ethylene terephthalate), see Poly(oxyterephthaloyloxyethylene)			
Poly(oxyadipoyloxyethylene, Poly(ethylene adipate)	Bzn., THF		32
Poly(oxyadipoyloxy-1,4-phenylene-1,2-propenylene-1,4-phenylene)	Chloroform		269
Poly(oxyadipoyloxytetramethylene), Poly(1,4-butylene adipate)	Chloroform, DMF, THF	Methanol	32,270
Poly(oxyadipoyloxytrimethylene), Poly(1,3-propylene adipate)	Chloroform, MEK, THF		32
Poly(oxyazelaoyloxyethlylene), Poly(ethylene azelate)	Bzn., THF		32
Poly(oxycarbonyl-4,4′-biphenylylenecarbonyloxy-hexamethylene)	Pentafluorophenol/methylene chloride (3/1), THF		271,272
Poly(oxycarbonyl-1,4-cyclohexylene-carbonyloxyoctamethylene), *cis* and *trans*	Chloroform		5
Poly(oxycarbonyldodecamethylenecarbonyloxy-4,4′-biphenylylene)	Phenol/tetrachloroethane (3/2)		273
Poly(oxycarbonylethylene), Poly(β-propiolactone)	Chloroform, formic acid	Hydrocarbons	274,275
Poly(oxycarbonylethyleneoxyethylene)	THF, toluene		278
Poly(oxycarbonylethylidene), Poly(DL-lactic acid)	Acetone, chloroform, toluene	Ethanol	276,277
Poly(oxycarbonylethynylene-1,4-phenylene-ethynylenecarbonyltetramethylene)	DMA	Methanol	279
Poly(oxycarbonyl-2,6-naphthalenediylcarbonyloxy-butylene, Poly(butylene 2,6-naphthalate)	Methylene chloride	Chloroform THF	280,281
Poly(oxycarbonyl-2,6-naphthalenediylcarbonyloxy-ethylene, Poly(ethylene 2,6-napthalenedicarboxylate)	Hexafluoroisopropanol		282
Poly(oxycarbonyl-2,6-naphthalenediyl-*co*-oxycarbonyl-1,4-phenylene) (1 : 3)	Pentafluorophenol/hexafluoro-isopropanol		283
Poly(oxycarbonyloctadecamethylenecarbonyloxyethylene)	Toluene	Methanol	284
Poly(oxycarbonylpentamethylene), Poly(ε-caprolactone), Poly(oxyhexanoyl)	Chloroform, methylene chloride, THF, toluene	Hexane, methanol	285–287
Poly(oxycarbonylpentamethylene-*co*-oxycarbonyl-3-hydroxypentamethylene) (9 : 1 to 1 : 9), Poly(5-hydroxyvaleric acid-*co*-4-hydroxyvaleric acid)	Methylene chloride	Methanol (cold)	288
Poly(oxycarbonyl-1,4-phenylene), Poly(4-hydroxybenzoic acid)	No known solvent		32
Poly(oxycarbonyl-1,4-phenyleneoxyhexamethyleneoxy-1,4-phenylene)	Phenol/*p*-chlorophenol/trichloroethylene (25/40/35)		289

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(oxycarbonyl-1,4-phenyleneoxyterephthaloyloxy-tetramethylene) (7 : 3 to 2 : 3), Poly(butylene terephthalate-*co*-4-hydroxybenzoic acid)	*p*-Chlorophenol/tetrachloroethane, trifluoroacetic acid		291
Poly(oxycarbonyl-2-phenyl-1,3-propylene)	Chloroform	Hexane	290
Poly(oxycarbonylpolyethylenecarbonylpolyethylene)	Cyclohexane		292
Poly(oxycarbonyl-1,2-propylene), Poly(3-hydroxybutyric acid)	Chloroform		7
Poly(oxycarbonyl-1,3-propylene), Poly(γ-butyrolactone), Poly(4-hydroxybutyric acid)	Carbon tetrachloride, chloroform, dichloroethylene, trifluoroethanol		293,294
Poly(oxycarbonyl-1,2-propylene-*co*-oxyethylenecarbonyloxyethylene) (9 : 1 to 1 : 9)	Chloroform	Diethyl ether/hexane (1 : 3)	295
Poly(oxycarbonyltetradecamethylene)	Chloroform		296
Poly(oxycarbonyltrimethyleneoxyethylene-*co*-methyl vinyl ether) (1 : 2 to 4 : 1)	Bzn.	Diethyl ether	297
Poly(oxycarbonyl-1-vinylethylene), Poly(β-vinyl-β-propiolactone)	Butyrolactone, chlorinated hydrocarbons, DMF		298
Poly(oxy-α,α-dibutylsebacoyloxyhexamethylene)	Bzn.		5
Poly(oxydodecanedioyloxy-1,4-phenylene-2-methylethenylene-1,4-phenylene)	Chloroform	Hexane, W	299
Poly(oxyfumaroyloxyhexamethylene)	Chloroform		5
Poly(oxyfumaroyloxytetramethylene)	Chloroform, NMP	Methanol, W	300
Poly(oxyglutaroyloxyhexamethylene)	Bzn., chlorobenzene, chloroform, THF		301
Poly(oxyglutaroyloxypropylene), Poly(1,3-propylene glutarate)	Chloroform, MEK, THF, toluene		32
Poly(oxyisophthyloyloxy-4,4′-biphenylylene)	See poly(oxyisophthaloyloxy-1,4-phenylene)		
Poly(oxyisophthaloyloxy-1,4-phenylene), Poly(phenylene isophthalate)	At elevated temp.: benzophenone, halogenated biphenyls, halogenated diphenyl oxides, halogenated naphthalenes, *m*-terphenyl, 2,4,6-trichlorophenol	Common organic solvents	302
Poly(oxyisophthaloyloxy-1,4-phenylene-fluorenylidene-1,4-phenylene)	Dichloroethane	Methanol, W	303
Poly(oxyisophthaloyloxy-1,1,3-trimethylindan-3,5-diyl-1,4-phenylene)	Chloroform, DMF, *m*-cresol, NMP, nitrobenzene, pyridine, THF	DMSO, hexane, methanol	304
Poly(oxymaleoyloxyhexamethylene), Poly(hexamethylene malonate)	Bzn., chloroform, THF		5
Poly(oxymaleoyloxytetramethylene), Poly(butylene malonate)	Chloroform, NMP, THF	Methanol	300
Poly(oxyoxalyloxyethylene), Poly(ethylene oxalate)		Bzn., Chlorobenzene, chloroform, THF	301
Poly(oxyoxalyloxyhexamethylene), Poly(hexamethylene oxalate)	Chlorobenzene, chloroform, dioxane, nitromethane, toluene	Bzn., methanol, toluene, THF	301,305
Poly(oxy-1-oxo-3-methyltrimethlylene-*co*-oxy-3-ethyltrimethylene) (9 : 1), Poly(3-hydroxybutryic acid-*co*-3-hydroxyvaleric acid)	Chloroform		306
Poly(oxy-1-oxo-3-methyltrimethylene-*co*-oxy-1-oxotrimethylene) (1 : 0 to 3 : 1), Poly(3-hydroxybutyric acid-*co*-3-hydroxypropionic acid)	Chloroform	Hexane, methanol	307
Poly(oxy-1-oxo-1,2-propylene), Poly(lactic acid)	Acetone, chloroform, dioxane, DMF, methylene chloride, pyridine	Ethanol, hexane, methanol	276,277,308,690
Poly(oxy-1-oxo-1,2-propylene-*co*-oxycarbonylmethylene), Poly(lactic acid-*co*-glycolic acid) (1 : 1 to 1 : 3)	Chloroform		309
Poly(oxysuccinoyloxy-2,2-dimethyl-1,3-propylene)	Bzn., chloroform, THF		32
Poly(oxysuccinoyloxydoeicosan-10,12-diyne-1,22-diyl)	Chloroform, THF		310
Poly(oxysebacoyloxyhexamethylene), Poly(hexamethylene sebacate)	Bzn., chlorobenzene, chloroform, THF		5,301
Poly(oxysebacoyloxyhexadecamethylene)	Chloroform		5
Poly(oxysuccinoyloxyhexamethylene), Poly(hexamethylene succinate)	Bzn., chlorobenzene, chloroform, nitromethane, THF	Methanol	5,301,305
Poly(oxysuccinoyloxymethylene-1,4-cyclohexylene-methylene)	Bzn., chloroform, THF (hot)		32
Poly(oxysuccinoyloxynonamethylenebutadyne-1,3-diylnonamethylene)	Chloroform, THF		310

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(oxysuccinoyloxytetramethylene), Poly(tetramethylene succinate)	Chloroform, toluene	Diethyl ether	311
Poly(oxysuccinoyloxytrimethylene), Poly(1,3-propylene succinate)	Chloroform, MEK, THF, toluene		32
Poly[oxyterephthaloyloxy-1,4-(2-*n*-alkyl)phenylene]	*p*-Chlorophenol, methylene chloride	Acetone, ethanol, hexane	312
Poly(oxyterephthaloyloxytetramethylene), Poly(butylene terephthalate)	Phenol/tetrachloroethane		313
Poly[oxyterephthaloyloxybutylene-*co*-oxycarbony-2,6-naphthanenediylcarbonylpoly(oxyethylene)] (1 : 1)	*m*-Cresol		314
Poly(oxyterephthaloyloxyethylene), crystalline, Poly(ethylene terephthalate), Poly(oxyethyleneoxyterephthaloyl)	Chloral hydrate, chlorophenol, DMSO (hot), halogenated aliphatic carboxylic acids, anhydrous hydrogen fluoride, nitrobenzene, phenol/2,4,6-trichlorophenol (10/7), phenol, phenol/tetrachloroethane (1/1)	Aliphatic alcohols, carboxylic esters, chlorinated hydrocarbons, ethers, hydrocarbons, ketones	4,5,315, 316
Poly(oxyterephthaloyloxyethylene-*co*-oxyhexanoyl) (1 : 1), Poly(ethylene terephthalate-*co*-ε-caprolactone)	Chloroform	Methanol	317
Poly(oxyterephthaloyloxyethylene-*co*-oxycarbonyl-naphthalene-2,6-diylcarbonyloxyethylene) (<4 : 1, >4 : 1)	Phenol/tetrachloroethane (3/2)		318
Poly(oxyterephthaloyloxy-1,4-phenylenecarbonyloxy tetraethylene) (2 : 1 : 1)	*p*-Chlorophenol/tetrachloroethane, trifluoroacetic acid		291
Poly(oxyundecanoyl)	Bzn., chloroform		5

4.1.4. POLY(ANHYDRIDES)

Polymer	Solvents	Nonsolvents	Refs.
Poly(oxysebacoyl)	Chloroform		276
Poly(oxyterephthaloyl)	DMF		319,320

4.1.5. POLY(URETHANES)
(alphabetically ordered)

Polymer	Solvents	Nonsolvents	Refs.
Poly(urethanes) (general)	Phenol, *m*-cresol, formic acid, sulfuric acid	Alcohols, diethyl ether, saturated hydrocarbons	4
Poly(oxy-1,4-butyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl), Poly(butanediol-*alt*-diphenylmethane-1,4-diisocyanate)	DMA		321
Poly(oxy-1,4-cyclohexyleneoxycarbonylimino-1,4-phenylenemethylene-1,4-phenylene-iminocarbonyl)	Dioxane (hot), DMF, THF	1,1,2-Trichloroethane	322
Poly(oxyethyleneoxycarbonyliminoethylene-iminocarbonyl)	*m*-Cresol	Chloroform, formic acid, methylene chloride	323
Poly(oxyethyleneoxycarbonyliminohexa-methyleneiminocarbonyl)	DMF	Diethyl ether	324
Poly(oxyethyleneoxycarbonylimino-1,3-phenyleneiminocarbonyl)	*m*-Cresol (hot), DMSO, sulfuric acid	Chlorobenzene, chloroform, cyclohexanone (sw), DMF (sw), xylene	325
Poly(oxytrimethyleneiminocarbonyl)	DMSO		326

4.2. MAIN-CHAIN –O– HETEROATOM POLYMERS

4.2.1. POLY(SULFONATES)

Poly(aryl sulfonates)

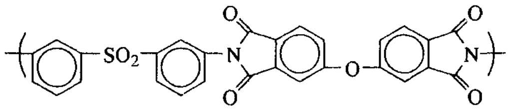
Polymer	Solvents	Nonsolvents	Refs.
$-(SO_2ArSO_2OAr'O-)$ $Ar = -C_6H_4-$ $= -C_6H_4C_6H_4-$ $= -C_6H_4CH_2C_6H_4-$ $= -C_6H_4SO_2C_6H_4-$	DMF	Methanol	349
	DMA, DMF, NMP	Chloroform, methanol, methyl ethyl ketone, tetrahydrofuran	676

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
4.2.2. POLY(SILOXANES) (ordered according to increasing complexity)			
Poly(siloxanes) (general)			
fluids and greases	Aromatic and chlorinated hydrocarbons, esters	Moderately conc. acids and alkalies, lower alcohols, W	6
rubbers		Aromatic and chlorinated hydrocarbons (sw), esters (sw)	6
Poly(oxydimethylsilylene), Poly(dimethylsiloxane)	Amyl acetate, chlorobenzene, chloroform, cyclohexyl acetate, dichlorobenzene, 1,2-dimethoxyethane, ethyl bromide, ethyl acetate, *o*-fluorotoluene, hydrocarbons, hydrogenated xylene, isopropyl acetate, MEK (above 20°C), octylamine, phenetol (above 13°C), trichloroethylene	Acetone, acetonitrile, acetophenone, aniline, benzyl alcohol, benzyl acetate, bromobenzene, γ-butyrolactone, Carbitol®, cyclohexanone, cyclohexanol, 1,4-dibromobutane, 1,2-dichloroethane, di(chloroethyl) ether, dichlorobenzene, dimethylnaphthalene, dioxane, diphenyl oxide, ethyl formate, ethyl benzoate, 2-isopropoxyethanol, mesityl oxide, methanol, nitrobenzene, 1-nitropropane	4,5
Poly(oxydiethylsilylene), Poly(diethylsiloxane)	Toluene	W	32
Poly(oxyhydrophenylsilylene)	THF		351
Poly(oxymethylphenylsilylene), Poly(methylphenylsiloxane)	Acetone (hot), butanol, chloroform, diethyl ether, ethyl acetate, toluene	Ethanol, ethylene glycol, methanol	352
Poly(oxymethylhexadecylsilylene)	Chloroform, THF, toluene	W	32
Poly(oxyalkylmethylsilylene)-ω-4-(4-cyanobenzoyl)phenoxy	DMF, toluene	Hexane, methanol	353
Poly(oxydiphenylsilylene), Poly(diphenylsiloxane)	Acetone (hot)	Acetone (cold)	352
Poly[oxybis(3,4-dichlorophenyl)silylene]	Acetone, bzn.		354
Poly(oxydimethylsilyleneethyleneoxydimethylsilylene)	Toluene		355
Poly(oxydimethylsilyleneoxydimethylsilylene-1,4-phenylenedimethylsilylene)	THF		356
Poly[oxymethyl(5-*t*-butoxycarbonyloxy-2-norbornyl)silylene]	Chloroform, toluene	Methanol	357,358
Poly(oxydimethylsilylene-*co*-oxyalkylmethylsilylene), Poly(dimethylsiloxane-*co*-alkylmethylsiloxane)	Aliphatic hydrocarbons, aromatic hydrocarbons, isopropanol	Ethanol, W	359
Poly(oxydimethylsilylene-*co*-oxycarbonyl-1,4-phenyleneisopropylidene-1,4-phenylene) (1 : 3 to 1 : 1)	Bzn., carbon tetrachloride, chloroform, methylene chloride, pyridine, THF		360
4.3. MAIN-CHAIN –C–S–C– AND –C–S–N–POLYMERS			
4.3.1. POLY(SULFIDES) (alphabetically ordered)			
Poly(2,5-dioxopyrrolidine-1,3-diylthio-1,4-phenylene)	Tricresol	Methanol	361
Poly(dithioethyleneoxyethylene)	1,1,2-Trichloroethane (partially), other chlorinated hydrocarbons (partially)	Dil. acids, alcohols, dil. alkalies, bzn. (sw), carbon disulfide, carbon tetrachloride (sw), gasoline (sw), turpentine (sw)	6,178
liquid polymers	Bzn., ethylene dichloride		6,178
Poly(tetrathioethylene)	No solvent known	Dil. acids, alcohols, dil. alkalies, bzn. (sw), carbon tetrachloride, carbon disulfide, gasoline	6,178
Poly(tetrathioethyleneoxyethylene)	1,1,2-Trichloroethane (partially), other chlorinated hydrocarbons (partially)	Dil. acids, alcohols, dil. alkalies, bzn. (sw), carbon tetrachloride, carbon disulfide, gasoline	6,178
liquid polymers	Bzn., ethylene dichloride		6,178
Poly(thio-4,4-biphenylylene)	Biphenyl, dichlorobiphenyl, dimethyl-*p*-terphenyl		362
Poly(thiodifluoromethylene)	Chloroform/methanol	Conc. nitric acid (reflux), aqu. sodium hydroxide (10%, reflux)	363
Poly(thio-2,5-dimethyl-1,4-phenylene)	Hexane, methylene chloride		364
Poly(thiomethylene-1,4-*trans*-cyclohexylene-methylenethiomethylene)	Bzn., chloroform	Methanol, W	365
Poly(thio-1,4-phenylene), Poly(phenylene sulfide)	Biphenyl, *m*-dichlorobenzene, dichlorobiphenyl, dimethyl-*p*-terphenyl, hexachlorobiphenyl	At reflux temp.: 2,4-lutidine, phenyl sulfide, phenyl oxide, pyridine, toluene	362,366, 367

TABLE 4. *cont'd*

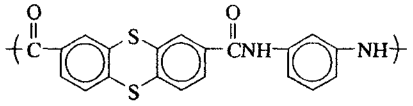
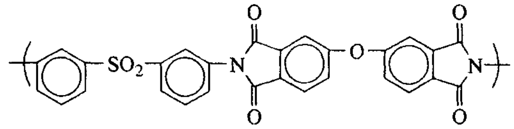
Polymer	Solvents	Nonsolvents	Refs.
Poly(thio-1,4-phenylenecarbonyl-1,4-phenylene-isopropylidene-1,4-phenylenecarbonyl-1,4-phenylene)	Chloroform, NMP	Methanol	368
Poly(thio-1,4-phenyleneiminocarbonyl-1,4-phenyleneoxy carbonylethylene)	Chloroform, NMP	Hexane, methanol	369
Poly(thio-1,4-phenyleneoxymethyleneoxy-1,4-phenylene)	Chloroform, methylene chloride	Methanol	364
Poly(thio-1,4-phenyleneoxy-1,4-phenylene)	Hexane, methylene chloride		364
Poly(thiotetramethyl-1,4-phenylene)	Durene		364
	DMA, DMF, NMP	Methanol	370
4.3.2. POLY(SULFONES) (ordered according to increasing complexity)			
Poly(ethylene-*co*-sulfur dioxide)	No solvent known		13,178
Poly(propylene-*co*-sulfur dioxide)	Conc. nitric acid, conc. sulfuric acid	Common organic solvents	13,178
Poly(1-butene-*co*-sulfur dioxide)	Acetone, cyclohexanone	Paraffins, cycloparaffins, aromatic hydrocarbons	13
Poly(butylethylene-*co*-sulfur dioxide)	Bzn., chloroform, dioxane		7
Poly(1,3-hexadiene-*co*-sulfur dioxide) (1 : <3)	Acetone, chloroform, DMA, DMF, THF		371
Poly(dimethylbutadiene-*co*-sulfur dioxide)	Conc. nitric acid, conc. sulfuric acid	Common organic solvents	13
Poly(1-pentyne-*co*-sulfur dioxide)	Dioxane		13
Poly(1-hexyne-*co*-sulfur dioxide)	Acetone, dioxane		13
Poly(1-heptyne-*co*-sulfur dioxide)	Acetone, dioxane		13
Poly[4-(*tert*-butoxycarbonyloxy)styrene-*co*-sulfur dioxide] (5 : 1)	Toluene		372
Poly(1,4-phenyleneoxymethyleneoxy-1,4-phenylenesulfonyl)	Chloroform	Methanol	364
Poly(1,4-phenylenesulfonyl)	Aniline, DMA, pyridine		373
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene)	Aniline, aromatic amines, DMF, DMSO, methylene chloride, NMP, pyridine	Alcohols, halogenated hydrocarbons, hydrocarbons, silicone oil	32,373–375
Poly(thio-1,4-phenylenesulfonyl-1,4-phenylene)	DMF, DMSO, NMP		376
Poly(carbonyl-1,3-phenylenemethylene-1,4-phenylenesulfonyl-1,4-phenylene)	No known solvent	Acetone, DMF, THF, toluene	377
Poly(thio-1,4-phenylenesulfonyl-1,4-phenylenethio-1,4-phenyleneisopropylidine-1,4-phenylene)	DMA/toluene		378
Poly(3-amino-1,4-phenylenesulfonyl-2-amino-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenylene)	THF	Ethanol/W (1 : 1)	379
Poly(2,5-thiophenediylsulfonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy)	DMA, methylene chloride, THF	Methanol, W	380
Poly(1,4-phenylenesulfonyl-1,4-phenyleneoxy–4,4′-biphenylyleneoxy)	Aniline, DMA, pyridine		373
Poly(1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenyleneoxy)	Chloroform, sulfolane	Methanol	381
Poly(1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,3-phenyleneethenylene-1,3-phenyleneoxy)	DMA		382
Poly(1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenevinylidene-1,4-phenylene)	Chloroform, DMA		181
Poly(1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenyleneoxy-1,3-pyridinediyloxy-1,4-phenyleneoxy)	DMA		347
Poly(1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylenemethylphosphineoxide-1,4-phenyleneoxy)	DMA	Methanol/W	383
	Dichlorobenzene	Isopropanol, methanol	384
Poly(1,3,4,6-tetraoxyperhydrocyclopentene-(1,2-c : 3,4-c′)-dipropyl-2,5-diylethylenesulfonylethylene)	DMF, DMSO, formic acid, NMP, sulfuric acid	Hexane	385

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
4.3.3. OTHERS			
Poly(trimethylenesulfite)	Methylene chloride		386
4.4. MAIN-CHAIN -C-N-C- POLYMERS			
4.4.1. POLY(AMIDES)			
Poly(amides) 1			
Poly(*N*-ethyliminocarbonyl), Poly(ethyl isocyanate)	Sulfuric acid, trifluoroacetic acid		387
Poly(*N*-butyliminocarbonyl) Poly(butyl isocyanate)	Bzn., carbon tetrachloride, THF		387,388
Poly(*N*-*n*-hexyliminocarbonyl), Poly(*n*-hexyl isocyanate)	Bzn., chloroform, DMF	Methanol	389–391
Poly(*N*-*m*-tolyliminocarbonyl)	DMF		387
Poly(*N*-vinyliminocarbonyl)	DMA, DMF, DMSO, pyridine	Alcohols, carbon disulfide, chloroform, dioxane	392
Poly(amide) 1,5			
Poly(iminoglutaroyliminomethylene)	1,4-Butanediol, dichloroacetic acid		393,394
Poly(amide) 1,6			
Poly(iminoadipoyliminomethylene), Poly(methylene adipamide)	1,4-Butanediol		394
Poly(amide) 1,12			
Poly(iminododecanoyliminomethylene)	2-Methyl-2,4-pentanediol		394
Poly(amides) 2			
Poly(γ-benzyl glutamamide)	*m*-Cresol, DMF		395,396
Poly(lysine-*co*-lactic acid) (1 : 19)	Chloroform	Methanol	397
Poly(amides) 3			
Poly[imino-(1-oxo-2,2-dimethyl-3-phenyltrimethylene)], Poly(3,3-dimethyl-4-phenylazetidine-2-one)	Phenol, sulfuric acid, trifluoroethanol	Chloroform, HMPT, methanol, sol. of $Ca(CNS)_2$ in methanol	399
Poly[imino-(1-oxo-3-methyltrimethylene)], Poly (4-methylazetidine-2-one)			399,691
optical activity < 75%	Formic acid, phenol, sulfuric acid, sol. of $Ca(SCN)_2$ in methanol	Chloroform, HMPT, methanol, trifluoroethanol	
optical activity > 80%	Chlorobenzene/trichloroacetic acid (1/1), dichloroacetic acid, formic acid/trichloroacetic acid (3/7)	Formic acid, sulfuric acid	691
Poly[imino-(1-oxotrimethylene)]	Aqu. chloral hydrate, aqu. sol. of $CaBr_2$ or $FeCl_3$, chloroacetic acid, cyanoacetic acid, formic acid, glycerol (hot), nitric acid, nitrophenols, phenol (hot), sulfuric acid, W>140°C	Most organic solvents, dilute bases and acids, DMF, DMSO, phenol (cold)	13,400,401
Poly(aspartic acid-*co*-lactic acid) (1 : 9)	Methylene chloride		402
Poly(amides) 4			
Poly[imino-(1-oxotetramethylene)], Polypyrrolidone	α-Pyrrolidone (hot), acetic acid (hot), aqu. sol. of $Ca(CNS)_2$, benzyl alcohol (hot), *o*-chlorophenol, *m*-cresol, dichloroacetic acid, formic acid, methanol, sulfuric acid	DMF, formamide, W	403, 404
Poly(iminooxalyliminotetramethylene)	Dichloroacetic acid, sulfuric acid, trifluoroacetamide	Formic acid, phenol, W	405
Poly(imino-1-carboxy-1,3-propylenecarbonyl), Poly (γ-glutamic acid)	W	Ethanol	406
Poly(amide) 4,6			
Poly(iminoadipoyliminotetramethylene), Poly(butylene adipamide)	Hexafluoroisopropanol		407
Poly(amides) 5,5			
Poly(iminoglutaroyliminopentamethylene), Poly (1,5-pentamethylene glutaramide)	Dichloroacetic acid		408
Poly(amide) 5,6			
Poly(iminoadipoyliminopentamethylene), Poly (pentamethylene adipamide)	Dichloroacetic acid, trifluoroethanol	Methanol	409,410
Poly(amides) 6			
Poly[imino-(1-oxohexamethylene)], Poly (ε-caprolactam)	Acetic acid, chlorophenol, *m*-cresol, ethylene carbonate, formic acid, HMPT, phosphoric acid, sulfuric acid, trichloroacetic acid	Alcohols, chloroform, esters, ethers, hydrocarbons, ketones	4,5
chlorinated	*o*-Chlorophenol, DMSO, sulfuric acid	Formic acid	411

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly[imino-(1-oxohexamethylene)], partially *N*-trifluoroacetic acid substituted	Acetone, chloroform, THF	Hexane, W	412
Poly[imino-(1-oxohexamethylene)-*co*-imino-(1-oxyundecamethylene)] (1 : 1)	2,2,2-Trifluoroethanol/methylene chloride (3/2)		413
Poly[imino-(1-oxohexamethylene)-*co*-iminosuccinoyl], (9 : 1 to 2 : 8)	Mesitylene/sulfolane		414
Poly(amide) 6,6			
Poly(iminoadipoyliminohexamethylene), Poly(hexamethylene adipamide)]	rt: Chloral hydrate, chloroacetic acids, formic acid, HCl, HF, liquid sulfur dioxide, methanol, phenols, phosphoric acid, sulfuric acid, trichloroethanol, trifluoroethanol, saturated solutions of: alcohol-soluble salts, e.g. calcium chloride, magnesium chloride in methanol, at 120–180°C: acetic acid, *N*-acetylmorpholine, benzyl alcohol, 2-butene-1,4-diol, 1,3-chloropropanol, di(ethylene glycol), DMSO, ethylene chlorohydrin, formamide	Aliphatic alcohols, chloroform, diethyl ether, hydrocarbons, aliphatic ketones, aliphatic esters	13
Poly(amide) 6,9			
Poly(iminoazelaoyliminohexamethylene)	*m*-Cresol		32
Poly(amide) 7			
Poly[imino-(1-oxohepamethylene)-*co*-imino-(1-oxodedecamethylene)], (1 : 1)	2,2,2-Trifluoroethanol/methylene chloride (3/2)		413
Poly(amide) 8,6			415
Poly(iminoadipoyliminooctamethylene)	1,4-Butanediol, hot		
Poly(amide) 10,6	Chlorobenzene, diethyl succinate (79°C)		5
Poly(iminoadipoyliminodecamethylene), Poly(decamethylene adipamide)			
Poly(amide) 11			
Poly[imino-(1-oxoundecamethylene)], Poly(11-amino-undecanoic acid)	Higher primary alcohols, DMF, DMSO, hexafluoropropanol		13,692
Poly(amide) 12			
Poly[imino-(1-oxododecamethylene)], Poly(12-amino-dodecanoic acid)	Cresol		416
Poly(amide) 12/2			
Poly(iminocarbonylmethyleneiminocarbonylundecamethylene)	DMSO	Diethyl ether	398
Poly(amide) 12,6			
Poly(iminoadipoyliminododecamethylene)	Cresol		416
Poly(amide) 18			
Poly[amino-(1-oxooctadecamethylene)], Poly (18-aminostearic acid)	DMF, DMSO, pyridine	Hexane, methanol, W	417
Other aliphatic poly(amides)			
Poly(iminotartronoyliminohexamethylene)	Chloroacetic acid, DMSO	Acetone, hexane, methanol, W	418
Aromatic poly(amides)			
Poly(imino-1,4-phenylenecarbonyl-*co*-oxy-1,4-phenylene-carbonyl) (1 : 1 to 1 : 9), Poly(*p*-aminobenzoic acid-*co*-*p*-hydroxybenzoic acid)	Conc. sulfuric acid (decomp.)	Insoluble in all common solvents	419
Poly(iminocarbonyl-1,4-phenyleneoxyterephthaloyloxy-1,4-phenylenecarbonylimino-1,4-phenylenehexa-fluoroisopropylidene-1,4-phenylene)	NMP		693
Poly(iminocarbonylpyridine-2,6-diyl-carbonylimino-1,4-phenyleneoxy-1,4-phenylene)	NMP, sulfuric acid	Methanol	420
Poly(iminoterephthaloyliminoethylene), Poly(ethylene terephthalamide)	Sulfuric acid	Acetone, chloroform, *m*-cresol, DMF, ethanol/W (4/1), formamide, trifluoroacetic acid	421
Poly(*N*-methyliminoterephthaloyl-*N*-methyliminoethylene)	Acetone, chloroform, *m*-cresol, DMF, formamide, sulfuric acid, trifluoroacetic acid	Ethanol/W (4/1)	421
Poly(*N*-methyliminoterephthaloyl-	Chloroform, *m*-cresol (hot),	Acetone, DMF	421

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
N-methyliminotetramethylene)	ethanol/W (4/1) (hot), formamide, sulfuric acid		
Poly(iminoisophthaloylimino-1,3-phenylene), *N*-methyl substituted	DMSO, sulfuric acid	Hexane, W	422
Poly(iminoisophthaloylimino-1,4-phenyleneoxy-1,4-phenylene)	NMP, sulfuric acid	Methanol	420
Poly(iminoisophthaloylimino-2,4-pentylene)	DMF, DMSO, methanol, trifluoroacetic acid, trifluoroethanol	Hexane, methanol	423
Poly(iminoisophthaloylimino-4,4′-biphenylylene)	Conc. sulfuric acid	*m*-Cresol (hot), DMA (sw), DMF (sw), DMSO (sw), formic acid (85%) (sw), glacial acetic acid (sw), methanol, NMP (sw)	424
Poly(iminoisophthaloylimino-1,4-phenylene)	HMPT		425
Poly(iminoterephthaloyliminoethylene oxyisophthaloyl-oxyethylene)	DMSO, NMP, trifluoroacetic acid	Methanol, DMF	426
Poly(iminoterephthaloyliminotetramethylene) Poly(butylene terephthalamide)	DMF, formamide, sulfuric acid, trifluoroacetic acid	Acetone, chloroform, *m*-cresol	421
Poly(iminoterephthaloylimino-2,4-pentylene)	LiCl, sulfuric acid, trifluoroacetic acid	DMF, DMSO, trifluoroethanol, W	423
Poly(iminoterephthaloylimino-1,4-phenylene), Poly (*p*-phenylene tetrephthalamide)	DMF/LiCl, NMP		427,428
Poly(iminocarbonyl-1-methyl-4,5-imidazolediyl-carbonyliminoethylene)	Chloroform, DMF, methylene chloride, NMP		429
Poly(iminocarbonyl-1,4-phenyleneiminocarbonyl-pentamethylene)	Ethyl acetate		430
Poly(iminoterephthaloylimino-3-methyl-1,4-phenyleneoxyethyleneoxy-2-methyl-1,4-phenylene)	Tetrachloroethane		431
Poly(iminocarbonyl-1,4-phenylenehexafluoroiso-propylidene-1,4-phenylenecarbonylimino-1,4-phenyleneoxy-1,4-phenylene)	DMA	Methanol	432
Poly(iminocarbonyl-1,4-phenyleneoxyterephthaloyloxy-1,4-phenylenecarbonylimino-1,4-phenylenehexafluoro-isopropylidene-1,4-phenylene)	NMP		693
Poly(imino-3-alkylisophthaloylimino-1,4-phenylene)	NMP		433
Poly(iminotetra(octylthio)terephthaloylimino-1,4-phenylene)	Methylene chloride/methanesulfonic acid	Chlorobenzene, chloroform, dioxane, THF, trifluoroacetic acid	434
Poly(pyromellitic dianhydride-*co*-aromatic diamines), Poly(amic acids)	DMF, DMA, DMSO, tetramethylurea		435
Sulfur and phosphorus containing poly(amides)			
Poly(iminoadipoyliminotrimethylene-1,4-phenylene-phosphinidene-1,4-phenylenetrimethylene)	Aqu. hydrochloric acid (5%), cresol, DMF, ethanol, formic acid	Acetone, acetonitrile, chlorobenzene, chloroform, C-7 fluoroalcohol, hexane (sw), W	436
Poly(iminoethyleneiminocarbonyl-1,4-phenylene-sulfonyl-1,4-phenylenecarbonyl)	Formic acid, tetrachloroethane/phenol (2/3), 1,1,2-trichloroethane/formic acid (3/2)	2-Chloroethanol, *m*-cresol, DMF	437
Poly(iminohexamethyleneiminocarbonylethylene-1,4-phenylenephosphinylidene-1,4-phenyleneethylenecarbonyl)	Cresol, DMF, ethanol, C-7 fluoroalcohol, formic acid	Acetone, acetonitrile, aqu. hydrochloric acid (5%, sw), chlorobenzene, chloroform (sw), HX, W (sw)	
Poly(iminohexamethyleneiminocarbonyl-ethylenethioethylenecarbonyl)	Cresol, DMF, formic acid	Acetone, acetonitrile, aqu. hydrochloric acid (5%), chlorobenzene, chloroform, ethanol, C-7 fluoroalcohol (sw), hexane, W	436
Poly(iminoisophthaloylimino-1,3-phenylene-sulfonyl-1,3-phenylene)	DMA, DMF, NMP		438
Poly(iminoterephthaloylimino-1,3-phenylene-sulfonyl-1,3-phenylene)	DMA, DMF	NMP	438
Poly(iminoterephthaloylimino-1,4-phenylene-sulfonyl-1,4-phenylene)	Sol. of LiCl in DMF (5%)	DMF, NMP	438
Poly(iminoterephthaloyliminotrimethylene-1,4-phenylenephosphinidene-1,4-phenylenetrimethylene	Cresol, DMF, formic acid, hydrochloric acid (5% sw)	Acetone, acetonitrile, chlorobenzene, chloroform, ethanol (sw), hexane, W	436
4.4.2. POLY(HYDRAZIDES)			
Poly[diazo-1,4-phenylenecarbonyltri(oxyethylene)-oxycarbonyl-1,4-phenylene]	Chloroform, *o*-dichlorobenzene, nitrobenzene, THF	Acetone, hexane, methanol	439

TABLE 4. *cont'd*

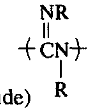
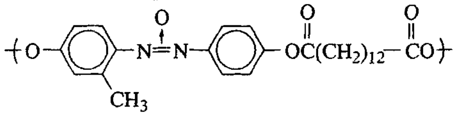
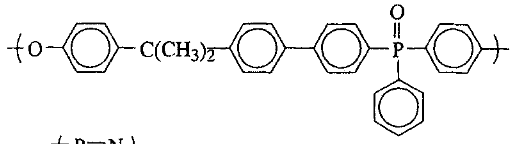
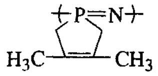
Polymer	Solvents	Nonsolvents	Refs.
Poly(hydrazoadipoylhydrazoisophthaloyl)	DMSO, HMPT		440
Poly(hydrazoadipoylhydrazosuccinoyl)		DMSO (sw)	440
Poly(hydrazoisophthaloylhydrazoterephthaloyl)	*m*-Cresol, dichloroacetic acid (degrad.), DMA, DMSO (cold), formic acid (degrad.), NMP, sulfuric acid (degrad.), trifluoroacetic acid (degrad.), trifluoropropanol	Chloroform, nitrobenzene, trichloroethane (sw), trifluoropropanol, W	441
Poly(4,4′-benzaldehydeazineoxy-1,4-phenylene-isopropylidene-1,4-phenyleneoxy)	Toluene	Methanol	442
4.4.3. POLY(UREAS)			
Poly(ureas) (general)	*m*-cresol, formic acid, phenol, sulfuric acid	Alcohols, diethyl ether	30
Poly(iminocarbonyliminononamethylene), Poly(ureylene-nonamethylene)	Sulfuric acid (60% and 95%)	*m*-Cresol (sw), glacial acetic acid, aqu. NaOH (45%, sw)	679
Poly(iminocarbonylimino-1,3-phenyleneimino-carbonylimino-2-methyl-5-sulfo-1,3-phenylene), Poly(ureylene-1,3-phenyleneureylene-2-methyl-5-sulfo-1,3-phenylene)	Aqu. NaOH	W	443
4.4.4. POLY(CARBODIIMIDES) (arranged according to increasing complexity) 			
Poly(diethylcarbodiimide)	Formic acid, aqu. mineral acids	Heptane	444
Poly(diallylcarbodiimide)	Formic acid	Heptane	444
Poly(di-*n*-butylcarbodiimide)	Formic acid	Heptane	444
Poly(diisobutylcarbodiimide)	Formic acid		444
Poly(methylhexylcarbodiimide)	Toluene		445
Poly(di-*n*-hexylcarbodiimide)	Formic acid, *n*-heptane, toluene		445,446
Poly(diphenylcarbodiimide)	Formic acid		444
–N=C=N–R–			
Poly(hexamethylenecarbodiimide)	No solvent known		447
Poly(4,4′-biphenylylenemethylenecarbodiimide)	*m*-Cresol, trichlorophenol/phenol (7/10)		447
Poly(3-methyl-1,4-phenylenecarbodiimide)	No solvent known		447
Poly(1,3-xylylenecarbodiimide)	No solvent known	Chlorobenzene, chloroform, cyclohexanone, DMF, DMSO, ethylene chlorohydrin, formic acid, trichloroethylene, xylene	447
Poly(2,2′-dimethyl-4,4′-biphenylylenecarbodiimide)	No solvent known		447
Poly(2,2′-dimethoxy-1,4-biphenylylenecarbodiimide)	No solvent known		447
Poly(1,5-naphthylenediylcarbodiimide)	No solvent known		447
4.4.5. OTHER COMPOUNDS			
Poly(*N*-propanoyliminoethylene), Poly(2-ethyl-2-oxazoline)	Ethanol, W		448,449
Poly[*N*-(perfluorooctylethylenecarbonyl)iminoethylene]	Hexafluoroisopropanol	Methanol	450
Poly(*N*-benzoyliminoethylene)	Chloroform	Diethyl ether	451
Poly[*N*-((9-carbazolyl)acetyl)iminoethylene]	Chloroform, THF	Ethanol, diethyl ether	452
Poly[*N*-2-((9-carbazolyl)propanoyl)iminoethylene]	Chloroform, THF	Ethanol, diethyl ether	452
Polysuccinimide	Mesitylene sulfolane		453
Poly(*tert*-butylmaleimide)	Bzn., carbon tetrachloride, DMF, THF	Hexane	454
Poly(phenylmaleimide)	DMF, DMSO	Bzn., hexane	454
Poly(*m*-aniline)	DMF, DMSO, methylene chloride (partially), NMP		455
Polyaniline, camphorsulfonic acid doped	Benzyl alcohol, chloroform, *m*-, *p*-cresol, DMF, NMP		456,457
Poly[*N*-(*p*-*tert*-butylbenzoyl)aniline]	Acetone (partially), chloroform (partially), DMSO, THF		458
Poly(2-pentadecylaniline)	Chloroform, THF		459
Poly(3-trifluoromethylaniline)	Acetone, acrylonitrile, toluene		460
Poly(4-amino-3-sulfoaniline)	Methanol, W		461

TABLE 4. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly[*N*-(*p*-sulfophenyl)imino-3-hydroxymethyl-1,4-phenyleneimino-1,4-phenylene]	DMF (partially), DMSO (partially), NMP (partially), W		462
Poly[*N*-(4-methylphenyl)-6-iminohexamethylenecarbonyl-1,4-phenylene]	Methylene chloride, THF	Diethyl ether, methanol	463
Poly(imino-1,4-phenylenecarbonyloxy-1,4-phenyleneoxycarbonyl-1,4-phenylene)	*m*-Cresol, DMA (partially), DMSO (partially), NMP (partially), sulfuric acid	Chloroform, hexane	464
Poly[*N*-(methyl)imino-3-phenyltriazine-1,5-diyl]	Bzn., cresols, phenols	Hexane	465
Poly(9-nitriloanthraquinone-10-nitrilo-1,4-phenylene)	Chlorobenzene, chloroform	Hexanes	466
Poly(9-nitriloanthraquinone-10-nitrilo-1,4-phenylene-methylene-1,4-phenylene)	Chlorobenzene		467
Poly[carbonyliminocarbonyl-1,4-phenylene-carbonyliminocarbonyloxy-2,2-(dimethyl) tetramethyleneoxy]	DMA	Diethyl ether	468
Poly(oxy-3-methyl-1,4-phenylene-*ONN*-azoxy-2-methyl-1,4-phenyleneoxy-1,12-dodecanoyl), 	Chloroform		469
Poly[*N*-(acetyl)iminoethylene-*co*-*N*-(3-thiopheneylcarbonyl)iminoethylene]		Acetone, acetonitrile, DMF, DMSO, THF	470

4.5. POLY(PHOSPHAZENES) AND RELATED COMPOUNDS

Polymer	Solvents	Nonsolvents	Refs.
Poly(dichlorophosphazene)	Acetonitrile, cyclohexane, methylene chloride, THF		682
Poly[bis(trifluoroethoxy)phosphazene]	Acetone, cyclohexanone (hot), dimethyl ether, ethyl acetate, glycol, methanol (hot), THF	Diethyl ether, dioxane, ethanol, hydrocarbons, W	471–473
Poly(dimethoxyphosphazene)	Acetonitrile, chloroform, dimethoxyethane, dioxane, DMF, methanol, pyridine, THF	Acetone, bzn., diethyl ether, ethanol, W	471
Poly(dihexyloxyphosphazene)	Bzn.		7
Poly(methylphenylphosphazene)	THF		474
Poly(diphenoxyphosphazene)	Bzn. (hot), chlorobenzene, DMF, THF	Acetone, DMSO, ethanol, hexane, W	471
Poly(4-nitrophenoxyphenoxyphosphazene)	Dioxane, THF	Hexane, methanol, W	475
Poly[(phenylthiophosphonoyl)trimethyene]	Acetone (partially), acetonitrile (partially), chloroform, DMF, DMSO	Toluene, ethyl acetate, methanol, W	476
	Chloroform	Methanol/W (9/1)	477
	Methylene chloride	Diethyl ether	478

4.6. POLY(SILANES), POLY(SILAZANES)

Polymer	Solvents	Nonsolvents	Refs.
Poly(alkyltrisilazane)	Aromatic hydrocarbons, carbon tetrachloride, cyclohexane	Acetone (partially), DMSO (partially)	479
Poly(dimethylsilylene-1,4-phenylene)	Aromatic hydrocarbons	Aliphatic hydrocarbons, ethanol	480
Poly(dimethlylsilylenetrimethylene)	Diethyl ether, THF		481
Poly(*n*-pentyl-*n*-hexylsilylene)	Toluene	Isopropanol/ethyl acetate	482
Poly(di-*n*-hexylsilylene)	Isooctane		483
Poly(methylphenylsilylene)	Chloroform		484
Poly(phenylchlorosilylene)	Carbon tetrachloride		485
Poly(1,1,2,2-tetramethyldisilylenemethylene)	Toluene	Ethanol	486
Poly(diethoxysilylene-1,4-phenylene)	THF	Chloroform/methanol	487
Poly(octamethyltetrasilylenedimethylsilylene)	Toluene	Methanol	488
Poly(octamethyltetrasilylenemethylene)	Toluene	Methanol	488
Poly(dihydrosilylene-1,4-phenylene)	Chloroform, diethyl ether	Ethanol	489
Poly(hydrophenylsilyleneethynylene-1,3-phenyleneethynylene)	Bzn., THF	Hexane, methanol	490,491

TABLE 4. *cont'd*

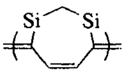
Polymer	Solvents	Nonsolvents	Refs.
Poly(dibutylsilylene-1,4-phenyleneethenylene-1,4-phenyleneethenylene-1,4-phenylene)	Chloroform	THF	492
Poly(hexamethylcyclotrisilazane)	Carbon tetrachloride, hydrocarbons	Acetone, DMSO	493
Poly(dihexylsilyleneferrocenediyl)	THF		680
Poly(dimethylsilylene-*N*-methylimino)	THF		494
Poly(dimethylsilyleneiminoethyleneimino)	Xylene		495
Poly(dimethylsilylene-*co*-1,3-dihydro-1,3-dimethyldisilazane) (1 : 1 to 3 : 1)	Decaline, toluene		496
	Toluene	Methanol	497

TABLE 5. MAIN-CHAIN HETEROCYCLIC POLYMERS

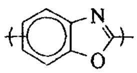
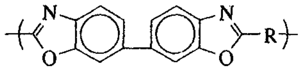
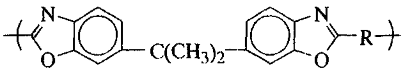
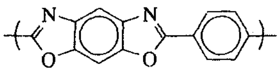
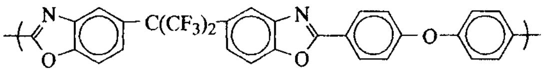
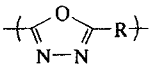
Polymer	Solvents	Nonsolvents	Refs.
5.1. POLY(BENZOXAZOLES), POLY(OXADIAZOLES), POLY(OXADIAZOLIDINES)			
Poly(benzoxazoles) 			
Poly(2,5-benzoxazolediyl)	Sulfuric acid		498
Poly(2,6-benzoxazolediyl)	Sulfuric acid		498
Poly(dibenzothiazoles)			
			499
R = 1,3-phenylene	Sulfuric acid	Organic solvents	499
R = 1,4-phenylene	Sulfuric acid	Organic solvents	499,500
R = octamethylene	*m*-Cresol, formic acid, sulfuric acid		500
R = 1,4-cyclohexylene	Sulfuric acid	Acetic acid, DMA, DMF, DMSO, formamide, NMP	501
			
R = tetramethylene	Chloroform, *m*-cresol, DMF (hot), pyridine (hot), sulfuric acid (hot), tetrachloroethane (hot), THF (hot)	Benzyl alcohol, formic acid	502
R = 1,3-phenylene	Benzyl alcohol (hot), chloroform, *m*-cresol (hot), pyridine, sulfuric acid, tetrachloroethane (hot), THF	DMF (partially), formic acid (partially)	502
R = 1,4-phenylene	Chloroform, *m*-cresol, formic acid (hot), sulfuric acid (hot)	Benzyl alcohol, DMF, pyridine, tetrachloroethane, THF	502
R = 	Polyphosphoric acid		503
R = 	DMA, NMP	Methanol	504–506
Poly(1,3,4-oxadiazoles)			
			
R = octamethylene	Bzn., chloroform, *m*-cresol, dichloroethylene, DMA (hot), DMF, DMSO (hot), NMP (hot), sulfuric acid		507–509
R = methylene to eicosamethylene	DMA (hot), DMSO (hot), NMP (hot), DMSO (sw), NMP (sw) sulfuric acid (95%)		509

TABLE 4. *cont'd*

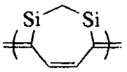
Polymer	Solvents	Nonsolvents	Refs.
Poly(dibutylsilylene-1,4-phenyleneethenylene-1,4-phenyleneethenylene-1,4-phenylene)	Chloroform	THF	492
Poly(hexamethylcyclotrisilazane)	Carbon tetrachloride, hydrocarbons	Acetone, DMSO	493
Poly(dihexylsilyleneferrocenediyl)	THF		680
Poly(dimethylsilylene-*N*-methylimino)	THF		494
Poly(dimethylsilyleneiminoethyleneimino)	Xylene		495
Poly(dimethylsilylene-*co*-1,3-dihydro-1,3-dimethyldisilazane) (1 : 1 to 3 : 1)	Decaline, toluene		496
	Toluene	Methanol	497

TABLE 5. MAIN-CHAIN HETEROCYCLIC POLYMERS

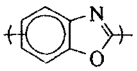
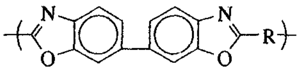
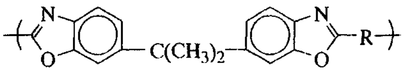
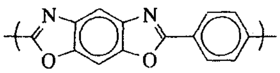
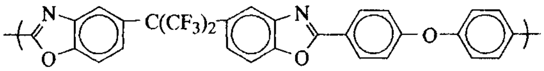
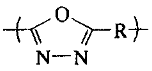
Polymer	Solvents	Nonsolvents	Refs.
5.1. POLY(BENZOXAZOLES), POLY(OXADIAZOLES), POLY(OXADIAZOLIDINES)			
Poly(benzoxazoles) 			
Poly(2,5-benzoxazolediyl)	Sulfuric acid		498
Poly(2,6-benzoxazolediyl)	Sulfuric acid		498
Poly(dibenzothiazoles)			
			499
R = 1,3-phenylene	Sulfuric acid	Organic solvents	499
R = 1,4-phenylene	Sulfuric acid	Organic solvents	499,500
R = octamethylene	*m*-Cresol, formic acid, sulfuric acid		500
R = 1,4-cyclohexylene	Sulfuric acid	Acetic acid, DMA, DMF, DMSO, formamide, NMP	501
			
R = tetramethylene	Chloroform, *m*-cresol, DMF (hot), pyridine (hot), sulfuric acid (hot), tetrachloroethane (hot), THF (hot)	Benzyl alcohol, formic acid	502
R = 1,3-phenylene	Benzyl alcohol (hot), chloroform, *m*-cresol (hot), pyridine, sulfuric acid, tetrachloroethane (hot), THF	DMF (partially), formic acid (partially)	502
R = 1,4-phenylene	Chloroform, *m*-cresol, formic acid (hot), sulfuric acid (hot)	Benzyl alcohol, DMF, pyridine, tetrachloroethane, THF	502
R = 	Polyphosphoric acid		503
R = 	DMA, NMP	Methanol	504–506
Poly(1,3,4-oxadiazoles) 			
R = octamethylene	Bzn., chloroform, *m*-cresol, dichloroethylene, DMA (hot), DMF, DMSO (hot), NMP (hot), sulfuric acid		507–509
R = methylene to eicosamethylene	DMA (hot), DMSO (hot), NMP (hot), DMSO (sw), NMP (sw) sulfuric acid (95%)		509

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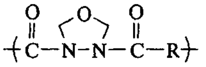
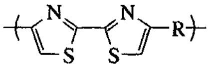
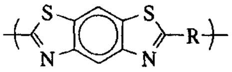
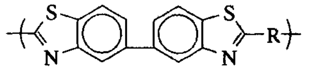
TABLE 5. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
R = 1,4-cyclohexylene	Formic acid (80%), sulfuric acid	DMA, DMSO, NMP	510
R = 1,3-cyclohexylene	DMA, DMSO, formic acid (80%), NMP, sulfuric acid		510
R = 1,2-phenylene	Sulfuric acid		511
R = 1,3-phenylene	Sulfuric acid, trifluoroacetic acid	Chloroform, *m*-cresol, DMF, nitrobenzene, tetrafluoropropanol	512–514
Poly(oxadiazolidines)			
			
R = 1,3-phenylene	DMSO	Methanol	515

5.2. POLY(DITHIAZOLES), POLY(BENZOTHIAZOLES)

Polymer	Solvents	Nonsolvents	Refs.
Poly(dithiazoles)			
			
R = 1,4-phenylene	Sulfuric acid (cold)	Diethyl ether, diphenyl ether, diphenylmethane, DMA, DMF, DMSO, ethanol, formic acid, quinoline	516
R = 1,4-phenylenehexamethylene-1,4-phenylene	Sulfuric acid (cold)		516
$M_w = 11000$	DMF (cold)		516
$M_w = 12000$	DMF (hot)		516
$M_w = 27000$		DMF (hot)	516
Poly(benzothiazoles)			
			
R = 1,4-phenylene	Methanesulfonic acid		517
R = 5-alkoxy-1,3-phenylene	Methanesulfonic acid		433
R = 1,4-bicyclo[2.2.2]octane	Methanesulfonic acid, sulfuric acid		518
R = 1,4-phenylene and 1,4-phenyleneimino-1,4-phenylene	Methanesulfonic acid, polyphosphoric acid		519
			
R = 1,3-phenylene	Conc. sulfuric acid		520
R = 3,5-pyridinediyl	Conc. sulfuric acid		520
R = 1,4-phenyleneoxy-1,4-phenylene	Conc. sulfuric acid		520
R = 1,4-phenylenecarbonyl-1,4-phenylene	Conc. sulfuric acid		520
R = 1,4-phenylene	Conc. sulfuric acid		500
R = 1,6-anthracenediyl	Sulfuric acid (partially)		521
Poly(2,6-benzothiazolediyl)	Sulfuric acid		498

5.3. POLY(IMIDES)

5.3.1. POLY(BENZIMIDES)

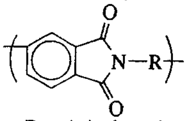
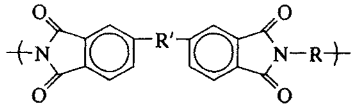
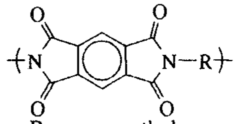
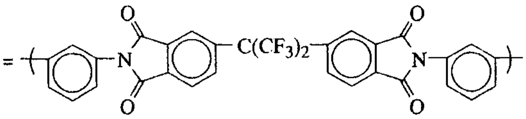
Polymer	Solvents	Nonsolvents	Refs.
			
R = 1,4-phenylenecarbonyloxyethyleneoxy-ethyleneoxycarbonyl	Methylene chloride/trifluoroacetic acid (4/1)	Methanol	522
R = poly(isobutylene)iminocarbonyl	*n*-Butyl acetate, diethyl ether	Ethanol, methanol	313
R = 1,4-phenyleneoxy-1,4-phenyleneiminocarbonyl	NMP		523
R = 4,4′-biphenylyleneiminocarbonyl	NMP/xylene		524
R = 1,4-phenylenemethylene-1,4-phenyleneiminocarbonyl	DMA, DMSO, NMP		525,539
R = 1,4-phenylenecarbonyloxymethyleneoxycarbonyl	*m*-Cresol (150°C), trichlorobenzene (reflux)		526
R = 1,4-phenyleneoxy-1,4-phenyleneiminocarbonyl	DMA	Methanol	527
R = 1,4-phenyleneoxy-1,4-phenylenecarbonylimino-1,4-phenyleneoxy-1,4-phenyleneiminocarbonyl	DMA, NMP	Methanol	528
			

TABLE 5. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
R = 1,4-phenylene R′ = 5-oxy-1,4-phenyleneisopropylidene-1,4-phenylene-5′-oxy	DMA		529
R = hexamethylene R′ = 5,5′-oxy	Conc. sulfuric acid		530
R = 2,2′-di(trifluoromethyl)-4,4′-biphenylylene R′ = 5,5′-hexafluoroisopropylidene	Acetone, chloroform, *m*-cresol		531
R = 1,4-phenyleneoxy-1,4-phenylene R′ = 5,5′-phenylphosphineoxide	NMP		532
R = 2,2′-ditrifluoromethyl-4,4′-biphenylylene R′ = 5,5′-idyl	*m*-Cresol (hot)		533
R = 1,4-phenyleneoxy-1,4-phenylene R′ = 5,5′-carbonyl	DMA		534
R = 1,3-phenylene R′ = 5,5′-oxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy	NMP		535

5.3.2. POLY(PYROMELLITIMIDES)



Polymer	Solvents	Nonsolvents	Refs.
R = nonamethylene	*m*-Cresol	Common organic solvents	13,540
R = 1,3-phenylene; 1,4-phenylene	Conc. sulfuric acid	Common organic solvents	13,540
R = 4,4′-biphenylylene	Fuming nitric acid	Common organic solvents	13,540
R = 1,4-phenylenemethylene-1,4-phenylene; 1,4-phenyleneisopropylidene-1,4-phenylene	Conc. sulfuric acid	Common organic solvents	13,540
R = 1,4-phenyleneoxy-1,4-phenylene	DMA, *N*-methylcaprolactone, fuming nitric acid	Common organic solvents	13,540, 541
amic acid	DMA, DMF, DMSO		542
R = 1,4-phenylenethio-1,4-phenylene	Fuming nitric acid	Common organic solvents	13,540
R = 1,4-phenylenesulfonyl-1,4-phenylene	Conc. sulfuric acid	Common organic solvents	13,540
R = 1,3-phenylenesulfonyl-1,3-methylene	Conc. sulfuric acid	Common organic solvents	13,540
R = pentaerythrityl	No solvent known		543
R = 4-hydroxy-1,3-phenyleneisopropylidene-4-hydroxy-1,3-phenylene	DMF, DMA, DMSO, nitrobenzene, tetramethylene sulfone		223
R = ethylidenecarbonyloxysebacoyloxy-carbonylethylidene, <40% imide	Chloroform		544
R = hexa-2,4-diyne-1,6-diyl	DMSO	W	545
R = 1,3-phenyleneoxy-1,3-phenyleneoxy-1,3-phenylene	DMA		525
R = 	DMA (partial), DMSO (partial), NMP (partial)		546

5.3.3. OTHERS

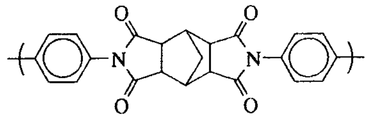
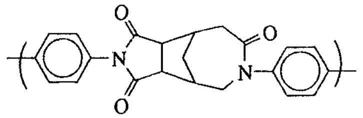
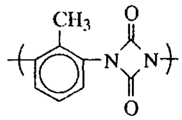
Polymer	Solvents	Nonsolvents	Refs.
	Cresol, DMA, DMF, DMSO, NMP		536
	4-Butyrolactone		537
	No known solvent		538

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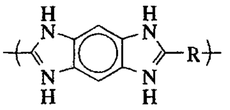
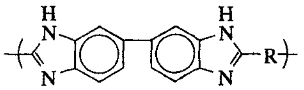
TABLE 5. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
5.4. POLY(QUINOXALINES)			
Poly(quinoxaline-2,6-diylquinoxaline-6,2-diyl-1,4-phenylene)	Sulfuric acid		547
Poly(quinoxalines) several different compositions	1,3-Dichloro-1,1,3,3-tetrafluoro-2,2-dihydroxypropane, methanesulfonic acid		548,549
5.5. POLY(BENZIMIDAZOLES)			
Poly(benzimidazoles)			



Polymer	Solvents	Nonsolvents	Refs.
R = tetramethylene	DMSO (partially), formic acid	DMF	550
R = 1,4-phenylene		DMF, DMSO, formic acid	550
R = 1,3-phenylene	Formic acid (partially)	DMF, DMSO	550
Poly(dibenzimidazoles)			



Polymer	Solvents	Nonsolvents	Refs.
R = tetramethylene to eicosane-1,20-diyl	*m*-Cresol, formic acid (85%), DMA, DMSO, NMP, conc. sulfuric acid	Glacial acetic acid, DMF (sw)	551
R = cyclohexylene	Acetic acid, *m*-cresol, DMF, DMSO, formic acid, NMP, sulfuric acid		501
R = 1,3-phenylene	DMA, DMSO, formic acid, NMP, conc. sulfuric acid	Glacial acetic acid, *m*-cresol, DMF (partially), formic acid (85%, sw)	550,551
R = 1,4-phenylene	Formic acid (2–3% soluble)	DMF, DMSO	550,551
R = 2,2′-biphenylylene	DMF, DMSO, formic acid		550,551
R = 4,4′-biphenylylene	Formic acid (partially)	DMF, DMSO	550,551
R = 3,5-pyridyenediyl	DMF (partially), DMSO, formic acid (partially)		550,551
R = 2,5-furandiyl	DMF, DMSO, formic acid (partially)		550,551
R = 1,4-phenyleneiminocarbonyl-R′-carbonylimino-1,4-phenylene; R′ = octamethylene; 1,4-phenylene; 1,3-phenylene	DMA, DMF, DMSO, NMP, conc. sulfuric acid	Glacial acetic acid (sw), *m*-cresol (sw), formic acid (sw), methanol	550,551
5.6. POLY(PIPERAZINES)			
Poly(2,5-diketo-1,4-piperazinediyl-1,4-phenylene sulfonyl-1,4-phenylene)	Dichloroacetic acid, formic acid, trifluoroacetic acid	DMA, DMF, DMSO	552
Poly(2,5-dimethyl-1,4-piperazinediylcarbonyl-1,4-phenylenesulfonyl-1,4-phenylene)	DMF, *sym*-tetrachloroethane/phenol (2/3)	Methanol, W	13
Poly(1,4-piperazinediylcarbonylethylene-1,4-phenylenephosphinylidene-1,4-phenyleneethylenecarbonyl)	Chloroform, cresol, DMF, ethanol, C-7 fluoroalcohol, formic acid, aqu. hydrochloric acid (5%)	Acetone, acetonitrile (sw), chlorobenzene, hexane	436
Poly(piperazinediylcarbonyloxy-*cis*-cyclohexyleneoxycarbonyl)	Chloroform, *m*-cresol, formic acid		323
Poly(1,4-piperazinediylcarbonyl-2,5-pyridinediylcarbonyl)	*m*-cresol, formic acid, conc. aqu. HCl, phenol, sulfuric acid		553
Poly(1,4-piperazinediyl-2-hydroxytrimethyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1-hydroxyethylene)	DMF		554
Poly(1,4-piperazinediylcarbonyl-2,5-norbornadiene-2,3-diylcarbonyl)	Chloroform, *o*-cresol	Methanol	555

TABLE 5. *cont'd*

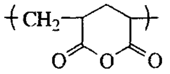
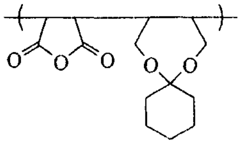
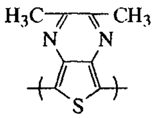
Polymer	Solvents	Nonsolvents	Refs.
5.7. POLY(ANHYDRIDES)			
Poly(maleic anhydride)	Acetic anhydride, acetonitrile, acetophenone, lower aliphatic alcohols, butanone, dioxane, DMF, ethers, ketones, nitroparaffins	Hydrocarbons, most chlorinated hydrocarbons	556
Poly(acrylic anhydride) 	DMF, DMSO	Alcohols, bzn., diethyl ether	13
Poly(methacrylic anhydride)	DMF, DMSO	Aliphatic hydrocarbons, diethyl ether, methanol, W	557,558
Poly(itaconic acid anhydride)	Acetic acid, acetone, cyclohexanone, THF	Chloroform, diethyl ether	687,700
Poly(maleic anhydride-*alt*-2-cyclohexylene-1,3-dioxepin-5-ene) 	THF	Hexenes	559
Poly(maleic anhydride-*alt*-isopropenylisocyanate)	Acetone, DMF		560
Poly(maleic anhydride-*alt*-2-propenylisocyanate)	MEK	Bzn.	561
Poly(maleic anhydride-*co*-styrene) (3 : 1)	Acetone, MEK		153
Poly(maleic anhydride-*alt*-methyl vinyl ether)	MEK, THF	Carbon tetrachloride, diethyl ether, hexane	186
Poly(maleic anhydride-*alt*-1-octadecene)	Acetone, bzn., carbon tetrachloride, ethyl acetate	Ethanol	562
Poly(maleic anhydride-*co*-*N*-vinylformamide) (1 : 1)	THF		563
5.8. POLY(THIOPHENES)			
Poly(3-alkyl-2,5-thiophenediyl)	Chloroform, methylene chloride, THF (partially)		564
Poly(3-hexyl-2,5-thiophenediyl)	THF, toluene		7
Poly(3-hexyloxycarbonyl-2,5-thiophenediyl)	Chloroform, DMF	Methanol	565
Poly(3,4-oxyethyleneoxy-2,5-thiophenediyl)	Chloroform	Methanol	566
Poly(2,5-thiophenediyl-*co*-3-undecyl-2,5-thiophenediyl) (1 : 1)	Nitrobenzene, THF	Methanol	567
Poly(3-methyl-2,5-thiophenediyl-*co*-3-oligodimethylysiloxane-2,5-thiophenediyl)	Chloroform		568
Poly(2,5-thiophenediylethylene)	THF		569
Poly(2,5-thiophenediyl-*co*-dimethylsilylene) (3 : 1 to 3 : 2)	Dimethoxyethane	Methanol	570
Poly(2,5-thiophenediyl-*co*-*N*-*n*-dodecyl-2,5-pyrrolediyl) (4 : 1)	THF		571
Poly(2,5-thiophenediyl-1,2-dimethoxyethenylene)	Chloroform	Hexane	572
Poly(2,5-thiophenediylethynylene-2,5-dioctyloxy-1,4-phenylene)	Chloroform, THF, toluene		573
Poly(2,5-thiophenediylethynylene-1,4-tetrafluoro phenyleneethynylene)	Chloroform, THF, toluene		573
Poly(thieno[3.2-b]thiophene-2,5-diyl)	Chloroform	Methanol	574
Poly(2,5-thiophenediylcarbonyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy)	Chloroform, DMA, NMP	Methanol	575–577
Poly(4,4′-diphenyl-2,2′-bisthiazole-5,5′-diyl)	Hexane	Methanol	578
	Chloroform		579
5.9. OTHERS			
Poly(2,3-dihydrofuran-3,4-diyl)	Toluene	Methanol	580
Poly(2,5-furandiylethylene)	THF		569
Poly(3,5-dicarboxytetrahydropyran-3,5-diylmethylene)	DMSO	Acetone	581

TABLE 5. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Poly(*N*-*n*-butylitaconimide)	Bzn., THF, toluene		7
Poly(*N*-phenylmaleimide)	DMF, DMSO, THF	Methanol	582
Poly(2,5-pyridinediylethenylene)	Formic acid, sulfuric acid		583
Poly(*N*-2-ethylhexyl-3,6-carbazolediylethenylene)	1 M LiCl in NMP	Methanol	584
Poly(*N*-methyleneimidazoleimide-1,5-diyl)	DMA (partially), sulfuric acid (partially)		585
Poly(3-phenyl-3,5-triazolediyl-1,4-phenyleneoxy-1,4-phenyleneisopropylidene-1,4-phenyleneoxy-1,4-phenylene)	Toluene	Methanol	586
Poly[3-(2′-pyridyl)-1,2,4-triazine-5,6-diyl-1,4-phenyleneoxy-4,4′-biphenylyleneoxy-1,4-phenylene]	Chlorobenzene, NMP	Methanol	587
Poly(3,5-pyrazolediyl-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy-1,4-phenylene)	DMA, NMP	Chloroform, methanol	588

TABLE 6. FORMALDEHYDE RESINS

Polymer	Solvents	Nonsolvents	Refs.
Aniline-formaldehyde resins			
low mol. wt.	Methylcyclohexanone	Alcohols, aniline (sw), hydrocarbons	6
high mol. wt.	No solvent known	Aniline, chlorinated hydrocarbons (sw)	6
Melamine-formaldehyde resins			
very low mol. wt.	Alcohol, W		6
intermediate mol. wt.	Dil. and conc. acids, formalin, formic acids, pyridine		6
final resin, high mol. wt.	No solvent known		6
Phenol-formaldehyde resins			
Novolaks and low mol. wt.	Acetone, diethyl ether, esters, hydrocarbons		6
4-*tert*-butylphenol and 4-phenylphenol polymers	Drying oils		6
final resins	Molten phenols (with some decomposition)	Most common organic compounds	6
fully cured resins		Dil. acids (sw), dil. alkalies (sw), alcohol, W (sw)	6
p-Toluenesulfonamide-formaldehyde resins	Alcohols, bzn., esters, ethers, ketones	Aliphatic hydrocarbons, W	6,589
Urea-formaldehyde resins			
very low mol. wt.	Alcohol, W		6
intermediate mol. wt.	Dil. and conc. acids, formalin, formic acid, pyridine		6
final resin, high mol. wt.	No solvent known		6
Phenyl glycidyl ether-formaldehyde resins, low mol. wt.	Acetone, MEK, methyl isobutyl ketone		590

TABLE 7. NATURAL POLYMERS AND MODIFIED NATURAL POLYMERS

Polymer	Solvents	Nonsolvents	Refs.
7.1. NATURAL RUBBER AND DERIVATIVES (see also 1.1)			
Natural rubber	Bzn., chlorinated hydrocarbons, cyclohexane, hydrocarbons, methyl isobutyl ketone (low mol. wt.), *n*-propyl ketone (above 14.5°C), toluene (low mol. wt.)	Acetone, alcohols, carboxylic acids	4,5,7, 591
cyclic	Aromatic and chlorinated hydrocarbons	Acetone, acids, alcohol, alkalies, diethyl ether, aliphatic hydrocarbons, oils (sw), W	6
hydrochlorinated	Chlorinated hydrocarbons	Alcohol, W	6
chlorinated	Aromatic and chlorinated hydrocarbons, hydrogenated naphthas	Conc. acids, oxidizing acids, acetone (sw), alcohol, moderately conc. alkalies, aliphatic hydrocarbons, diethyl ether (sw), W	6
dichlorocarbene modified	Chloroform	Methanol	592

TABLE 7. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
7.2. GUTTA PERCHA			
Gutta percha	Bzn., cloroform, hot petroleum ether	Alcohol, W	6
7.3. CELLULOSE AND DERIVATIVES			
7.3.1. CELLULOSE			
Cellulose	*N*-Ethylpyridinium chloride/DMF (1/1), *N*-ethylpyridinium chloride/pyridine (1/1), trifluoroacetic acid, aqu. solutions of: alkalies (ice-cold), beryllium perchlorate, calcium thiocyanate, cupriammonium hydroxide, cupriethylenediamine, sodium xanthate, tetramethylammonium hydroxide, zinc chloride/hydrochloric acid (cold), zinc chloride (hot), conc. phosphoric acid, conc. sulfuric acid. See also table on cellulose in this Handbook	Dil. aqu. alkalies, hydrocarbons, mineral oils, W (sw)	4–6, 593,594
7.3.2. CELLULOSE ETHERS			
Methyl cellulose			
SC = 3–10%	Aqu. alkalies	W	6,595
= 22–32%	Aqu. alkali, *N*-ethylpyridinium chloride/DMF, methanol/methylene chloride, W (cold)	Diethyl ether, methanol, methylene chloride, W (hot)	6,594,595
= >40%	Acetone, chloroform, cyclohexanone, esters, pyridine	Aliphatic hydrocarbons, diethyl ether, ethanol, W	6,595
Ethyl cellulose			5,6,30,
DS = 0.5–0.7	Aqu. alkali	W (cold)	595,596
= 1.0–1.5	Acetic acid, cuoxam, formic acid, pyridine, W (cold)	Ethanol	
= 2	Chloroform, chlorohydrins, dichloroethylene, ethanol, methylene chloride, THF	Alcohols, diethyl ether, esters, hydrocarbons, ketones, tetrachloroethylene, W	
= 2.3	Acetic esters, alcohols, alkyl halides, bzn., carbon disulfide, furan derivatives, ketones, nitromethane	Acetone (cold), ethylene glycol	
= 3	Alcohols, bzn., esters, methylene chloride	Carbon tetrachloride, diols, di-*n*-propyl ether, hydrocarbons, tetrahydrofurfuryl alcohol	
Isopropyl cellulose			
DS = 0.5	W (cold)	W (hot)	595
= 2.5	Acetone, butanol, bzn., chloroform, cyclohexanone, dichloroethane, dioxane, glycol formal, methyl acetate, methylcyclohexanone, THF	Ethanol, ethanol/diethylether (1/3), hydrocarbons, methanol, propanol	30
Butyl cellulose			
DS = 0.8	Polar organic solvents	Hydrocarbons, W	595
= 1.9	Aromatic hydrocarbons, polar organic solvents	Aliphatic hydrocarbons, W	595
Benzyl cellulose			
DS = 1.65	Methylene chloride, methyl ether glycol acetate, nitrobenzene	Bzn., chlorobenzene, butyl acetate	210
= 2	Acetates (< C5), acetone, bzn./acetone, bzn./alcohol, chlorobenzene, chlorohydrins, dichloroethylene, ethanol/carbon tetrachloride (1/1), MEK, methylene chloride, pyridine, tetrahydrofurfuryl alcohol, tetralin, trichloroethylene	Alcohols, (> C5), carbon tetrachloride, *o*-chlorotoluene, diethyl ether, dioxane, dipropyl ketone, hydrocarbons	6,30

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TABLE 7. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
DS = 3	Acetone, butyl acetate, chlorobenzene, chloroform, cyclohexanone, ethyl acetate, MEK	Aliphatic hydrocarbons, aromatic hydrocarbons (sw), carbon tetrachloride, diethyl ether, dioxane, ethanol	199
Hydroxyethyl cellulose			
SC = < 30%	Alkali		
= 35–55%	Ethylene chlorohydrin, DMSO, formic acid, W	Cellosolve®, hexane, methanol, toluene	597
= > 55%	Bzn./acetone, bzn./alcohol, chloroform, pyridine, esters	Acetone, bzn., methanol (sw), methyl acetate, THF	
Hydroxypropyl cellulose	Cellosolve®, dioxane, ethanol, methanol, W (< 45°C)	W (> 45°C)	597
Carboxymethyl cellulose			
SC = 5–10%	Alkali		
= 15–30%	W (sodium salt)		
= high	Acetone, bzn./acetone, bzn./alcohol, chloroform, esters, pyridine		
Cyanoethyl cellulose			6
SC = 8–12%	Alkali		
= 24–32%	W		
= > 50%	Acetone, bzn./acetone, bzn./alcohol, chloroform, esters, pyridine		
7.3.3. CELLULOSE ESTERS			
Cellulose triformate	Formic acid, pyridine		30
Cellulose acetate			
DS = 0.6–0.8	W		
= 1.3–1.7	2-Methoxyethanol	Acetone, W	595
= 2–2.3	Acetic acid (glacial), acetone, aniline, benzyl alcohol, chloroform/methanol, cyclohexanone, diethanolamine, dioxane, ethyl acetate/nitrobenzene, ethylene glycol ethers, formic acid, glycol monoethyl ether acetate, methyl acetate, methylene chloride/methanol (4/1), nitromethane, phenols, pyridine	Aliphatic ethers, hydrocarbons, weak mineral acids	4,6
Cellulose triacetate	Acetone/W (4/1), chloroform/alcohol, chloroform, dioxane, ethyl acetate, ethylene glycol ether acetates, ethylene carbonate, methyl acetate, methylene chloride/ethanol (4/1), methylene chloride, THF, trichloroethane	Acetone (partially), aliphatic hydrocarbons, aliphatic ethers, bzn., chlorobenzene, *o*-chlorotoluene, dichloroethane, ethanol (absolute), glycol ethers, methyl *i*-butyl ketone, weak mineral acids	4–6,30, 598,599
Cellulose acetate hydrogen phthalate	Acetone		32
Cellulose tripropionate	Acetone, bzn., chlorobenzene, dichloroethane, ethyl acetate	*o*-Chlorotoluene, ethanol, hydrocarbons	30
Cellulose tributyrate	Acetone, amyl acetate, bzn., chlorobenzene, chloroform, cyclohexanone, dodecane/tetralin (3/1 above 130°C), ethanol (hot), ethyl acetate, nitrobenzene, THF, xylene (hot)	2-Ethylhexanol, cyclohexane, diethyl ether, hexane, methanol	595
Cellulose tricaproate	Acetone, bzn., chlorobenzene, chloroform, cyclohexanone, diethyl ether, dioxane, DMF, ethanol (hot), ethyl acetate, glacial acetic acid (hot), hexane, nitroethane, THF, xylene	2-Hydroxyethyl acetate, formamide, methanol, nitromethane	595
Cellulose tricaprylate	DMF (above 140°C), 3-phenylpropanol (above 48°C), toluene		5
Cellulose stearate DS = 3	bzn., tetrachloroethane, toluene	Acetone, butyl acetate, dichloroethane, ethyl acetate	595

TABLE 7. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Cellulose acetate butyrate			
DS (acetate) = 0.5 DS (butyrate) = 2.35	Acetone, amyl acetate, bzn., chloroform, cyclohexanone, dioxane, esters, methanol (hot), nitroethane, tetrachloroethane, toluene (hot)	Aliphatic hydrocarbons, diethyl ether, ethanol, methanol	595
DS (acetate) = 2.1 DS (butyrate) = 0.7	Acetone, chloroform, cyclohexanone, dichloroethane, dioxane, ethyl acetate, nitroethane	Amyl acetate, bzn./methanol (1/4 and 4/1), carbon tetrachloride, diethyl ether, ethanol, hydrocarbons, methanol, W	595
Cellulose tricarbanilate	Acetone, bzn., chloroform, dioxane, DMF, *N*-ethylpyridinium chloride/DMSO (1/1), *N*-ethylpyridinium chloride/pyridine (1/1), pyridine, THF	Methanol, W	7,594, 595
Propyl cellulose benzoate	Acetone, bzn., chloroform, dioxane, DMA, ethyl acetate, pyridine, TMF, toluene, xylene		600
Hydroxypropyl cellulose perfluorooctanoate DS = 3 (ester), DS = 4 (ether)	Acetone	Ethanol	601
7.3.4. CELLULOSE NITRATE AND SULFATE			
Cellulose nitrate			
N = 6.8%	W		602
N = 10.5–12%	Acetic acid (glacial), acetone, alcohol/diethyl ether, alcohol (lower), amyl acetate, ethylene glycol ethers	Higher alcohols, higher carboxylic acids, higher ketones, tricresyl phosphate	4,6,595
N = 12.7%	Acetone, cyclohexanone, ethanol/diethyl ether, ethyl lactate, ethyl butyrate, ethylene carbonate, ethylene glycol ether acetates, furan derivatives, halogenated hydrocarbons, methyl acetate, methyl amyl ketone, nitrobenzene	Dil. carboxylic acids, aliphatic hydrocarbons, aromatic hydrocarbons (sw), diethyl ether, ethylene glycol, higher alcohols (sw), lower alcohols, W	4–6,595
Cellulose sulfate, sodium salt			
DS = 1	W	Ethanol	595
7.4. STARCH AND DERIVATIVES			
Amylose	Ethylenediamine, *N*-ethylpyridinium chloride/pyridine (1/1), DMSO, nitromethane, W (hot), aqu. KOH, aqu. KCl (0.33 M, above 25°C)	*n*-Butanol, diethyl ether	5,7,363,594,595,603
Amylose acetate DS = 2	Chloroform, methyl acetate, nitromethane	W	5
Amylose tricarbanilate	Acetone, dioxane, pyridine		5
Amylopectin	W, W/butanol	Acetone, diethyl ether, ethanol	604
Benzyl amylose DS = 3	Bzn., chloroform, dioxane, DMF, DMSO, THF	Ethanol, methanol, W	605
Starch	Liquid ammonia, aqu. sol. of cupriethylenediamine, fused chloral hydrate, *N*-ethylpyridinium chloride/pyridine (1/1), W (hot, pressure)	Alkali (sw), diethyl ether, W (sw)	6,363, 594,595
Starch, methyl ether			
DS = 0.5–2	W (cold)	W (hot)	595
DS = 3	Chloroform		595
7.5. OTHER POLY(SACCHARIDES)			
Alginic acid	Aqu. alkalies, aqu. sodium carbonate, W (sparingly)	Dil. acids, aqu. calcium salt solutions, hydrophilic organic compounds (sw), hydrophobic organic compounds	6,363
alkali and ammonium salts	Aqu. alkali, W	Organic hydrophobic compounds	6
magnesium and ferrous salts	W	Organic hydrophobic compounds	

TABLE 7. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
calcium salts	Weak aqu. alkali	Organic hydrophobic compounds, W	
copper, zinc, aluminum salts	Aqu. ammonium hydroxide	Organic hydrophobic compounds, W	
beryllium, chromium, ferric salts		Aqu. alkali, organic hydrophobic compounds	
ι-Carrageenan	W		694
Chitin	Formic acid, conc. mineral acids (degrad.)	Dil. acids, organic solvents	363
Chitosan	Acetic acid, W (pH <6.5)		606
N-[(3′-hydroxy-2′,3′-dicarboxy)ethyl]chitosan	W		607
Glycogen	Dil. trichloroacetic acid	Alcohol	363
Gum arabic	W (warm)	Alcohol	363
Gum tragacanth, Tragacanthin, tragacanthic acid	W	Acetone, alcohol	363
2,3-Di-O-benzyl-(1,5)-α-D-furanan	*o*-Dichlorobenzene (hot)	Acetone, cyclohexanone, ethyl acetate, hexane, methanol	608
Heparin	Dil. alkali solution, alkaline solution of ammonium sulfate, W	Acetic acid, acetone, alcohol	363
Konjac glucomannan	W		609
Pectin	Dil. acids, W	Alcohol	363
Pullulan	W		609
Xanthan gum	W		610
7.6. NATURAL RESINS			
Colophony	Acetone, aromatic hydrocarbons (partially), carbon tetrachloride, chloroform, diethyl ether, ethanol, ethyl acetate, methanol	Aliphatic hydrocarbons	30
Copal	Acetone (25–90%)[a], bzn. (35–60%)[a], carbon tetrachloride (15–40%)[a], chloroform (30–90%)[a], diethyl ether (10–90%)[a], ethanol (20–100%)[a], hydrocarbons (10–55%)[a], methanol (20–70%)[a]		30
Shellac	Acetone (50–80%)*, bzn. (10–20%)[a], carbon tetrachloride (5–15%)[a], chloroform (25–40%)[a], diethyl ether (10–25%)[a], ethanol (85–98%)[a], methanol (100%)	Aliphatic hydrocarbons	30
Zein	Aqu. alcohols, glycols, DMF		32

[a] Percentage soluble, depending on source.

TABLE 8. INORGANIC POLYMERS

Polymer	Solvents	Nonsolvents	Refs.
Poly(phosphorus nitrile chloride)	Bzn., carbon tetrachloride, chloroform, cyclohexane	Aliphatic hydrocarbons	611
Poly(sodium-*m*-phosphate)	Aqu. sol. of LiCl, NaCl or NH_4Cl	Acetone, ethanol, W	612
Poly(tri-*n*-butyl tin fluoride)	Aliphatic hydrocarbons		259
Poly(phosphoryldimethylamide)	Carbon tetrachloride (hot), W	Acetone	613
Poly(2,5-selenienylene)	Chloroform, THF	Methanol, W	614
Poly[η^5-(vinylcyclopentadienyl)tricarbonylmethyltungsten]	Bzn., chloroform, THF	Hexane	615
Poly(*n*-dibutyl stannane)	Chloroform, THF, toluene	Methanol	616

TABLE 9. POLY(ELECTROLYTES)

Polymer	Solvents	Nonsolvents	Refs.
Poly(allyammonium chloride)	W	Methanol	617
Poly(allylammonium phosphate)	HCl, W	Methanol, W	617
Poly(diallyldimethylammonium chloride)	W		618
Poly(benzyltrimethylammonium chloride)	W		32
Poly(diallyldimethylammonium chloride-*co*-*N*-isopropylacrylamide), (2 : 98)	W		619
Poly(sodium trimethyleneoxyethylenesulfonate)	DMSO, W	Bzn., hexane	620
Poly[dimethyldodecyl(2-acrylamidoethyl) ammonium bromide]	W		701
Poly(4-*N*-butylpyridiniumethylene bromide)	Benzyl alcohol, DMSO, nitromethane, W	Bzn., hexane	621
Poly(2-*N*-methylpyridiniumethylene iodine)	Methanol, W	Methylene chloride	687
Poly(*N*-methylpyridinium-2,5-diylethenylene)	DMF, DMSO, NMP, W		583
Poly(4,4′-bipyridiniumdiyl-*N*,*N*′-decamethylene dibromide)	DMF/methanol, W	*tert*-Butyl methyl ether	622
Poly(1,4-pyridiniumdiyl-*N*,*N*′-tetramethylene-4,1-pyridiniumdiylethenylene methylsulfate)	Ethanol	Ethyl acetate	623
Poly(2,6-diphenyl-1,4-pyridiniumdiyl-*N*,*N*′-1,4-phenylene-4,1-pyridiniumdiyl-1,4-phenylene)	DMA, DMF, DMSO, NMP	Diethyl ether	624
Poly[ethyldipropargyl-4-sulfobutyl ammonium betaine]	Formic acid, W	Hexane, methanol, THF, toluene	625

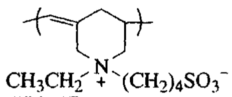

TABLE 10. BLOCK COPOLYMERS

(alphabetically listed)

Polymer	Solvents	Nonsolvents	Refs.
Poly(*t*-butyl methacrylate)-b-polystyrene-b-poly(*t*-butyl methacrylate) (1 : 6 : 1)	Dioxane	Hexane	626
Poly(*t*-butyl methacrylate)-b-poly(oxytetramethylene)-b-poly(butyl methacrylate) (2 : 6 : 2 to 4 : 2 : 4)	Toluene		627
Poly(butyl acrylate)-b-poly[3-(pentamethyldisiloxy)propyl methacrylate] (3 : 1)	THF		628
Poly(butyl vinyl ether)-b-poly(2-ethyloxazoline)	Chlorobenzene, THF	Hexanes	629
Poly(2-cinnamoylethyl methacrylate)-b-poly(acrylic acid) (4 : 5)	Methanol, methylene chloride	Isopropanol/hexane (3/7)	630
Poly(ε-caprolactone)-b-poly(oxytetramethylene)-b-poly(ε-caprolactone) (4 : 2 : 4 to 1 : 3 : 1)	THF, toluene		631
Poly(dimethylsiloxane)-b-poly(6-aminohexanoic acid) (1 : 2)	2,2,2-Trifluoroethanol		632
Poly(2-ethyl-2-oxazoline)-b-poly(lactic acid) (3 : 2 to 2 : 4), Poly(*N*-proponyliminoethylene)-b-poly(oxy-1-oxo-2-methylethylene)	Chlorobenzene	Hexane	633
Poly(3-hydroxybutyric acid)-b-poly(ε-caprolactone) (3 : 5 to 2 : 1)	Chloroform	Methanol	634
Polyisobutylene-b-poly(α-methylstyrene) (9 : 1)	Chloroform	Methanol	635
Poly(methacrylic acid)-b-polystyrene-b-poly(methacrylic acid) (1 : 8 : 1)	Dioxane	Hexane	626
Poly(3-methyl-2,5-thiophenediyl)-b-poly(2-vinylpyrrolidone)	Anisole		636
Poly(oxy-2,2-di(chloromethyl)trimethlylene)-b-poly(oxytetramethylene)-b-polyoxy-2,2-di(chloromethyl)trimethylene (7 : 86 : 7)	Methylene chloride		637
Poly(oxytetramethylene)-b-poly(ε-caprolactone) (1 : 4)	THF, toluene		638
Polystyrene-b-polybutadiene-b-polystyrene) (7 : 86 : 7 to 15 : 70 : 15)	Toluene		639
Polystyrene-b-poly(*tert*-butyl methacrylate) (2 : 3 to 4 : 1)	Dioxane	Hexane	626
Polystyrene-b-poly(dimethylsiloxane) (1 : 1)	THF	Methanol	350
(1 : 9 to 7 : 3)	Bzn./2-methoxyethyl ether, dioxane	Methanol, W	640

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TABLE 10. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
Polystyrene-b-poly(ethylene/butylene)-b-polystyrene (1 : 8 : 1 to 1 : 3 : 1)	Toluene		641,642
Polystyrene-b-poly(ethylene/propylene) (3 : 7)	THF		643
Polystyrene-b-(*N*-ethyl-2-ethynylpyridinium trifluoromethanesulfonate) (8 : 1)	Diethyl ether/petroleum ether (1/1), THF		644
Polystyrene-b-poly(hexyl isocyanate) (1 : 4)	Carbon tetrachloride, chloroform, toluene		645
Polystyrene-b-poly(hydroxyethyl methacrylate) (2 : 3)	DMF, THF		646
Polystyrene-b-polyisoprene (1 : 1)	Dioctyl phthalate		647
Polystyrene-b-polyisoprene-b-polystyrene (1 : 12 : 1 to 2 : 1 : 2)	MEK/isobutyl isobutyrate, methylcylcohexane/methylene chloride (3/2), methyl amyl ketone, methylene chloride, xylene		639, 548–650
Polystyrene-b-poly(methyl methacrylate) (7 : 3)	Toluene		7,698
Polystyrene-b-poly(methylphenylsiloxane) (3 : 2)	Cyclohexane		651
Polystyrene-b-poly(methyl vinyl ether) (2 : 1)	Methylene chloride		652
Polystyrene-b-poly(4-vinylpyridine) (5 : 1)	THF	Hexanes	653
Polystyrene-b-poly(2-vinylpyridine) (1 : 1 to 6 : 1)	Bzn.	Hexane/methanol (8/2)	654
Polystyrene-b-poly(vinylpyridine) (1 : 1)	THF	Hexane	655
Polypropylene-b-poly(methacrylic acid) (2 : 1)	Dioxane, THF, toluene	Methanol	653,626

TABLE 11. DENDRIMERS

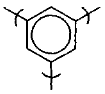
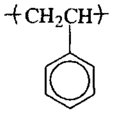
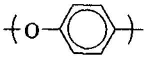
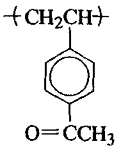
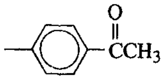
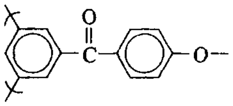
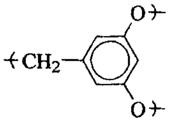
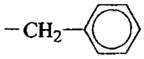
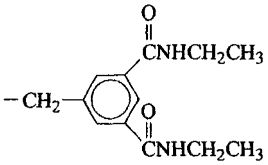
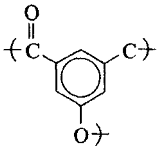
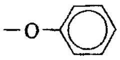
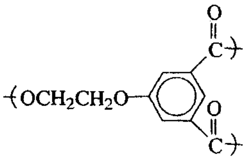
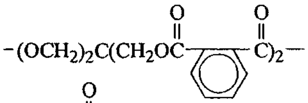
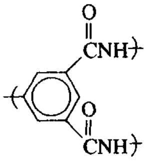
Polymer	Solvents	Nonsolvents	Refs.
$-\!(OCH_2CH_2)\!-$ $-OH$	DMSO, methanol, THF (partially), W		656
$-\!(OCHO)\!-$, $CH_2O\!-$			
$-CH_3$	THF		657
$-\!(OC(=O)C(CH_3)(CH_2\!-)(CH_2\!-)$			
$-OCH_3$	Methylene chloride, most organic solvents	Hexane, W	658,684
$-OH$	Acetone, DMSO		689
$-\!(OC(=O)CH_2CH_2)_2NCH_2CH(CH_3)\!-$			
$-(CH_2CH_2CH(CH_3)_2)_2$	Toluene		659
$-\!(CH_2CH_2NHCH_2CH_2N<$ hyperbranched	Lower alcohols, ethyl acetate, W	Hydrocarbons	683
$-NH_2$	Alcohol, glycols, W		660
$-CN$	Acetone, chloroform		
$-\!(N(CH_2CH_2C(=O)NHCH_2CH_2)_2\!-$			
$-NH_2$	W		661,685
	THF, toluene	Methanol	662
	Bzn., chloroform, cyclohexane, methylene chloride		287

TABLE 11. *cont'd*

Polymer	Solvents	Nonsolvents	Refs.
			
—I	THF	Methanol	663
			
	THF	Methanol	664
			
—OH, —F	DMF, NMP, THF		665
			666,667
	Chloroform	Methanol	668
$-\overset{O}{\overset{\Vert}{C}}OCH_2CH_3$	THF	Methanol	669
	THF		
	Ethyl acetate, chloroform, DMF, DMSO, methylene chloride, THF, toluene		670
—OH	DMF, DMSO, THF		671
	Methylene chloride		524
			
—OH	THF	Diethyl ether, W	672
	DMF		673
	NMP, THF		695

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Specific Refractive Index Increments of Polymers in Dilute Solution*

S. Michielsen
School of Textile and Fiber Engineering, Georgia Institute of Technology, Atlanta, GA, USA

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A. INTRODUCTION

This section presents a compilation of the specific index of refraction increments, $\nu = dn/dc$, of polymer solutions. This table has been updated since the third edition. The trend of using $\lambda_0 = 633$ nm from the HeNe laser continues and thus the 633 nm data has been given its own column in this compilation. As in the previous edition, most copolymer data has not been included.

Perhaps the most significant change since the previous edition is the coupling of size exclusion chromatography (SEC) with multiple detectors, largely eliminating the need for ν for obtaining molecular weights. In addition, the measurement of the specific refractive index increment has become so routine that many authors no longer report the results of these measurements. These two factors combine to reduce the number of new entries to a mere 46 new references and about 160 new entries.

Finally, the excellent introduction written by Huglin for the third edition has been retained in its entirety and follows this brief introduction.

B. INTRODUCTION FROM THE THIRD EDITION

This is the limiting value at $c = 0$ of the quantity $(n - n_0)/c$, where n and n_0 are the refractive indices of the solution and solvent, respectively, and c (g/ml) denotes the concentration of the polymer in solution. Conditions of constant pressure p, constant temperature T, and a fixed wavelength of light in vacuum, λ_0, are implied. Specific refractive index increments are required to determine the weight-average molecular weight, $\overline{M}_w$, of a polymer and the second virial coefficient, A_2, of a polymer in solution, using the light scattering equation.

$$\frac{K^*c}{R_\Theta} = \frac{1}{\overline{M}_w P(\Theta)} + 2A_2c \qquad (A1)$$

where

$$K^* = K(n_0\nu)^2 \quad \text{and} \quad K = 2\pi^2/N_A\lambda_0^4 \qquad (A2)$$

Here, c is the concentration of the polymer in solution (g/ml) R_Θ (cm^{-1}) is the reduced intensity at an angle Θ, $P(\Theta)$, is the particle scattering function, A_2 is expressed in mol cm^3/g^2, N_A (mol^{-1}) is the Avogadro number. Because

* Based on a table by M. B. Huglin in the 3rd ed. of the Polymer Handbook.

ν appears as a squared term, an error of $E\%$ in ν will result in an error of $2E\%$ in the derived molecular weight, and consequently an accurate determination of ν is imperative. Examination of reported data discloses that about 20 different values of λ_0 have been used by different workers, this increase over the earlier more restricted number being due to growing use of various laser light sources. The values of the constant K appropriate to nine common values of λ_0 are as follows:

$10^7 \times \lambda_0$ (cm)	$10^6 \times K$ (cm^{-4} mol)
366	18.3
403	12.4
436	9.07
488	5.78
514	4.69
546	3.69
578	2.94
633	2.04
1086	0.236

For a copolymer comprising monomers A and B or a terpolymer comprising units A, B and C, the specific increment is an additive function of the composition of the polymer expressed in terms of weight fractions w. Thus,

$$\nu = w_A\nu_A + w_B\nu_B \tag{A3}$$

$$= w_A\nu_A + w_B\nu_B + w_C\nu_C \tag{A4}$$

Equations (A3) and (A4) have been verified with copolymer samples of known composition (5,6). In studies on terpolymerization, Kambe and Honda (7,897) have found that the value of ν, from monomer feeds other than the azeotropic composition, changes with conversion, on account of a composition distribution. On the other hand, a constant value of ν, independent of conversion, is yielded for the azeotropic case in which feed and polymer have the same composition. When ν_A and ν_B differ appreciably in a given solvent, Eq. (A3) affords a convenient means of estimating composition from the measured value of ν. If this is not the situation, it is possible to introduce changes in the specific increment by using mixed solvents. The appropriate specific increment to be utilized in light scattering is then ν_μ, that is, one at constant potential of low molecular weight solvent. ν_μ is measured after dialysis equilibrium between solution and pure mixed solvent. ν and ν_μ allow one to obtain the coefficient of preferential adsorption γ_1 (ml/g) of the liquid (solvent 1) in the binary solvent mixture, which has a greater affinity for the polymer:

$$\gamma_1 = (\nu_\mu - \nu)/(\mathrm{d}n_0/\mathrm{d}\phi_1) \tag{A5}$$

In Eq. (A5), $\mathrm{d}n_0/\mathrm{d}\phi_1$ is the variation of the refractive index of the mixed solvent, with its composition expressed in terms of the volume fraction ϕ_1 of liquid 1.

For a copolymer derived from A and B, light scattering always yields the true value of the molecular weight M if $\nu_A = \nu_B$. However, it is not possible to derive the molecular weights M_A and M_B of the constituent portions or the heterogeneity parameters P and Q. If $\nu_A \neq \nu_B$, an apparent value of M is obtained. Tuzar et al. (8) have summarized the criteria for the most sensitive characterization of a copolymer:

Quantity to be determined	Criterion
M	ν_A and ν_B both large and of same sign; or $\nu_A = \nu_B$
M_A	ν_A large and $\nu_B = 0$
M_B	ν_B large and $\nu_A = 0$
Q	$\nu = 0$

Normally, these conditions cannot be satisfied by using single solvents alone, and recourse must be made to using mixed solvents and employing ν_μ, $(\nu_A)_\mu$, and $(\nu_B)\mu$ of the appropriate composition to satisfy them.

The concentration dependence of ν is expressed by the coefficient a_2, in Eq. (A6).

$$(n - n_0)/c = \nu + a_2 c \tag{A6}$$

Lorimer (1) has derived an expression for coefficient a_2 in terms of n_0, ν, and the concentration dependence of the partial specific volume of the polymer in solution, $\bar{v}_2$. However, within the range of c normally used to measure v, the value of a_2 is usually close to zero. Expressions have also been formulated for v in terms of n_0, v_2, and the refractive index of the polymer in solution, n_2. These afford an indirect means of obtaining $\bar{v}_2$ from an experimental value of v (see Refs. 2–5). Actually $\bar{v}_2$ can now be measured to a very high level of accuracy with the Kratky digital densimeter, provided there is an appreciable difference between the densities of polymer and solvent. The main uncertainty or difficulty lies in the value of n_2, when one wishes to calculate ν via $\bar{v}_2$.

1. Measurement and Calibration

Experimental methods and refinements have been summarized elsewhere (4). The main approaches are given below.

Interferometry In this absolute method, light beams of identical geometrical paths traverse two different optical paths and the number (f) of displaced fringes is measured by an optical compensator. If l is the length of the troughs, $(n - n_0)$ is given by

$$(n - n_0) = f\lambda_0/l \tag{A7}$$

When $(n - n_0)$ is very small, for example, in extremely dilute solutions, the accuracy can be enhanced by increasing the trough length. A range of troughs of different lengths is normally available with a commercial instrument. The slope of a plot f versus c, when multiplied by (l/λ_0),

yields the value of ν. Baltog et al. (10) have developed an improved cell which prevents the formation of a liquid film at the central surface with the trough, thus enabling accurate measurements to be made with volatile liquids.

Differences in the dispersion of the refractive index of the solvent and the solute can lead to discontinuities in the plot of f versus c. This problem can be overcome by measuring f for a large number of solutions of gradually increasing concentration, i.e., by the dropwise addition of concentrated polymer solution to pure solvent (5,11).

Differential Refractometry This relies on the image displacement ΔX of beams from the light source, which traverse pure solvent and polymer solution in a divided cell. Adequate temperature control is necessary and it is essential to utilize a stoppered cell to prevent solvent "creep". The method is not an absolute one and necessitates calibration with solutions of accurately known $(n - n_0)$, so that the calibration constant k can be determined for the apparatus:

$$k = (n - n_0)/\Delta X \tag{A8}$$

In Eq. (A8), n is the refractive index of the solution of calibrant, and n_0 that of the solvent. The value of k decreases slightly with increase in λ_0 and must therefore be re-determined if measurements are to be conducted at a different wavelength. A selection of useful calibration data (all involving aqueous solutions) has been gathered from several sources in the literature and is given in Section C. The Brice–Phoenix differential cell is satisfactory for liquids having refractive indices not in excess of about 1.60. At higher values than this, the slit image disappears from the field of vision because of total reflection in the glass partition dividing the cell. Kratochvil and Babka (9) have described a useful modification whereby the partition is replaced with glass of a higher refractive index. This extends the useful range of the different refractometers so that even such highly refractive liquids as 1-bromonaphthalene can be accomodated.

The calibration data at $\lambda_0 = 436$ nm for aq. KCl in Section C have been fitted by Abdel–Azim and Huglin (676) to the following polynomial in which C is the concentration expressed is g salt/100 g water

$$(n - n_0) \times 10^6 = 1.862 + 1415.8C - 17.699C^2 + 0.428C^3$$

Some light scattering and refractometric data relating to wavelengths different from those in Section C have been summarized elsewhere (833). The most common light source for recent light scattering studies is probably the He–Ne laser affording $\lambda_0 = 633$ nm. At this λ_0, directly measured specific refractive index increments for certain aqueous salt solutions have been reported. On the assumption of direct proportionality between $(n - n_0)$ and concentration, these may be represented as follows for $\lambda_0 = 633$ nm and C in g salt/100 g water (Ref. 942):

$$\text{Aq. } NH_4HO_3 \quad (n - n_0) \times 10^6 = 1239C$$
$$\text{Aq. KCl} \quad (n - n_0) \times 10^6 = 1371C$$
$$\text{Aq. NaCl} \quad (n - n_0) \times 10^6 = 1766C$$

Also, for $\lambda_0 = 1086$ nm and C expressed in g salt/100 ml solution, the following holds at 20°C (Ref. 943):

$$\text{Aq. KCl} \quad (n - n_0) \times 10^6 = 1351C$$

Mandel and coworkers (722) have calibrated the Chromatix differential refractometer for $\lambda_0 = 633$ nm and have also indicated the range over which ΔX is directly proportional to $(n - n_0)$. Values of the latter quantity were interpolated to $\lambda_0 = 633$ nm via a Cauchy dispersion from the values at other wavelengths in Section C. Within the interval $3.6 > C > 0.46$ g salt/100 g water, the following polynomial was found for aq. NaCl at 633 nm

$$(n - n_0) \times 10^6 = 1735C - 27C^2 + C^3$$

Abbreviations/Symbols Used

Arochlor	(approximately) Chlorinated diphenyl
(B)	Branched polymer
Cadoxen	Triethylenediamine cadmium hydroxide
Calgon	Sodium hexametaphosphate
Cuoxam	Cuprammonium hydroxide
Cuoxen	Cupriethylenediamine hydroxide
DCA	Dichloroacetic acid
DMA	*N*,*N*-Dimethylacetamide
DMSO	Dimethyl sulfoxide
DN	Degree of neutralization (also α)
DS	Degree of substitution
EDTA	Ethylenediamine tetraacetic acid
FeTNa	Iron–tartaric acid–sodium complex solution
Freon 113	1-Fluorodichloro-2-chlorodifluoroethane
GHCl	Guanidine hydrochloride
Halothane	1,1,1-Trifluoro-2-chloro-2-bromoethane
HEMA	2-Hydroxyethyl methacrylate
HMP	Hexamethyl phosphoramide
I	Ionic strength
M	Relative molar mass (M) or molarity (M), according to context
MEK	Methyl ethyl ketone
MMA	Methyl methacrylate
TEAB	Tetraethyl ammonium bromide
TFP	2,2′,3,3′-Tetrafluoropropanol
THF	Tetrahydrofuran
Versene	Sodium salt of EDTA
(μ)	Specific increment measured at dialysis equilibrium

C. REFRACTOMETRIC CALIBRATION DATA

	Concentration			$(n - n_0)$ ($\times 10^6$)			
Solute	(g/100 ml solution)	(g/100 g water)	Temp. (°C)	436 nm	546 nm	578 nm	589 nm
NaCl	0.0938	0.09412	25	173	166	165	165
	0.1034	0.1037	25	190	184	182	182
	0.3362	0.3375	25	614	592	588	587
	0.5602	0.5627	25	1019	982	976	974
	0.6866	0.6900	25	1246	1202	1194	1191
	0.9090	0.9142	25	1645	1586	1576	1572
	1.1240	1.1311	25	2028	1956	1943	1939
	1.6465	1.6595	25	2954	2848	2830	2824
	2.0327	2.0513	25	3634	3504	3481	3474
	3.7307	3.7854	25	6583	6345	6306	6293
	6.7405	6.9092	25	11673	11247	11174	11151
NH_4NO_3	0.07878	0.07906	25	103.5	98.77	–	97.73
	0.1671	0.1677	25	218.9	208.9	–	206.7
	0.3433	0.3450	25	448.5	428.0	–	423.5
	1.0314	1.0408	25	1336	1275	–	1262
	2.8884	2.9479	25	3702	3531	–	3494
	5.8417	6.0732	25	7410	7066	–	6992
Na_2SO_4	0.09566	0.09595	25	153.1	151.0	–	150.5
	0.2198	0.2205	25	349.0	344.1	–	343.0
	0.2686	0.2694	25	425.3	419.3	–	417.9
	0.3939	0.3952	25	620.1	611.5	–	609.4
	0.7508	0.7536	25	1168	1151	–	1148
	1.2640	1.2693	25	1940	1913	–	1906
	1.5417	1.5488	25	2352	2319	–	2311
	2.5322	2.5471	25	3796	3744	–	3731
	5.7875	5.8500	25	8309	8195	–	8168
$SrCl_2$	0.08474	0.08506	25	159.8	155.1	–	154.1
	0.1749	0.1755	25	328.5	318.9	–	316.7
	0.2430	0.2437	25	455.5	442.2	–	439.1
	0.3580	0.3591	25	669.2	649.6	–	645.1
KCl	0.0696	0.0699	25	100	96	96	96
	0.1067	0.1070	25	153	148	147	146
	0.2799	0.2812	25	399	386	383	382
	0.5964	0.5994	25	845	817	812	810
	1.0794	1.0869	25	1521	1469	1460	1457
	1.4911	1.5037	25	2093	2022	2009	2005
	2.9821	3.0250	25	4135	3994	3969	3962
	3.9969	4.0703	25	5500	5314	5281	5271
	4.4732	4.5647	25	6136	5926	5890	5879
	5.9642	6.1217	25	8105	7828	7781	7766
	6.4680	3.6526	25	8763	8465	8414	8398
Sucrose	0.100	0.100	20	–	–	–	140
	–	–	28	–	–	–	140
	0.200	0.200	20	–	–	–	290
	–	–	28	–	–	–	290
	0.300	0.301	20	–	–	–	430
	–	–	28	–	–	–	430
	0.400	0.402	20	–	–	–	580
	–	–	28	–	–	–	570
	0.500	0.502	20	–	–	–	720
	–	–	28	–	–	–	720
	0.600	0.604	20	–	–	–	860
	–	–	28	–	–	–	860
	0.701	0.705	20	–	–	–	1010
	–	–	28	–	–	–	1000
	0.801	0.806	20	–	–	–	1150
	–	–	28	–	–	–	1140
	0.902	0.9082	20	–	–	–	1300
	–	–	28	–	–	–	1290
	1.002	1.010	20	–	–	–	1440
	–	–	28	–	–	–	1430
	1.506	1.523	20	–	–	–	2160

Solute	Concentration (g/100 ml solution)	(g/100 g water)	Temp. (°C)	$(n - n_0)$ (× 10^6) 436 nm	546 nm	578 nm	589 nm
	–	–	28	–	–	–	2150
	2.012	2.041	20	–	–	–	2890
	–	–	28	–	–	–	2870
	3.030	3.093	20	–	–	–	4340
	–	–	28	–	–	–	4300
	3.52	–	25	5100	5000	–	–
	4.056	4.167	20	–	–	–	5810
	–	–	28	–	–	–	5760
	5.089	5.263	20	–	–	–	7280
	–	–	28	–	–	–	7220
	6.14	–	25	8900	8800	–	–
	7.181	7.527	20	–	–	–	10270
	–	–	28	–	–	–	10190
	8.240	8.696	20	–	–	–	11780
	–	–	28	–	–	–	11680
	9.306	9.890	20	–	–	–	13300
	–	–	28	–	–	–	13190
	10.6	–	25	15400	15200	–	–
	16.3	–	25	23600	23200	–	–

D. TABLES OF SPECIFIC REFRACTIVE INDEX INCREMENTS OF POLYMER SOLUTIONS

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Solvent	d*n*/d*c* (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	*T* (°C)	Refs.
1.1. POLY(DIENES)							
Poly(1,3-butadiene)	Benzene		0.011				57
		0.0117	0.0086			20	58
		0.022	0.021			25	647
	Bromoform		−0.115				58
	1-Bromonaphthalene		−0.185				58
	Chloroform		0.083				58
	Cyclohexane	0.144					59,60
		0.126	0.118				61
pure 1,4		0.121	0.113			25	62
pure 1,2		0.092	0.087			25	62
	Diethyl ketone	0.156				25	63
	n-Heptane	0.151	0.141				61
	THF		0.132				57
hydroxyl terminated and	Chloroform	0.092	0.087			25	859
acetyl terminated	Chloroform	0.096	0.093			37	859
	Cyclohexane			0.106		20	835
	Cyclohexane	0.127	0.118			25	647
98% *cis* 1,4	Cyclohexane			0.111		30	836
98% *trans* 1,4	Cyclohexane			0.110		30	836
7% vinyl-99% vinyl	Cyclohexane			0.110–0.087		30	836
high 1,4; $M = 0.96 \times 10^3$	Cyclohexane			0.094–0.111		30	836
to 90.6×10^3	Cyclohexanone		0.081			25	647
	1,2-Dichloroethane	0.092	0.088			25	647
hydroxyl terminated and	*n*-Heptane	0.157	0.150			25	859
acetyl terminated	Hexane	0.177	0.169			35	859
	Isobutyl acetate	0.149	0.143			20.5	859
	MEK	0.165	0.159			26	859
	5-Methyl-2-hexanone	0.125	0.120			12.6	859
	3-Pentanone	0.145	0.139			10.3	859
	THF			0.130		23	830
	Toluene	0.034	0.031			25	647

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TABLE 1. *cont'd*

		dn/dc (ml/g)					
Polymer	Solvent	$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Poly(chloroprene)	*n*-Butyl acetate	0.146				25	64
	Carbon tetrachloride	0.0976				25	64
	trans-Decalin	0.0799				25	64
		0.0820				40	64
		0.0777				10	64
	MEK	0.160				25	64
		0.162	0.156			25	65
					0.152		66
	THF				0.138		66
Poly(cyclopentadiene)	Benzene		0.0394			21	67
	Carbon tetrachloride		0.125			21	67
Poly(isoprene)							
97.8% *cis* 1,4	Benzene	0.0143	0.0194			20	58
73–80% *cis* 1,4	Bromobenzene		−0.041			20	73
Poly(isoprene) anionically polymerized	Carbon tetrachloride			0.082		25	964
	Chloroform	0.100	0.095			25	68
73–80% *cis* 1,4	*o*-Chlorotoluene		−0.003			20	73
73–80% *cis* 1,4	Cyclohexane		0.104			20	73
70–75% *cis* 1,4			0.1034			23	34
trans		0.117					59
cyclic			0.131				74,75
		0.1305	0.1238			25	69
			0.124			27	69
			0.117			7	69
	Cyclohexene	0.0988	0.0943			25	68
		0.0992	0.0947			27	68
		0.0953	0.0909			17	68
		0.0914	0.0869			7	68
(non-extracted)			0.145			20	70
(extracted)			0.0946			20	70
	Decalin	0.0669	0.0605			25	69
73–80% *cis* 1,4	*n*-Hexane		0.168			20	73
		0.1886	0.1802			25	68
73–80% *cis* 1,4	Methyl isobutyl ketone		0.139			20	73
cyclic	THF		0.156				73,74
cis 1,4			0.128			20	70
			0.128			20	70
		0.160 (calc.)				19–21	71
70–75% *cis* 1,4	Toluene		0.0308			35	34
73–80% *cis* 1,4			0.028			20	73
		0.0308	0.0339			25	68
chlorinated	MEK	0.131				35	72
synthetic high *cis*	Chloroform	0.104	0.100			25	655
natural hevea		0.106	0.104			25	655
natural guayule		0.108	0.101			25	655
	Cyclohexane	0.117				35	704
				0.106		20	835
trans 1,4					0.117	30	838
star branched				0.104–0.113		25	833
93% 1,4- $M = 0.9 \times 10^3 - 10.1 \times 10^3$				0.093–0.105		25	833
93% 1,4- $M \geq 19.5 \times 10^3$				0.106		25	833
synthetic high *cis*	*n*-Hexane	0.192	0.191			25	655
natural hevea		0.200	0.198			25	655
natural guayule		0.198	0.193			25	655
	THF			0.124		20	835
synthetic, high *cis*		0.153	0.148			25	655
natural hevea		0.160	0.156			25	655
natural guayule		0.157	0.153			25	655
synthetic	Toluene	0.030	0.028			25	655
natural hevea		0.034	0.032			25	655
natural guayule		0.033	0.030			25	655
Poly(trichlorobutadiene)	Benzene				0.06	25	76

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
1.2. POLY(ALKENES)							
Poly(1-butene)	*n*-Nonane	0.092				35	13
		0.108				80	13
isotactic	1-Chloronaphthalene	−0.206	−0.187			135	867
					−0.183 (578)	135	867
				−0.177		135	867
	Cyclohexane		0.074			25	621
	Cyclohexane/*n*-propanol						
	(10/90, v/v)		0.068			35	767
			0.072			35	767
	(20/80, v/v)		0.072			35	767
	(30/70, v/v)		0.075			35	767
	(35/65, v/v)		0.079			35	767
	1,2,4-Trichlorobenzene	−0.120	−0.108		−0.127 (403)	135	867
				−0.103	−0.105 (578)	135	867
Poly(ethylene)	Biphenyl		−0.174			123.2	14
	Bromobenzene	−0.101	−0.089		−0.107 (403)	135	863
				−0.083	−0.085 (578)	135	863
B		−0.095	−0.083		−0.101 (403)	135	863
B				−0.078	−0.080 (578)	135	863
B							
	1-Bromonaphthalene		−0.208			135	863
				−0.205	−0.207 (578)	135	863
B			−0.210			135	863
B					−0.208 (578)	135	863
B				−0.206		135	863
B	*o*-Chlorobenzene			−0.076		135	863
	1-Chloronaphthalene		−0.195			65–80	15
			−0.199			90	16,17
			−0.198			90	18
			−0.197			100	19
			−0.188			105	20,21
			−0.195			110	19
			−0.1957			114	23
			−0.193			120	19
			−0.192			125	24
			−0.195			125	25,18
			−0.191			125	16
			−0.214			125	26
		−0.245				125	27
			−0.1967			127	23
			−0.1955			128	23
			−0.191			130	19
$M_n =$ 12300			−0.1931			135	22
13500			−0.1929			135	22
18300			−0.1932			135	22
25200			−0.1916			135	22
110000			−0.1883			135	22
112000			−0.1879			135	22
			−0.190			135	17,28
			−0.1956			139	23
			−0.1961			140	23
			−0.191			140	25
			−0.189			140	19
			−0.1967			145	23
			−0.187			150	19
			−0.1943			151	23
			−0.193			115	832,917
			−0.192			120	931
			−0.191			125	931
			−0.191			127	610

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
		−0.215	−0.192	−0.183	−0.188 (578)	135	863,867
			−0.192			135	866
			−0.191			135	932
			−0.193			135	832,917,934
			−0.196			135	631
			−0.188 to −0.193			135	815,914
			0.195 to −0.192			135	933
increase with *M*			−0.193 to −0.188			135	914
B		−0.212	−0.189			135	863,867
B				−0.178	−0.184 (578)	135	863,867
B			−0.190			140	935,936
			−0.196			145	934
				−0.177		145	864
			−0.195				937,938
	n-Decane		0.0881			65	15
			0.0890			70	15
			0.0901			75	15
			0.0917			80	15
			0.0870			111	23
			0.0881			114	23
			0.095			115	24
			0.0915			120	23
			0.0922			125	23
			0.0937			130	23
			0.0955			138	23
			0.0971			139	23
			0.0985			143	23
			0.0979			146	23
			0.0995			149	23
		0.114	0.113		0.114 (404)	106	632
					0.112 (577)	106	632
		0.121	0.117		0.119 (404)	106	632
					0.116 (577)	106	832
		0.126	0.121		0.123 (404)	106	832
					0.120 (577)	106	832
		0.132	0.126		0.130 (404)	106	832
					0.124 (577)	106	832
		0.117	0.114		0.119 (403)	135	863
				0.112	0.113 (578)	135	863
B		0.120	0.118		0.122 (403)	135	863
B				0.116	0.117 (578)	135	863
B							
			0.098			140	935
	p-Dibromobenzene	−0.179	−0.162		−0.184 (403)	135	863
				−0.155	−0.159 (578)	135	863
B		−0.176	−0.159		−0.182 (403)	135	863
B				−0.153	−0.157 (578)	135	863
B							
	o-Dichlorobenzene		−0.078			120	939
			0.078			120	29
				−0.056		135	864
		−0.095	−0.083		−0.101 (403)	135	863
				−0.078	−0.080 (578)	135	863
B		−0.091	−0.081		−0.099 (403)	135	863
B					−0.078 (578)	135	863
	Diphenyl		−0.174			123	939
		−0.202	−0.176		−0.215 (403)	127	863
				−0.166	−0.172 (578)	127	863
B		−0.199	−0.173		−0.212 (403)	127	863
B				−0.165	−0.169 (578)	127	863
B							
		−0.195	−0.172		−0.209 (403)	135	863
				−0.163	−0.168 (578)	135	863

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
B		− 0.192	− 0.167		− 0.207 (403)	135	863
B				− 0.158 (633)	− 0.163 (578)	135	863
B							
	Diphenylmethane	− 0.146	− 0.129		− 0.155 (403)	142	863
			− 0.126			142	866
				− 0.126	− 0.127 (578)	142	863
B		− 0.135	− 0.120		− 0.142 (403)	142	863
B				− 0.116	− 0.118 (578)	142	863
B							
	1-Dodecanol	0.048	0.046		0.049 (403)	137	863
				0.045	0.046 (578)	137	863
B		0.049	0.047		0.050 (403)	137	863
B				0.047	0.047 (578)	137	863
B							
	1-Methylnaphthalene	− 0.206	− 0.177		− 0.220 (403)	135	863
				− 0.167	− 0.172 (578)	135	863
B		− 0.199	− 0.170		− 0.211 (403)	135	863
B				− 0.159	− 0.164 (578)	135	863
B							
	Paraffin oil	− 0.001	− 0.001		− 0.001 (403)	135	863
			–	− 0.001	− 0.001 (578)	135	863
B		0.001	0.001		0.001 (403)	135	863
B				0.001	0.001 (578)	135	863
B							
	Tetralin		− 0.075			120	931
			− 0.074			125	931
			− 0.094			125	940
			− 0.094			129	941
		− 0.087	− 0.077		− 0.091 (403)	135	863
				− 0.074	− 0.075 (578)	135	863
B		− 0.085	− 0.075		− 0.089 (403)	135	863
B				− 0.071	− 0.073 (578)	135	863
B							
			− 0.0834			50	15
			− 0.0811			80	15
		0.104				81.5	30,20
		− 0.0887	− 0.075			81.5	25
			− 0.0910			95	23
			− 0.0918			95	23
			− 0.0903			100	23
			− 0.893			104	23
		− 0.0805	− 0.0691			105	25
			− 0.100			105	21*
			− 0.078			105	29*
			− 0.072			105	29*
			− 0.083			105	29*
			− 0.088			110	23
			− 0.0866			116	23
			− 0.0858			119	23
			− 0.075			125	15
			− 0.0837			128	23
			− 0.0813			138	23
			− 0.0801			144	23
	1,2,4-Trichlorobenzene		− 0.106			135	631
					− 0.109 (488)	135	746,900
		− 0.125	− 0.116		− 0.130 (403)	135	863,867
				− 0.107	− 0.108 (578)	135	863,867
				− 0.104		135	864
			− 0.111			135	866
B		− 0.177	− 0.105		− 0.122 (403)	135	863,867
B				− 0.102	− 0.103 (578)	135	863,867

*Values reported erroneously as positive in these references.

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
B							
increase with *M*			−0.109 to −0.106			135	914
M_n = 2000			−0.1085			135	22
18400			−0.1085			135	22
34000			−0.1082			135	22
77000			−0.1073			135	22
110000			−0.1063			135	22
Poly(hexene-1)	Cyclohexane	−0.063				25	858
	Toluene	−0.042				25	858
Poly(isobutylene)	Benzene	−0.007				25	956
	Cyclohexane		0.105			20	31
					0.099	25	32
	Cyclohexane	0.067				25	872
	Cyclohexane	0.0285 + 2.08 × 10^{-4} *T* (K)	0.0198 + 2.29 × 10^{-4} *T* (K)				956
	Cyclohexane	0.0991	0.0966			25	957
	1-Chloronaphthalene	−0.146	−0.131			135	867
	Decalin	0.043	0.0374			25	33
	n-Decane		0.1036			35	34
	Dibutyl ether		0.124			22.5	35
			0.167			120	35
	n-Heptane		0.135			25	36
		0.140				25	37
		0.1422				25	38
	n-Hexane	0.1008				25	38
		0.155				25	872
	Isoamyl isovalerate	0.1066				15	38
		0.1091				25	38
		0.1129				40	38
	Isooctane	0.140				25.5	39
					0.135	25	32
			0.139			25	40
				−0.122	−0.128 (578)	135	867
	Toluene	0.001				25	872
	1,2,4-Trichlorobenzene	−0.066	−0.054		−0.070 (403)	135	867
				−0.051	−0.053 (578)	135	867
Poly(1-octene)	Bromobenzene		−0.105			30	41
trans-poly(pentenamer)							
	n-Hexane	0.175	0.171			25	894
Poly(propylene)	Benzene		−0.0497			25	42
	Bromobenzene		−0.1125			40	42
			−0.0599			25	43
	n-Butyl chloride		−0.1082			25	43
	n-Butyl propionate		0.1101			25	43
	Carbon tetrachloride		0.0112			25	43
	1-Chloronaphthalene	−0.228	−0.227			125	44
			−0.195			140	25
		−0.227				145	27
		−0.231				145	45
isotactic			−0.189			125	46
			−0.188			140	28,47
		−0.2275	−0.2157			145	48
		−0.195	−0.184		−0.200 (365)	150	49
	Cyclohexane		0.0570			25	42
	Decalin				0.023	120	50
isotactic	*n*-Heptane	0.1105				30	51
syndiotactic		0.1077				30	52
	n-Hexane		0.1152			25	42
	Methylcyclohexane		0.0652			25	42
	Toluene		−0.0368			25	42
			−0.0027			25	43
	p-Xylene		−0.0380			25	43
atactic	1-Chloronaphthalene	−0.211	−0.188	−0.177	−0.183 (578)	135	867

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
isotactic		−0.205	−0.184	−0.173	−0.180 (578)	135	867
atactic	1,2,4-Trichlorobenzene	−0.123	−0.111		−0.130 (403)	135	867
				−0.105	−0.109 (578)	135	867
isotactic		−0.121	−0.107		−0.128 (403)	135	867
				−0.102	−0.105 (578)	135	867
				−0.092 to −0.094		145	646
Poly(1-phenyl-1-propyne)	Toluene	0.1861	0.1656			25	979
	Cyclohexane	$0.264 + 5.3 \times 10^{-4}$(T°C-30)	$0.234 + 4.7 \times 10^{-4}$(T°C-30)			30–45	979
Poly(trifluorochloroethylene)	Mesitylene		0.026			145	53
Poly(vinylcyclohexane)	Cyclohexane		0.101			25	305
	Cyclohexane/dioxane (50.1/49.9, v/v)		0.103			25	305
	Cyclohexane/MEK (64.6/35.4, v/v)		0.138			25	305
	Decalin/dioxane (50.6/49.4, v/v)		0.078			25	305
	Decalin/MEK (59.7/40.3, v/v)		0.075			25	305
	n-Heptane/dioxane (56.8/43.2, v/v)		0.147			25	305
	n-Heptane/MEK (82.6/17.4, v/v)		0.167			25	305
	n-Hexane		0.170			25	305
	THF		0.131			25	305
1.3. POLY(ACRYLIC ACID) AND DERIVATIVES							
Poly(acrylamide)	Acetic acid	0.199	0.194	0.192		25	627
	DMSO	0.091	0.089	0.089		25	627
	Ethanolamine	0.093	0.089	0.088		25	627
	Ethylene glycol		0.177			25	657
			0.095–0.110			25	657
			0.084			25	620
		0.117	0.113	0.111		25	627
	Formamide	0.109	0.109	0.109		25	627
		0.103				30	898
			0.127			65	928
	Formic acid	0.172	0.169	0.166		25	627
	Aq. 1% LiCl				0.181	25	928
	Aq. 5% LiCl		0.110			65	928
	Aq. 1 M $Mg(ClO_4)_2$		0.165			25	728
	Aq. 2.8 M $Mg(ClO_4)_2$		0.145			25	728
	Aq. 3 M $Mg(ClO_4)_2$		0.138			25	728
	Aq. 1 M NaCl		0.175			RT	674
	Aq. 1 M NaCl		0.175 (μ)			20	714
	Aq. 1 M NaCl			0.156–0.159		25	926
	Aq. 0.2 M NaCl	0.186	0.182			20	714
	Aq. 0.2 M NaCl		0.172 (μ)			20	714
	Aq. 0.1 M NaCl		0.17			20	929
	Aq. 0.1 M NaCl				0.164		927
	Aq. 1 M $NaNO_3$	0.182				30	899
	Aq. 0.02 M Na_2SO_4			0.1869		25	980
	Water	0.185	0.182			20	714
					0.149	20–65	77
			0.163				78
					0.195 (589)	30	79
					0.179		80
			0.173 (μ)			20	714
		0.167	0.160		0.172 (405)	25	639
					0.157 (579)	25	639
			0.187			25	657
			0.183			25	728
			0.170			25	845
			0.169			25	785
			0.162			25	657

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
			0.161			25	804
				0.183		25	926
		0.18				25	888
					0.165		927
		0.193	0.187	0.185		25	627
				0.146		23	924
				0.142		23	925
On aging	Water		0.197–0.326			25	620
containing carboxyl groups							
	Water			0.149 (488)		53.7	604
Poly[*N*-(1,1-dimethyl-3-imidazolylpropyl)acrylamide]							
	0.01 M Tetrabutyl-ammonium	0.209				25	944
Poly(acrylic acid)							
DN = 0.102, I = 0.10	Aqueous NaCl	0.158				30	85
0.335, 0.10		0.179				30	85
0.994, 0.10		0.261				30	85
	Dioxane				0.090	25	86
					0.088	25	86
	HCl 0.1 N				0.140 (589)		87
	0.2 N				0.146	20–65	77
	Water				0.137		80
			0.156			25	617
	Water/dioxane (90/10, v/v)		0.160			25	617
			0.112 (μ)			25	617
	(80/20, v/v)		0.164			25	617
			0.105 (μ)			25	617
	(60/40, v/v)		0.171			25	617
			0.119 (μ)			25	617
	(50/50, v/v)		0.174			25	617
			0.117 (μ)			25	617
	(40/60, v/v)		0.178			25	617
			0.117 (μ)			25	617
	(35/65, v/v)		0.166			25	617
			0.112 (μ)			25	617
	(30/70, v/v)		0.159			25	617
			0.101 (μ)			25	617
	(25/75, v/v)		0.141			25	617
			0.079 (μ)			25	617
	(10/90, v/v)		0.204			25	617
			0.138 (μ)			25	617
	(5/95, v/v)		0.092			25	617
			0.075 (μ)			25	617
	(1.5/98.5, v/v)		0.078			25	617
			0.084 (μ)			25	617
–, lithium salt	Methanol $\alpha = 0$			0.191		20	743
	0.04			0.198		20	743
	0.09			0.199		20	743
	0.21			0.233		20	743
	0.40			0.235		20	743
	0.60			0.251		20	743
	0.69			0.224		20	743
–, sodium salt	Water		0.231			25	617
	Water/dioxane (90/10, v/v)		0.246			25	617
			0.126 (μ)			25	617
	(80/20, v/v)		0.258			25	617
			0.100 (μ)			25	617
	(60/40, v/v)		0.238			25	617
			0.073 (μ)			25	617
	(50/50, v/v)		0.219			25	617
			0.082 (μ)			25	617
	(40/60, v/v)		0.203			25	617
			0.069 (μ)			25	617

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(30/70, v/v)		0.184			25	617
			0.066 (μ)			25	617
	(20/80, v/v)		0.223			25	617
	Aq. 0.3 M NaCl				0.159 (μ) (488)	25	678
	Aq. 1 M NaCl				0.152 (μ) (488)	25	678
DN = 0.2	Aq. NaBr (M = 0.01, 0.025, 0.1)	0.128 (μ)				25	711
DN = 0.2	(M = 0.5)	0.122 (μ)				25	711
DN = 0.6	(M = 0.01, 0.025, 0.1)	0.156 (μ)				25	711
DN = 0.6	(M = 0.5)	0.138 (μ)				25	711
DN = 1	(M = 0.01, 0.025, 0.1)	0.183 (μ)				25	711
DN = 1	(M = 0.5)	0.166 (μ)				25	711
DN = 1	(M = 1.5)	0.140 (μ)				25	711
Poly(benzyl acrylate)	Benzene	0.062	0.062			20	6
	DMF	0.124	0.119		0.132 (365)	20	6
					0.118 (578)	20	6
					0.117 (589)	20	6
					0.116 (644)	20	6
	MEK	0.1760				20	88
		0.1746	0.1665			20	6
		0.1746	0.1665		0.1653 (578)	20	5
					0.1647 (589)	20	5
					0.1623 (644)	20	5
Poly(*n*-butyl acrylate)	Acetone	0.112				20	89
	Benzene		− 0.0292			30	84
	Chlorobenzene		− 0.0525			30	84
	Cyclohexanone				0.021 (488)	30	729
	Dioxane				0.043 (488)	30	729
	n-Hexane		0.0885			30	84
	MEK				0.088 (488)	30	729
	THF		0.0651			30	84
			0.062				803
	Toluene		− 0.0239			30	84
Poly(*tert*-butyl acrylate)	MEK		0.0818			25	90
Poly(1,1-dihydroperfluoro-butyl acrylate)	Benzotrifluoride				0.30	25	91
					0.0311	25	91
Poly(*N*,*N*-dimethyl-acrylamide)	Methanol				0.194	25	83
	Water				0.150	25	83
Poly(ethyl acrylate)	Acetone		1.107			25	10,92,93
		0.109				20	89
	Benzene		− 0.042			25	10
	Chloroform		0.0363			25	10
	Cyclohexanone				0.017 (488)	30	729
	Dichloroethane		0.23			25	10
	Dioxane		0.036			25	10,93
					0.045 (488)	30	729
	DMF		0.032			25	10
	Ethyl acetate		0.0916			25	10
	MEK	0.0870	0.0856		0.0854 (578)	20	5
					0.088 (488)	30	729
					0.0853 (589)	20	5
					0.0852 (644)	20	5
			0.086			25	10,93
			0.1407			30	94
	n-Methylpyrrolidone		− 0.027			25	10
	Water				0.131	25	95
Poly(2-ethylhexyl acrylate)	Butanone	0.101					982
	n-Heptane	0.096					982
	Tetrahydrofuran	0.070					982
	Toluene	− 0.040					982
	Chlorobenzene	− 0.072					982
Poly(isopropyl acrylate) isotactic, syndiotactic and atactic	Bromobenzene	− 0.103	− 0.0870			60	101

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TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) λ_0 = 436 nm	λ_0 = 546 nm	λ_0 = 633 nm	Others	T (°C)	Refs.
isotactic and atactic	TFP		0.124			25	101
Poly(methyl acrylate)	Acetone	0.113				20	89
	Acetonitrile	0.120	0.118			25	96
		0.121	0.119			32	96
		0.122	0.120			40	96
		0.123	0.122			48	96
		0.123				30	96
		0.127	0.125			56	96
	Benzene	−0.019				30	97
	o-Chlorophenol	−0.056				30	916–918
	m-Cresol	−0.035				30	916–918
	1,2-Dibromoethane	−0.0606	−0.560			25	96
		−0.0598	−0.0528			32	96
		−0.0578	−0.0532			40	96
		−0.0579	−0.0523			48	96
		−0.062				30	916–918
	Dioxane	0.0503	0.0497			25	96
		0.052				30	96
		0.055				30	97
		0.0524	0.0515			32	96
		0.0533	0.0526			40	96
		0.0547	0.0537			48	96
		0.0566	0.0562			56	96
	Ethyl acetate	0.0940	0.0920			19.5	96
		0.0989	0.0967			25	96
		0.0967	0.0964			32	96
		0.100				30	96
		0.102				35	98
		0.102	0.101			40	96
		0.105	0.103			48	96
	Isoamyl acetate	0.077				30	97
	MEK	0.090				RT	99
		0.0938	0.0923		0.0921 (578)	20	5
					0.0919 (589)	20	5
					0.0915 (644)	20	5
		0.097				30	97,100
		0.090				35	72
	TFP	0.126				30	916–918
	TFP/*o*-chlorophenol						
	(10/90, v/v)	−0.050				30	916–918
		−0.050 (μ)				30	916–918
	(26/74, v/v)	−0.014				30	916–918
		−0.004 (μ)				30	916–918
	(32/68, v/v)	−0.005				30	916–918
		−0.016 (μ)				30	916–918
	(40/60, v/v)	0.004				30	916–918
		0.029 (μ)				30	916–918
	(50/50, v/v)	0.043				30	916–918
		0.064 (μ)				30	916–918
	(70/30, v/v)	0.075				30	916–918
		0.123 (μ)				30	916–918
	(90/10, v/v)	0.102				30	916–918
		0.135 (μ)				30	916–918
	Toluene	−0.009				30	97
Poly(*n*-octadecyl acrylate)	Benzene		−0.0505			30	84
			−0.0269			30	84
			−0.0363			30	84
	n-Butyl acetate		0.0883			30	84
	Carbon tetrachloride		0.0114			30	84
	Chlorobenzene		−0.0682			30	84
			−0.0489			30	84
			−0.0563			30	84
	Cyclohexane		0.0175			30	84
	n-Hexane		0.1096			30	84
			0.1292			30	84

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	THF		0.0702			30	84
			0.0898			30	84
			0.0723			30	84
	Toluene		– 0.0425			30	84
Poly(phenyl acrylate)	MEK	0.183				30	634
Poly(*n*-propyl acrylate)	MEK		0.1102			30	94
Poly(trimethylammoniumethyl chloride acrylate)							
	Aq. 1 M NaCl		0.154			RT	674

1.4. POLY(METHACRYLIC ACID) AND DERIVATIVES

Polymer	Solvent	$\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
Poly(allyl methacrylate)	Carbon tetrachloride				0.0508 (589)	25	982
Poly(benzyl methacrylate-*co*-cyclohexylmethyl methacrylate) (1/1, (mol/mol)							
	Di-isobutyl ketone				0.123	12	922
Poly(*N*-*tert*-butylacrylamide)	Methanol	0.249	0.234				81
			0.234			20	82
Poly(*n*-butyl methacrylate)	Acetone	0.1249	0.1236		0.1257 (366)	25	105
		0.122				20	89
	Benzene	– 0.023	– 0.014			25	106
		– 0.024	0.015			25	107
	Bromobenzene	– 0.084	– 0.073			25	106,107
	Bromoform	– 0.129	0.118			25	106
	n-Butyl chloride	0.085				25	911
	Carbon tetrachloride	0.026	0.027			25	106
	m-Cresol/*n*-heptane (30/70, v/v)		0.155			25	789
			0.358 (μ)			25	789
	DMF			0.016		20	769
	Isopropanol	0.102	0.102			23	108
		0.1059				20	109
		0.1066				23.7	109
		0.1068				25	109
		0.1076				31	109
		0.1097				45	109
	MEK	0.103	0.102			25	106,107
		0.1059	0.1046		0.1064 (366)	25	105
			0.104			23	108
				0.097		20	869
			0.100			25	807
	TFP		0.169			25	789
				0.067		20	869
	Toluene			– 0.024		20	869
		– 0.017				25	911
Poly(*tert*-butyl methacrylate)	*n*-Butyl acetate				0.09		110
Poly(*p*-*tert*-butylphenyl methacrylate)	Acetone				0.183		111
	Chloroform/THF (90/10, v/v)				0.110	25	665
					0.107 (μ)	25	655
	(70/30, v/v)				0.120	25	665
					0.100 (μ)	25	665
	(50/50, v/v)				0.130	25	665
					0.129 (μ)	25	665
	(30/70, v/v)				0.133	25	665
					0.206 (μ)	25	655
	(10/90, v/v)				0.164	25	665
					0.266 (μ)	25	655
	Water/THF (2/98, v/v)				0.142	25	796
					0.124 (μ)	25	796
	(4/96, v/v)				0.208	25	796
					0.143 (μ)	25	796
	(7/93, v/v)				0.177	25	796
					0.194 (μ)	25	796
	(9/91, v/v)				0.192	25	796
					0.205 (μ)	25	796

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Poly(cetyl methacrylate)	Benzene				0.02		112
	n-Butyl acetate	0.095				25	113
	Carbon tetrachloride				−0.015		112
	n-Heptane				0.114	21	112
Poly(2-chloroethyl methacrylate)	THF			0.096		30	749
Poly(4-chlorophenyl methacrylate)	Benzene		0.0758			25	114
Poly(cyclohexyl methacrylate)	*n*-Butyl alcohol		0.098			25	762
	n-Butyl chloride	0.116				25	911
	Cyclohexane		0.0845			25	115
	Toluene	0.019				25	911
Poly(decahydro-β-naphthyl methacrylate)	Cyclohexane		0.104			25	856
Poly(*n*-decyl methacrylate)	Cyclohexane			0.054		30	744
	Ethyl acetate	0.115				25	744
Poly-[2-(2-diethylaminoethoxy)ethyl methacrylate]	Methanol			0.163		RT	680
Poly(dimethylaminoethyl methacrylate)	Methanol			0.157		RT	680
Poly(*N*,*N*-dimethylaminoethyl methacrylate *N*-oxide)	Aq. 0.1 M NaCl			0.119		25	679
Poly(*n*-docosyl methacrylate)	*o*-Dichlorobenzene	0.102	0.090			25	116
	Tetralin	0.094	0.084			25	116
		0.0935				29	116
		0.093	0.082			35	116
		0.091	0.081			50	116
		0.088	0.077			65	116
		0.084	0.070			75	116
		0.076	0.068			85	116
	THF	0.0745	0.0745			25–48	116
	n-Amyl acetate	0.090				31	744
	Cyclohexane			0.054		30	744
Poly(2-ethylbutyl methacrylate)	Isopropanol	0.109	0.105			25	117
	MEK	0.104	0.102			25	117
Poly(ethyl methacrylate)	*n*-Butyl chloride	0.087				25	911
	Ethyl acetate	0.109					122
	Ethyl acetate/ethanol (1/4.5 – 1/6, v/v)	0.113					122
	MEK		0.104			23	123
			0.101			25	807
	MEK/isopropanol (1/7, v/v)		0.107			23	123
	Methyl cellusolve		0.075			25	807
	Toluene	−0.009				25	911
Poly(*n*-hexyl methacrylate)	MEK	0.105	0.105			23	124
	Isopropanol	0.108	0.106			32.6	124
Poly(2-hydroxyethyl methacrylate)	2-Chloroethanol		0.048			25	616
	DMF		0.076			25	807
			0.076				120
	Dioxane/water (90/10, v/v)		0.083			25	119
			0.066 (μ)			25	119
	(80/20, v/v)		0.086			25	119
			0.071 (μ)			25	119
	(60/40, v/v)		0.095			25	119
			0.100 (μ)			25	119
	(40/60, v/v)		0.108			25	119
			0.120 (μ)			25	119
	(20/80, v/v)		0.123			25	119
			0.130 (μ)			25	119
	Ethanol/water (80/20, v/v)		0.124			25	119
			0.121 (μ)			25	119

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(70/30, v/v)		0.121			25	119
			0.119 (μ)			25	119
	(60/40, v/v)		0.120			25	119
			0.120 (μ)			25	119
	(40/60, v/v)		0.123			25	119
			0.127 (μ)			25	119
	(30/70, v/v)		0.125			25	119
			0.132 (μ)			25	119
	Formamide		0.045				120
	n-Heptane/*m*-cresol (50/50, v/v)		0.033			25	698
	(50/50, v/v)		0.361 (μ)			25	698
	Methanol		0.162				120
	Methanol/HEMA (25/75, v/v)		0.078			25	726
	(25/75, v/v)		0.070 (μ)			25	726
	(35/65, v/v)		0.090			25	726
	(35/65, v/v)		0.081 (μ)			25	726
	(50/50, v/v)		0.110 (μ)			25	726
	(50/50, v/v)		0.093 (μ)			25	726
	(62.5/37.5, v/v)		0.120			25	726
			0.107 (μ)			25	726
	(75/25, v/v)		0.135			25	726
			0.122 (μ)			25	726
	(87.5/12.5, v/v)		0.151			25	726
			0.140 (μ)			25	726
	2-Methoxy ethanol		0.091				769
	Methyl cellusolve		0.095			25	807
	n-Propanol/dioxane						
	(85/15, v/v)		0.105			25	119
			0.108 (μ)			25	119
	(70/30, v/v)		0.100			25	119
			0.103 (μ)			25	119
	(60/40, v/v)		0.096			25	119
			0.097 (μ)			25	119
	(40/60, v/v)		0.091			25	119
			0.090 (μ)			25	119
	(30/70, v/v)		0.087			25	119
			0.086 (μ)			25	119
	n-Propanol/water (95/5, v/v)		0.110			25	121
			0.105 (μ)			25	121
	(90/10, v/v)		0.113			25	121
			0.105 (μ)			25	121
	(80/20, v/v)		0.115			25	121
			0.106 (μ)			25	121
	(75/25, v/v)		0.103 (μ)				120
	(70/30, v/v)		0.119			25	121
			0.109 (μ)			25	121
	(60/40, v/v)		0.122			25	121
			0.110 (μ)			25	121
	(50/50, v/v)		0.125			25	121
			0.123 (μ)			25	121
	(40/60, v/v)		0.128			25	121
			0.138 (μ)			25	121
	(30/70, v/v)		0.131			25	121
			0.149 (μ)			25	121
	(20/80, v/v)		0.135			25	121
			0.153 (μ)			25	121
	TFP/HEMA (50/50, v/v)		0.105			25	726
			0.083 (μ)			25	726
	Toluene/methanol (42/58, v/v)		0.101			25	118
			0.063 (μ)			25	118
	Toluene/isopropanol		0.087			25	118
	(38/62, v/v)		0.064 (μ)			25	118

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Water/2-chloroethanol						
	(80/20, v/v)		0.031			25	616
			0.131 (μ)			25	616
	(72/25, v/v)		0.046			25	616
			0.127 (μ)			25	616
	(70/30, v/v)		0.023			25	616
			0.120 (μ)			25	616
	(60/40, v/v)		0.015			25	616
			0.101 (μ)			25	616
	(50/50, v/v)		0.016			25	616
			0.103 (μ)			25	616
	(40/60, v/v)		0.020			25	616
			0.091 (μ)			25	616
	(20/80, v/v)		0.034			25	616
			0.066 (μ)			25	616
	Water/Hema						
	(20/80, v/v)		0.068			25	726
			0.049 (μ)			25	726
			0.069			30	726
			0.051 (μ)			30	726
			0.071			40	726
			0.053 (μ)			40	726
			0.074			50	726
			0.055 (μ)			50	726
			0.076			60	726
			0.057 (μ)			60	726
			0.079			70	726
			0.059 (μ)			70	726
	(60/40, v/v)		0.103			25	726
			0.143 (μ)			25	726
			0.104			30	726
			0.144 (μ)			30	726
			0.107			40	726
			0.147 (μ)			40	726
			0.109			50	726
			0.149 (μ)			50	726
			0.111			60	726
			0.151 (μ)			60	726
			0.114			70	726
			0.154 (μ)			70	726
Poly [1(2-hydroxyethyl)pyridinium methacrylate]], benzenesulfonate							
	Aq. 0.5 M KBr		0.178			25	818
		0.136 (μ)	0.129 (μ)			25	813
	0.5 M KCl		0.178			25	818
		0.122 (μ)	0.117 (μ)			25	813
	1M KCl		0.174			25	818
		0.118 (μ)	0.114 (μ)			25	813
	2 M KCl		0.167			25	818
		0.113 (μ)	0.108 (μ)			25	813
	3M KCl		0.161			25	818
		0.104 (μ)	0.100 (μ)			25	813
	1.86 M KSCN		0.119 (μ)			25	813
	0.05 M NaF	0.123 (μ)	0.118 (μ)			25	813
	0.05 M NaI		0.183			25	818
			0.155 (μ)			25	818
	4 M NaI		0.121			25	818
			0.119 (μ)			25	818
Poly [1(2-hydroxyethyl)pyridinium methacrylate], toluenesulfonate							
	Benzyl alcohol		0.039			25	813
	Benzyl alcohol/methyl-α-naphthyl ether (45/55, v/v)		0.000			25	813
	DMF		0.130			25	813

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Ethanol		0.182			25	813
	Aq. 0.5 M KBr		0.181			25	813
			0.129 (μ)			25	818
	0.5 M KCl		0.182			25	813
		0.121 (μ)	0.114 (μ)			25	813,818
	1 M KCl		0.178			25	813
		0.117 (μ)	0.111 (μ)			25	813,818
	2 M KCl		0.171			25	813
		0.109 (μ)	0.105 (μ)			25	813,818
	3 M KCl		0.163			25	813
		0.100 (μ)	0.097 (μ)			25	813,818
	Methanol		0.209			25	813
	Methanol + 0.5 M LiCl		0.205			25	813
	0.5 M NaF		0.186			25	813
	4 M NaI		0.121			25	813
			0.116 (μ)			25	818
	7 M NaI		0.072			25	813
	n-Propanol		0.159			25	813
	Tetrahydrofurfuryl alcohol		0.106			25	813
	TFP		0.196			25	813
	Water		0.187			25	813
Poly[1(2-hydroxyethyl)trimethylammonium methacrylate], benzene sulfonate							
	Aq. 0.5 M KCl		0.101 (μ)			25	813
Poly[1(2-hydroxyethyl)trimethylammonium methacrylate], toluene sulfonate							
	Aq. 0.5 M KCl		0.095 (μ)			25	813
Poly(*N*-2-hydroxypropyl methacrylamide)							
	Aq. 0.1 M KCl		0.166			25	755
Poly(isobutyl methacrylate)	Acetone	0.122	0.117			25	103,104
	n-Butyl chloride	0.084				25	911
	Toluene	−0.021				25	911
Poly(isooctyl methacrylate)	*n*-Heptane				0.109		168
Poly(*n*-lauryl methacrylate)	*n*-Amyl alcohol	0.0744	0.0781				125
	n-Butyl acetate	0.092	0.090			23	126
	Isopropyl acetate	0.107	0.104			13	126
Poly(methacrylamide)	Aq. 0.4 M Mg perchlorate		0.180			25	775
			0.180 (μ)			25	775
	Water				0.209	20–65	77
Poly(methacrylic acid)	Water		0.175			25	628
	Water/dioxane (95/5, v/v)		0.170			25	628
			0.179 (μ)			25	628
	(90/10, v/v)		0.165			25	628
			0.180 (μ)			25	628
	(80/20, v/v)		0.163			25	628
			0.200 (μ)			25	628
	(70/30, v/v)		0.150			25	628
			0.191 (μ)			25	628
	(60/40, v/v)		0.150			25	628
			0.196 (μ)			25	628
	(50/50, v/v)		0.139			25	628
			0.169 (μ)			25	628
	(40/60, v/v)		0.134			25	628
			0.155 (μ)			25	628
	(35/65, v/v)		0.148 (μ)			25	628
	(25/75, v/v)		0.125			25	628
			0.122			25	628
	(15/85, v/v)		0.115			25	628
			0.109 (μ)			25	628
	Dimethyl formamide/ 1,4-dioxane (5 : 7, v/v)	0.099				26.9	977
	Alcoholic LiBr	0.154				25	127
	Ethanol	0.154				25	127
	HCl 0.1 N				0.159 (589)		87
	0.5 N		0.137			25	128

TABLE 1. *cont'd*

		dn/dc (ml/g)					
Polymer	**Solvent**	$\lambda_0 = 436$ **nm**	$\lambda_0 = 546$ **nm**	$\lambda_0 = 633$ **nm**	**Others**	T **(°C)**	**Refs.**
	0.045 N				0.156 (560)	20	129
					0.162 (μ) (560)	20	129
	0.02 N				0.158	20–65	77
	0.001 N		0.140			25	128
	Methanol		0.134			25	128
	NaBr 0.1 M				0.234 (560)	20	129
					0.209 (μ) (560)	20	129
	NaCl 0.1 M				0.213 (μ) (560)	20	129
	NaF 0.1 M				0.229 (560)	20	129
					0.219 (μ)(560)	20	129
	NaI 0.1 M				0.197 (μ) (560)	20	129
	Na_2SO_4 0.1 M				0.210 (μ) (560)	20	129
	$(NH_4)_2Mo_7O_{24}$ 0.01 M				0.227	20	129
					0.169 (μ) (560)	20	129
	Water		0.142			25	128
					0.153		80
Poly(methacrylic acid), sodium salt							
	Water		0.260			25	628
	Water/dioxane (95/5, v/v)		0.256			25	628
			0.230 (μ)			25	628
	(90/10, v/v)		0.240			25	628
			0.189 (μ)			25	628
	(80/20, v/v)		0.250			25	628
			0.154 (μ)			25	628
	(75/25, v/v)		0.252			25	628
			0.121 (μ)			25	628
	(70/30, v/v)		0.238			25	628
			0.108 (μ)			25	628
Poly(methoxybiphenyl methacrylate)							
	THF		0.196				958
50/50 Poly(methoxy-biphenyl methacrylate-*co*-methoxybiphenyl ethylene oxide methacrylate)							
	THF		0.194				958
Poly(methoxybiphenyl ethylene oxide methacrylate)							
	THF		0.212				958
50/50 Poly(methoxy-biphenyl ethylene oxide methacrylate-*co*-methoxy-biphenyl bis(ethylene oxide)methacrylate)							
	THF		0.188				958
Poly(methoxybiphenyl bis(ethylene oxide) methacrylate							
	THF		0.205				958
Poly(methoxybiphenyl methacrylate-*co*-methoxybiphenyl tris(ethylene oxide)methacrylate)							
	THF		0.170				958
Poly(methoxybiphenyl tris(ethylene oxide)methacrylate)							
	THF		0.181				958
50/50 poly(methoxybiphenyl methacrylate-*co*-methoxybiphenyl tetrakis(ethylene oxide) methacrylate							
	THF		0.153				958
Poly(methoxybiphenyl tetrakis(ethylene oxide) methacrylate)							
	THF		0.171				958
Poly(methoxybiphenyl methacrylate)							
	$CHCl_3$		0.163				958
Poly(methoxybiphenyl ethylene oxide methacrylate)							
	$CHCl_3$		0.180				958
50/50 Poly(methoxybiphenyl ethylene oxide methacrylate-*co*-methoxybiphenyl bis(ethylene oxide)methacrylate)							
	$CHCl_3$		0.153				958
Poly(methoxybiphenyl bis(ethylene oxide) methacrylate)							
	$CHCl_3$		0.167				958
Poly(methoxybiphenyl tris(ethylene oxide) methacrylate)							
	$CHCl_3$		0.152				958
Poly(methoxybiphenyl tetrakis(ethylene oxide) methacrylate)							
	$CHCl_3$		0.152				958
Poly(2-methacryloyloxyethyl trimethylammonium chloride)							
	1 M aqueous NaCl			0.157			971
Poly(2-methoxyethyl methacrylate)	Halothane		0.125			25	589
	MEK		0.108			25	589,902

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Nitrobenzene		−0.058			25	589
	THF		0.078			25	589
	Toluene		0.000			25	589
	1,2,4, Trichlorobenzene		−0.067			25	653
Poly(methyl methacrylate)	Acetone	0.1391				27	130
		0.107				27	131
		0.137	0.134			23 ± 2	132
		0.129					133
					0.131		134
		0.1313	0.1293		0.134 (366)	25	135
		0.136	0.134			25	10,136
					0.132		92
		0.132				20	89
		0.1305	0.1285		0.1281 (578)	20	5
					0.1279 (589)	20	5
					0.1276 (644)	20	5
			0.132			20	93
			0.135			20	137,138
		0.1312	0.1292			20	139
			0.1330			25	140,141
	Acetone		0.135			25	759
				0.130			618
				0.129		25	689
$M_w > 5060$	Acetone	0.134				25	947
isotactic	Acetone	0.136	0.134			20	142
	Acetone/benzene (88/12, v/v)		0.1170			25	141
	(76/24, v/v)		0.1005			25	141
	(64/36, v/v)		0.0861			25	141
	(52/48, v/v)		0.0734			25	141
	(40/60, v/v)		0.0590			25	141
	Acetone/chloroform						
	(80/20, v/v)		0.1170			25	140
	(60/40, v/v)		0.1005			25	140
	(52/48, v/v)		0.091			25	140
	(40/60, v/v)		0.0861			25	140
	(20/80, v/v)		0.0734			25	140
	Acetone/water	0.136				20	626
	(62.2/37.8, mol)						
	Acetonitrile		0.133			25	721
		0.140	0.137			20	136
$M_w > 10^4$	Acetonitrile	0.144				44	947
	Acetonitrile/MMA						
	(17/83, v/v)		0.094			25	726
						25	726
			0.078 (μ)			25	726
	(32/68, v/v)		0.100			25	726
			0.085 (μ)			25	726
	(50/50, v/v)		0.110			25	726
			0.097 (μ)			25	726
	(68/32, v/v)		0.119			25	726
			0.113 (μ)			25	726
	Acetophenone/MMA						
	(50/50, v/v)		0.034			25	726
			0.033 (μ)			25	726
	Acetophenone/isopropanol						
	(30/70, v/v)		0.074			25	825
			0.115 (μ)			25	825
	(40/60, v/v)		0.059			25	825
			0.104 (μ)			25	825
	(50/50, v/v)		0.044			25	825
			0.084 (μ)			25	825
	(60/40, v/v)		0.027			25	825
			0.050 (μ)			25	825

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TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(70/30, v/v)		0.017			25	825
			0.030 (μ)			25	825
	(80/20, v/v)		0.001			25	825
			0.005 (μ)			25	825
	(90/10, v/v)		−0.012			25	825
			−0.012 (μ)			25	825
	Arochlor	−0.124				20	144
	Benzene	0.0398				27	130
			−0.010				145
		0.002				25	146
		0.0039	0.0110			25	139
			0.004				147
					~0		148
			−0.016			25	10
		0.001	0.007			20	6
		0.006				30	677
				0.015		25	689
	Benzene/MMA (30/70, v/v)		0.061			25	726
			0.054 (μ)			25	726
	(50/50, v/v)		0.046			25	726
			0.044 (μ)			25	726
	(70/30, v/v)		0.033			25	726
			0.032 (μ)			25	726
	Benzyl alcohol/MMA		0.026			25	726
	(50/50, v/v)		0.027 (μ)			25	726
	Benzyl alcohol/*n*-butanol						
	(90/10, v/v)		−0.036			25	782
			−0.034 (μ)			25	782
	(80/20, v/v)		0.012			25	782
			0.017 (μ)			25	782
	(70/30, v/v)		0.016			25	782
			0.024 (μ)			25	782
	(60/40, v/v)		0.030			25	782
			0.043 (μ)			25	782
	(50/50, v/v)		0.041			25	782
			0.060 (μ)			25	782
	(40/60, v/v)		0.057			25	782
			0.084 (μ)			25	782
	Benzyl alcohol/*sec*-butanol						
	(90/10, v/v)		−0.037			25	782
			−0.070 (μ)			25	782
	(80/20, v/v)		0.011			25	782
			−0.012 (μ)			25	782
	(70/30, v/v)		0.012			25	782
			0.013 (μ)			25	782
	(60/40, v/v)		0.029			25	782
			0.082 (μ)			25	782
	(50/50, v/v)		0.040			25	782
			0.160 (μ)			25	782
	(40/60, v/v)		0.056			25	782
			0.254 (μ)			25	782
	(30/70, v/v)		0.074			25	782
			0.316 (μ)			25	782
	Bromobenzene		−0.058				145
		−0.050				25	624
	Bromoform/isopropanol		0.056			25	825
	(30/70, v/v)						
			0.196 (μ)			25	825
	(40/60, v/v)		0.036			25	825
			0.166 (μ)			25	825
	(50/50, v/v)		0.019			25	825
			0.136 (μ)			25	825

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(60/40, v/v)		0.002			25	825
			0.092 (μ)			25	825
	(70/30, v/v)		− 0.017			25	825
			0.034 (μ)			25	825
	(80/20, v/v)		− 0.036			25	825
			− 0.031 (μ)			25	825
	(90/10, v/v)		− 0.059			25	825
			− 0.067 (μ)			25	825
	Bromoform/acetophenone/ isopropanol	Values for numerous solvent ratios given in reference					825
	1-Bromonaphthalene		− 0.147				145
			− 0.148			25	9
	2-Butanol	$0.0802 + 0.0004^* T$ (°C)				$55 \leq T \leq 76$	954
	n-Butyl acetate	0.0987	0.0970		0.101 (366)	25	135
		0.0986	0.0969			25	139
		0.1				25	113
			0.0970			25	149
			0.097			25	670
					0.096	25	689
					0.096	25	802
syndiotactic					0.097	25	742
	n-Butyl acetate/chloroform						
	(20/80, v/v)				0.063	25	802
	(40/60, v/v)				0.070	25	802
	(60/40, v/v)				0.073	25	802
	(80/20, v/v)				0.083	25	802
	(90/10, v/v)				0.094	25	802
	n-Butyl chloride	0.0913	0.0898			20	143
		0.0948	0.0934			30	143
		0.0984	0.0970			40	143
					0.096	40	615
			0.093			25	721
		0.098				40	731
atactic		0.0931	0.0914			25	150
		0.1021	0.1001			50	150
syndiotactic		0.1001	0.0986			50	150
isotactic		0.0902	0.0875			25	150
		0.0965	0.0954			50	150
	n-Butyl chloride/toluene						
	(83/17, v/v)	0.080				25	911
	(56.9/43.1, v/v)	0.058				25	911
	(32.1/67.9, v/v)	0.035				25	911
	(20/80, v/v)	0.026				25	911
	Carbon tetrachloride		0.023				145
		0.033				30	677
	Chlorobenzene		− 0.026				145
		− 0.004				35	697
					− 0.010	25	689
		− 0.018				25	146
					− 0.026		148
	1-Chlorobutane	0.098				40	955
	Chloroform	0.0631	0.0629		0.0635 (366)	25	135
					0.056		134
		0.0630	0.0628			25	139
					0.050		148
			0.059			25	10,140
		0.056				30	677
					0.062	25	689
					0.059	25	802
	Cyclohexanone				0.046	30	729
	o-Dichlorobenzene				− 0.037	25	689

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TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	1,2-Dichloroethane	0.050	0.051				151
		0.050				30	152
			0.050				147
			0.046			25	10
			0.079			30	826
					0.050	25	689
	Dioxane		0.075				154
		0.0720	0.0707		0.074 (366)	25	135,139
			0.068				145
			0.071			25	93
					0.0703 (589)	25	155
			0.07			25	121,147
					0.070		148
			0.066			25	10
			0.0707			25	156,157
					0.072 (488)	30	729
				0.068			618
				0.069		25	689
			0.070			25	807,822
	Dioxane/water (95/5, v/v)		0.072			25	121
			0.076 (μ)			25	121
	(90/10, v/v)		0.076			25	121
			0.083 (μ)			25	121
	(85/15, v/v)		0.079			25	121
			0.072			25	118
			0.090 (μ)			25	118,121
			0.090			30	158
	(82/18, v/v)		0.082 (μ)			25	121
			0.096 (μ)			25	121
	DMF	0.0600	0.0614		0.0617 (578)	20	5,6
					0.0168 (589)	20	5,6
					0.0619 (644)	20	5,6
					0.055 (365)	20	6
			0.055			25	10
			0.069			30	159
			0.095			90	159
					0.042		148
		0.060	0.058			20	897
			0.086			30	826
			0.058			25	807
					0.063	25	689
Polymer modified with RCH_2Li							
$R = SC_6H_5$					0.079–0.096	25	700
$R = SO_2CH_3$			0.070–0.081			25	700
$R = SO_2N(CH_3)_2$			0.075–0.107			25	700
	Ethyl acetate	0.1200	0.1180		0.123 (366)	25	135,139
					0.1174 (589)	25	155
			0.118			25	10
				0.118			618
isotactic					0.117	25	771
			0.138			30	826
			0.116			25	720
	Furfuryl alcohol		0.010			30	691
	n-Heptane/*m*-cresol		0.040			25	698
	(50/50, v/v)		0.349 (μ)			25	698
	Isoamyl acetate	0.0931	0.0911			20	143
		0.0945	0.0926			30	143
		0.0959	0.0942			40	143
		0.0974	0.0957			50	143
	MEK		0.111				154
			0.112			RT	160
		0.093					131
					0.111		134

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
			0.1173			RT	163
		0.100				RT	99
					0.110		148
		0.1131	0.1112		0.1110 (578)	20	5,6,88
					0.1107 (589)	20	5
					0.1102 (644)	20	5
		0.113	0.111			23 ± 2	132
			0.117			25	162
		0.111				25	146
			0.111			25	132,161
			0.110			25	10,93
			0.108			25	165
		0.01385				27	130
					0.111 (488)	28	134
		0.114	0.113				151
			0.111				145
		0.113				30	152
					0.059	30	164
					0.131		153
			0.113				147
			0.1147			35	34
		0.113				35	72
				0.111		25	689
			0.112			25	807
			0.134			30	826
		0.110	0.108			20	897
	MEK/isopropanol	0.1090	0.1075			10	143
		0.1130	0.1114			20	143
		0.1167	0.1153			30	143
		0.1208	0.1192			40	143
atactic	(55/54, v/v)	0.1169	0.1153			30	150
syndiotactic		0.1165	0.1155			30	150
isotactic		0.1167	0.1152			30	150
	MEK/2-propanol (43.6/56.4, mol/mol)	0.109				20	626
	2-Methoxy ethanol	0.089				40	731
	Methyl cellusolve		0.082			25	807
	MMA/styrene (50/50, v/v)		0.025			25	726
			0.025 (μ)			25	726
	Methyl methacrylate		0.075			30	158
	N-Methylpyrrolidone		0.0176			25	10
	Nitroethane		0.100				154
			0.094			25	161
	2-Propanol/isopropylamine (5.6/94.4, mol/mol)	0.109				20	626
	TFP		0.141			25	121
	TFP/water (92/5, v/v)		0.141			25	121
			0.140 (μ)			25	121
	(90/10, v/v)		0.139			25	121
			0.137 (μ)			25	121
	(80/20, v/v)		0.135			25	121
			0.131 (μ)			25	121
	(70/30, v/v)		0.133			25	121
			0.124 (μ)			25	121
	(65/35, v/v)		0.132			25	121
			0.121 (μ)			25	121
	THF	0.0887	0.0871		0.091 (366)	25	135
		0.0886	0.0870			25	139
			0.0902			36	34
		0.09					166
				0.087			618
				0.098		25	637
				0.086		25	689

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g)				T (°C)	Refs.
		$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others		
$M_w > 10^4$				0.110–0.114			984
atactic				0.084		25	811
isotactic				0.086		25	811
varying tacticities				0.084–0.088		25	686
	THF/cyclopentane	0.089				20	626
	(65.7/34.3, mol/mol)						
	Toluene	0.004				30	152
		0.010				25	146
		0.0094	0.0157			25	139
					0.004		153
			0.005				147
			0.003			30	691
		0.004				30	697,699,834
		0.009				50	699
		0.014				70	699
		−0.003				15	834
		0.001				20	834
		0.003				25	834
		0.007				25	911
atactic		0.010				25	146
syndiotactic		0.007				25	146
isotactic		0.014				25	146
	Toluene/methanol		0.094			25	118
	(42/58, v/v)		0.152 (μ)			25	118
			0.096			25	167
			0.154 (μ)			25	167
	Toluene/isopropanol		0.073			25	118
	(38/62, v/v)		0.121 (μ)			25	118
	Toluene/*p*-cymene						
	(73.4/26.6, w/w)	0.006				30	699
	(49.7/503, w/w)	0.008				30	699
Poly(*o*-methylphenylthio	Benzene	0.133			0.133	35	666
methacrylate							
Poly(β-naphthyl	Benzene		0.142			25	856
methacrylate)							
Poly(nonyloxy-1,4-phenyleneoxycarbonylphenyl methacrylate)							
	Carbon tetrachloride				0.096	24	890
Poly(*N*-octadecylacrylamide)	Benzene		0.0269			30	84
	Chlorobenzene		0.0489			30	84
	Cyclohexane		0.0651			30	84
	n-Hexane		0.1292			30	84
			0.1168			30	84
	THF		0.0898			30	84
	Toluene		0.0154			30	84
Poly(*n*-octyl methacrylate)	*n*-Butanol	0.083	0.080			16.8	169
	MEK	0.107	0.107			28	169
Poly(4-phenylbutyl-	1-Chloroundecane			0.100	0.105 (488)	23	965
1-methacrylate)							
Poly(2-phenylethyl-	1-Chloroheptane			0.128	0.134 (488)	27.5	965
1-methacrylate)							
Poly(phenyl methacrylate)	Acetone		0.234				170
	MEK		0.182			25	115
Poly(phenylthiol	Benzene	0.142				35	666
methacrylate)							
Poly[2-(3-sodium sulfonato-2-methylpropyl) methacrylamide]							
	Aq. 0.05 M NaCl	0.142 (μ)				RT	701
	Aq. 5 M NaCl	0.097 (μ)				RT	701
Poly(3-sodium sulfonatopropyl methacrylate)							
	Aq. 0.01 M NaCl	0.11				25	824
	Aq. 0.1 M NaCl	0.13				25	824
Poly(*n*-stearyl methacrylate)	Cyclohexane			0.054		20	744
	n-Propyl acetate	0.107				36	744

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Poly(tetrahydro-4H-pyranyl-2-methacrylate)	THF			0.092		20	840
Poly(*n*-tridecyl methacrylate)	Ethyl acetate	0.121				27	744
	THF			0.083		30	744
Poly(3-trimethylammonium ethyl chloride methacrylate)							
	Aq. 1 M NaCl	0.157	0.155	0.154		25	882
		0.158 (μ)	0.155 (μ)	0.154 (μ)		25	882
Poly[2-(triphenylmethoxy)ethyl methacrylate]							
	Dioxane		0.180			25	770
1.5. OTHER α- OR β-SUBSTITUTED POLY(ACRYLICS) AND POLY(METHACRYLICS)							
Poly[bis(phenylethyl) itaconate]	MEK	0.180				20	738
Poly[bis(phenyl-*n*-propyl) itaconate]	MEK	0.173				20	738
Poly(*tert*-butyl crotonate)	*n*-Butyl chloride	0.083				25	718
	Ethyl acetate	0.111				25	718
Poly(di-*n*-amyl itaconate)	*n*-Amyl acetate	0.074				20	102
	Benzene	−0.035				20	102
	Carbon tetrachloride	0.018				20	102
	Chloroform	0.036				20	102
	Ethyl acetate	0.102				20	102
	MEK	0.096				20	102
	Toluene	−0.027				20	102
Poly(dibenzyl itaconate)	MEK	0.183				20	738
Poly(di-*n*-butyl itaconate)	Acetone	0.109				20	102
	n-Amyl acetate	0.074				20	102
	Benzene	−0.030				20	102
	Carbon tetrachloride	0.020				20	102
	Chlorobenzene	−0.050				20	102
	Chloroform	0.036				20	102
	Ethyl acetate	0.101				20	102
	Ethylbenzene	−0.021				20	102
	n-Hexane	0.101				20	102
	MEK	0.096				20	102
	Methyl acetate	0.112				20	102
	Styrene	−0.077				20	102
	Toluene	−0.023				20	102
Poly(di-cyclohexyl itaconate)	*n*-Amyl acetate	0.109				20	763
	n-Butyl acetate	0.126				20	763
	Carbon tetrachloride	0.058				20	763
	Chlorobenzene	−0.005				20	763
	n-Propyl acetate	0.132				20	763
	Toluene	0.017				20	763
Poly(di-*n*-decyl itaconate)	*n*-Amyl acetate	0.079				20	102
	Benzene	−0.041				20	102
	Carbon tetrachloride	0.015				20	102
	Toluene	−0.032				20	102
Poly(diethyl itaconate)	*n*-Amyl acetate	0.074				20	102
	Benzene	−0.018				20	102
	Carbon tetrachloride	0.024				20	102
	Ethyl acetate	0.100				20	102
	MEK	0.096				20	102
	Toluene	−0.014				20	102
Poly(di-*n*-heptyl itaconate)	*n*-Amyl acetate	0.075				20	102
	Benzene	−0.037				20	102
	Benzene	−0.036				20	102
	Carbon tetrachloride	0.017				20	102
	Chloroform	0.035				20	102
	Ethyl acetate	0.102				20	102
	Ethyl acetate	0.102				20	102

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	MEK	0.095				20	102
	MEK	0.095				20	102
	Toluene	− 0.029				20	102
	Toluene	− 0.028				20	102
Poly(dimethyl itaconate)	Acetone	0.118				20	102
	Benzene	0.000				20	102
	Chlorobenzene	− 0.022				20	102
	Chloroform	0.041				20	102
	MEK	0.096				20	102
	Methyl acetate	0.110				20	102
Poly(*N*-1,1-dimethyl-3-oxobutylacrylamide)	MEK	0.137				25	622
Poly(di-*n*-nonyl itaconate)	*n*-Amyl acetate	0.079				20	102
	Benzene	− 0.030				20	102
	Toluene	− 0.039				20	102
Poly(di-*n*-octyl itaconate)	*n*-Amyl acetate	0.078				20	102
	Benzene	− 0.039				20	102
	Carbon tetrachloride	0.016				20	102
	Chloroform	0.033				20	102
	Ethyl acetate	0.105				20	102
	MEK	0.096				20	102
	Toluene	− 0.030				20	102
Poly(diphenyl itaconate)	Benzene	0.083				20	768
	Chlorobenzene	0.060				20	768
	Ethyl acetate	0.191				20	768
	MEK	0.189				20	768
	Styrene	0.040				20	768
	Toluene	0.087				20	768
Poly(di-*n*-propyl itaconate)	*n*-Amyl acetate	0.074				20	102
	Benzene	− 0.025				20	102
	Carbon tetrachloride	0.021				20	102
	Chloroform	0.036				20	102
	MEK	0.096				20	102
	Toluene	− 0.019				20	102
Poly(di-*n*-undecyl itaconate)	*n*-Amyl acetate	0.079				20	102
	Benzene	− 0.042				20	102
	Carbon tetrachloride	0.014				20	102
	Chlorobenzene	− 0.064				20	102
	Chloroform	0.030				20	102
	Ethyl benzene	− 0.030				20	102
	n-Hexane	0.112				20	102
	Styrene	− 0.088				20	102
	Toluene	− 0.032				20	102
Poly(methyl α-chloroacrylate)	Chloroform	0.072					707
Poly(methyl *n*-butacrylate)	*n*-Butanol	0.0878				13	286
	MEK	0.1192				30	286
Poly(methyl ethacrylate)	Diisobutyl ketone	0.0791				11.4	286
	MEK	0.1357				30	286

1.6. POLY(STYRENES)

Polymer	Solvent	$\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
Poly(4-acetoxystyrene)	Dioxane	0.139				25	654
Poly(4-acetoxymethyl styrene)							
	Toluene			0.0643		25	974
Poly(0.05 wt.% 4-acetoxymethyl styrene-*co*-0.95 wt.% *tert*-butyloxy carbonyloxy styrene)							
	Toluene			0.0344		25	974
Poly(0.10 wt.% 4-acetoxymethyl styrene-*co*-0.90 wt.% *tert*-butyloxy carbonyloxy styrene)							
	Toluene			0.0368		25	974
Poly(0.20 wt.% 4-acetoxymethyl styrene-*co*-0.80 wt.% *tert*-butyloxy carbonyloxy styrene)							
	Toluene			0.0391		25	974
Poly(0.35 wt.% 4-acetoxymethyl styrene-*co*-0.65 wt.% *tert*-butyloxy carbonyloxy styrene)							
	Toluene			0.0443		25	974

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
Poly(0.50 wt.% 4-acetoxymethyl styrene-*co*-0.50 wt.% *tert*-butyloxy carbonyloxy styrene)							
	Toluene			0.0486		25	974
Poly(*p*-*tert*-butylstyrene)	Cyclohexane		0.139			35	778
	1-Nitropropane		0.162			35	778
Poly(*o*-chlorostyrene)	MEK		0.191			25	765
Poly(*p*-chlorostyrene)	Benzene	0.095					171
	Chloroform	0.157					171
	Dioxane	0.164					171
	MEK	0.207	0.197			20	172
	Toluene	0.121				35	173
Poly(*p*-iodostyrene)	Dioxane	0.156	0.144		0.166 (365)	20	174
					0.143 (578)	20	174
					0.142 (589)	20	174
					0.140 (644)	20	174
14% iodine	Bromoform				0.032	874	
27% iodine					0.050	874	
Poly(*p*-isopropyl-α-methylstyrene)	Toluene		0.084			25	776
Poly(*p*-isopropylstyrene)	Chloroform	0.134	0.124			25	187
	MEK	0.198	0.186			25	187
	THF	0.177	0.167			25	188
Poly(*p*-isopropylstyrene)	MEK	0.195–0.203	0.184–0.197			25	187
hydroperoxide	THF	0.177	0.167			25	189
Poly(*p*-methoxystyrene)	Benzene/cyclohexanol (61.19/38.81, v/v)		0.112				175
	Benzene/methanol (73.69/26.31, v/v)		0.125				175
	Chloroform/cyclohexane (36.08/63.92, v/v)		0.163				175
	Chloroform/methanol (66.49/33.51, v/v)		0.190				175
	MEK/*n*-heptane (80.01/19.99, v/v)		0.211				175
	MEK/*n*-propanol (80.64/19.36, v/v)		0.215				175
	Toluene	0.105	0.101			25	176
	Toluene/cyclohexanol (62.8/37.2, v/v)		0.113				175
Poly(α-methylstyrene)	Benzene	0.1238				25	177
			0.138			25	178
		0.134				30	179
		0.131				30	180
Poly(α-methylstyrene)	Carbon tetrachloride	0.178	0.168		0.193 (366)	23	181
	Cyclohexane	0.206				32	183
		0.208				36	183
		0.199				37	182
		0.200				39	179
		0.1967				39	177
		0.210				40	183
		0.212				45	183
		0.214				50	183
		0.204	0.192		0.219 (366)	35	181
	1,2-Dichloroethane	0.1764				25	177
	Toluene		0.1165			23	34
		0.131				25	184
		0.1307				25	177
		0.130	0.126		0.135 (366)	23	181
					0.129	25	185
					0.137		186
		0.137				25	613
Poly(*p*-methylstyrene)	Toluene			0.093		20	976
Poly(styrene)	Acetone/cyclohexane (26.6/73.4, v/v)		0.192			25	783

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(38.2/61.8, v/v)		0.202			25	783
	(49.1/50.9, v/v)		0.207			25	783
	(59.1/40.9, v/v)		0.214			25	783
	(68.4/31.6, v/v)		0.220			25	783
	(77.2/22.8, v/v)		0.225			25	783
	Isoamyl acetate	0.205				30	97
	n-Amyl acetate	0.205				20	102,190
	Arochlor		−0.017				144
	Benzene	0.1151					191
		0.111				20	102
		0.1066	0.1034			20	6
		0.113				20	203
		0.1066	0.1034		0.1030 (578)	20	5
					0.1028 (589)	20	5
					0.1021 (644)	20	5
		0.115				25	205
		0.108	0.105			25	106
		0.109	0.105			25	107
					0.109		32
		0.112	0.109		0.107 (589)	25	206
			0.110			25	193
					0.115		194
			0.108				57
			0.1025			25	195
		0.108				25	146,197
		0.1094	0.1062			25	139
					0.106		148
			0.105			25	10
		0.111				25	198
			0.106			25	145,196, 199,201
		0.113				28	192
			0.109			30	204
			0.106				147
		0.101				30	97
		0.115				30	200
			0.1123			30	84
		0.112				35	202
		0.131				70	203
		0.107	0.103			20	709
			0.111			25	664
				0.105		25	593,705
			0.106			25	779,751
			0.103			25	774
		0.109	0.106			25	890,647
					0.109 (488)	25	812
increase with *M*:			0.093–0.109			25	648
$M = 1.3 \times 10^3 - 1.3 \times 10^5$			0.091–0.106			25	612
$M > 1.05 \times 10^6$			0.108			25	612
star shaped			0.104			25	612
star shaped			0.126			35	683
comb shaped			0.104–0.109			25	612
				0.102		30	671
		0.116				30	677
		0.113				30	821
			0.112			35	683
				0.105			618
	Benzene	$0.0495 + 2.20 \times 10^{-4}\ T$ (K)					962
	Benzene/bromoform						
	(95/5, v/v)	0.101				25	198
	(90/10, v/v)	0.096				25	198
	(85/15, v/v)	0.099				25	198

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(75/25, v/v)	0.083				25	198
	(50/50, v/v)	0.074				25	198
	(25/75, v/v)	0.036				25	198
	Benzene/$(CH_2Cl)_2CHOH$						
	(33/67, v/v)		0.112				207
	Benzene/cyclohexane						
	(82.9/18.1, mol/mol)	0.137				20	208
		0.155				70	208
	(65.3/34.7, mol/mol)	0.155				20	208
		0.172				70	208
	(44.8/55.2, mol/mol)	0.170				20	208
		0.186				70	208
	(23.6/76.4, mol/mol)	0.183				20	208
		0.197				70	208
	(10/90, mol/mol)	0.189				20	208
		0.202				70	208
	(4.8/95.2, mol/mol)	0.191				20	208
	(90/10, v/v)	0.116	0.113			20	709
	(80/20, v/v)	0.126	0.120			20	709
		0.138				30	692
		0.142 (μ)				30	692
	(75/25, v/v)		0.124			25	751
	(70/30, v/v)	0.135	0.129			20	709
	(60/40, v/v)	0.144	0.135			20	709
			0.137			25	751
	(50/50, v/v)	0.151	0.142			20	709
			0.145			25	751
		0.150				30	692
		0.159 (μ)				30	692
	(40/60, v/v)	0.158	0.148			20	709
	(35/65, v/v)		0.153			25	751
	(30/70, v/v)	0.165	0.154			20	709
	(20/80, v/v)	0.171	0.158			20	709
			0.162			25	751
		0.166				30	692
		0.175 (μ)				30	692
	(10/90, v/v)	0.175	0.162			20	709
	Benzene/cyclohexanol						
	(61.6/38.4, v/v)		0.108			25	209
	(81.8/18.2, mol/mol)	0.121				20	208
		0.134				70	208
	(90.9/9.1, mol/mol)	0.119				20	208
	(99.628/0.372, mol/mol)	0.124				20	208
		0.134				70	208
	Benzene/*n*-docosane						
	(98.7/1.3, mol/mol)	0.122				20	210
		0.140				70	210
	(95.7/4.3, mol/mol)	0.135				20	210
		0.147				70	210
	(90.3/9.7, v/v)	0.147				20	210
		0.150				70	210
	Benzene/*n*-dodecane						
	(96.2/3.8, mol/mol)	0.123				20	210
		0.139				70	210
	(92.7/7.3, mol/mol)	0.131				20	210
		0.145				70	210
	(86.4/13.6, mol/mol)	0.140				20	210
		0.149				70	210
	Benzene/1-dodecanol						
	(98.1/1.9, mol/mol)	0.116				20	210
	(94.6/5.4, mol/mol)	0.122				20	210
	(89.7/10.3, mol/mol)	0.132				20	210

TABLE 1. *cont'd*

		dn/dc (ml/g)					
Polymer	Solvent	$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Benzene/ethanol						
	(70.4/29.6, v/v)	0.156				19.6	611
	(70.4/29.6, v/v)	0.155				25	611
	(94.3/5.7, v/v)	0.115				20	210
	(89.1/10.9, v/v)	0.119				20	210
		0.131				70	210
	(62.1/37.9, v/v)	0.162				20	210
		0.151				70	210
	Benzene/*n*-heptane						
	(44/56, v/v)	0.130				35	211
	(90/10, v/v)	0.124				35	202
	(50/50, v/v)		0.157			25	751
	(60/40, v/v)		0.152			25	751
	Benzene/*n*-hexane						
	(88/12, mol/mol)	0.141				20	210
	(78.6/21.4, mol/mol)	0.160				20	210
		0.174				70	210
	(63.2/36.8, mol/mol)	0.188				20	210
		0.199				70	210
	(55.1/44.9, mol/mol)	0.197				20	210
		0.205				70	210
	Benzene/1-hexanol						
	(92.7/7.3, mol/mol)	0.119				20	210
	(84.9/15.1, mol/mol)	0.126				20	210
		0.135				70	210
	(76.6/23.4, mol/mol)	0.136				20	210
	(67.8/32.2, mol/mol)	0.148				20	210
		0.144				70	210
	Benzene/MEK						
	(25.1/74.9, mol/mol)	0.210				20	203
		0.224				70	203
	(50.2/49.8, mol/mol)	0.178				20	203
		0.193				70	203
	(75.1/24.9, mol/mol)	0.145				20	203
		0.162				70	203
	Benzene/methanol						
	(70.9/29.1, mol/mol)	0.154				20	208
	(83.9/16.1, mol/mol)	0.124				20	208
	(92.4/7.6, mol/mol)	0.114				20	208
	(22.2/77.8, v/v)		0.145			25	209
	(76.6/23.4, v/v)		0.122			25	193
	(80/20, v/v)		0.137				207
	(74.7/25.3, v/v)		0.159			35	211
	(95/5, v/v)		0.114			25	751
	(80/15, v/v)		0.127			25	751
	(83/17, v/v)		0.132			25	751
	(80/20, v/v)		0.136			25	751
	(78/22, v/v)		0.141			25	751
	(76.8/23.2, v/v)	0.190				16.7	611
	(76.8/23.2, v/v)	0.187				25	611
	(75/25, v/v)		0.144			25	751
	Benzene/1-octadecanol	0.116				20	210
	(99.15/0.85, mol/mol)	0.134				70	210
	Benzene/poly(oxyethylene)						
	420 (95.9/4.1, mol/mol)	0.125				20	210
	2100						
	(99.41/0.59, mol/mol)	0.120				20	210
	Benzene/isopropanol						
	(35.8/64.2, v/v)		0.159			25	212
	(65/35, v/v)		0.154				207
	(61/39, v/v)	0.142				35	211
	(64/36, v/v)	0.150				30	692
		0.216 (μ)				30	692

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	Benzene/n-propanol	0.131				21.7	611
	(63.7/36.3, v/v)	0.130				29.7	611
	Bromobenzene	0.0492				18	213
		0.043	0.042			25	106
		0.0495	0.0485				107
					0.0455	25	214
			0.042			25	145,215
		0.047				25	624
			−0.005				57
		0.015	0.012			25	106
		0.014				30	216
	Bromoform		0.012				874
		0.014				30	216,919
	1-Bromonaphthalene		−0.051				145
			−0.091				57
			−0.0517			25	9
	n-Butyl chloride		0.1997			25	43
	n-Butyl propionate		0.2018			25	43
	Carbon tetrachloride	0.156				20	102
		0.161				25	217
			0.144				154
			0.146				145
		0.159	0.147			25	106
		0.160	0.150		0.145 (589)	25	206
			0.1518			30	84
			0.148			30	204
		0.162				35	202
		0.159	0.148			25	647
			0.15			25	651
		0.162				30	677
				0.156		30	671
Poly(styrene) anionically polymerized	Carbon tetrachloride			0.145		25	964
	Carbon tetrachloride/n-butanol (65/35, v/v)	0.176				35	211
	Carbon tetrachloride/n-heptane (53/47, v/v)	0.189				35	211
	Carbon tetrachloride/methanol (18.3/81.7, v/v)		0.162			25	209
	Chlorobenzene		0.079				145
		0.0833				18	213
		0.082				20	102
		0.079				25	146
			0.079			25	215
			0.0848			30	84
					0.079		148
					0.081		891
		0.083				35	697
	Chlorobenzene/isopropyl ether (68/32, v/v)		0.192			25	209
	1-Chlorodecane	0.165				6.2	661
	1-Chlorodecane/3-methyl-cyclohexanol						
	(78.2/21.8, v/v)	0.165				22.8	661
	(75/25, v/v)	0.168				35	661
	(49.5/50.5, v/v)	0.166				59.6	661
	(10/90, v/v)	0.155				87.8	661
	Chloroform		0.158				57
		0.1554				18	213
		0.165				20	102
			0.169			25	26
					0.152		148
		0.161				25	146
		0.157				30	677

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Cyclohexane	0.1795	0.1682			20	219
		0.1798	0.1685			21	219
		0.1801	0.1687			22	219
		0.1804	0.1690			23	219
		0.1810	0.1695			25	139,219
$\overline{M}_w = 2.18 \times 10^3$		0.168	0.156			25	220
2.92×10^3		0.171	0.160			25	220
4.69×10^3		0.174	0.163			25	220
11.8×10^3		0.177	0.165			25	220
22.2×10^3		0.180	0.167			25	220
167×10^3		0.181	0.167			25	220
		0.1825	0.1709			30	219
		0.181				34.5	221
		0.1840	0.1723			35	219
			0.171			35	209
		0.181				35	202,222
			0.179			40	218
		0.1855	0.1738			40	219
		0.1870	0.1752			45	219
		0.188				50	223
					0.181		224
				0.163			618
		0.179	0.166			20	709
		0.181	0.170			25	647
			0.169			25	751
		0.191				30	677
		0.181	0.171			34.5	712,705
		0.181	0.169			34.5	809
$M = 1.2 \times 10^3$ - 1.07×10^5				0.156–0.168		34.5	732
star shaped				0.157–0.163		34.5	737
after photoisomerization: *trans* → *cis*			0.100			28	736
		0.181				34.8	611
			0.171			34.8	664
					0.175 (488)	35	642
		0.181				35	659,694,704
		0.184				35	661
				0.161		35	671
			0.168			35	683
			0.170			35	683
	Cyclohexane			0.187		30	943
				0.191		40	943
				0.195		50	943
	Cyclohexane/cyclohexanol						
	(75.3/24.7, v/v)	−0.043				36	611
		−0.044				38	611
		−0.045				44	611
		−0.046				52.2	611
		−0.047				58.2	611
	(37.3/62.7, v/v)	−0.048				65.1	611
		−0.049				74	611
		−0.050				82	611
		−0.051				86	611
	Cyclohexane/ethanol	0.065				29.2	611
	(97/3, v/v)	0.064				39.8	611
	Cyclohexane/ethyl acetate						
	(10/90, v/v)	0.229	0.216			20	709
	(20/80, v/v)	0.226	0.213			20	709
	(30/70, v/v)	0.223	0.210			20	709
	(40/60, v/v)	0.219	0.206			20	709
	(50/50, v/v)	0.216	0.202			20	709
	(60/40, v/v)	0.211	0.197			20	709
	(70/30, v/v)	0.206	0.191			20	709

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(80/20, v/v)	0.198	0.184			20	709
	(90/10, v/v)	0.189	0.176			20	709
	Cyclohexane/methanol	0.099				29.2	611
	(95.5/4.5, v/v)	0.098				39.8	611
	Cyclohexane/*n*-propanol	0.041				28.2	611
	(97.6/2.4, v/v)	0.040				37.8	611
	Cyclohexane/styrene						
	(15/85, v/v)		0.075			25	726
			0.086 (μ)			25	726
	(30/70, v/v)		0.092			25	726
			0.112 (μ)			25	726
	(40/60, v/v)		0.104			25	726
			0.129 (μ)			25	726
	(50/50, v/v)		0.120			25	726
			0.152 (μ)			25	726
	(60/40, v/v)		0.129			25	726
			0.160 (μ)			25	726
	(70/30, v/v)		0.138			25	726
			0.166 (μ)			25	726
	(85/15, v/v)		0.155			25	726
			0.173 (μ)			25	726
	Cyclohexanol	0.165				84.2	611
		0.141				87.8	661
		0.169				92.5	611
		0.169				100	611
	Cyclohexanone	0.151				30	216
		0.151				25	647
		0.151				30	216,919
	Cyclohexene	0.165				25	23
	Decalin		0.129			24	217
			0.129			25	215
		0.118				25	23
			0.137			52	23
			0.138			60	23
			0.143			87	23
			0.147			104	23
			0.152			123	23
			0.155			139	23
				0.120		20	615,713
			0.125		0.123 (579)	20	625
		0.119	0.110			20	827
		0.137	0.130			20.4	809
		0.141				22.8	661
		0.120	0.110			25	827
			0.127		0.125 (579)	30	625
		0.120	0.111			30	827
			0.128		0.126 (579)	40	625
		0.120	0.111			40	827
			0.130		0.128 (579)	50	625
			0.132		0.130 (579)	60	625
50 bar pressure			0.119			20	625
			0.120			30	625
			0.121			40	625
50 bar pressure			0.122			50	625
50 bar pressure			0.123			60	625
	cis-Decalin	0.124				12	221
	Decalin, 50% *trans*		0.115			20	885
			0.115			30	885
			0.116			40	885
			0.117			50	885
			0.118			60	885
	1,2-Dibromoethane	0.065				30	216,919

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TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	Dibutyl phthalate		0.108			25	863
			0.120			135	863
	1,2-Dichloroethane	0.168	0.155			25	647
		0.168	0.155				151
			0.161			20	218
		0.168				30	152
			0.168				147
					0.168		152
		0.166				30	200
			0.158			30	826
	Diethyl ether/methylcyclohexane						
	(70/30, v/v)	0.215				25	693
	(65/35, v/v)	0.220				25	693
	(60/40, v/v)	0.215				25	693
	(50/50, v/v)	0.225				25	693
	(40/60, v/v)	0.240				25	693
	(35/65, v/v)	0.245				25	693
	Diethyl oxalate	0.195				59.6	661
	Diethyl fumarate/CH_2ClCH_2OH						
	(80/20, v/v)		0.152				207
	Dioxane		0.171				154
			0.176				225
			0.168				145
			0.172				196
		0.185	0.173		0.204 (365)	20	174
					0.171 (578)	20	174
					0.170 (589)	20	174
					0.168 (644)	20	174
		0.1852	0.1731			25	139
					0.1702 (589)	25	155
		0.193	0.182		0.176 (589)	25	206
					0.170		148
		0.181				35	97
		0.190				35	202
			0.184				147
				0.166			618
			0.170			25	807,822
			0.173			25	751
				0.181		30	671
			0.170			35	683
star shaped			0.195			35	683
deuterated polymer	Dioxane/1-bromonaphthalene		0.164				645
	(96/4, v/v)	0.134 (μ)				30	216,919
	(90/10, v/v)	0.075 (μ)				30	216,919
	(83/17, v/v)	0.000 (μ)				30	216,919
	(81.5/18.5, v/v)	−0.010 (μ)				30	216,919
	(50/50, v/v)	−0.298 (μ)				30	216,919
	Dioxane/*n*-heptane	0.212				35	211
	(41.5/58.5, v/v)						
	Dioxane/methanol						
	(28.6/71.4, v/v)		0.191			25	209
	(66.5/33.5, v/v)	0.218				35	211
	Dioxane/methanol					25	
	(71.4/28.6, v/v)		0.222			35	683
	(71.4/28.6, v/v)		0.197			35	683
	Dioxane/isopropanol	0.212				35	211
	(51.5/48.5, v/v)						
star shaped	Dioxane/styrene						
	(15/85, v/v)		0.076			25	726
	(15/85, v/v)		0.084 (μ)			25	726
	(30/70, v/v)		0.092			25	726
			0.102 (μ)			25	726

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(40/60, v/v)		0.104			25	726
			0.112 (μ)			25	726
	(50/50, v/v)		0.116			25	726
			0.129 (μ)			25	726
	(60/40, v/v)		0.126			25	726
			0.138 (μ)			25	726
	(70/30, v/v)		0.137			25	726
			0.147 (μ)			25	726
	(85/15, v/v)		0.155			25	726
			0.163 (μ)			25	726
	DMF	0.1703				18	213
		0.1739	0.1648		0.1632 (578)	20	5,6
					0.1625 (589)	20	5,6
					0.1604 (644)	20	5,6
					0.145		148
					0.189 (365)	20	6
			0.165			25	215
		0.175				25	146
			0.166				658
					0.171		658
				0.165		20	869
		0.168	0.158			20	897
			0.166			25	638
			0.178			30	826
Microgel			0.174				608
	DMF/tetralin (35.2/64.8, v/v)		0.119 (μ)			25	638
			0.119			80	638
	Ethyl acetate	0.2310				18	213
		0.234				20	102
			0.2231			25	226
		0.231	0.218			20	709
			0.223			25	779
			0.226			30	826
				0.216			618
	Ethyl acetate/ethanol						
	(94.81/5.19, v/v)		0.2196			25	226
	(91.76/8.24, v/v)		0.2210			25	226
	(89.34/10.66, v/v)		0.2238			25	226
	Ethylbenzene	0.111				25	102
			0.093			20	885
			0.093			30	885
			0.096			40	885
			0.102			50	885
			0.114			60	885
	Ethylcyclohexane		0.128			70	806
	Furfuryl alcohol		0.117			30	691
	n-Heptane/styrene						
	(10/90, v/v)		0.075			25	726
			0.089 (μ)			25	726
	(20/80, v/v)		0.091			25	726
			0.109 (μ)			25	726
	(30/70, v/v)		0.106			25	726
			0.136 (μ)			25	726
	(40/60, v/v)		0.122			25	726
			0.162 (μ)			25	726
	(50/50, v/v)		0.137			25	726
			0.191 (μ)			25	726
	(60/40, v/v)		0.154			25	726
			0.195 (μ)			25	726
	MEK	0.2258	0.2138			7.5	219
		0.2275	0.2155			15	219
		0.2290				18	213
		0.2287	0.2167			20	219

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g)				T (°C)	Refs.
		$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others		
		0.2296	0.2170			20	6
			0.214			20	227
		0.243				20	203
					0.232		153
		0.229				20	88,231
		0.228				20	102,190
		0.2296	0.2170		0.2150 (578)	20	5
					0.2143 (589)	20	5
					0.2110 (644)	20	5
		0.2298	0.2175			25	139
					0.2146 (589)	25	155
			0.2165			25	165
		0.2298	0.2178			25	219
			0.214			25	195
			0.220				145,154,196
		0.229					146
		0.226				25	217
		0.231	0.220			25	212
		0.231	0.218		0.208 (589)		151,232
					0.220 (589)		232
		0.226				25	228
					0.220		148
			0.219			25	215
			0.230				147
		0.227	0.215			25	106
					0.210*		224
		0.229	0.217				107
					0.222 (437)	25	233
		0.232	0.223		0.216 (589)	25	206
		0.238				30	216
		0.232				30	152
		0.223				30	229
		0.229	0.219				230
					0.170	30	164
		0.2309	0.2189			30	219
		0.227				35	97
		0.2321	0.2201			35	219
		0.2333	0.2213			40	219
		0.2345	0.2225			45	219
			0.230			67	218
		0.254				70	203
				0.212			618
					0.222		891
				0.214		20	869
		0.225	0.207			20	897
			0.217			25	751
			0.220			25	807
		0.230	0.217			25	809
			0.218			25	902
increase with *M*			0.207–0.211			25	648
			0.220			30	826
		0.238				30	216,919
randomly branched		0.235					599
branched with divinyl benzene		0.240				35	598
	MEK/$(CH_2Cl)_2CHOH$ (46/54, v/v)		0.165				207
	MEK/1-dodecanol (95.4/4.6, mol/mol)	0.238				20	203
		0.253				70	203

* Given erroneously as 0.110 in journal.

TABLE 1. *cont'd*

		dn/dc (ml/g)					
Polymer	**Solvent**	$\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	**Others**	T (°C)	**Refs.**
	(91.2/8.8, mol/mol)	0.232				20	203
		0.248				70	203
	MEK/1-hexanol						
	(93.3/6.7, mol/mol)	0.241				20	203
	(84.8/15.2, mol/mol)	0.238				20	203
		0.251				70	203
	(73.7/26.3, mol/mol)	0.234				20	203
		0.249				70	203
	MEK/methanol						
	(11.3/88.7, v/v)		0.214			25	209
	MEK/isopropanol		0.211			25	209
	(11.4/88.6, v/v)						
	(85/15, v/v)		0.219				207
	MEK/styrene (50/50, v/v)		0.140			25	726
			0.149 (μ)			25	726
	Methylcyclohexane		0.188				26
	Methylcyclohexane/acetone						
	(17/83, v/v)	0.242				22	234
	(22.2/77.8, v/v)	0.242				22	234
	(28/72, v/v)	0.239				22	234
	(39/61, v/v)	0.231				22	234
	(50/50, v/v)	0.228				22	234
	(61/39, v/v)	0.223				22	234
	(72/28, v/v)	0.222				22	234
	(83/17, v/v)	0.217				22	234
	(88.3/11.7, v/v)	0.210				22	234
	3-Methyl cyclohexanol	0.154				98.4	661
	3-Methyl cyclohexanol/1-chlorodecane						
	(21.8/78.2, v/v)	0.165				22.8	661
	(25/75, v/v)	0.168				35	661
	(50.5/49.5, v/v)	0.166				59.6	661
	(90/10, v/v)	0.155				87.8	661
	3-Methylcyclohexanol/tetralin						
	(23.2/76.8, v/v)	0.096				98.4	903,676
	(43.4/56.6, v/v)	0.115				98.4	903,676
	(49.5/50.5, v/v)	0.112				98.4	903,676
	(61/39, v/v)	0.131				98.4	903,676
	(77/23, v/v)	0.145				98.4	903,676
	Nitropropane	0.208				35	202
	Nitropropane/n-heptane						
	(42/58, v/v)	0.216				35	202
		0.218				35	211
	Phenylcyanide	0.0775				25	146
	Styrene	0.054				20	102
	Tetralin	0.072				34.5	903
		0.075				98.4	676,903
	Tetralin/cyclohexane						
	(89.4/10.6, v/v)	0.082 (μ)				34.5	903
	(88/12, v/v)	0.087				34.5	903
	(81/19, v/v)	0.093				34.5	903
	(79.4/20.6, v/v)	0.095 (μ)				34.5	903
	(69.7/30.3, v/v)	0.119 (μ)				34.5	903
	(59.7/40.3, v/v)	0.139 (μ)				34.5	903
	(39.6/60.4, v/v)	0.159 (μ)				34.5	903
	(20/80, v/v)	0.173 (μ)				34.5	903
	THF	0.195				30	216
			0.1926			30	84
					0.190		235
			0.198				57
					0.194		166
$\bar{M}_w =$ 2.4 × 10^4		0.205	0.193			25	236
5.31 × 10^4		0.202	0.189			25	236
16.5 × 10^4		0.207	0.194			25	236

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
54.1×10^4		0.208	0.195			25	236
150×10^4		0.209	0.196			25	236
570×10^4		0.211	0.198			25	236
				0.186			618,798
				0.193		20	869
				0.192		23	830
				0.186		25	637
		0.195				30	216,919
		0.208	0.193	0.188		RT	630
100% mol deuterated		0.186	0.171	0.165		RT	630
62% mol deuterated		0.190	0.177	0.172		RT	630
25% mol deuterated		0.193	0.182	0.178		RT	630
	THF/methanol (28.7/71.3, v/v)		0.179			25	209
	Toluene	0.111	0.109			RT	232
		0.112				12	221
			0.104			20	31,227
		0.112				20	102
			0.109			20	238
		0.1113	0.1079		0.1073 (578)	20	5
					0.1071 (589)	20	5
					0.1060 (644)	20	5
					0.113		153
		0.112	0.108				230
		0.195				20	231
			0.110			20	240
		0.111				23	237
		0.112				25	239
			0.109				225
		0.1188	0.1079			25	241
		0.1129	0.1091			25	242
			0.1130			25	43
			0.110			25	243
			0.111			25	240
		0.111				25	217,228
		0.112				25	146
		0.1150	0.1111			25	139
			0.111			28	29
			0.110				147
		0.113				30	152,216
		0.118				30	229
		0.114				35	97
			0.118			45	243
			0.125			65	243
				0.110			244
			0.118			67	218
				0.106			618
				0.101			842
		0.113				15	834
		0.115				20	834
				0.111		20	869
					0.103 (1086)	20	915
$M = 1.2 \times 10^3 - 1.07 \times 10^5$				0.089–0.105		20	732
star shaped polymer				0.103		20	737
					0.105 (1086)	25	915
			0.109		0.113	25	647
			0.111			25	751
			0.110			25	601
		0.112				25	613
			0.105			25	633
increase with *M*			0.110–0.112	0.107–0.110		25	635
increase with *M*:			0.093–0.109			25	648
			0.112			25	664
		0.117				25	834

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g)				T (°C)	Refs.
		$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others		
$M > 2 \times 10^4$				0.108		25	833
star branched				0.103–0.106		25	833
				0.107–0.112		23–27	652
				0.108		30	671
			0.110			30	691
		0.113				30	697,699,216
		0.118				30	834
$M = 2 \times 10^3 - 18 \times 10^5$		0.101–0.118				30	837
		0.113				35	659
$M = 2 \times 10^3 - 18 \times 10^5$		0.114				35	704
		0.119				50	699
		0.125				70	699
			0.125			80	638
			0.126			90	609
isotactic		0.111				30	245
$M_w = 0.02 \times 10^5 - 0.5 \times 10^5$	Toluene	0.101–0.107				30	962
$M_w = 1.10 \times 10^5$	Toluene	0.106				30	962
$M_w = 1.60 \times 10^5$	Toluene	0.107				30	962
$M_w = 2.00 \times 10^5 - 8.67 \times 10^5$	Toluene	0.110–0.117				30	962
$M_w = 18 \times 10^5$	Toluene	0.118				30	962
$M_w = 1.25 \times 10^5 - 2.5 \times 10^5$	Toluene	0.117				30	962
dispersion	Water				0.250	25	95
					0.241		246
		0.256				25	247
latex		0.257					248
sulfonated	Neutralization equiv.						
	= 0.9 mEq/g: 0.05 M NaCl		0.212			25	247
	1.8 mEq/g: 0.056 M NaCl		0.207			25	247
	2.0 mEq/g: 0.10 M NaCl		0.195			25	247
	2.7 mEq/g: 0.10 M NaCl		0.205			25	247
	Toluene/*p*-cymene						
	(73.4/26.6 w/w)	0.115				30	699
	(49.7/50.3 w/w)	0.117				30	699
	Trichlorobenzene		0.028			25	653
	Water/THF (1/99, v/v)				0.183	25	796
					0.166 (μ)	25	796
	(3/97, v/v)				0.192	25	796
					0.183 (μ)	25	796
	(4.5/95.5, v/v)				0.180	25	796
					0.177 (μ)	25	796
	(7/93, v/v)				0.180	25	796
					0.188 (μ)	25	796
Poly(styrene-*p*-sulfonic acid)	Aq. KCl 2.5 M		0.0347*			25	249
–, K-salt, DN = 1.0	Aq. KCl; $I = 0.10$	0.197				30	85
–, Na-salt	THF/ethanol (76/24, v/v)		0.124			25	675
			0.128 (μ)			25	675
	Aq. 0.1 M Na_2SO_4		0.152 (μ)			25	879
	Aq. 1 M Na_2SO_4		0.122 (μ)			25	879
Poly(styrene-co-acrylonitrile), (1/1, mol/mol)							
	MEK		0.198			25	753
Poly(styrene-*co*-*n*-butyl methacrylate) (1/1, mol/mol)							
	MEK	0.164				35	814
Poly(styrene-*co*-*p*-chlorostyrene), (~1/1, mol/mol)							
	Cumene	0.122				25	795
		0.124				40	795
		0.125				55	795
Poly(styrene-*co*-ethylene-*co*-butene) (Kraton G)							
	THF		0.116			25	675
	THF/ethanol (94/6, v/v)		0.118			25	675
			0.120 (μ)			25	675
	(88/12, v/v)		0.120			25	675
			0.124 (μ)			25	675

*Expressed in l/g-segment.

TABLE 1. *cont'd*

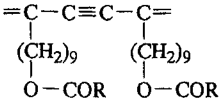
Polymer	Solvent	dn/dc (ml/g)				T (°C)	Refs.
		$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others		
1.7. OTHER COMPOUNDS							
Poly(acrylonitrile)	γ-Butyrolactone		0.079			25	276
			0.078			30	277
	Dimethylacetamide	0.0767	0.0769			25	278
	Chlorobenzene				0.00		891
	DMF		0.080				643
					0.085		891
		0.870				18	213
			0.082			20	238
			0.0874			20	281
		0.0877				20	283
		0.0914				20	283
		0.0924				20	283
			0.196			25	284
			0.083			25	215,276, 278,280
			0.089				279
		0.080				25	282
			0.084			25	277
			0.087			25	10
		0.085	0.084			20	897
			0.078			25	985
	DMSO	0.029	0.031			25	278
			0.043			25	285
			0.092			140	278
			0.0263			25	284
	DMSO/acrylonitrile						
	(65/35, v/v)		0.061			25	726
			0.067 (μ)			25	726
	(73/27, v/v)		0.055			25	726
			0.062 (μ)			25	726
	(82/18, v/v)		0.048			25	726
			0.053 (μ)			25	726
	(91/9, v/v)		0.040			25	726
			0.044 (μ)			25	726
	MEK				0.132		891
Poly(diacetylenes) 							
R = isopropyl	Chloroform				0.174 (580)		644
R = benzyl					0.198 (580)		644
R = 1-methylene naphthalene					0.228 (580)		644
R = 1-methylene naphthalene							
	1,2-Dichloroethane		0.267		0.220 (578)	RT	740
				0.190		RT	740
Poly(*tert*-butyl vinyl ketone)	*sec*-Butyl alcohol		0.097			25	715
Poly(*N*-isobutyl maleimide)	Chlorobenzene				0.01		577
Poly(maleic acid-*co*-ethyl vinyl ether) (1/1, mol/mol)							
	THF			0.091		25	663
Poly(maleic acid-*co*-ethyl vinyl ether) (1/1 mol), sodium salt							
	Aq. 0.18 M NaCl			0.180		25	663
Poly(maleic anhydride-*co*-ethyl vinyl ether (1/1, mol/mol)							
	THF			0.088		25	663
	Acetone	0.133				30	896
Poly(maleic anhydride-*co*-octadecene) (1/1, mol/mol)							
	Ethyl acetate		0.119			25	733
Poly(2-methyl 5-vinylpyridine; *N*-oxide)							
	Methanol			0.262		25	679
Poly(2-methyl-5-vinylpyridine)							
	n-Butyl acetate	0.200	0.188			25	269
	MEK	0.212	0.202			25	269

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Methanol	0.273	0.257			25	270
				0.250		RT	680
Poly(phenyl vinyl ketone)	Benzene		0.102			25	759
Poly(vinyl acetate)	Acetone		0.095			20	238
		0.104					287
					0.116	25	32
			0.104			25	289
		0.104				25	288
			0.105			25	201
			0.1021			35	34
	Acetonitrile				0.104		290
	Benzene				0.030		194
			−0.0225			30	84
	n-Butyl acetate		0.0716			30	84
	Chlorobenzene		−0.0426			30	84
					−0.049	25	32
	Dioxane				0.028		290
	Ethyl acetate				0.087	25	32
	Ethyl formate				0.095		290
	MEK				0.080	15	32
			0.080				291
		0.080					252,287,292
					0.080	25	32,293
		0.083				25	205
			0.080			25	289
					0.080	35	32
				0.075			618
	Methanol	0.107				25	287
		0.130				25	288
		0.132				25	205,294
					0.124	25	32
			0.132				289
		0.1319				34–38	295
				0.119			618
		0.130	0.132		0.128 (366)		881
	Methyl isobutyl ketone				0.068		290
	Methyl isopropyl ketone/ *n*-heptane (3/1–6/1, v/v)	0.075	0.075			25	252
	THF		0.0582			30	84
				0.050			618
Poly(vinyl acetate)							
				0.057		25	637
			0.059				803
				0.054		25	865
	Trichlorobenzene	0.1030				34–38	296
Poly(vinyl acetate) (partially hydrolyzed)							
Deg. of Hydrolysis							
= 0.840	Water		0.151				297
0.883			0.155				297
0.964			0.161				297
0.008	Acetone		0.103			25	289
0.029			0.101			25	289
0.049			0.098			25	289
0.119			0.090			25	289
0.008	MEK		0.083			25	289
0.029			0.087			25	289
0.049			0.092			25	289
0.119			0.110			25	289
0.008	Methanol		0.128			25	289
0.029			0.115			25	289
0.049			0.107			25	289
0.119			0.071			25	289
Poly(9-vinyl adenine)	Aq. 0.1 M NaCl+Na cacodylate		0.326			26	823
			0.331			40	823

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TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Poly(vinyl alcohol)	Water/*n*-propanol (98/2, w/w)	0.134	0.135		0.128 (366)	25	881
					0.133 (404)	25	881
		0.145	0.147		0.142 (366)	40	881
					0.144 (404)	40	881
		0.158	0.160		0.151 (366)	70	881
					0.153 (404)	70	881
	Water		0.150			20	298
		0.144				20	299
		0.168	0.164		0.164 (578)	30	287
$M_w = 39900$	Water			0.151		25	948
$M_w = 120000$				0.153		25	948
$M_w = 160000$				0.153		25	948
Poly(vinylbiphenyl)	Benzene	0.182	0.165			24	300
	Carbon tetrachloride	0.220	0.207			24	300
	Dioxane	0.257	0.233			24	300
	Ethylene glycol dimethyl ether	0.301	0.277			24	300
	Ethylene glycol dimethyl ether/ethylene glycol monomethyl ether (56/44, v/v)	0.297–0.301	0.271–0.275			30	300
Poly(vinyl bromide)	THF		0.112				251
					0.112 (644)		252
Poly(vinyl *n*-butyl ether)	MEK	0.0792				25	250
Poly(vinyl butyral) – acetylated							
	Acetone		0.119			25	880
	Acetonitrile		0.130			25	880
	n-Butyl acetate		0.084			25	880
	n-Butyl chloride		0.075			25	880
	THF		0.071			25	880
Poly(vinyl *n*-butyrate)	MEK				0.0684	20	301
Poly(vinyl carbanilate)	Dioxane	0.159	0.155			20	302
Poly(*N*-vinylcarbazole)	Benzene	0.210	0.190			25	304
		0.219	0.195			25	303
		0.222	0.198			30	303
		0.225	0.201			35	303
		0.228	0.204			40	303
		0.231	0.207			45	303
	Chloroform	0.268	0.232			25	304
	Tetrachloroethane	0.214	0.185			25	304
	THF	0.282	0.262			25	304
Poly(9-vinylcarbazole-*co*-diethyl fumarate)							
	Benzene		0.128			25	781
Poly(*N*-vinyl-3,6-dibromocarbazole)							
	o-Dichloroenzene		0.113			25	800
	THF		0.174			25	800
Poly(vinyl chloride)	Acetone		0.138			20	238
	iso-Amyl acetate			0.098		20	682
	Aq. NH_4OH; pH 9–10 (latex)		0.200				253
	n-Butyl acetate			0.112		20	682
	Cyclohexanone	0.0718	0.0705		0.0701 (578)	15.5	259
		0.0723	0.0714		0.0708 (578)	20	259
			0.0840			25	255,256
		0.079	0.077		0.076 (589)	25	206
			0.075			25	10
			0.074			25	254,257
					0.078		258
		0.0739	0.0727		0.0716 (578)	25	259
		0.0758	0.0742		0.0740 (578)	25	259
		0.0764	0.0746		0.0745 (578)	30	259
		0.0767	0.0756		0.0753 (578)	35	259

TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
			0.0905			50	255
			0.0840			50	256
			0.0900			75	256
			0.0970			75	255
			0.0940			95	256
				0.075		20	682
			0.074			25	851
	Di-*n*-butyl phthalate		0.0380			25	256
	Diethyl adipate			0.085		20	682
	Di-2-ethylhexyl phthalate		0.0435			25	256
			0.0465			50	256
			0.0494			80	256
			0.0518			105	256
	Diethyl malonate			0.094		20	682
	Diethyl oxalate			0.103		20	682
	Diethyl succinate			0.094		20	682
	Di-2-heptylnoyl phthalate		0.0420			25	256
	Di-*n*-hexyl phthalate		0.0250			25	256
			0.0260			50	256
			0.0280			70	256
			0.0300			105	256
	Dimethyl phthalate		0.0260			25	256
	Dioxane		0.0900			25	256
			0.0925			25	260
		0.107	0.104		0.107 (589)	25	206
			0.11			25	261
$M_w = 2.04 \times 10^6$			0.0850			28.5	262
1.78×10^6			0.0865			28.5	262
	Di-*n*-propyl phthalate		0.0395			25	256
	DMF		0.069			25	256
			0.078			50	256
			0.0875			75	256
			0.095			95	256
		0.084					258
		0.0816	0.0810		0.0813 (578)	25	259
	Ethyl heptanoate			0.102		20	682
	Tetrachloroethane		0.0432			20	255
			0.0450			25	255
			0.0540			50	255
			0.0630			75	255
	THF	0.1040	0.1017		0.1010 (578)	16.5	259
		0.115	0.110			RT	265
					0.102		258
			0.106				266
		0.1124				20	263
			0.105			25	261
			0.1123			25	256
		0.119	0.116		0.115 (589)	25	206
			0.1065			25	267
		0.1079	0.1052		0.1068 (578)	25	259
		0.1067	0.1053		0.1046 (578)	25	259
		0.1093	0.1064		0.1059 (578)	30	259
		0.1118	0.1087		0.1093 (578)	35	259
			0.1045			35	34
			0.1065				264
				0.111		20	682
				0.102		25	637
			0.106			25	851
	THF/water (91/9, v/v)	0.112 (μ)	0.1085 (μ)			25	267
–, chlorinated 56.4, wt.% Cl	Tetrachloroethane		0.045			25	255
58.3, wt.% Cl			0.0424			25	255
61.5, wt.% Cl			0.525			25	255
63.4, wt.% Cl			0.0606			25	255
66.6, wt.% Cl			0.073			25	255

TABLE 1. *cont'd*

		dn/dc (ml/g)					
Polymer	**Solvent**	$\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	**Others**	T (°C)	**Refs.**
Poly(vinyl dimethylamylsilane)	Cyclohexane		0.070			25	884
Poly(vinyl dimethylheptylsilane)	Cyclohexane		0.085			25	884
Poly(vinyl dimethylphenylsilane)	Cyclohexane		0.142			25	884
Poly(vinylidene chloride)	1-Methyl-2-pyrrolidone		0.080			RT	695
	Tetramethylene sulfoxide		0.049			RT	695
Poly(vinyl ethyl ether)	MEK	0.0736				25	250
Poly(vinyl fluoride)	DMF				≈0.02		268
Poly(vinylidene fluoride)	DMA		−0.033	−0.031		25	986
	DMF		−0.023	−0.021		25	986
	DMSO		−0.062	−0.060		25	986
	N,*N*′-dimethylethyleneurea		−0.055	−0.053		25	986
	Hexamethylphosphoric triamide		−0.046	−0.044		25	986
	N-methyl pyrrolidone		−0.052	−0.50		25	986
	3-methyltetramethylene sulfone		−0.064	−0.063		25	986
	Tetramethylurea		−0.042	−0.040		25	986
Poly(*N*-vinyl-imidazole)							
incr. with mol. wt.	Ethanol		0.180–0.192			25	887
	Methanol	0.235				25	719
	Tetrabutyl ammonium bromide	0.224				25	719
	Tetrabutyl ammonium bromide	0.224 (μ)				25	719
Poly(vinyl isopropyl ether)	MEK	0.0827				25	250
Poly(vinyl methyl ether)	MEK	0.0944				25	250
	Chloroform			0.044			842
	THF			0.063			842
	Toluene			0.001			842
Poly(α-vinylnaphthalene)	Benzene	0.192	0.175			24	300
	Ethylene dichloride	0.239	0.217			24	300
	Ethylene glycol dimethyl ether	0.268	0.248			24	300
	Toluene	0.162–0.192				24	300
Poly(β-vinylnaphthalene)	Benzene	0.182–0.197	0.167–0.181			24	300
	Carbon tetrachloride	0.215	0.194			24	300
	Ethylene glycol dimethyl ether	0.309	0.284			24	300
	Ethylene glycol dimethyl ether/ethylene glycol monomethyl ether (56/44, v/v)	0.283	0.258			24	300
Poly(2-vinylpyridine)	Aniline	0.023				25	907
	Benzene	0.107				25	907
	n-Butanol	0.209				25	907
	2-Butanol	0.216				25	907
	Chloroform		0.1372			23	34
		0.168				25	907
			0.1215			35	39
	Cyclohexanone	0.144				25	907
	1,2-Dichloroethane	0.148				25	907
	Dioxane	0.175				25	907
	DMF	0.165				25	907
atactic			0.157				271
isotactic			0.163				271
	DME/methacrylic acid (95/5, v/v)				0.187 (589)	20	797
					0.195 (μ) (589)	20	797
	Ethanol	0.245				25	907
atactic			0.221				271
isotactic			0.221				271
isotactic	Ethanol + 0.1 M sodium acetate		0.222				271

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TABLE 1. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	MEK	0.215				25	907
	Methanol			0.254		RT	680
		0.270				25	907
$M = 2.1 \times 10^3$–22.9×10^3		0.259–0.263				25	909
Poly(vinyl-2-pyridine)	0.950 Nitromethane/0.050 carbon tetrachloride		0.2020			25	967
	0.900 Nitromethane/0.100 carbon tetrachloride		0.1989			25	967
	0.800 Nitromethane/0.200 carbon tetrachloride		0.1918			25	967
	0.750 Nitromethane/0.250 carbon tetrachloride		0.1889			25	967
	0.700 Nitromethane/0.300 carbon tetrachloride		0.1847			25	967
	0.625 Nitromethane/0.375 carbon tetrachloride		0.1793			25	967
	0.565 Nitromethane/0.435 carbon tetrachloride		0.1740			25	967
	0.500 Nitromethane/0.500 carbon tetrachloride		0.1705			25	967
	0.470 Nitromethane/0.530 carbon tetrachloride		0.1684			25	967
	0.400 Nitromethane/0.600 carbon tetrachloride		0.1560			25	967
	0.250 Nitromethane/0.750 carbon tetrachloride		0.1525			25	967
	0.214 Nitromethane/0.786 carbon tetrachloride		0.1500			25	967
	Nitroethane	0.197				25	907
	n-Propanol	0.215				25	907
	2-Propanol	0.221				25	907
	1,1,2,2-Tetrachloroethane	0.109				25	907
	THF	0.195				25	907
					0.182		272
	1,1,1-Trichloroethane	0.162				25	907
Poly(4-vinylpyridine)	Chloroform	0.150				25	146
	DMF	0.160				25	146
			0.153				658
				0.153		RT	680
	Ethanol	0.231					273
	Ethanol/water (95/5, w/w)	0.231					273
	Isopropanol	0.224				25	274
	MEK/isopropanol (85/15, w/w)	0.221				25	274
	(86/14, w/w)	0.224				25	274
	Methanol	0.267				25	274
	Nitromethane				0.180		275
					0.159		275
					0.152		275
	Phenyl cyanide	0.052				25	146
Poly(2-vinylpyridine 1-oxide)	Aq. 1 M NaCl			0.220		25	679
	2-Propanol	0.209				25	640,987
Poly(4-vinylpyridine *N*-oxide)	Aq. 0.1 M NaCl			0.241		25	679
Poly(vinylpyrrolidone)	Chloroform	0.108	0.108				306
	Methanol		0.183			25	201
			0.176			25	193
	Water		0.135			25	193
		0.185	0.185				306
		0.181	0.176		0.176 (578)	20	792
		0.180	0.176		0.175 (578)	25	792
		0.179	0.175		0.174 (578)	30	792
		0.179	0.174		0.173 (578)	35	792
$M_w = 10100$	Water			0.181		25	948
$M_w = 35100$				0.181		25	948
$M_w = 46400$				0.185		25	948
$M_w = 1540000$				0.179		25	948
Poly(vinylsulfonic acid), potassium salt	KCl 0.35 M		0.01664 (μ)*			23	308
	0.65 M		0.01638 (μ)*			23	308
Poly(vinyltrimethyl silane)	Carbon tetrachloride		0.048				307
	Cyclohexane		0.083				307
	Cyclohexane		0.087			25	884

* Expressed in i/g-segment.

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TABLE 2. MAIN-CHAIN CYCLIC CARBON POLYMERS

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,\text{nm}$	$\lambda_0 = 546\,\text{nm}$	$\lambda_0 = 633\,\text{nm}$	Others	T (°C)	Refs.
Poly(acenaphthylene)	Benzene	0.225	0.119			25	55
	1,2-Dichloroethane	0.264	0.238			35	55
	Toluene		0.190			25	56
Poly(4,7-dimethyl-indene)	Benzene				0.100		750
Poly(6-methyl-indene)	Benzene				0.100		750
Poly(phenylenes)-phenyl substituted							
	Benzene		0.250			25	848
	THF		0.294			25	848

TABLE 3. MAIN-CHAIN HETEROATOM POLYMERS

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,\text{nm}$	$\lambda_0 = 546\,\text{nm}$	$\lambda_0 = 633\,\text{nm}$	Others	T (°C)	Refs.
3.1. C–O–C POLYMERS (POLY(OXIDES), POLY(ESTERS) AND OTHERS)							
3.1.1. POLY(OXIDES)							
Poly(formaldehyde) see Poly(oxymethylene)							
Poly(oxybutylethylene) [Poly(hexamethylene oxide)]							
	Diethyl ketone					0.08825	340
Poly(oxy-*tert*-butylethylene)	*o*-Dichlorobenzene				0.095	80	819
	Isooctane		0.114			75	328
Poly(oxy-2,6-dimethyl-1,4-phenylene) (PPO)							
	Benzene		0.114			25	330
	Chlorobenzene		0.098			25	330
	Chloroform		0.124			25	330
			0.169			25	331
	Toluene		0.1153			25	331
			0.118			25	330
			0.116			25	787
			0.128			35	787
			0.133			40	787
			0.136			60	787
	Trichloroethane		0.139			25	787
			0.145			35	787
			0.152			40	787
			0.160			60	787
	Xylene		0.1136			25	331
Poly(oxy-2,6-diphenyl-1,4-phenylene)							
	Chloroform		0.226			30	921
	Toluene		0.185			25	331
Poly(dichlorophenylene oxide)	Toluene	0.123				30	963
$M_w = 5 \times 10^4$							
$M_w = 0.47 \times 10^5$	Toluene	0.119				30	983
$M_w = 1.14 \times 10^5$	Toluene	0.117				30	983
$M_w = 0.47 \times 10^5$	Toluene	0.119				30	983
$M_w = 0.47 \times 10^5$	Toluene	0.124				30	983
Poly(oxyethylene) glycol							
$M_w =$ 62	Acetonitrile		0.0964			25	332
100			0.106			25	332
161			0.114			25	332
205			0.121			25	332
316			0.123			25	332
407			0.130			25	332
970			0.135			25	332
9400			0.135			25	332
106	Benzene	−0.086					333
194		−0.073					333

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
282		−0.066					333
810		−0.059					333
3510			−0.016			25	332
		−0.018				30	846
		−0.013				54	846
$M = 1.5 \times 10^3 - 5.3 \times 10^5$	Benzene		−0.017 to −0.010			25	612
$M_w = 4000$		−0.022				30	962
	Bromofrom	−0.108	−0.090			23	860
	n-Butanol		0.076				334
	Carbon tetrachloride/ methanol (75/25, v/v)		0.066			25	751
	(50/50, v/v)		0.091			25	751
	(20/80, v/v)		0.128			25	751
	Chlorobenzene	−0.039	−0.030			23	860
	Chloroform	0.054	0.053			23	860
		0.054				30	846
	Chloroform/*n*-hexane (47/53, v/v)		0.091			20	193
	1,2-Dibromoethane	−0.048	−0.044			23	860
$M_w = 10000$	Dioxane		0.045				333
		0.061				45	846
	DMF		<0.05			25	335
$M_w = 9400$			0.044			25	332
$M_w = 810$	MEK		0.092				333
10000			0.094				333
	Methanol		0.150				334
$M_w = 62$			0.118			25	332
100			0.127			25	332
161			0.135			25	332
205			0.139			25	332
316			0.141			25	332
445			0.142			25	332
810			0.143				333
1020			0.144			25	332
3000			0.149				333
6000			0.150				333
9400			0.150			25	332
10000			0.148				333
31000			0.150			25	332
			0.143			25	193
			0.152			45	328
		0.145	0.142			30	846
		0.150				45	846
$M_w = 0.68 \times 10^5$	Methanol			0.142		25	963
$M_w = 6700$	Methyl acetate		0.111			25	332
	Pyridine	−0.026	−0.018			23	860
	1,1,2,2-Tetrachloroethane	0.006	0.007			23	860
	THF		0.068				334
	Water	0.134	0.132			27	337
			0.139				334
		0.138	0.135	0.134	0.135 (578)	20	725
				0.132		25	685
		0.138		0.132		25	688
		0.136	0.134	0.133	0.133 (578)	30	725
		0.134	0.132	0.132	0.132 (578)	40	725
		0.133	0.131	0.129	0.130 (578)	50	725
$M_w = 62$		0.093					333
106		0.108					333
194		0.124					333
300		0.126	0.123				333
600		0.135	0.131				333

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
600					0.128 (589)	25	338
810		0.136	0.128				333
1200		0.139	0.134				333
3000		0.141					333
4000					0.134 (589)	25	338
6000					0.134 (589)	25	338
6000		0.145	0.139				333
9000					0.134 (589)	25	338
9400			0.135			25	332
10000		0.142					333
14400			0.139			25	336
14400			0.115			80	336
31000			0.135			25	332
340000		0.149				25	339
Poly(ethylene glycol) carbamate $M_w = 5500$							
	Benzene	−0.035				30	962
Poly(oxyethylethylene) [Poly(1-butene oxide)]							
	Benzene		−0.0403			25	326
	Chlorobenzene		−0.0784			25	326
	Ethyl acetate		0.1125			25	326
	n-Hexane		0.1008			25	326
	MEK	0.0863				30	327
	Toluene		−0.0357			25	326
Poly(oxymethylene)	Hexafluoroacetone/water (1/1.7, mol/mol) + 1% (v/v) triethylamine buffer, pH 2.0	0.134	0.128				341
		0.114 (μ)	0.112 (μ)				341
	1H,1H,5H-Octafluoropentanol-1		0.156			110	325
Poly(oxymethyleneoxyethylene) [Poly(dioxolane)]							
MW	Chlorobenzene		0.051				578
	o-Dichlorobenzene		0.075				578
	Dichloroethane		0.020				578
	Dioxane		0.050				578
Poly(oxy-1-octylethylene))	Chloroform				0.0357	25	329
Poly(oxy(1-phenyl)ethylene) [Poly(styrene oxide)]							
	Benzene		0.085			30	328
$M_w =$ 67	Acetone	0.085				25	342
125		0.0915				25	342
450		0.096				25	342
1100		0.099				25	342
1240		0.099				25	342
2100		0.100				25	342
3270		0.100				25	342
3850		0.101				25	342
	Benzene	−0.0530	−0.0448			25	343
Poly(propylene glycol)							
$M_w = 4000$	Benzene	−0.055				30	963
	Chlorobenzene	−0.0658	−0.0638			25	343
	n-Hexane	0.0775	0.0775			25	343
		0.0460	0.0460			40	343
$M_w = 9.6 \times 10^5$		0.0887	0.0887			46	343
		0.101	0.101			57	343
2.0×10^5		0.0895	0.0895			46	343
		0.104	0.104			57	343
	Feron 113	0.118	0.115			25	343
	Isooctane	0.0655	0.0655			35	343
	Methanol	0.137	0.135			24 ± 1	300
$M_w = 12.2 \times 10^5$		0.118	0.118			25	343
12.5×10^5		0.115	0.115			25	343
Poly(oxytetramethylene) [Poly(tetrahydrofuran)]							
	Chlorobenzene	0.070					347
	Ethyl acetate	0.110				25	348

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
		0.114				30	349
	Ethyl acetate/n-hexane (22.7/77.3, w/w)	0.114				31.8	349
	Isopropanol	0.108				46	351
	Isopropyl acetate	0.098				22.5	352
	MEK	0.102				30	348
			0.091			25	350
			0.095				347
	Methyl acetate		0.101			25	350
	3-Methyl-2-heptanone		0.056			25	350
	2-Pentanone		0.084			25	350
	THF	0.0625	0.0625			25	348
			0.064			25	350
Poly(oxytrimethylene)	MEK				0.0946		353
3.1.2. POLY(ESTERS)							
Poly(ethylene terephthalate) see Poly(oxyethyleneoxyterephthaloyl)							
Poly(β-hydroxybutyric acid)	2,2,2-trifluoroethanol	0.153	0.149	0.146	0.148 (578)	25	988
Poly(oxyadipoyloxytetramethylene) [Poly(butylene adipate)]							
	Acetic acid		0.100			50	317
	Diethyl carbonate		0.084			35	317
			0.091			70	317
	Dioxane		0.0518			35	317
	THF		0.0784			35	317
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene) [Poly(carbonate) from Bisphenol A]							
	Bromoform	0.004	0.004			23	860
	Chloroform		0.162				319
		0.164				20	318
			0.156			20	920
			0.153			23	793
		0.157	0.147			23	860
		0.167	0.155			25	588
	Chloroform + 2% (w/w) ethanol		0.154			25	758
	1,2-Dibromomethane	0.054	0.050			23	860
	Dioxane		0.168			25	320
	Dichloroethane	0.166	0.154			25	588
	Methylene chloride	0.1660			0.1547 (553)	7	322
					0.1538 (574)	7	322
		0.177				25	321
		0.1773			0.1654 (533)	27	322
					0.1643 (574)	27	322
			0.177		0.165 (553)	25	322
	Pyridine	0.077	0.073			23	860
	1,1,2,2-Tetrachloroethane	0.106	0.094			23	860
	THF	0.1889			0.1765 (553)	7	322
					0.1753 (574)	7	322
		0.1943			0.1815 (553)	27	322
					0.1805 (574)	27	322
		0.198	0.186			23	860
		0.194	0.182			25	588
Poly(oxyethyleneoxyterephthaloyl) [Poly(ethylene terephthalate)]							
	Dichloroacetic acid		0.1021			35	34
	Trifluoroacetic acid		0.278				323
	1,1,1,3,3,3-Hexafluoropropanol-2			0.243		25	875
		0.308	0.287			25	843
Poly(oxy-1-oxohexamethylene) [Poly(ε-caprolactone)] Prepared with 1 mol/mol $(C_2H_5)_3Al$							
	Acetic acid		0.108			50	317
	o-Dichlorobenzene		– 0.0595			35	317

TABLE 3. *cont'd*

		dn/dc (ml/g)					
Polymer	Solvent	$\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	Diethyl carbonate		0.092			35	317
			0.0990			70	317
	Dioxane		0.0489			25	317
			0.0507			35	317
			0.054			50	317
			0.0581			70	317
Prepared with 1 mol% $(C_2H_5)_2AlCl$							
	Acetic Acid		0.0940			50	317
	o-Dichlorobenzene		−0.057			35	317
	Diethyl carbonate		0.093			35	317
			0.0939			40	317
			0.101			70	317
	Dioxane		0.0489			25	317
			0.0504			35	317
			0.0581			70	317
	THF		0.0795			35	317
Prepared with 0.61 mol% *n*-C_4H_9OK							
	Diethyl carbonate		0.0917			35	317
			0.1021			70	317
Poly(D-oxy-1-oxo-3-methyl tetramethylene)							
	Trifluoroethanol	0.152	0.149			25	703
Poly(D,L-oxy-1-oxo-3-methyl tetramethylene)							
	Trifluoroethanol	0.153	0.151			25	702
	Tetrahydrofuran	0.153	0.151			25	595
Poly(oxy-1-oxo-2-methylethylene) [poly(lactic acid)]							
	Bromobenzene		−0.06			85	324
Poly(oxypropylenetriol-*co*-diphenylmethane diisocyanate)							
	DMF		0.039			20	636
Poly(oxysebacoyloxyoctamethylene)							
	Acetic acid		0.100			50	317
	o-Dichlorobenzene		−0.071			35	317
	Diethyl carbonate		0.090			45	317
			0.100			70	317
	Dioxane		0.050			35	317
			0.054			50	317
			0.054			70	317
	THF		0.076			35	317
Poly(oxytetramethyleneoxyadipoyl-*co*-butandiol-*co*-diphenylmethane diisocyanate)							
	DMF		0.110			25	877
Poly(oxytetramethyleneoxyterephthaloyl)							
	1,1,1,3,3,3 Hexafluoropropanol-2			0.236		25	875
Poly(oxytriphenylstibyleneoxytetramethylterephthaloyl)							
	HMP				0.56		873
Poly(oxytriphenylstibyleneoxyterephthaloyl)							
	HMP				0.86		873
Poly(oxytriphenylstibyleneoxybromoterephthaloyl)							
	HMP				2.2		873
Poly(oxytriphenylstibyleneoxynitroterephthaloyl)							
	HMP				0.45		873
Poly(oxytriphenylstibyleneoxydichloroterephthaloyl)							
	HMP				0.18		873
Poly(oxytriphenylstibyleneoxyoxalyl)							
	HMP				2.1		873
Poly(oxytriphenylstibyleneoxyfumaroyl)							
	HMP				0.68		873
Poly(oxytriphenylstibyleneoxyferrocene-1,1-dicarboxoyl)							
	HMP				0.88		873
3.1.3. OTHER COMPOUNDS							
Poly(oxy-1,4-phenyleneoxy-1,4-phenylene-carbonyl-1,4-phenylene)							
	97.4% H_2SO_4				0.525 (514)	RT	747
				0.385		RT	747

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
3.2. C–S–C POLYMERS (POLY(SULFONES) AND OTHERS)							
3.2.1. POLY(SULFONES)							
Poly(bicycloheptene-*co*-sulfur dioxide)							
	Chloroform			0.102		25	696
	Cyclohexanone			0.112		25	696
Poly(1-butene-*co*-sulfur dioxide)							
	Chloroform	0.0970			0.0949 (578)	20	355
	MEK	0.133	0.129			26	904
Poly(cyclohexene-*co*-sulfur dioxide)							
	Chloroform	0.1133			0.1104 (578)	20	355
Poly(1-dodecene-*co*-sulfur dioxide)							
Phenolphthalein poly(ether sulfone)							
	$CHCl_3$				0.204 (532)	25	967
	Chloroform	0.0695			0.0581 (578)	20	355
Poly(1-hexene-*co*-sulfur dioxide)							
	Chloroform	0.0790			0.0782 (578)	20	355
	n-Hexyl chloride	0.0796				7	355
		0.0834				20	355
	MEK/isopropanol (37/63, v/v)	0.1242				27	355
		0.1261				37	355
	(41.5/58.5, v/v)	0.1208				7	355
		0.1233				20	355
Poly(1-octene-*co*-sulfur dioxide)							
	Chloroform	0.0732			0.0718 (578)	20	355
Poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene) [Poly(sulfone)]							
	DMF		0.194			25	580
3.2.2. OTHER COMPOUNDS							
Poly(2-acrylamido, 2-methyl propane sulfonic acid)							
	4.5 M aqueous NaCl			0.102		25	966
Poly(2-acrylamido, 2-methyl propane sulfonamide)							
	Formamide			0.082		25	972
	Water			0.157		25	972,966
Poly(2-acrylamido-2-methylpropane sulfonate)							
	1 M aqueous NaCl			0.154			971
Poly(2-ethyl-2-oxazoline)	Water				0.184 (510)	5	970
	Water				0.176 (510)	25	970
	Water				0.174 (510)	45	970
	Ethanol				0.155 (510)	25	970
	i-Propanol				0.155 (510)	25	970
	n-Butanol				0.110 (510)	25	970
Poly(2-methyl-2-oxazoline)	Water				0.182 (510)	5	970
	Water				0.172 (510)	25	970
	Water				0.172 (510)	45	970
Poly(2-methoxycyanurate) of bisphenol F							
	Chloroform	0.173				30	973
Poly(*p*-phenylene-*cis*-benzobisoxazole)							
	Methane sulfonic acid			0.480		25	947
Poly(thio-carbonyl-1-(4-methylphenyl sulfonylamino)-ethylene)							
	DMF		0.126–0.142				853
Poly(thiopropylene)	Benzene		0.100			20	344
			0.0935				345
		0.08095					346
3.3. C–N–C POLYMERS (POLY(AMIDES), POLY(ISOCYANATES), POLY(URETHANES) AND OTHERS)							
3.3.1. POLY(AMIDES)							
Poly(iminoadipoyliminohexamethylene) (Nylon 66)							

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	Formic acid 90% + 0.5 M sodium formate	0.137				25	870
	Trifluoroethanol	0.228				25	870
Trifluoroacetylated	Acetone	0.076				25	669
	Formic acid 75%				0.144	25	311
	80%				0.145	25	311
	85%	0.141				25	312
	90%				0.145	25	311,313
			0.145			25	309
		0.145				25	312
	95%				0.150		311
	100%				0.157	25	311
		0.1525					310
	Formic acid + KCl						
	85% + 2.0 M KCl				0.124		313
	90% + 0.2 M KCl				0.143		313
	0.5 M KCl				0.140		313
	1.0 M KCl				0.136		313
	1.5 M KCl				0.131		313
	2.0 M KCl				0.126		313
	2.5 M KCl				0.122		313
	95% + 2.0 M KCl				0.129		313
	Formic acid + sodium formate						
	75% + 0.5 M				0.138	25	311
	80% + 0.5 M				0.136	25	311
	90% + 0.02 M				0.147	25	311
	0.05 M				0.146	25	311
	0.10 M				0.142	25	311
	0.2 M				0.142	25	311
	0.5 M				0.136	25	311
	0.75 M				0.130	25	311
	1.0 M				0.124	25	311
	95% + 0.5 M				0.136	25	311
	100% + 0.5 M				0.136	25	311
	Tetrafluoropropanol		0.190			25	314,315
	Tetrafluoropropanol + 0.1 N sodium trifluoroacetate buffer		0.190			25	314
Poly(4-iminobenzoyl)	Dichloroacetic acid		0.151			RT	808
	DMA		0.188			RT	808
	Trifluoroacetic acid		0.226			RT	808
	96% Sulfuric acid		0.360				656
Poly(iminocarbonyl-(4,6-dicarboxy-1,3-phenylene)-carbonylimino-1,4-phenylene) [Poly(amic acid)]							
	DMF	0.269	0.230			25	816
Poly(iminocarbonyl-(3,4-dicarboxy-1,5-phenylene)carbonylimino-1,4-phenyleneisopropylidene-1,4-phenylene) [Poly(amic acid)]							
	LiBr 0.1 N in DMA		0.206				574
			0.210				573
Poly(iminohexamethyleneiminoterephthaloyl)							
	1,1,1,3,3,3-Hexafluoro-isopropanol-2			0.231		25	875
Poly(imino(1-oxododecamethylene)) (Nylon 12)							
	m-Cresol		−0.030			25	766
	m-Cresol		−0.020			25	698
	m-Cresol/*n*-heptane						
	(90/10, v/v)		−0.004			25	698
			0.036 (μ)			25	698
	(80/20, v/v)		0.006			25	698
			0.075 (μ)			25	698
	(70/30, v/v)		0.022			25	698
			0.182 (μ)			25	698
	(60/40, v/v)		0.043			25	698,790
			0.340 (μ)			25	698,790
	(40/60, v/v)		0.083			25	791
			0.254 (μ)			25	791

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	m-Cresol/TFP (40/60, v/v)		0.254 (μ)			25	766
	Hexafluoroisopropanol	0.266	0.255			25	614
Trifluoroacetylated	Acetone	0.088				25	669
Poly(imino-(1-oxohexamethylene)) (Nylon 6)							
	Carbon disulfide 95%		0.0815			25	309
	Chloral hydrate	0.075	0.072		0.071 (578)	60	871
	o-Chlorophenol	0.024				30	916–918
	m-Cresol		−0.016			25	309
		0.003				30	916–918
			0.005			25	698
	m-Cresol/*n*-Heptane						
	(90/10, v/v)		0.020			25	698
			0.047 (μ)			25	698
	(80/20, v/v)		0.031			25	698
			0.032 (μ)			25	698
	(70/30, v/v)		0.246 (μ)			20	698
			0.045			25	698
			0.243 (μ)			25	698
			0.241 (μ)			37	698
			0.240 (μ)			45	698
	(50/40, v/v)		0.053			25	698
			0.471 (μ)			25	698
	(50/50, v/v)		0.853 (μ)			20	698
			0.083			25	698,790
			0.816 (μ)			25	698,790
			0.711 (μ)			37	698
			0.640 (μ)			45	698
	Dichloroacetic acid		0.098			RT	808
			0.098			25	309
			0.099			50	309
			0.104			80	309
	DMA		0.136			RT	808
	Formic acid 90% ± 1.0 M KCl		0.136			25	309
	2.0 M KCl		0.126			25	309
	90% Formic acid + 0.5 M Na formate	0.138	0.135	0.134		25	623
	1,1,1,3,3,3-Hexafluoro-propanol-2			0.253		25	876
	Octafluoropentanol		0.192			25	309
	Tetrafluoropropanol/water						
	(95/5, v/v)		0.183			25	316
	(90/10, v/v)		0.182			25	316
	(80/20, v/v)		0.180			25	316
	(70/30, v/v)		0.179			25	316
	(90/10, v/v)		0.18			25	316
	Tetrafluoropropanol + 1.27×10^{-3} g/ml LiCl (extrapolated to 0% H_2O		0.183			25	316
	2.54×10^{-3} g/ml LiCl (extrapolated to 0% H_2O)		0.183			25	316
	4.24×10^{-3} g/ml LiCl (extrapolated to 0% H_2O)		0.183			25	316
	6.36×10^{-3} g/ml LiCl (extrapolated to 0% H_2O)		0.182			25	316
	Trifluoroacetic acid		0.172			RT	808
	TFP	0.187				30	916–918
		0.038				30	916–918
	TFP/*o*-chlorophenol						
	(10/90, v/v)	0.027 (μ)				30	916–918
	(27/73, v/v)	0.061				30	916–918
	(27/73, v/v)	0.100 (μ)				30	916–918
	(50/50, v/v)	0.092				30	916–918

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	(50/50, v/v)	0.220 (μ)				30	916–918
	(70/30, v/v)	0.143				30	916–918
	(70/30, v/v)	0.290 (μ)				30	916–918
	(90/10, v/v)	0.174				30	916–918
		0.254 (μ)				30	916, 918
	TFP/water (90/10, v/v)		0.180			25	761
	+ 0.1 M LiCl		0.182			25	791
			0.182 (μ)			25	791
	Trifluoroethanol	0.236				25	870
Trifluoroacetylated	Acetone	0.075				25	669
Poly(imino-(1-oxooctamethylene))							
	TFP/5 vol% water/ 0.05 M LiCl		0.173 (μ)			25	878
Poly[imino-(1-oxotetramethylene)]							
	m-Cresol		0.015			25	698
	m-Cresol/*n*-Heptane						
	(90/10, v/v)		0.028			25	698
			0.042 (μ)			25	698
	(80/20, v/v)		0.035			25	698
			0.121 (μ)			25	698
	(70/30, v/v)		0.055			25	698
			0.234 (μ)			25	698
	(60/40, v/v)		0.079			25	698
			0.415 (μ)			25	698
	(50/50, v/v)		0.089			25	698
			0.710 (μ)			25	698
Poly(imino-1,3-phenylene-imino-isophthaloyl)							
	DMA		0.245			RT	862
	DMA + 3% LiCl		0.219			RT	862
	DMA + 5% LiCl		0.217			RT	862
	DMA + 6.5% LiCl		0.214			RT	862
	DMA + 8% LiCl		0.200			RT	862
Poly(imino-1,4-phenylene-imino-terephthaloyl)							
	Chlorosulfonic acid			0.275		25	841
	Chlorosulfonic acid + 0.01 M $LiClSO_3$			0.287		25	850
	H_2SO_4			0.278		25	841
	96% H_2SO_4		0.309				656
	Methane sulfonic acid			0.254		25	850
Poly(imino-trimethylhexamethylene-imino-terephthaloyl) (Trogamid T Polyamide)							
Trifluoroacetylated	Acetone	0.117				25	669
Trifluoroacetylated	Acetonitrile	0.105				25	669
	Chloroform/ethanol (53/47, v/v)	0.191				25	669
	DMF	0.153				20	784
		0.144				25	669

3.3.2. POLY(ISOCYANATES)

Polymer	Solvent	$\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
Poly(*N*-butyliminocarbonyl) [Poly(butyl isocyanate)]							
	Chloroform		0.054				356
	THF		0.084			40	706
Poly(*N*-hexyliminocarbonyl)	*n*-Butyl chloride		0.092			25	745
	Chloroform	0.054					358
	n-Hexane	0.134	0.129			25	717
	THF	0.0978					358
		0.100	0.097				360
		0.099					708
$M = 38 \times 10^3$	THF				0.088	25	854
$M = 110 \times 10^3$	THF				0.093	25	854
Poly(*N*-octyliminocarbonyl)	THF		0.098				708

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Poly(*N*-tolyliminocarbonyl) [Poly(tolyl isocyanate)]							
	Bromoform				0.017		359
3.3.3. POLY(URETHANES)							
Poly(oxycarbonylimino-1,4-phenylenemethylene-1,4-phenylene-iminocarbonyloxyhexamethylene)							
	DMF				0.159		357
	DMF/acetone (90/10, v/v)				0.166		357
					0.163 (μ)		357
	(80/20, v/v)				0.173		357
					0.178 (μ)		357
	(70/30, v/v)				0.181		357
					0.188 (μ)		357
	(60/40, v/v)				0.189		357
					0.200 (μ)		357
	(50/50, v/v)				0.195		357
					0.205 (μ)		357
	(40/60, v/v)				0.203		357
	DMF/toluene (90/10, v/v)				0.154		357
					0.159 (μ)		357
	(80/20, v/v)				0.147		357
					0.160 (μ)		357
	(70/30, v/v)				0.143		357
					0.149 (μ)		357
	(60/40, v/v)				0.139		357
					0.135 (μ)		357
	(50/50, v/v)				0.134		357
					0.125 (μ)		357
	(40/60, v/v)				0.130		357
					0.120 (μ)		357
	(30/70, v/v)				0.125		357
	(25/75, v/v)				0.123		357
Poly(oxycarbonylimino-2,4-tolylene-iminocarbonyl-oxy(poly(oxypropylene))							
	Methanol	0.152	0.150			22	361
		0.148	0.145			22	361
3.3.4. OTHER COMPOUNDS							
Poly(aryl ether ether ketone)							
$M_w = 123600$	NMP			0.188		35	952
$M_w = 33800$	NMP			0.185		35	952
$M_w = 23800$	NMP			0.185		35	959
$M_w = 3450$	NMP			0.180		35	952
Phenolphthalein poly(aryl ether ketone)							
	$CHCl_3$				0.231 (532)	25	960
Poly(hydrazocarbonyl-1,4-phenylene-imino-terephthaloyl)							
	DMSO		0.175			25	799
	DMA	0.564				20	868
	DMA + 5% LiCl	0.292	0.254			25	855
	DMSO		0.180			25	831
			0.166			25	916
		0.195	0.166			25	855
	96% H_2SO_4		0.305			25	855
	DMA	0.288	0.248			25	607
	DMSO	0.240	0.205			25	607
Poly(nitrilo-2-methyl-1,4-phenylene-nitrilo-methylidine-1,4-phenylene-methylidine) (Poly(azomethine))							
	96% H_2SO_4			0.62			660
	H_2SO_4		1.05	0.78		22	662
Polyethyleneimine	Water			0.210		35	969
	1 M aqueous NaCl			0.195		35	969
	Methanol			0.225		35	969

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TABLE 3. *cont'd*

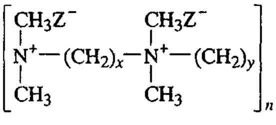
Polymer	Solvent	dn/dc (ml/g)				T (°C)	Refs.
		$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others		
Poly(oxydianiline-pyromellitic dianhydride) poly(amic acid)	*N*-methylpyrrolidone			0.192			968
Ionene Polymers							
	(Polymer 3,4 Br with $x=3$, $y=4$ and Z = Br)						
	(Polymer 6,6 Br with $x=6$, $y=6$ and Z = Br)						
	(Polymer 6,6 Br with $x=6$, $y=6$ and Z = Cl)						
	3,4 Br 0.4 M aq. KBr				0.1560–0.1601		572
	0.30 M KBr				0.160		572
	0.20 M				0.160		572
	0.10 M				0.162		572
	0.05 M				0.168		572
	6,6 Br, 0.4 M KBr				0.1567–0.1609		572
	6,6 Cl, 0.4 M KBr				0.1546–0.1599		572
	6,6 Cl, 0.4 M KCl				0.1636–0.1668		572
3.4. POLY(AMINO ACIDS)							
Poly(γ-benzyl-L-glutamate)	Dichloroacetic acid (DCA)		0.085			25	619,629
	DCA/dioxane (20/80, v/v)		0.103			25	619,629
			0.102 (μ)			25	619,629
	(40/60, v/v)		0.097			25	619,629
			0.098 (μ)			25	619,629
	(50/50, v/v)		0.096			25	619,629
			0.100 (μ)			25	619,629
	(60/40, v/v)		0.093			25	619,629
			0.103 (μ)			25	619,629
	(66/34, v/v)		0.081			25	619,629
			0.108 (μ)			25	619,629
	(70/30, v/v)		0.077			25	619,629
			0.115 (μ)			25	619,629
	(80/20, v/v)		0.083			25	619,629
			0.124 (μ)			25	619,629
	(83/14, v/v)		0.084			25	619,629
			0.124 (μ)			25	619,629
	Dioxane		0.114			25	619,629
Bovine Serum Albumin	Native: Aq. buffer, pH 6.2–7.4		0.193			25	906
	Heated 100 min at 60°C; pH 6.2–7.4		0.190			25	906
	Heated 100 min at 70°C; pH 6.2–7.4		0.180			25	906
	Heated 100 min at 90°C; pH 6.2–7.4		0.147			25	906
Poly(γ,*N*-carbobenzoxy-L-α,γ-diaminobutyric acid)							
	DMSO	0.087	0.083			25	600
DNA-Sodium salt							
	Aq. 0.2 M NaCl, $I=0.5$	0.170 (μ)				25	710
	$I=0.2$	0.166 (μ)				25	710
	$I=0.02$	0.172 (μ)				25	710
	$I=0.01$	0.176 (μ)				25	710
	$I=0.005$	0.180 (μ)				25	710
Poly(L-glutamic acid)							
	Aq. 0.5 M NaCl		0.170 (μ)			25	739
	Aq. 0.2 M NaCl		0.183 (μ)			25	739
	Aq. 0.1 M NaCl		0.190 (μ)			25	739
	Aq. 0.05 M NaCl		0.194 (μ)			25	739
	Aq. 0.02 M NaCl		0.195 (μ)			25	739
–, Sodium salt	1-Propanol/water						
	(10/90, v/v)				0.191	25	910
					0.174 (μ)	25	910
	(20/80, v/v)				0.181	25	910
					0.143 (μ)	25	910
	(30/70, v/v)				0.171	25	910
					0.133 (μ)	25	910
	(40/60, v/v)				0.157	25	910
					0.111 (μ)	25	910
	(60/40, v/v)				0.141	25	910
					0.089 (μ)	25	910

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	(70/30, v/v)				0.136	25	910
					0.103 (μ)	25	910
	(72/25, v/v)				0.131	25	910
					0.107 (μ)	25	910
	(85/15, v/v)				0.128	25	910
					0.119 (μ)	25	910
	2-Propanol/water						
	(10/90, v/v)				0.185	25	910
					0.167 (μ)	25	910
	(20/80, v/v)				0.174	25	910
					0.140 (μ)	25	910
	(30/70, v/v)				0.166	25	910
					0.130 (μ)	25	910
	(40/60, v/v)				0.151	25	910
					0.109 (μ)	25	910
	(50/50, v/v)				0.143	25	910
					0.103 (μ)	25	910
	(60/40, v/v)				0.135	25	910
					0.097 (μ)	25	910
	(70/30, v/v)				0.129	25	910
					0.117 (μ)	25	910
	(72/25, v/v)				0.127	25	910
					0.119 (μ)	25	910
	tert-Butanol/water						
	(10/90, v/v)				0.191	25	910
					0.171 (μ)	25	910
	(20/80, v/v)				0.176	25	910
					0.142 (μ)	25	910
	(30/70, v/v)				0.168	25	910
					0.127 (μ)	25	910
	(50/50, v/v)				0.138	25	910
					0.084 (μ)	25	910
	(60/40, v/v)				0.132	25	910
					0.082 (μ)	25	910
	(70/30, v/v)				0.128	25	910
					0.090 (μ)	25	910
	(75/25, v/v)				0.124	25	910
					0.100 (μ)	25	910
	(80/20, v/v)				0.123	25	910
					0.103 (μ)	25	910
	Glycol/water						
	(10/90, v/v)				0.172	25	910
					0.182 (μ)	25	910
	(20/80, v/v)				0.161	25	910
					0.176 (μ)	25	910
	(30/70, v/v)				0.152	25	910
					0.166 (μ)	25	910
	(40/60, v/v)				0.142	25	910
					0.150 (μ)	25	910
	(50/50, v/v)				0.137	25	910
					1.138 (μ)	25	910
	(60/40, v/v)				0.132	25	910
					0.128 (μ)	25	910
	(70/30, v/v)				0.130	25	910
					0.120 (μ)	25	910
	(80/20, v/v)				0.126	25	910
					0.112 (μ)	25	910
	(90/10, v/v)				0.121	25	910
					0.100 (μ)	25	910
	DMSO/water						
	(10/90, v/v)				0.180	25	910
					0.157 (μ)	25	910

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	(20/80, v/v)				0.170	25	910
					0.131 (μ)	25	910
	(30/70, v/v)				0.161	25	910
					0.120 (μ)	25	910
	(40/60, v/v)				0.151	25	910
					0.092 (μ)	25	910
	(50/50, v/v)				0.141	25	910
					0.073 (μ)	25	910
	(60/40, v/v)				0.130	25	910
					0.045 (μ)	25	910
Glycogen	Aq. 1% cetyl trimethyl ammonium bromide	0.154	0.150				650
	Aq. 8 M GHCl	0.131	0.127				650
	Aq. 15% $MgCl_2$	0.102	0.097				650
	Aq. 0.1 M NaCl	0.158	0.156				650
	Aq. 8 M Urea	0.102	0.095				650
	Water	0.153	0.151				650
Poly(N^5-(2-hydroxyethyl)L-glutamine)							
	Water	0.186				25	590
	Water/2-propanol						
	(75/25, v/v)	0.161				25	590
	(60/40, v/v)	0.158				25	590
	(40/60, v/v)	0.151				25	590
Poly(4-nitrol-L-phenylalanine)	*N*,*N*-Dimethylacetamide			0.1398			961
Poly(L-proline)	Form I: propionic acid	0.158				24	857
	Form II: propionic acid	0.167				24	857
	Collapsed form: propionic acid + 3 M LiBr	0.122				24	857
Phycocyanin	Aq. pH 6.8, $I = 0.1$		0.180			25	908
Poly(sulfopropyl betaines)	Aq. 0.1 M NaCl			0.197		25	679
Tobacco mosaic virus	Water		0.184				587
α-Tropomyosin	Aq. NaCl	0.187				60	734

3.5. POLY(SILANES) AND POLY(SILAZANES)

Polymer	Solvent	$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Ludox	Diluted with water	0.0620	0.0608		0.0606 (578)	23 ± 2	362
	Diluted with NaCl (0.05 M)	0.0592	0.0587		0.0585 (578)	23 ± 2	362
Poly(di-*n*-hexylsilane)	Hexane			0.177		25	947
	THF			0.138		25	947
	Cyclohexane			0.123		25	947
	Toluene			0.044		25	947
Poly(dimethyl siloxane)	Bromocyclohexane		−0.825			28	978
	Toluene		−0.0938			25	978
Poly(dimethylsilmethylene)	*n*-Heptane	0.098				25	37
	n-Heptane/*n*-propanol						
	(75/25, v/v)	0.115				25	37
	(71/29, v/v)	0.092				25	37
	(69.5/30.5, v/v)	0.103				25	37
Poly(dimethylsiltrimethylene)	*n*-Heptane	0.123				25	37
Poly(diphenylsiltrimethylene)	Toluene	0.112				25	37
	Toluene/cyclohexanol						
	(79.5/20.5, v/v)	0.133				25	37
	(75/25, v/v)	0.135				25	37
	(70/30, v/v)	0.145				25	37
	(40/60, v/v)	0.172				25	37
	(37.6/62.4, v/v)	0.175				25	37
Poly(oxydimethylsilylene)	Benzene		0.098			25	201
			−0.096			25	779
$M = 1100$–8700			−0.108 to −0.099			25	777
	Benzene/triethyl borate (94.44/5.56, v/v)		0.115			25	138

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
$M_w = 1.06 \times 10^6$	Bromocyclohexane		0.078			25	363
0.078×10^6			0.079			25	363
0.545×10^6			−0.083			29	364
0.34×10^6			0.081			25	363
0.085×10^6			0.090			25	363
0.033×10^6			0.090			25	363
1892			−0.086			29	364
978			−0.092			29	364
682			−0.098			29	364
150			−0.111			29	364
$M = 930–32600$		−0.105 to 0.082				28	667
	Ethyl acetate		0.036			25	779
	MEK			0.029		20	673
	MEK/n-undecane						
	(80/20, v/v)			0.023		20	673
	(70/30, v/v)			0.020		20	673
	(60/40, v/v)			0.016		20	673
	(50/50, v/v)			0.011		20	673
	(40/60, v/v)			0.009		20	673
	(10/90, v/v)			−0.010		20	673
	(5/95, v/v)			−0.013		20	673
$M = 481–1132$	*n*-Octadecane	−0.050 to −0.030			70–100	748	
	Toluene	0.103	0.094				365
		−0.1042	−0.0947			14.6	366
		−0.1037	−0.0941			19.9	366
		−0.1029	−0.0933			25.4	366
		−0.1027	−0.0933			29.9	366
		−0.1023	−0.0927			34.8	366
$M_w = 0.545 \times 10^6$			−0.084			25	364
0.21×10^6			0.092			25	367
1892			−0.085			25	364
978			−0.094			25	364
682			−0.099			25	364
150			−0.134			25	364
			−0.093	−0.090		25	641
$M = 1430$		−0.105 to −0.107				16.5–35	801
$M = 850–301000$		−0.119 to 0.084				25	667,672, 748,801
$M = 481–677$		−0.130 to −0.122				25–70	748
			−0.094			25	752
Cyclic polymer, $M = 1980–21800$		−0.087 to −0.084				25	667
	n-Undecane			−0.016		20	673
Poly(oxymethylphenylsilylene)							
	Acetone		0.179			25	690
	Benzene		0.053			25	690
	n-Butyl chloride		0.142			25	690
	Carbon tetrachloride		0.089			25	690
	Chlorobenzene		0.030			25	690
	Chloroform		0.102			25	690
	Cyclohexane		0.111			25	690
	MEK		0.163			25	690
Poly(oxymethyl-3,3,3-trifluoropropylsilylene)							
	Cyclohexyl acetate	0.052				35	368
Poly(oxyphenylsilylene)	Benzene				0.08		369
Poly(phenylsilsesquioxane)							
cis-syndio	Chloroform	0.119	0.111			20	847
cis-syndio	THF			0.133		20	847
Poly(silicic acid)	Water	0.0592					362
					0.65		370
Poly(trimethylsiloxanotitanoxanes)							
	Cyclohexane		0.156			25	371

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
3.6. POLY(HETEROCYCLICS) AND OTHERS							
3.6.1. POLY(HETROCYCYCLICS)							
Poly(benzimidazolediyl-benzimidazolediyl-1,4-phenyleneoxy-1,4-phenylene)							
	DMA		0.326			30	828
Poly(benzo[1,2-d: 5,4-d′] Bisoxazol-2,6-diyl-1,4-phenylene)							
	Chlorosulfonic acid + 0.01 M $LiClSO_3$			0.502		25	850
	Methane sulfonic acid			0.0474		25	850
Poly(benzo[1,2-d: 5,4-d′]-bisthiazol-2,6-diyl-1,4-phenylene)							
	Chlorosulfonic acid			0.540		25	841
	Methane sulfonic acid			0.564		25	841
Poly(benzoxazolediyl-iminoterephthaloylimino-1,3-(4-hydroxyphenylene))							
	96% H_2SO_4		0.30				895
Poly(3,9-bis(ethylidene-2,4,8,10-tetraoxaspiro[5,5]undecane-per-cyclohexanedimethanol) (TCHD)							
Poly(3,9-bis(ethylidene-2,4,8,10-tetraoxaspiro[5,5]undecane-per-hexanediol) (HD)							
TCHD/HD = 100/0, mol/mol	THF			0.085			839
= 70/30, mol/mol				0.083			839
= 60/40, mol/mol				0.083			839
= 50/50, mol/mol				0.082			839
= 29/71, mol/mol				0.081			839
= 0/100, mol/mol				0.079			839
Poly(*N*,*N*-dimethylpiperidine-3,5-diyl-methylene), hydrochloride							
	Methanol + 0.0093 M TEAB	0.211				21	780
		0.258 (μ)				21	780
	+ 0.0186 M TEAB	0.215				21	780
		0.262 (μ)				21	780
	+ 0.030 M TEAB	0.220				21	780
		0.270 (μ)				21	780
	+ 0.0352 TEAB	0.230				21	780
		0.300 (μ)				21	780
	+ 0.046 M TEAB	0.210				21	780
		0.305 (μ)				21	780
	Aq. 0.1 M NaCl	0.183				21	772
		0.182 (μ)				21	772
	Aq. 0.2 M NaCl	0.200				21	772
		0.186 (μ)				21	772
	Aq. 0.3 M NaCl	0.173				21	772
		0.170 (μ)				21	772
	Aq. 0.4 M NaCl	0.171				21	772
		0.170 (μ)				21	772
	Aq. 0.5 M NaCl	0.181				21	772
		0.167 (μ)				21	772
Poly(2,5-dimethyl-1,4-piperazinediyl-isophthaloyl)							
	N-Methyl-2-pyrrolidone	0.131	0.123			25	603
	Trifluoroethanol	0.279	0.267			25	603
Poly(isophthaloyl-*trans*-2,5-dimethylpiperazine)							
	NMP	0.131	0.123			25	951
Poly(2,5-dimethyl-1,4-piperazinediyl-phthaloyl)							
	Acetic acid (glacial)	0.212	0.200			25	591
	Chloroform	0.160	0.150			25	591
	m-Cresol	0.066	0.064			25	591
	DMA	0.152	0.146			25	591
	Hexafluoro-propanol-2	0.290	0.278			25	591
	N-Methyl-2-pyrrolidone	0.130	0.121			25	591
Poly(2,5-dimethyl-1,4-piperazinediyl-terephthaloyl)							
	Trifluoroethanol	0.278	0.266			25	592
Poly(iminobenzimidazole-diyl-1,4-phenylene-iminoterephthaloyl)							
	DMF		0.29			25	889
	Sulfuric acid		0.29			25	889
Poly(pyrazole-3,5-diyl-methylenephenylene)							
	DMF		0.223			25	687

TABLE 3. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Poly[(1,3,5,7-tetraoxo-2,3,6,7-tetrahydro-1H,5H-benzo[1,2,-c: 4,5-c′]dipyrrol-2,6-diyl)-1,4-phenyleneisopropylidene-1,4-phenylene] (Polyimide from pyromellitic anhydride and 4,4′-diaminodiphenylpropane)							
	LiBr 0.1 N in DMA		0.196				574
3.6.2. OTHER COMPOUNDS							
Poly(2,6-dichloroquinoline)	Formic acid				0.57		951
Poly [*trans*-bis(tributylphosphine)-platinum-1,4-butadiynediyl]							
	n-Heptane		0.199			25	597
Poly[bis(*m*-chlorophenoxy)phosphazene]							
	Chloroform		0.114			25	861
Poly(fluoroalkoxyphosphazenes)	Frezon E2/acetone (10/1, v/v)	0.048				30	579
Sodium polyphosphate	Aq. NaBr 0.1 N				0.109		581
	0.25 N				0.105		581
	0.35 N				0.102		581
	0.40 N				0.101		581

TABLE 4. CELLULOSE AND DERIVATIVES

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Acetoxypropyl cellulose							
	Acetone		0.100			25	730
	THF		0.056			25	730
Carboxymethyl cellulose	NaCl 0.1 M		0.147			25	373
Carboxymethyl cellulose, sodium salt							
DS = 0.96	Cadoxen 0.237 M Cd.	0.1398	0.1896			25	377
		0.1373 (μ)	0.1861 (μ)			25	377
0.94		0.147	0.145			25	404
0.44		0.164	0.162			25	404
0.21		0.175	0.171			25	404
	Aq. NaCl	0.136					128
		0.154					405
		0.158					405
Cellulose	Acetone	0.111				25	374
	Cadoxen	0.186	0.183			25	375,376
	Cadoxen (5% Cd)/water (1/1, v/v)	0.190 (μ)	0.189 (μ)			25	912
	0.237 M Cd	0.1317	0.1927			25	377
		0.1925 (μ)	0.1890			25	377
	Cuoxam 0.205 M Cu	0.117	0.233			25	378
	Cuoxen 0.0518 M Cu	0.1352	0.2574			25	377
	0.0776 M Cu		0.2653			25	377
	FeTNa	0.110 (μ)	0.245 (μ)			25	379
	DMA + 5%w/w LiCl		0.08			25	735
	DMA + 9%w/w LiCl (incr. with M_w)			0.040–0.027		30	741
Cellulose acetate							
DS = 0.49	DMA	0.068					602
DS = 0.49	Formamide	0.069					602
DS = 0.49	Water	0.131					602
DS = 1.75	DMA	0.046				25	605
DS = 2.45	THF	0.071				25	817
DS = 2.45	Trifluoroethanol	0.157				25	817
Cellulose carbanilate							
DS 1.6–2.3	Dioxane				0.141		757
DS 1.6–2.3	Ethyl acetate				0.180		757

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TABLE 4. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Cellulose diacetate	Acetone	0.112				25	786
	Acetone		0.109			25	913
	DMA	0.042				25	594
	MEK	0.104				50	794
Cellulose nitrate							
10.98% N	Acetone	0.1022	0.0998			25	380
11.89% N		0.1010	0.0985			25	380
12.55% N		0.0968	0.0950			25	380
12.9% N		0.1151				25	382
11.3% N	Ethyl acetate		0.103			20	381
13.49% N		0.102				25	383
12–12.3% N	Acetone	0.107				20	756
	DMA + 6% LiCl				0.055	25	892
	Ethyl acetate				0.092	25	892
Cellulose triacetate	Chloroform				0.0406	25	384
					0.0496	55	384
	DMA	0.040				25	594
Cellulose nitrate	Methylene chloride/ methanol (50/50, v/v)	0.130 (μ)					773
	Trifluoroacetic acid				0.185 (589)		668
Cellulose tricaproate	1-Chloronaphthalene		0.147			24	385
Cellulose tributyrate	Bromoform		−0.11			21	886
	MEK		0.078			21	886
	Dioxane/water (100/7, v/v)		0.104			63	385
	DMF	0.0442	0.478			41	385
Cellulose tricarbanilate	Acetone	0.2069	0.1966			7	385
		0.2155	0.2047			25	386
		0.2176	0.2033			27	385
		0.215				30	216
			0.205			25	844
	Benzophenone				0.0148 (589)	55	387
	Cyclohexanone	0.1556	0.1666			25	386
		0.137				30	216,919
		0.137				30	216
	Dibutyl ketone		0.210			25	388
	Diethyl ketone	0.1911	0.1797			25	386
	Dioxane	0.1651	0.1558			25	386
					0.156 (488)	20	681
		0.168				30	764
		0.168				30	216,919
	Dioxane/1-bromonaphthalene						
	(97/3, v/v)	0.162 (μ)				30	216,919
	(96/4, v/v)	0.140 (μ)				30	216,919
	(90/10, v/v)	0.000 (μ)				30	216,919
	(83/17, v/v)	−0.150 (μ)				30	216,919
		0.168	0.156		0.181 361	20	389
	Furfural	0.070				30	216
		0.070				30	216,919
	MEK	0.188				30	216
		0.188				30	216,919
	Pyridine	0.089				30	216
		0.089				30	216,919
	THF	0.182				30	216
			0.169			25	844
		0.182				30	216,919
	Nitrobenzene	0.050				30	216,919
Cellulose trinitrate (fully substituted)	Acetone	0.105					253
		0.102	0.101			RT	390
		0.1116				25	382
		0.0930	0.0903			25	380
					0.098 (1086)	25	915

TABLE 4. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Ethyl acetate		0.102			30	383
		0.107				25	391
			0.103			20	381
		0.105	0.105				852
Cellulose xanthate	Aq. NaOH		0.212				392
			0.230				393
			0.190				394
					0.20		395
	1.0 M		0.231				378
	2.5 M		0.185				396
Cellulose xanthate, sodium salt							
DS = 0.25	Aq. NaOH 1.0 N	0.205					406
0.48		0.275					406
0.77		0.300					406
0.91		0.425					406
Diethylacetamide cellulose xanthate							
DS = 0.40	Aq. DMSO 90%				0.144		397
0.49					0.098		397
0.60					0.144		397
0.80					0.144		397
0.92					0.098		397
1.00					0.096		397
1.22					0.079		397
Ethyl cellulose	Methanol	0.130				25	398
Ethyl hydroxyethyl cellulose	Methanol	0.147					399
Hemicellulose	KOH 0.36 M		0.131				400
	NaCl 0.25 M/0.5% Calgon	0.127					400
	0.5 M		0.145				400
	0.5 M/0.5% Versene	0.136					400
Hydroxypropyl cellulose	Anhydrous ethanol		0.120			25	401
	Water	0.146	0.143		0.143 (578)	25	684
Lignin	Aq. $NaHCO_3$ pH 9.65		0.218			25	372
Ligninsulfonic acid, sodium salt	Aq. NaCl 0.1 M				0.197		407
					0.200		407
	DMSO				0.117		407
Methyl cellulose	Water	0.154					402
$M_w = 160000$	Water			0.134		25	948
$M_w = 210000$	Water			0.135		25	948
$M_w = 234000$	Water			0.132		25	948
Sodium carboxymethyl cellulose	Water	0.153	0.150		0.150 (578)	25	684
Sodium cellulose disulfate	Aq. 0.5 M NaCl	0.081 (μ)				25	788

TABLE 5. POLY(SACCHARIDES)

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
Amylopectin	DMSO		0.066				408,409
	DMSO/water (90/10, v/v)		0.074				408,409
	(80/20, v/v)		0.083				408,409
	(60/40, v/v)		0.101				408,409
	(50/50, v/v)		0.110				408,409
	Ethylenediamine	0.098	0.098				410
	Ethylenediamine hydrate	0.092	0.092				410
	Formamide	0.069	0.069				410
	KOH 1.0 N	0.142	0.142				410
	NaOH 0.2 N	0.142	0.142				412

TABLE 5. *cont'd*

		dn/dc (ml/g)					
Polymer	**Solvent**	$\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	**Others**	T (°C)	**Refs.**
	Water	0.156	0.154				412
		0.155	0.0151				413
			0.152				408,409,411
	Aq. 1% cetyl trimethyl ammonium bromide	0.146	0.143				650
	Aq. 0.33 M KCl	0.153					650
	Aq. 0.1 M KCl	0.156					650
	Aq. 15% $MgCl_2$	0.112	0.111				650
	Aq. 1% Na lauryl sulfate	0.158	0.153				650
	Aq. 8 M Urea	0.106	0.100				650
	Water	0.160	0.157				650
Amylopectin acetate	Acetone	0.118					412
	Acetonitrile	0.128					412
	Chloroform	0.051					412
	Dioxane	0.057					412
	Nitromethane	0.088					412
Amylose	DMSO/water (30/70, v/v)	0.127 (μ)				25	716
	(35/65, v/v)	0.128 (μ)				25	716
	(45/55, v/v)	0.119 (μ)				15	716
		0.108 (μ)				25	716
		0.118 (μ)				35	716
		0.147 (μ)				45	716
	(50/50, v/v)	0.112 (μ)				25	716
	(60/40, v/v)	0.093 (μ)				25	716
	(70/30, v/v)	0.080 (μ)				25	716
	(80/20, v/v)	0.076 (μ)				25	716
	(90/10, v/v)	0.062 (μ)				25	716
	DMSO	0.0676	0.0659				414
	GHCl 4.2 M	0.118	0.116			25	415
	Aq. KCl				0.146		416
	KOH 1.0 M				0.146		416
	Aq. $NaIO_3$	0.153	0.152				417
Amylose acetate	Nitromethane	0.0875				30	418
		0.0857				RT	419
			0.0835			20	420
			0.0835			20	421
		0.088	0.083				650
DS = 2.9		0.087				30	760
Amylose tributyrate	Ethyl acetate	0.098				25	754
	MEK	0.091				25	754
Amylose tricarbonilate	Acetone	0.2279	0.2164			27	422
		0.2218	0.2094			7	422
	Dioxane	0.163	0.151		0.178 (361)	20	389
	Pyridine		0.0973			25	423
Amylose tripropionate	Ethyl acetate	0.092				25	820
	MEK	0.086				25	820
Araban	Aq. DMF 1%				0.142		424
	NaCl 2 M				0.130		424
Araban acetate	DMF		0.126				425
	MEK		0.0886				425
Chitosan	Water				0.166		426
Curdlan (bacterial β-1,3 glucan)							
	Cadoxen/water (1/1, v/v)	0.107				25	596
		0.163 (μ)				25	596
Dextran	Water				0.148		649
	$Ba(OH)_2$ 0.0503 M	0.1465	0.1441			25	377
		0.1642 (μ)	0.1618 (μ)			25	377
	0.108 M	0.1415	0.1394			25	377
		0.1738 (μ)	0.1708 (μ)			25	377
	Cadoxen 0.237 M Cd	0.1235	0.1219			25	377
		0.1842 (μ)	0.1809 (μ)			25	377
		0.1907 (μ)	0.1875 (μ)			25	377

TABLE 5. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436$ nm	$\lambda_0 = 546$ nm	$\lambda_0 = 633$ nm	Others	T (°C)	Refs.
	Cuoxen 0.0518 M Cu	0.1323				25	377
		0.2525 (μ)				25	377
	0.0776 M Cu	0.2625 (μ)				25	377
	LiSCN 2.5 M		0.129				409
	NaCl 0.1 M			0.151			427
	0.5 M	0.1476	0.1454			25	377
		0.1470 (μ)	0.1445 (μ)			25	377
	1.0 M	0.1447	0.1424			25	377
		0.1435 (μ)	0.1413 (μ)			25	377
	2.0 M	0.1361	0.1342			25	377
		0.1374 (μ)	0.1351 (μ)			25	377
	NaOH 0.25 M	0.1456	0.1433			25	377
		0.1584 (μ)	0.1558 (μ)			25	377
	0.75 M	0.1437	0.1415			25	377
		0.1646 (μ)	0.1621 (μ)			25	377
	$ZnCl_2$ 4 M	0.151	0.147				428
	Water	0.154	0.151				429
			0.151				430
			0.15			25	431
		0.1518	0.1481		0.1476 (578)	25	432
		0.154	0.151				428
		0.161				23	237
		0.150				20	433
			0.152				409
		0.1504	0.1481				377
		0.1494 (μ)	0.1472 (μ)				377
Dextran							
$M_w = 10100$	Water			0.152		25	948
$M_w = 43400$	Water			0.151		25	948
$M_w = 68100$	Water			0.147		25	948
$M_w = 508900$	Water			0.147		25	948
Dextran tricarbanilate	DMF	0.161	0.151				428
Dialdehyde starch	Water	0.153	0.152				434
Glucomannan triacetate	Nitroethane		0.076			25	435
D-Gluose (products from irradiated aq. glucose solutions)							
$M = 9.8 \times 10^3$	Water		0.166				436
14.4×10^4			0.200				436
50×10^5			0.215				436
25×10^5	DMSO/water (98/2, w/w)		−0.135				436
Guaran triacetate	Acetonitrile		0.1200			22.5	437
Gum arabic	Aq. HCl	0.152	0.150			25	438
	NaCl 0.35 M; NaOH 0.02 N; 0.25% Na salt of EDTA	0.149					439
	Water	0.145					439
Hyaluronic Acid	Water		0.166–0.170			25	905
Hydroxyethyl starch	Aq. NaCl 0.9%	0.136				25	440
DS = 0.8		0.160	0.161			25	441
0.06–1.2 (no change, av. value)	Aq. NaCl 0.9%	0.151				20	442
	Water	0.151				20	442
Related compounds:							
Acetyl (DS = 0.1)	Water	0.150				20	442
(DS = 0.7)		0.147				20	442
(DS = 1.0)		0.141				20	442
Hydroxy butyl starch (DS = 0.2)		0.151				20	442
Hydroxy propyl starch							
(DS = 0.5)		0.151				20	442
(DS = 1.5)		0.152				20	442
Hydrolyzed waxy maize starch		0.152				20	442
α-Keratose	Aq. Phosphate buffer; $I = 0.2$; pH 6.7		0.182				443

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TABLE 5. *cont'd*

Polymer	Solvent	dn/dc (ml/g) $\lambda_0 = 436\,nm$	$\lambda_0 = 546\,nm$	$\lambda_0 = 633\,nm$	Others	T (°C)	Refs.
	Dichloroacetic acid		0.088				444
	Dichloroacetic acid 0.1 M KCl		0.088				444
	Formic acid		0.156				444
	0.1 M KCl		0.155				444
	0.5 M KCl		0.152				444
Lipopolysaccharide	Water	0.151					445
Mannan	Acetone	0.102	0.102			RT	446
	Ethyl acetate	0.101	0.101			RT	446
Magnesium alginate	Aq. $MgCl_2$	0.158	0.157			20–25	447
	Aq. 0.033 M $MgCl_2$	0.158 (μ)				RT	805
Mucopolysaccharides	Phosphate buffer 0.15 M				0.166		448
	+ NaCl 0.2 M				0.166		448
	Water				0.181		448
Potassium alginate	Aq.; in presence of KCl	0.160	0.159			20–25	447
Schizophyllan	DMSO		0.057			25	727
(Polysaccharide)		0.062	0.061			25	829
	DMSO/Water						
	(86.5/13.5, w/w)		0.066			25	727
	(86.5/13.5, w/w)		0.071 (μ)			25	727
	Water	0.145	0.142			25	829
			0.142			25	727
Sodium Alginate	Aq. 0.1 M NaCl	0.150 (μ)				RT	805
	Aq. NaCl (+ Na EDTA)				0.15	RT	724
	Aq.; in presence of NaCl	0.165	0.163			20–25	447
Sodium amylose xanthate							
(DS = 0.4–0.5)	Aq. NaCl 0.1 M		−0.1460			25	449
	0.25 M		−0.1480			25	449
	0.50 M		−0.1555			25	449
	1.0 M		−0.1741			25	449
(Ripening time	Aq. NaOH 4%		0.1700				450
= 0 hr) (in air)							
22			0.1547				450
46			0.1471				450
94			0.1522				450
142			0.1938				450
190			0.2564				450
0 (under N_2)			0.1700				450
45			0.1785				450
93			0.1899				450
140			0.2181				450
188			0.2963				450
Sodium carboxymethyl	Aq. NaCl 0.0065 M	0.138				30	450
amylose	0.01 M	0.138				30	450
	0.03 M	0.138				30	450
	0.035 M	0.134				30	450
	1.0 M	0.124				30	450
	2.5 M	0.103				35	450
	0.35 M	0.1325				30	451
Xanthan	Aq. 0.1 M NaCl	0.144 (μ)				27	723
	Na salt: Aq. 0.1 M NaCl	0.144 (μ)	0.141 (μ)			25	606
	Na salt: cadoxen	0.167 (μ)	0.164 (μ)			25	606
Xylan	Cadoxen				0.178	25	452
	DMSO				0.064		453
					0.062		454
	Ethyl acetate	0.097	0.97				455

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Particle Scattering Factors in Rayleigh Scattering

Edward F. Casassa
Department of Chemistry, Carnegie–Mellon University, Pittsburgh, PA, USA

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A. INTRODUCTION: GENERAL RELATIONS FOR A HOMOGENEOUS SOLUTE (1,2)

When electromagnetic radiation interacts with any fluid medium, inhomogeneities in refractive index (dielectric constant) arising from microscopic thermal fluctuations in density and composition cause scattering of a small fraction of the incident radiation. If scattering elements are spatially correlated over distances of the order of magnitude of the wavelength of the exciting radiation, the scattering is subject to optical interferences that affect the angular intensity distribution. This distribution can provide information on the size and shape of macromolecular solutes or suspended colloidal particles: in principle, the molecular radius of gyration is determinable unambiguously, and calculated scattering distributions for idealized models can be compared with experimental data to infer an acceptable molecular conformation. However, an experimental scattering distribution does not permit a unique model assignment in the absence of additional information or supposition.

The limiting dilute-solution behavior of the reduced intensity $R(q, c)$ (Rayleigh's ratio) of light scattered through an angle θ is given by (3)

$$Kc/R(q,c) = 1/MP(q) + 2A_2Q(q,c)c + O(c^2) \qquad \text{(A1)}$$

where M is the molecular weight of the solute, c is the concentration in units of mass/volume, A_2 is the second virial coefficient, and q is an angle variable

$$q = (4\pi\tilde{n}/\lambda)\sin(\theta/2) \qquad \text{(A2)}$$

$\tilde{n}$ denoting the refractive index of the solution, and λ the vacuum wavelength of the incident radiation. In the optical constant (assuming incident radiation polarized perpendicular to the plane containing angle θ)

$$K = \frac{2\pi^2\tilde{n}^2(\partial\tilde{n}/\partial c^2)}{N_A\lambda^4} \qquad \text{(A3)}$$

$\partial\tilde{n}/\partial c$ is the specific refractive index increment at constant pressure and temperature, and N_A is Avogadro's number. The intensity $R(q, c)$ is that due to the solute; the (relatively weak) background solvent scattering is assumed to be that measured for the pure solvent.

The first term on the right-hand side of Eq. (A1) contains the *intramolecular* interference function, or particle scattering factor, defined by (4,5)

$$P(q) = [R(q,c)/R(0,c)]^0 \qquad \text{(A4)}$$

the superscript zero denoting the limit of infinite dilution. Thus the intensity distribution $P(q)$ is normalized to unity at zero scattering angle. Unless particle dimensions are infinitesimally small compared with λ, $P(q)$ is less than unity for $q < 0$; and for particles of less than colloidal dimensions, it is almost always a monotonously decreasing function of q throughout the accessible range of q with visible light.

The second term of Eq. (A1) contains the effects of pairwise interactions between solute molecules (and, implicitly, of interactions involving solvent). The dimensionless angle factor, $Q(q)$, is a function generally unknown, dependent on both *intermolecular* and *intramolecular* correlations (3,6). Like $P(q)$ it is normalized to unity at $\theta = 0$, but usually the approximation is made that $Q(q)$ is unity at all angles so that

$$Kc/R(q,c) = 1/MP(q) + 2A_2c + \cdots \qquad \text{(A5)}$$

replaces Eq. (A1). In all that follows, Eq. (A5), which is Zimm's "single contact" approximation (4), is assumed to hold for any macromolecular species in solution. At $\theta = 0$, Eqs. (A1) and (A5) revert to a thermodynamic equation of a state in virial form.

A scattering entity (polymer molecule, particle) may be represented by n optically isotropic point scattering centers whose spatial arrangement in any given conformation is specified by $n(n-1)/2 \approx n^2/2$ vectors $\mathbf{r}_{ij}$, separating pairs of scattering centers i, j. The scattering function $P(q)$ is then

$$P(q) = n^{-2} \sum_i \sum_j \int F(\mathbf{r}_{ij}) \exp(i\mathbf{q} \times \mathbf{r}_{ij}) \mathrm{d}\mathbf{r}_{ij} \qquad \text{(A6)}$$

The vector $\mathbf{q}$ is the difference between vectorial wave numbers of incident and scattered rays such that $|\mathbf{q}| = q$, as defined above. The nonsubscript i has the usual significance of $(-1)^{1/2}$, and $F(\mathbf{r}_{ij})$ is the probability distribution function (probability density) for the vector $\mathbf{r}_{ij}$. Since the molecules in solution exhibit no preferential orientation in space, $F(\mathbf{r}_{ij})$ is spherically symmetric, and $P(q)$ assumes the form (7)

$$P(q) = \sum_i \sum_j \left\langle \frac{\sin(qr_{ij})}{qr_{ij}} \right\rangle \qquad \text{(A7)}$$

where the pointed brackets indicate averaging over molecular conformations. It is evident from Eq. (A7) that $P(q)$ can be expanded in the even moments of the intramolecular distances $\mathbf{r}_{ij}$. It follows that (7)

$$P(q) = 1 - \frac{1}{3}\left(\frac{4\pi\tilde{n}}{\lambda}\sin\frac{\theta}{2}\right)^2 R_g^2 + \cdots \qquad \text{(A8)}$$

where R_g denotes the root-mean-square (rms) radius of gyration of the molecule about its center of mass

$$R_g^2 \equiv \frac{1}{2n^2} \sum_i \sum_j \langle r_{ij}^2 \rangle^2 \qquad \text{(A9)}$$

B. SCATTERING FACTORS FOR VARIOUS MOLECULAR MODELS (1,2)

The scattering factor $P(q)$ has been calculated for a number of simple molecular geometries. For monodisperse random-flight (Gaussian) coils it is given by (7)

$$P(q)_{\text{coil}} = 2u^{-2}(\mathrm{e}^{-u} + u - 1) = 1 - u/3 + \cdots \qquad \text{(B1)}$$

$$u \equiv (nb^2/6)q^2 = R_g^2 q^2 \qquad \text{(B2)}$$

where n is the number of equivalent statistical segments of root-mean-square length b in the chain.

For a flexible-ring model (a long chain of Gaussian segments constrained to have ends joined), $P(q)$ is given by (8)

$$P(q)_{\text{ring}} = 2u^{-1/2} I_D(u^{1/2}/2) \qquad \text{(B3)}$$

where

$$I_D(x) = \exp(-x^2) \int_0^x \exp(t^2)\mathrm{d}t \qquad \text{(B4)}$$

is Dawson's integral, for which tabulations are available (9). The variable u is defined as in the first equality in Eq. (B2), so that in this case $u = 2q^2 R_{g,\text{ring}}^2$ since the mean-square radius $R_{g,\text{ring}}^2$ is $nb^2/12$.

For flexible regular-star branched molecules with f identical arms (f random-flight chains starting from a common node), $P(q)$ is given by (10,11)

$$P(q)_{\text{star}} = \frac{2}{u^2}\left[\frac{f(f-1)}{2}\mathrm{e}^{-2u/f} - f(f-2)\mathrm{e}^{-u/f} + u + \frac{f(f-3)}{2}\right] \qquad \text{(B5)}$$

The mean-square radius of the star model is $[(3f-2)/f^2][nb^2/6]$. Scattering functions have also been calculated for certain random-flight comb-shaped models of flexible backbones with uniform side chains (11). Provided $q^2 R_g^2 \leq 2$, a good approximation to $P(q)$ for a variety of branched chains and for the ring model is afforded by the form of Eq. (B1) for a linear chain with u replaced by gu, g denoting the ratio of the mean-square radius of the nonlinear structure to that of the linear chain of the same mass (2,10).

Strictly, Eqs. (B1–B5) apply only to flexible chain molecules in a theta solvent. To account approximately for the chain expansion in a good solvent, the most obvious expedient is to increase the statistical mean-square segment length b^2 by the same factor as that for the increase of the overall mean-square radius over the unperturbed value and assume that the foregoing equations still apply. Several derivations (12–15) however, recognize the non-Gaussian character of the segment distribution perturbed by the excluded volume effect. Scattering factors have also been obtained for another type of modification of the random flight, the "wormlike" chain of Kratky and Porod, which introduces a persistence length to account for chain "stiffness" (1,16).

For thin cylindrical rods of length L, $P(q)$ is (7,17,18)

$$P(q)_{\text{rod}} = \frac{1}{y}\mathrm{Si}(2y) - \left(\frac{\sin y}{y}\right)^2 = 1 - \frac{1}{9}y^2 + \frac{2}{225}y^4 - \frac{1}{2205}y^6 + \cdots \qquad \text{(B6)}$$

where $y = qL/2$, and

$$\mathrm{Si}(x) = \int_0^x \frac{\sin w}{w}\mathrm{d}w \qquad \text{(B7)}$$

The "sine integral" function $\mathrm{Si}(x)$ is given in standard tabulations (9). For large y this $P(q)$ function asymptotically approaches $(\pi/2y) - (1/2y^2)$; and, in fact, the asymptotic relation is less than 1% in error for $y > 4$. The four terms of the series form given in Eq. (B6) are within 1% of the correct value for $y < 2$.

For spheres of diameter D, $P(q)$ is (7,18)

$$P(q)_{\text{sphere}} = [(3/v^3)(\sin v - v\cos v)]^2 = 1 - \frac{1}{5}v^2 + \cdots \quad \text{(B8)}$$

where $v = qD/2$; and for thin disks of diameter D, the function is (18)

$$P(q)_{\text{disk}} = \frac{2}{w^2}\left[1 - \frac{1}{w}J_1(2w)\right] = 1 - \frac{1}{6}w^2 + \cdots \quad \text{(B9)}$$

with $w = qD/2$, and $J_1(x)$, the Bessel function of the first kind, of order one (9).

Scattering factors have been calculated for a variety of more complicated particles; e.g., oblate and prolate ellipsoids, cylinders of finite thickness, shells of different forms, particles of nonuniform density, and assemblages of simple geometrical shapes (see Ref. 19 and citations therein).

C. EFFECTS OF DISPERSION IN MOLECULAR WEIGHT (2)

For a mixture of solutes all having the same specific refractive increment, e.g., a polymer heterogeneous in molecular weight, the reciprocal scattering function in Eq. (A5), for the single-contact approximation, is replaced by (2, 20–22)

$$\frac{Kc}{R(q,c)} = \frac{1}{M_{\text{w}}P_X(q)} + 2A_{2,\text{app}}c + \cdots \quad \text{(C1)}$$

Here, M_{w} denotes the weight-average molecular weight $\sum_i M_i w_i$, M_i being the molecular weight of the ith solute and w_i its weight fraction in the solute mixture; c is the total solute concentration. The measured particle scattering factor is the average

$$P_X(q) = M_{\text{w}}^{-1}\sum_i M_i P_i(q) w_i \quad \text{(C2)}$$

where $P_i(q)$ is the scattering factor for the ith polymer. The quantity $A_{2,\text{app}}$ is an apparent, angle-dependent second virial coefficient

$$A_{2,\text{app}} = \sum_i\sum_j B_{ij}M_i w_i P_i(q) M_j w_j P_j(q)/[M_{\text{w}}P_X(q)]^2 \quad \text{(C3)}$$

where B_{ij} is the virial coefficient for interaction between components i and j (B_{ii} is just A_2 for a solution of component i alone). At the limit $\theta \to 0$, $A_{2,\text{app}}$ reduces to a true thermodynamic quantity:

$$\lim_{\theta\to 0} A_{2,\text{app}} = A_2^{(\text{LS})} = M_{\text{w}}^{-2}\sum_i\sum_j B_{ij}M_i w_i M_j w_j \quad \text{(C4)}$$

which might be described as a "light-scattering-average" second virial coefficient (to distinguish it from the analogous average obtained from an osmotic pressure experiment).

Series expansion of $P_X(q)$ gives an average over the mean-square radii of gyration R_{gi}^2 of the solute species

$$P_X(q) = 1 - (q^2/3)R_X^2 + \cdots \quad \text{(C5)}$$

$$R_X^2 = M_{\text{w}}^{-1}\sum_i R_{\text{g}i}^2 M_i w_i \quad \text{(C6)}$$

The average R_X^2 is sometimes called the Z-average mean-square radius (for a distribution of random-flight chain species R_X^2 is proportional to the so-called Z-average molecular weight

$$M_z = \sum_i (M_i^2 w_i/M_{\text{w}}) \quad \text{(C7)}$$

Angular scattering functions $P_X(q)$ have been calculated for various molecular size distributions. In particular, distributions of linear random-flight chains have been studied for the exponential weight-fraction distribution of Schulz and Zimm (20)

$$w(M) = \frac{b^{h+1}}{\Gamma(h+1)}M^h e^{-bM} \quad \text{(C8)}$$

with $b = (h+1)/M_{\text{w}} = h/M_{\text{n}}$, $\Gamma(x)$ the gamma function, and the dispersion parameter $h = 1/[M_{\text{w}}/M_{\text{n}}) - 1]$. For a system of random flight chains with this distribution, the averaged scattering factor is

$$P_X(q) = \frac{2}{h(h+1)}\left(\frac{h+2}{u_X}\right)^2\left[\left(\frac{u_X}{h+2}+1\right)^{-h} + \frac{h}{h+2}u_X - 1\right] \quad \text{(C9)}$$

where $u_X = q^2R_X^2$. For a monodisperse polymer, h is infinite; and for increasing dispersion in molecular weight it decreases towards zero. It is unity for the "most probable" distribution (characteristic of the products of step-growth polymerization at high conversion and of free-radical polymerization at low conversion with chain transfer). In this special case, $P_X(q)$ for random-flight linear chains is given by the very simple relation (20)

$$[P_X(q)]^{-1} = 1 + \frac{1}{3}u_X \quad \text{(C10)}$$

Plots of $[P_X(q)]^{-1}$ versus u_X for $h < 1$ curve upward, and for $h > 1$ curve downward.

The asymototic dependence of $[P_X(q)]^{-1}$ for heterogeneous chains at large q is (23)

$$\frac{1}{P_X(q)} \sim \frac{M_{\text{w}}}{2M_{\text{n}}} + \frac{M_{\text{w}}}{2M_z}u_X \quad \text{(C11)}$$

so that, in principle, this dependence could provide information on M_{n}. In practice, the experimental limit on q imposed by the upper bound on θ of 180° makes it difficult to ascertain whether the asymptotic behavior is accessible, even for polymers of high molecular weight.

Calculations for branched monodisperse Gaussian chain models and for systems with certain distributions of

References page VII-635

branching and molecular weight suggest as a reasonable approximation for such heterogeneous systems in general, the $P_X(q)$ obtained by replacement of the variable u in Eq. (B1) by $(u_X)_1 R_X^2/(R_X^2)_1$, where $(u_X)_1$ and $(R_X^2)_1$ denote u_X and R_X^2, as defined above, for the system of linear chains with the same weight distribution as the structurally heterogeneous system. Derivations of $P(q)$ for randomly branched systems have been based on cascade models and moment generating functions (24–26). Branching and molecular-weight dispersion have opposing effects on the $P(q)$ function and in randomly branched systems are largely compensatory (2,26). Interestingly, however, the asymptotic behavior of $P(q)$ for Gaussian chains is unaffected by chain branching; it depends only on molecular weight and weight distribution (10).

$P_X(q)$ has been obtained in closed analytical form for systems of thin rodlike (cylindrical) particles distributed in length (and therefore in mass) according to Eq. (C8) for integral values of the parameter h (27). For $h = 1$, the result is

$$P_X(q) = y_w^{-1} \arctan y_w \qquad \text{(C12)}$$

where $y_w = (q/2)\sum_i L_i w_i$, L_i being the length of the ith rod species. For large qL, the asymptotic dependence of $[Kc/R(\theta)]^\circ$ on q (not q^2) for rods of uniform diameter and density is linear, and the slope of the plot is $(L_i/M_i)/\pi$: i.e., the slope yields the linear density or mass per unit rod length, independent of any dispersion in L (28). If the rods are heterogeneous in diameter, the limiting slope is $[\pi \sum_i (M_i w_i/L_i)]^{-1}$. Unlike the asymptotic behavior for Gaussian coils, this asymptotic dependence for rods is manifested in practical situations with both synthetic polymers and biopolymers. Some care in interpretation is needed, however. For thin oblate ellipsoids ("needles"), a model seemingly scarcely different from thin cylinders, the asymptotic dependence of $[(Kc/R(\theta)]^\circ$ on q is also linear but with slope 5/6 that for the cylinder system (28).

D. DETERMINATION OF MOLECULAR WEIGHT AND RADIUS OF GYRATION

In general, information from a light scattering experiment on a polymer/solvent system consists of an array of intensity data determined at a number of concentrations and a number of angles. These are usually represented as values of the reciprocal intensity function $Kc/R(\theta, c)$. The form of Eq. (A5) suggests use of the popular Zimm plot: i.e., the values of $Kc/R(\theta, c)$ are plotted against $C_1 c + C_2 \sin^2(\theta/2)$, with C_1 and C_2 being arbitrary constants chosen merely to separate data points conveniently, to form a gridlike pattern (4,20). In conformity with Eq. (A5), a homogeneous polymer gives contours at constant angles (θ) that form a family of parallel straight (or nearly parallel and straight) lines, and contours at constant concentrations that form another family of curves of similar shape, displaced from one another by translations. This representation, shown schematically in Figure 1, facilitates simultaneous extrapolations of angular data to zero concentration and concentration data to zero angle, and extrapolation of both limiting dependences to a common intercept $[Kc/R(0,c)]^\circ$. In general, the ratio of the initial slope to the intercept of the angular plot extrapolated to $c = 0$ is $16\pi^2\tilde{n}^2 R_X^2/3\lambda^2$; the slope of the concentration dependence extrapolated to $\theta = 0$ is twice the averaged second virial coefficient $A_2^{(LS)}$; and the double limit $[Kc/R(0,c)]^\circ$ is M_w^{-1}. The dominant cause of lack of parallelism of the contours in experimental Zimm plots is dispersion in molecular weight (cf. Eqs. C19, C21).

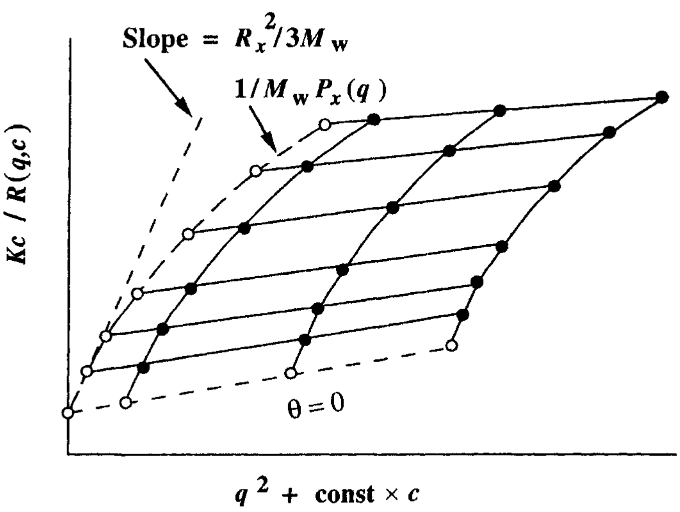

Figure 1. Schematic Zimm plot for a solute polydisperse in molecular weight, illustrating empirical determination of averaged molecular weight M_w, scattering factor $P_x(q)$, and radius of gyration R_x according to Eq. 19. The filled circles simulate experimental data; the open circles represent extrapolations to zero scattering angle and zero concentration.

If both the molecular architecture of a polymer in solution and its molecular weight dispersion are known, the scattering function $P_X(q)$ is known (in principle) and can be combined with limited angular scattering data to deduce M_w and R_X^2. Thus, in the "dissymmetry" method (7) scattered intensities at 90° and the ratio of intensities at 45° and 135° (or another pair of complementary angles) are measured for each concentration. Then the extrapolated transverse scattering function $[Kc/R(q_{90})]^\circ$ and the extrapolated dissymmetry ratio

$$Z_{45} = [R(q_{45}, c)]/R(q_{135}, c)]^\circ \qquad \text{(D1)}$$

determine the molecular weight and radius of gyration, given the $P_X(q)$ function. Tables correlating Z_{45} with $P^{-1}(q_{90})$ and the molecular dimensions have been compiled for monodisperse coils (5,29), rods (5,29), spheres (5,29), and disks (5,29,30), and for polydisperse coils (5,31).

Except for routine characterization of systems of well known character exhibiting low dissymmetry, the dissymmetry method cannot be recommended if a photometer is available that is capable of a full complement of angular readings. Apart from the desirability of determining M_w and R_X^2 without assumptions, it is

helpful to have the maximum amount of information as an aid in detecting any spurious angular dependence of scattering due to instrumental artifacts or to contamination by "dust".

In current practice, photometers that do not provide scattering measurements over a continuous angular range, are typically dedicated to the limited task of monitoring the output stream in size exclusion chromatography, perhaps on line with other detection modes. In this application, passage of the polymer through the chromatographic column effectively eliminates the problem of contamination by foreign particulate matter. One popular instrument of this kind reads scattering only at right angles and at 15°.

E. CALCULATIONS OF SCATTERING FACTORS

Figure 2 and Tables 1 and 2 illustrate some quantitative comparisons among scattering factors for several molecular models and the effects of dispersion in molecular weight for Gaussian coils. Tables of $P(q)$ and Z_{45} in the older literature are much more extensive and reflect the needs of a time without widely available computer technology. Today, for careful work to compare experimental $R(q, 0)$ data with theoretical scattering functions, investigators will find it preferable to return to the mathematical functions and write computer routines to do calculations for data analysis rather than to routinely interpolate in tables. For those who may wish to use a traditional programming language such as FORTRAN, the following rational approximation formulas will facilitate accurate calculation of the special functions that appear in the various expressions for $P(q)$.

The sine integral Si(x) for $x \leq 1$ (Refs. 32,33):

$$\mathrm{Si}(x) = \frac{\pi}{2} - f(x)\cos x - g(x)\sin x$$

$$f(x) = \frac{1}{x}\left(\frac{a_0 + a_2x^2 + a_4x^4 + x^6}{b_0 + b_2x^2 + b_4x^4 + x^6}\right) + \epsilon$$

$$a_0 = 8.493336 \quad a_2 = 47.411538 \quad a_4 = 19.394119$$

$$b_0 = 30.038277 \quad b_2 = 70.376496 \quad b_4 = 21.361055$$

$$10^6|\epsilon| < 8$$

$$g(x) = \frac{1}{x^2}\left(\frac{a_0 + a_2x^2 + a_4x^4 + x^6}{b_0 + b_2x^2 + b_4x^4 + x^6}\right) + \epsilon$$

$$a_0 = 5.08904 \quad a_2 = 49.719775 \quad a_4 = 21.383724$$

$$b_0 = 76.707878 \quad b_2 = 119.918932 \quad b_4 = 27.177958$$

$$10^6|\epsilon| < 6$$

The Bessel function $J_1(x)$ for $0 \leq x \leq 3$ (Ref. 34):

$$x^{-1}J_1(x) = \frac{1}{2} - 0.56249985(x/3)^2 + 0.21093573(x/3)^4 - 0.03954289(x/3)^6 + 4.43319 \times 10^{-3}(x/3)^8 - 3.1761 \times 10^{-4}(x/3)^{10} + 1.109 \times 10^{-5}(x/3)^{12} + \epsilon$$

$$10^8|\epsilon| < 1.3$$

The Bessel function $J_1(x)$ for $x \geq 3$ (Ref. 34):

$$x^{1/2}J_1(x) = f_1 \cos\theta_1$$

$$f = 0.79788456 + 1.56 \times 10^{-6}(3/x) + 0.01659667(3/x)^2 + 1.7105 \times 10^{-4}(3/x)^3 - 2.49511 \times 10^{-3}(3/x)^4 + 1.13653 \times 10^{-3}(3/x)^5 - 2.0033 \times 10^{-4}(3/x)^6 + \epsilon$$

$$10^8|\epsilon| < 4$$

$$\theta_1 = x - 2.35619449 + 0.12499612(3/x) + 5.650 \times 10^{-5}(3/x)^2 - 6.37879 \times 10^{-3}(3/x)^3 + 7.4348 \times 10^{-4}(3/x)^4 + 7.9824 \times 10^{-4}(3/x)^5 - 2.9166 \times 10^{-4}(3/x)^6 + \epsilon$$

$$10^8|\epsilon| < 9$$

Modern mathematics programs such as Mathematica and Maple constitute higher level languages that make possible direct operations with special functions on a personal computer (35,36).

F. PARTICLE SCATTERING FACTORS AND DISSYMMETRIES

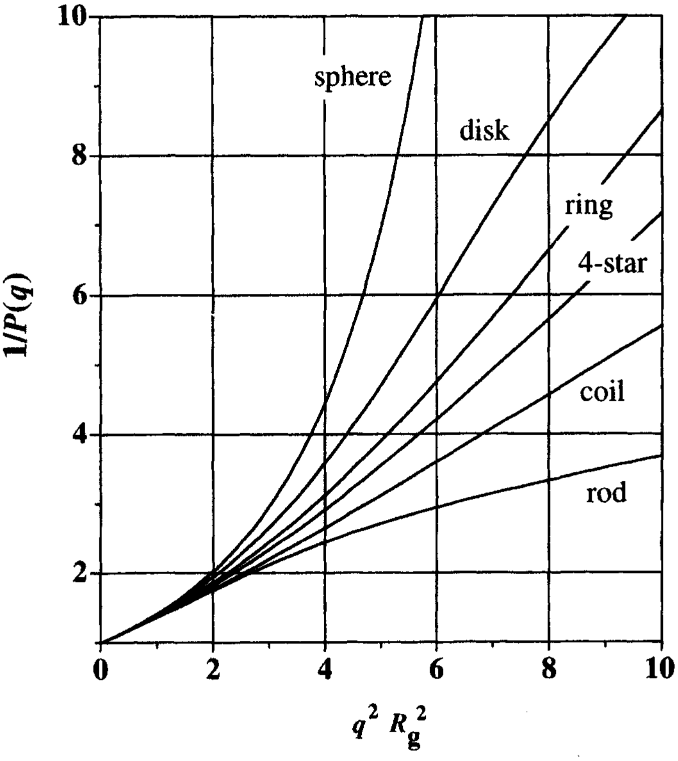

Figure 2. Reciprocal scattering factors $1/P(q)$ versus $q^2R_g^2$ for monodisperse systems of the models indicated. R_g^2 is: $nb^2/6$ (linear Gaussian coil); $5nb^2/48$ (4-branch regular star); $nb^2/12$ (flexible ring); $L^2/12$ (thin rod); $D^2/8$ (disk); $3D^2/20$ (sphere).

TABLE 1. DISSYMMETRIES FOR MONODISPERSE SYSTEMS

	Z_{45} and $P^{-1}(q_{90})$				
$R_g\tilde{n}/\lambda$	Coil	4-Star[a]	Rod	Disk	Sphere
0.00	1.000 (1.000)[b]	1.000 (1.000)	1.000 (1.000)	1.000 (1.000)	1.000 (1.000)
0.01	1.004 (1.003)	1.004 (1.003)	1.004 (1.003)	1.004 (1.003)	1.004 (1.003)
0.02	1.015 (1.011)	1.015 (1.011)	1.015 (1.011)	1.015 (1.011)	1.015 (1.011)
0.03	1.034 (1.024)	1.034 (1.024)	1.034 (1.024)	1.034 (1.024)	1.034 (1.024)
0.04	1.060 (1.043)	1.061 (1.043)	1.060 (1.043)	1.061 (1.043)	1.062 (1.043)
0.05	1.094 (1.067)	1.095 (1.067)	1.093 (1.067)	1.097 (1.068)	1.098 (1.068)
0.06	1.136 (1.097)	1.139 (1.098)	1.137 (1.097)	1.143 (1.099)	1.146 (1.100)
0.07	1.186 (1.133)	1.191 (1.135)	1.187 (1.133)	1.200 (1.138)	1.204 (1.139)
0.08	1.245 (1.175)	1.253 (1.178)	1.245 (1.176)	1.268 (1.183)	1.277 (1.186)
0.09	1.311 (1.224)	1.325 (1.229)	1.311 (1.225)	1.351 (1.237)	1.365 (1.242)
0.10	1.386 (1.280)	1.407 (1.287)	1.384 (1.280)	1.448 (1.301)	1.473 (1.308)
0.11	1.469 (1.342)	1.500 (1.353)	1.463 (1.343)	1.564 (1.374)	1.604 (1.386)
0.12	1.559 (1.412)	1.604 (1.428)	1.546 (1.412)	1.700 (1.459)	1.765 (1.477)
0.13	1.657 (1.490)	1.720 (1.512)	1.632 (1.488)	1.859 (1.558)	1.963 (1.584)
0.14	1.761 (1.575)	1.848 (1.607)	1.717 (1.570)	2.044 (1.671)	2.208 (1.710)
0.15	1.872 (1.669)	1.987 (1.712)	1.801 (1.659)	2.258 (1.800)	2.514 (1.858)
0.16	1.987 (1.771)	2.138 (1.828)	1.879 (1.753)	2.504 (1.949)	2.901 (2.034)
0.17	2.108 (1.881)	2.299 (1.957)	1.951 (1.853)	2.783 (2.120)	3.397 (2.242)
0.18	2.231 (2.001)	2.470 (2.098)	2.013 (1.956)	3.096 (2.315)	4.045 (2.490)
0.19	2.357 (2.129)	2.650 (2.253)	2.067 (2.063)	3.439 (2.538)	4.906 (2.789)
0.20	2.485 (2.266)	2.837 (2.422)	2.110 (2.171)	3.807 (2.791)	6.080 (3.149)
0.21	2.613 (2.413)	3.030 (2.606)	2.145 (2.279)	4.190 (3.079)	7.724 (3.589)
0.22	2.741 (2.568)	3.277 (2.806)	2.173 (2.387)	4.574 (3.403)	10.112 (4.130)
0.23	2.868 (2.733)	3.427 (3.022)	2.195 (2.493)	4.942 (3.768)	
0.24	2.993 (2.906)	3.627 (3.254)	2.212 (2.597)	5.278 (4.174)	
0.25	3.116 (3.089)	3.826 (3.502)	2.226 (2.698)	5.566 (4.622)	
0.26	3.236 (3.280)	4.022 (3.768)	2.238 (2.796)	5.797 (5.112)	
0.27	3.353 (3.481)	4.214 (4.051)	2.249 (2.892)	5.970 (5.640)	
0.28	3.466 (3.690)	4.400 (4.350)	2.259 (2.985)	6.089 (6.202)	
0.29	3.576 (3.908)	4.579 (4.667)	2.268 (3.076)	6.163 (6.788)	

[a] Regular star with four arms.
[b] Entries in parentheses indicate $P^{-1}(q_{90})$ values.

TABLE 2. DISSYMMETRIES FOR MONODISPERSE AND POLYDISPERSE COILS[a]

	$P^{-1}(q_{90})$ and $\left(\frac{1000\tilde{n}}{\lambda}(R_g^2)_w^{1/2}\right)$				
Z_{45}	$\rho=1$	$\rho=1.2$	$\rho=1.5$	$\rho=2.0$	$\rho=5.0$
1.00	1.000 (0)[b]	1.000 (0)	1.000 (0)	1.000 (0)	1.000 (0)
1.02	1.014 (23)	1.014 (21)	1.014 (20)	1.014 (19)	1.014 (17)
1.04	1.028 (33)	1.028 (30)	1.028 (29)	1.028 (27)	1.028 (24)
1.06	1.042 (40)	1.042 (37)	1.042 (35)	1.042 (33)	1.042 (30)
1.08	1.056 (46)	1.056 (43)	1.056 (40)	1.056 (38)	1.056 (35)
1.10	1.070 (51)	1.070 (48)	1.071 (45)	1.071 (43)	1.071 (39)
1.12	1.085 (56)	1.085 (53)	1.086 (49)	1.086 (47)	1.087 (43)
1.14	1.099 (61)	1.099 (57)	1.100 (53)	1.101 (51)	1.102 (47)
1.16	1.113 (65)	1.114 (61)	1.115 (57)	1.116 (54)	1.116 (50)
1.18	1.128 (69)	1.129 (65)	1.130 (61)	1.131 (58)	1.133 (53)
1.20	1.142 (72)	1.143 (68)	1.145 (64)	1.146 (61)	1.148 (56)
1.22	1.157 (76)	1.159 (71)	1.161 (67)	1.162 (64)	1.164 (59)
1.24	1.171 (79)	1.173 (75)	1.176 (71)	1.177 (67)	1.180 (62)
1.26	1.186 (82)	1.189 (78)	1.191 (73)	1.193 (70)	1.196 (65)
1.28	1.201 (85)	1.204 (80)	1.207 (76)	1.210 (73)	1.213 (68)

TABLE 2. *cont'd*

Z_{45}	$P^{-1}(q_{90})$ and $\left(\frac{1000\tilde{n}}{\lambda}\langle R_g^2\rangle_w^{1/2}\right)$				
	$\rho=1$	$\rho=1.2$	$\rho=1.5$	$\rho=2.0$	$\rho=5.0$
1.30	1.215 (88)	1.219 (83)	1.222 (79)	1.225 (76)	1.229 (70)
1.40	1.290 (102)	1.297 (97)	1.303 (92)	1.308 (88)	1.314 (82)
1.50	1.366 (113)	1.377 (109)	1.387 (104)	1.394 (100)	1.404 (93)
1.60	1.444 (124)	1.460 (119)	1.473 (115)	1.484 (111)	1.498 (104)
1.70	1.524 (134)	1.546 (129)	1.564 (125)	1.578 (121)	1.597 (114)
1.80	1.607 (144)	1.636 (139)	1.659 (135)	1.677 (131)	1.703 (125)
1.90	1.693 (152)	1.729 (149)	1.758 (145)	1.782 (141)	1.815 (134)
2.00	1.781 (161)	1.826 (158)	1.861 (154)	1.890 (150)	1.932 (144)
2.10	1.874 (169)	1.927 (167)	1.971 (163)	2.007 (160)	2.058 (154)
2.20	1.969 (178)	2.032 (175)	2.084 (172)	2.128 (169)	2.190 (163)
2.30	2.069 (185)	2.143 (184)	2.205 (181)	2.257 (178)	2.332 (173)
2.40	2.174 (194)	2.260 (192)	2.332 (190)	2.393 (188)	2.484 (183)
2.50	2.283 (201)	2.382 (201)	2.466 (199)	2.538 (198)	2.645 (193)
2.60	2.397 (209)	2.510 (209)	2.607 (209)	2.691 (207)	2.817 (203)
2.70	2.517 (217)	2.645 (218)	2.757 (218)	2.855 (217)	3.003 (214)
2.80	2.643 (225)	2.788 (227)	2.916 (227)	3.029 (227)	3.202 (225)
2.90	2.776 (233)	2.939 (235)	3.085 (236)	3.215 (237)	3.416 (236)
3.00	2.916 (240)	3.099 (244)	3.264 (246)	3.414 (247)	3.648 (247)
3.50	3.755 (283)	4.070 (292)	4.375 (299)	4.665 (305)	5.145 (312)
4.00	4.948 (333)	5.488 (349)	6.044 (364)	6.601 (377)	7.588 (397)

[a] Polydisperse systems characterized by the Schulz–Zimm distribution: $\rho = M_w/M_n$.
[b] Entries in parentheses denote weight-average value of R_g^2.

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Dipole Moments of Polymers in Solution

J. F. Salort
C/Azalea 200, 28109-Madrid, Spain

C. Salom
Escuela Técnica Superior de Ingenieros Aeronáuticos, Universidad Politécnica, Madrid, Spain

E. Riande
Instituto de Ciencia y Tecnología de Polímeros, Consejo Superior de Investigaciones Científicas, Madrid, Spain

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A. INTRODUCTION

Each conformation of a polymer chain has a dipole moment, μ, in Debye units D ($=10^{-18}\times$ u.e.e. $\times$ 1 cm or 3.338×10^{-30} C $\times$ m), equal to the vectorial sum of the moments of N dipolar groups along the chain, that is, $\mu(\zeta)=\sum_i m_i$, where m_i is the dipole moment associated with the skeletal bond i in the conformation ζ. The mean-square dipole moment $\langle\mu^2\rangle$ can be written as (22,91)

$$\langle\mu^2\rangle=\left\langle\sum_i\sum_j m_i m_j\right\rangle=\sum_i m_i^2+\left\langle\sum_i\sum_{i\neq j} m_i m_j\right\rangle \tag{A1}$$

where m_i and m_j are the dipole moments associated with the skeletal bonds i and j, respectively, and the brackets mean averages. For a freely jointed chain, the last term in Eq. (A1) averages to zero, and the corresponding mean-square dipole moment is given by

$$\langle\mu^2\rangle=\sum_i^N m_i^2 \tag{A2}$$

The values of the mean-square dipole moment are currently expressed in terms of the dipole moment ratio, $D_n=\langle\mu^2\rangle/\sum m_i^2$, or the dipolar correlation coefficient, g, by means of the following expression:

$$g=D_n=1+\frac{\left\langle\sum_i\sum_{i\neq j} m_i m_j\right\rangle}{\sum_i m_i^2} \tag{A3}$$

Debye (13) pioneered the theories which allow calculation of the dipole moments of molecules in the vapor or gas phase. Other theories (23,32,53) developed to determine the dipole moments of molecules in the liquid state were not so successful because of the difficulties involved in defining the internal field in a polar, condensed medium. This problem was circumvented by calculating the dipole moment of polymers and polar liquids in very dilute solutions using nonpolar solvents. In this way, the solute molecules are separated from one another by nonpolar molecules, and the dielectric behavior of the system resembles that of a gaseous condition. The method developed by Guggenheim (27) and Smith (106), based on this approach, permits calculation of the mean-square dipole moments of polymers by means of the following equation:

$$\langle\mu^2\rangle=\frac{27\,k_B MT}{4\pi\rho N_A(\varepsilon_1+2)^2}\left[\frac{d\varepsilon}{dw}-\frac{dn^2}{dw}\right] \tag{A4}$$

where k_B and N_A are, respectively, the Boltzmann constant and Avogadro's number, M is the molecular weight of the solute, T the absolute temperature, ρ and ε_1 the density and the dielectric permitivity of the solvent, respectively. The term $d\varepsilon/dw$ (proportional to the total polarization of the solute) can be obtained from plots of the dielectric permitivity of the solution, ε, against the weight fraction of solute w, in the limit $w \to 0$. The values of dn^2/dw (proportional to the electronic polarization) can be obtained from the increments of the indices of refraction of the solution n with respect to that of the solvent n_1, also in the limit $w \to 0$. A shortcoming of this equation is that a ficticious atomic polarization (instead of the true one) is assumed. However, with the exception of the silicones, the atomic polarization for most systems is less than 10% of the electronic polarization and, consequently, the error involved in the determination of $\langle \mu^2 \rangle$ with Eq. (A4) is negligible. The mean-square dipole moment presents some advantages over other more traditional conformation-dependent properties such as the mean-square end-to-end distance $\langle r^2 \rangle_0$. For example, since the skeletal bonds change much more in polarity than they do in length, $\langle \mu^2 \rangle$ is usually more sensitive to structure than $\langle r^2 \rangle_0$. Moreover, with the exception of a relatively few number of polymers that have dipole moments in their structure with a component parallel and the other perpendicular to the chain contour, excluded volume effects are negligible.

In the tables, the dipole moments are expressed in terms of either the dipolar correlation coefficient g, or the mean-square dipole moment per repeating unit, $\langle \mu^2 \rangle / x$. For relatively long chains in which dipole contributions of the end groups are not important, $\langle \mu^2 \rangle / x$ and g are related by

$$\frac{\langle \mu^2 \rangle}{x} = g\mu_0^2 \qquad \text{(A5)}$$

where x is the degree of polymerization, and μ_0^2 is the sum of the squares of the dipole moments associated with the repeating unit. Below the generic name of each family of polymers, the dipole moments associated with the backbone are indicated.

B. DIPOLE MOMENTS OF POLYMERS IN SOLUTION

TABLE 1. POLYOXIDES (POLYETHERS)*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle \mu^2 \rangle / x$, D^2	Remarks	Refs.
Poly(oxymethylene)						
Polyformaldehyde						
With $x=1$	Benzene	25	0.1			109
With $x=2$	Benzene	25	0.29			109
With $x=$ infinite	Melt	202	0.3			56
Poly(oxyethylene)						
Poly(ethylene oxide)						
$x=2-6$	Benzene	20		1.32–1.23	End groups: $-OC_2H_5$	47
$M_n=4000$	Benzene	20–60	0.603–0.644		$m(CH_2-O)=0.99D$	59
$x=1-6$	Benzene	25		1.30–1.14	End groups: $-OC_2H_5$	34
$x=4.0-176.2$	Benzene	25		2.82–1.28		46
$x=4.1-153.0$	Benzene	25		2.59–1.28		2
$x=1-33.6$	Benzene	20		1.99–1.19		45
$M_n=4000$	Benzene	20–60	0.621–0.693		$m(CH_2-O)=0.99D$	4
$x=1-7$	Dioxane	25		2.82–1.66		110
$x=2-227$	Benzene	20–30		2.13–1.14		47
Poly(oxypropylene)						
Poly(propylene oxide)						
$x=6.6-69.0$	Benzene	25		1.96–1.04		45
	Benzene	25	0.54		Isotactic	1
	Dioxane	25	0.49		Isotactic	1
Poly(oxytrimethylene)						
Poly(trimethylene oxide)	Benzene	25	0.41			50
Poly[oxy(2,2-dimethyltrimethylene)]						
Poly(3,3-dimethyloxetane)						
$M_n=8500$	Benzene	20–60	0.25–0.30			94
$M_n=19000$	Benzene	30–60	0.20–0.22			25
$M_n=35000$	Benzene	30–60	0.21–0.23			25
Poly[oxy(1-methyltrimethylene)]						
Poly(2-methyloxetane)						
$M_n=13000$	Cyclohexane	30–60	0.36–0.41			78
Poly[oxy(2-methyltrimethylene)]						
Poly(3-methyloxetane)						
$M_n=125000$	Cyclohexane	30–60	0.35–0.38			77

*If not indicated otherwise, the dipole moments associated with the skeletal bonds used in the calculation of g were $m(CH_2-O)=1.07D$, $m(CH_2-CH_2)=0D$, and $m(O-H)=1.7D$.

TABLE 1. *cont'd*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly(oxytetramethylene)					$m(CH_2\text{–}O) = 0.99D$	
Poly(tetramethylene oxide)						
$M_n = 2500$	Benzene	20–60	0.60–0.65			61
$M_n = 408000$	Benzene	20–60	0.59–0.65			4
Poly[oxy(2-methyltetramethylene)]						
Poly(3-methyltetrahydrofuran)						
$M_n = 6700$	Benzene	30–60	0.52–0.55			81
Poly(oxyhexamethylene)					$m(CH_2\text{–}O) = 0.99D$	
Poly(hexamethylene oxide)						
$M_n = 5500$	Benzene	35–60	0.65–0.68			59
$M_n = 2460$	Benzene	35–60	0.64–0.67			80
Poly(oxydecamethylene)					$m(CH_2\text{–}O) = 0.99D$	
Poly(decamethylene oxide)						
$M_n = 2000$	Benzene	35–60	0.64–0.68			61
Poly(oxyethyleneoxymethylene)					Polyformals: alternating	
Poly(1,3-dioxolane)					copolymer of methylene	
$M_n = 12000$	Benzene	20–60	0.160–0.204		oxide and alkylene oxide	62
$M_n = 16000$	Benzene	20–60	0.164–0.213			62
$M_n = 42000$	Benzene	20–60	0.177–0.227			62
Poly(oxytetramethyleneoxymethylene)						
Poly(1,3-dioxepane)						
$M_n = 17000$	Benzene	25–60	0.160–0.190			63
Poly(oxypentamethyleneoxymethylene)						
Poly(1,3-dioxocane)						
$M_n = 1850$	Benzene	20–60	0.190–0.232			64
$M_n = 2560$	Benzene	20–60	0.183–0.207			64
$M_n = 3700$	Benzene	20–60	0.168–0.207			64
Poly(oxyhexamethyleneoxymethylene)						
Poly(1,3-dioxonane)						
$M_n = 4020$	Benzene	20–60	0.190–0.230			64
$M_n = 2600$	Benzene	20–60	0.180–0.217			64
Poly(*trans*-oxymethylene-1,4-cyclohexyleneoxymethylene)						
Poly(trans-1,4-cyclohexane dimethanol-alt-formaldehyde)						
$M_n = 6500$	Benzene	20–60	0.17–0.21			71
Poly(oxypropyleneoxymethylene)						
Poly[(4-methyl)-1,3-dioxolane]						
$M_n = 40000$	Benzene	20–60	0.237–0.281			73
$M_n = 48000$	Benzene	20–60	0.216–0.256			73
Poly(*trans*-7-oxabicyclo-[4.3.0]nonane)						
Poly(trans-7-oxabicyclo-[4.3.0]nonane)	Benzene	30–60	0.63–0.66			111

TABLE 2. POLYSULFIDES (POLYTHIOETHERS)*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly(thiotrimethylene)						
Poly(trimethylene sulfide)						
$M_n = 14000$	Benzene	20–60	0.60–0.63			75
Poly(thiopentamethylene)						
Poly(pentamethylene sulfide)						
$M_n = 3200$	Benzene	20–60	0.75–0.78		End bonds: $CH_2\text{–}Br$; $m(CH_2\text{–}Br) = 1.96D$	74
Poly(thiopropylene)						
Poly(propylene sulfide)						
	Benzene	20–60	0.434–0.449			67
$M_n = 5000000$	Carbon tetrachloride	20–60	0.362–0.407			68
$M_n = 5000000$	Benzene	20–60	0.429–0.458			68
$M_w = 1.6 \times 10^6$	Carbon tetrachloride	20–60	0.325–0.347	Isotactic		68
$M_n = 5000$	Benzene	20–60	0.448–0.460			67
$M_n = 6000$	Carbon tetrachloride	20–60	0.357–0.389			67
$M_n = 1.6 \times 10^6$	Benzene	20–60	0.386–0.420	Isotactic		68

* $m(CH_2\text{–}CH_2) = 0D$, $m(CH_2\text{–}S) = 1.21D$, $m(O\text{–}H) = 1.7D$.

TABLE 2. *cont'd*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly[thio(2,2-dimethyltrimethylene)]						
Poly(3,3-dimethylthietane)						
$M_n = 8200$	Benzene	30–60	0.62–0.63			72
Poly(thiopentamethylenethioethylene)						
Poly(ethylene sulfide-alt-pentamethylene sulfide)						
$M_n = 3800$	Benzene	30–60	0.64–0.67		End bonds: CH_2–Br, $m(CH_2\text{–}Br) = 1.96D$	70
Poly(thiopentamethylenethiomethylene)					Alternating copolymer of	
Poly(1,3-dithiocane)					pentamethylene sulfide	
$M_n = 14000$	Benzene	20–60	0.26–0.31		and methylene sulfide	112
Poly(thiomethylene-1,4-cyclohexylenemethylenethiomethylene) *trans*						
$M_n = 8000$	Benzene	30–60	0.176–0.207			54

TABLE 3. HYDROXYL TERMINATED OXIDE/SULFIDE COPOLYMERS[a]

Polymer	Solvent	Temp. (°C)	g or D_n	Remarks	Refs.
Poly(thioethyleneoxyethylene)				Alternating copolymer of	
Poly(thiodiethylene glycol)				ethylene sulfide and	
$M_n = 13000$	Benzene	20–60	0.607–0.648	methylene sulfide	66
$M_n = 8000$	Benzene	20–60	0.627–0.659		66
Poly(thiomethyleneoxymethylenethiopentamethylene)					
Poly(3-oxa-1,5-dithiadeca-methylene)					
$M_n = 5200$	Benzene	30–60	0.323–0.358		84
Poly(oxymethyleneoxyethylenethioethylene)					
Poly(1,3-dioxa-6-thiocane)					
$M_n = 2500$	Benzene	20–60	0.419–0.432		65
$M_n = 3000$	Benzene	20–60	0.419–0.432		65
Poly(oxymethyleneoxyethylenethiomethylenethioethylene)					
Alternating copolymer of *1,3-dioxolane and 1,3-dithiolane*					
	Benzene	30	0.26		66

[a] $m(CH_2\text{–}CH_2) = 0D$, $m(CH_2\text{–}O) = 1.07D$, $m(CH_2\text{–}S) = 1.21D$.

TABLE 4. POLYESTERS DERIVED FROM AROMATIC DIACIDS*

Polymer	Solvent	Temp. (°C)	g or D_n	Remarks	Refs.
Poly[di(oxyethylene) oxyterephthaloyl]					
Poly(diethyleneglycol terephthalate)					
$M_n = 2500$	Benzene	35–60	0.688–0.692		60
Poly[di(oxyethylene) oxyisophthaloyl]					
Poly(diethyleneglycol isophthalate)					
$M_n = 5900$	Benzene	30–60	0.691–0.692		79
Poly[di(oxyethylene) oxyphthaloyl)					
Poly(diethyleneglycol phthalate)					
$M_n = 10300$	Benzene	30–60	0.637–0.679		86
Poly(oxypropyleneoxyterephthaloyl)					
Poly(propyleneglycol terephthalate)					
$M_n = 11000$	Benzene	30–60	0.582–0.609		87
Poly[di(oxypropylene) oxyterephthaloyl)					
Poly(dipropyleneglycol terephthalate)					
$M_n = 10000$	Benzene	30–60	0.715–0.750		14
Poly(tri(oxytrimethylene) oxyterephthaloyl)					
Poly(triethyleneglycol terephthalate)					
$M_n = 7800$	Benzene	30–60	0.677–0.695		82
Poly[di(oxytrimethylene) oxyterephthaloyl]					
Poly(ditrimethyleneglycol terephthalate)					
$M_n = 15500$	Benzene	30–60	0.805–0.798		26
(Poly(thioethyleneoxyethyleneoxyterephthaloyl)					
Poly(thiodiethyleneglycol terephthalate)					
$M_n = 6400$	Dioxane	40–70	0.540–0.552	$m(CH_2\text{–}S) = 1.21D$	69

*Hydroxyl terminated polyesters $m(C_6H_5COOCH_2) = 1.98D$; $m(CH_2\text{–}O)$ (ether) $= 1.07D$; $m(CH_2\text{–}CH_2) = 0D$; $m(O\text{–}H) = 1.7D$.

TABLE 5. ALIPHATIC AND CYCLOALIPHATIC POLYESTERS*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle \mu^2 \rangle / x$	Refs.
Poly[oxy (2,2-dimethyltrimethylene) oxysuccinoyl]					
Poly(neopentylglycol succinate)					
$M_n = 6900$	Benzene	30–60	0.548–0.586		88
Poly(oxysuccinoyloxymethylene-1,4-cyclohexylenemethylene) *trans*					
Poly(trans-1,4-cyclohexane dimethanol succinate)					
$M_n = 5800$	Dioxane	70	0.454		90
Poly[oxy(2,2-dimethyltrimethylene) oxyadipoyl]					
Poly(neopentylglycol adipate)					
$M_n = 5500$	Benzene	30–60	0.653–0.688		85
Poly(oxyadipoyloxymethylene-1,4-cyclohexylenemethylene) *cis*					
Poly(cis-1,4-cyclohexane dimethanol adipate)					
$M_n = 11000$	Benzene	30–60	0.950–0.972		90
$M_n = 11000$	Dioxane	30–60	0.914–0.959		90
Poly(oxyadipoyloxymethylene-1,4-cyclohexylenemethylene) *trans*					
Poly(trans-1,4-cyclohexane dimethanol adipate)					
$M_n = 10000$	Dioxane	50–70	0.596–0.65		90
Poly(oxysebacoyloxymethylene-1,4-cyclohexylenemethylene) *trans*					
Poly(trans-1,4-cyclohexane dimethanol sebacate)					
$M_n = 4600$	Benzene	30–60	0.631–0.709		83
Poly[oxy(2,2-dimethyltrimethylene) oxyhexafluoroglutaroyl]					
Poly(neopentylglycol hexafluoroglutarate)					
$M_n = 3640$	Benzene	30–60		9.16–9.78	58
Poly[oxy(2,2-dimethyltrimethylene) oxyglutaroyl]					
Poly(neopentylglycol glutarate)					
$M_n = 4500$	Benzene	30–60		4.26–4.52	58
Poly(oxysebacoyloxymethylene-1,4-cyclohexylenemethylene) *cis*					
Poly(cis-1,4-cyclohexane dimethanol sebacate)					
$M_n = 5200$	Benzene	300–60	0.983–1.04		83
Poly[di(oxyethylene) oxycarbonyl-1,4-cyclohexylenecarbonyl] *trans*					
Poly(diethyleneglycol-1,4-trans-cyclohexane dicarboxylate)					
$M_n = 5300$	Benzene	30–60	0.585–0.608		89

* Hydroxyl terminated polyesters $m(CH_2COOCH_2) = 1.89D$.

TABLE 6. POLYCARBONATES

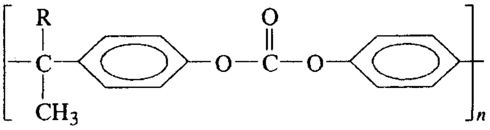
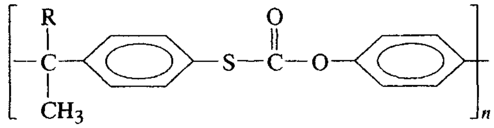
Polymer	Solvent	Temp. (°C)	$\langle \mu^2 \rangle / x$, D^2	Remarks	Refs.
Poly(oxycarbonyloxy-1,4-phenylene-1-(R)-1-methylmethylene-1,4-phenylene)					
Polycarbonate					
$x = 97$	Benzene	25	9.36	R = 3-chlorophenyl	28
$x = 88$	Benzene	25	11.70	R = 4-chlorophenyl	28
$x = 73$	Benzene	25	17.64		28
Poly(thiocarbonate)					
Poly(thiocarbonate)					
$x = 128$	Benzene	25	1.69	R = isobutyl	21
$x = 75$	1,4-Dioxane	25	1.88	R = H	21
$x = 280$	1,4-Dioxane	25	2.07	R = phenyl	21
$x = 75$	Benzene	25	2.76	R = H	21
$x = 49$	Benzene	25	2.13	R = ethyl	21
Poly(thiocarbonate of 2,2/-bis(4-hydroxylphenyl)propane)					
Poly(thiocarbonate of 2,2/-bis(4-hydroxylphenyl)propane)					
$M_n = 9400$	1,4-Dioxane	25	0.92		97
Poly(thiocarbonate of 1,1/-bis(4-hydroxyphenyl)-1-(3-chlorophenyl)ethane)					
Poly(thiocarbonate of 1,1/-bis(4-hydroxyphenyl)-1-(3-chlorophenyl)ethane)					
With $x = 97$	Benzene	25	7.40		99,28
Poly(thiocarbonate of 1,1/-bis(4-hydroxyphenyl)-1-(4-chlorophenyl)ethane)					
Poly(thiocarbonate of 1,1/-bis(4-hydroxyphenyl)-1-(4-chlorophenyl)ethane)					
With $x = 88$	Benzene	25	6.05		99,28

TABLE 6. *cont'd*

Polymer	Solvent	Temp. (°C)	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly(thiocarbonate of 1,1/-bis(4-hydroxyphenyl)-1-(3,4-dichlorophenyl)ethane)					
Poly(thiocarbonate of 1,1/-bis(4-hydroxyphenyl)-1-(3,4-dichlorophenyl)ethane)					
With $x=73$	Benzene	25	12.25		99,28

TABLE 7. VINYL POLYMERS*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly(1-phenylethylene)						
Poly(styrene)						
Atactic	Toluene	38.4	0.36		$\mu_0 = 0.60D$	35
Atactic	Carbon tetrachloride	25	0.56		$\mu_0 = 0.35D$	37
Isotactic	Toluene	38.4	0.53		$\mu_0 = 0.60D$	35
Poly(2-bromophenylethylene)						
Poly(o-bromostyrene)			0.50			57
			1.21			57
Poly(4-bromophenylethylene)						
Poly(p-bromostyrene)						
PPBSI	*p*-Dioxane	20–50		2.20–2.49		108
PPBSI	Carbon tetrachloride	20–50		2.12–2.54		108
PPBSII	*p*-Dioxane	20–50		2.44–2.72		108
Poly(1-phenylethylene/(4-pyridyl) ethylene)						
Poly(styrene/4-vinylpyridine)	Benzene	25	0.73		$\mu_0 = 2.65D$	5
Poly[1-methyl-1-(4-fluorophenyl) ethylene]						
Poly(p-fluoromethylstyrene)	Benzene	25	0.62		$\mu_0 = 1.82D$	6
	Benzene	25	0.27	0.89	$\mu_0 = 1.82D$	5
Poly[(4-methoxyphenyl) ethylene]						
Poly(p-methoxystyrene)	Toluene	25	0.54	0.78	$\mu_0 = 1.21D$	31
	Benzene	25	0.72	1.06	$\mu_0 = 1.21D$	5
	Benzene	25	0.64	0.94	$\mu_0 = 1.21D$	6
Poly[(4-fluorophenyl) ethylene]						
Poly(p-fluorostyrene)	Benzene	25	0.62	2.05	$\mu_0 = 1.82D$	6
	Benzene	25	0.51	1.69	$\mu_0 = 1.82D$	5
Poly[(2-chlorophenyl) ethylene]						
Poly(o-chlorostyrene)						
				2.85		57
Poly[(3-chlorophenyl) ethylene]						
(Poly(m-chlorostyrene)	Toluene	25	0.63	1.61	$\mu_0 = 1.60D$	93
Poly[(4-chlorophenyl) ethylene]						
Poly(p-chlorostyrene)	Xylene	30	0.71	2.00	$\mu_0 = 1.68$	11
		30–50	0.42–0.56			57
	Benzene	30	0.56	2.10	$\mu_0 = 1.93$	12
	Carbon tetrachloride	50		1.89		108
	p-Dioxane	20–50		2.11–2.46		108
	Toluene	25		1.82		113
	Cumene	25–65		1.87–1.73		113
	Toluene	30	0.77	2.17	$\mu_0 = 1.68$	11
	Isopropylbenzene	30–90	0.73–0.70	2.06–1.98	$\mu_0 = 1.68$	9
	Toluene	30–60	0.74–0.75	2.09–2.12	$\mu_0 = 1.68$	9
	Benzene	25	0.64		$\mu_0 = 2.0$	5
	Toluene	25		1.65		31
	Isopropylbenzene	30	0.53	1.50	$\mu_0 = 1.68$	11
	n-Propylbenzene	20–90	0.436–0.499	1.641–1.878		114
	Carbon tetrachloride	25	0.57		$\mu_0 = 1.88D$	6
	Benzene	30		1.49		55
	Benzene	30		1.49	Isotactic	55
	Toluene	25	0.60	1.59	$\mu_0 = 1.63$	93
	Isopropylbenzene	30–90	0.493–0.520	11.854–1.956		114
	Benzene	15–70	0.599–0.562	2.373–2.224		114

*In vinyl polymers the dipolar correlation coefficient is expressed by $g = \langle\mu^2\rangle/x\mu_0^2$, where x is the degree of polymerization and μ_0 is the dipole moment of a model compound of the repeating unit.

TABLE 7. *cont'd*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly(1-acetoxyethylene)						
Poly(vinyl acetate)	Benzene and CCl_4	25	0.89 and 0.94	2.59–2.89	$\mu_0 = 1.80D$	38
	Benzene	20	0.84	2.89	$\mu_0 = 1.86$	101
			0.75–0.80			107
Poly(1-bromoethylene)						
Poly(vinyl bromide)						
Several fractions	*p*-Dioxane	25		1.97–3.20	$\mu_0 = 1.93D$	40
	p-Dioxane	30–60	0.53–0.86	2.29–2.38	$\mu_0 = 2.08D$	95
	1-Methylnaphthalene	30–60	0.45–0.46		$\mu_0 = 2.08D$	95
Poly(1-chloroethylene)						
Poly(vinyl chloride)						
Atactic fraction	*p*-Dioxane	20 and 40	0.59	2.65	$\mu_0 = 2.12D$	33
	p-Dioxane	20–65	0.70–0.75	2.79–3.06	$\mu_0 = 2.00D$	29
Atactic fraction	Tetrahydrofuran	40		1.716	$\mu_0 = 1.64D$	33
Atactic fraction	Tetrahydrofuran	20 and 40	0.64–0.62	1.72–1.67	$\mu_0 = 1.64D$	33
Eight fractions (atactic)	*p*-Dioxane	25	0.66–0.72	2.59–2.82	$\mu_0 = 2.00D$	39
Syndiotactic fraction	Tetrahydrofuran	20	0.71	1.93	$\mu_0 = 1.64D$	33
$M_n = 26000$ (atactic)	*p*-Dioxane	25–55	0.68–0.65	2.72–2.60	$\mu_0 = 2.00D$	8
			0.75			12
$M_n = 47000$ (atactic)	*p*-Dioxane	25–55	0.70–0.68	2.80–2.72	$\mu_0 = 2.00D$	8
Poly(isobutoxyethylene)						
Poly(vinyl isobutylether)						
Isotactic fraction	Benzene	25 and 50	0.90 and 0.98	1.345 and 1.464	$\mu_0 = 1.22D$	107
Atactic fraction	Benzene	25	0.77 and 0.83		$\mu_0 = 1.22D$	107
Isotactic fraction	Benzene	30		0.98		55
Atactic fraction	Benzene	30	0.98	0.96		55
Poly(carbazolylethylene)						
Poly(vinyl carbazole)	Toluene	25	0.36	3.71	$\mu_0 = 3.21D$	30
	p-Dioxane	30–60	0.41–0.44	3.52–3.78	$\mu_0 = 2.93D$	102
Poly(ethylenethiophenylene)						
Poly(vinylphenyl sulfide)	Benzene	20–50	1.10–1.06	2.34–2.26	$\mu_0 = 1.46D$	100
Poly[1-methyl-1-(4-bromophenyl) ethylene]						
Poly(p-bromo-α-methylstyrene)	Benzene	25	0.28	1.21	$\mu_0 = 2.08D$	6

TABLE 8. ACRYLIC POLYMERS*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly[1-methoxycarbonyl) ethylene]						
Poly(methyl acrylate)	Benzene	20	0.717	2.22	$\mu_0 = 1.76D$	51
	Benzene	25	0.64–0.67	1.99–2.07	$\mu_0 = 1.76D$	43
Poly[2-(biphenyloxycarbonyl) ethylene]						
Poly(2-biphenyl acrylate)	Benzene	30–60	0.69–0.74	2.05–2.22	$\mu_0 = 1.723–1.732D$	16
Poly[1-(cyclohexyloxycarbonyl) ethylene]						
Poly(cyclohexyl acrylate)	Benzene	30–60	0.75–0.81	2.79–3.01	$\mu_0 = 1.93D$	15
Poly[1-(ethoxycarbonyl) ethylene]						
Poly(ethyl acrylate)						
Atactic fraction	Benzene	30	1.04			55
Syndiotactic fraction	Benzene	30	1.04			55
Poly[1-(phenoxycarbonyl) ethylene]						
Poly(phenyl acrylate)	Benzene	30–60	0.62–0.66	1.73–1.91	$\mu_0 = 1.669–1.700D$	98
Poly[1-((3-chloro) phenoxycarbonyl) ethylene]						
Poly(m-chlorophenyl acrylate)	Benzene	30–60	0.57–0.61	1.85–2.02	$\mu_0 = 1.800–1.824D$	98
Poly[1-((2-chloro) phenoxycarbonyl) ethylene]						
Poly(o-chlorophenyl acrylate)	Benzene	30–60	1.09–1.09	3.30–3.97	$\mu_0 = 1.74–1.91D$	98
Poly[1-((4-chloro) phenoxycarbonyl) ethylene]						
Poly(p-chlorophenyl acrylate)	Benzene	30–60	0.524–0.501		$\mu_0 = 2.590–2.694D$	98
Poly[1-((4-benzoyl) phenoxycarbonyl) ethylene]						
Poly(4-benzoylphenyl acrylate)	1,4-Dioxane	30–60	0.81–0.84	10.27–10.41	$\mu_0 = 3.561–3.521D$	17
Poly[1-(4-phenoxy) phenyloxycarbonyl) ethylene]						
Poly(4-phenoxyphenyl acrylate)	Benzene	30–60	0.82–0.84	3.61–3.74	$\mu_0 = 2.10–2.11D$	18
Poly[1-(hydroxyethylenedi(oxyethylene) oxycarbonyl) ethylene]						
Poly(triethyleneglycol acrylate)	Benzene	30–60		7.97–8.16		92

* μ_0 is the dipole moment of a model compound of the side group.

TABLE 9. METHACRYLIC POLYMERS*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly[1-methoxycarbonyl)-1-methylethylene]						
Poly(methyl methacrylate)						
Atactic fraction	Five solvents	25	0.62		$\mu_0 = 1.73D$	48
Atactic fraction	Benzene	25	0.53–0.66			57,107
Atactic fraction	Benzene	25	0.55–0.72	1.77–2.31	$\mu_0 = 1.80D$	42
Syndiotactic fraction	Toluene	30–90	0.67–0.79	1.72–2.01	$\mu_0 = 1.60D$	105
Isotactic fraction	Toluene	25–65	0.65–0.75	1.66–1.93	$\mu_0 = 1.60D$	105
Syndiotactic fraction	Benzene	25–65	0.70–0.78	1.79–1.99	$\mu_0 = 1.60D$	105
Atactic fraction	Benzene	25–65	0.69–0.78	1.77–1.99	$\mu_0 = 1.60D$	105
Isotactic fraction	Benzene	25–65	0.77–0.81	1.96–2.07	$\mu_0 = 1.60D$	105
Isotactic fraction	Benzene	30	0.67	2.00	$\mu_0 = 0.73D$	3
Atactic fraction	Benzene	30	0.56–0.61	1.66–1.82	$\mu_0 = 1.73D$	3
Atactic fraction	Toluene	25–65	0.66–0.78	1.69–1.99	$\mu_0 = 1.60D$	105
Syndiotactic fraction	Benzene	30	0.53	1.61	$\mu_0 = 1.73D$	3
Atactic fraction	*p*-Dioxane	23		2.25		10
Poly[1-(ethoxycarbonyl)-1-methylethylene]						
Poly(ethyl methacrylate)	1,4-Dioxane	25	0.58	2.00	$\mu_0 = 1.86D$	36
	Carbon tetrachloride	25	0.54	1.87	$\mu_0 = 1.86D$	36
	Toluene	25	0.62	2.14	$\mu_0 = 1.86D$	36
			0.59–0.62			57
	Benzene	25	0.58	2.00	$\mu_0 = 1.86D$	
Poly[1-(propoxycarbonyl)-1-methylethylene]						
Poly(propyl methacrylate)			0.56–0.59			57
Poly[1-(isopropoxycarbonyl)-1-methylethylene]						
Poly(isopropyl methacrylate)			0.61–0.66			57
Poly(butyl methacrylate)						
Poly(butyl methacrylate)				1.93–2.72		10
	Four solvents	23	0.55–0.59			57
Poly(phenylmethacrylate)						
Poly(phenylmethacrylate)			0.55			57
Poly(*p*-chlorophenylmethacrylate)						
Poly(p-chlorophenylmethacrylate)			0.35			57
Poly(dichlorophenylmethacrylate)						
Poly(dichlorophenylmethacrylate)			0.38			52

*μ_0 is the dipole moment of a model compound of the side group.

TABLE 10. ITACONATE POLYMERS

Polymer	Solvent	Temp. (°C)	$\langle\mu^2\rangle/x$, D^2	Refs.
Poly[1-(cyclohexylmethylene oxycarbonylmethylene)-1-(carboxy)ethylene]				
Poly(monocyclohexylmethylene itaconate)	1,4-Dioxane	20–50	5.75–5.70	20
Poly[1-(cyclohexylmethyleneoxycarbonylmethylene)-1-(cyclohexylmethyleneoxycarbonylmethylene) ethylene]				
Poly(dicyclohexylmethylene itaconate)	Benzene	30–60	6.89–7.00	19
Poly[1-benzyloxycarbonylmethylene)-1-(carboxy) ethylene]				
Poly(monobenzyl itaconate)	1,4-Dioxane	25	3.84	96
Poly[1-(benzyloxycarbonylmethylene)-1-(benzyloxycarbonylmethylene)ethylene]				
Poly(dibenzyl itaconate)	1,4-Dioxane	25–33	2.31–2.79	24

TABLE 11. POLYDIENES

Polymer	Solvent	Temp. (°C)	g or D_n	Remarks	Refs.
Poly(1-methyl-1-butenylene)					
Poly(isoprene)					
cis 1,4	Benzene	25	0.70	$\mu_0 = 0.34D$	41
trans 1,4	Benzene	25	0.82	$\mu_0 = 0.34D$	41
Poly(1-chloro-1-butenylene)					
Poly(chloroprene)	Benzene	20	2.70		101

TABLE 12. SILICON BASED POLYMERS[a]

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Linear Poly(dimethylsiloxane)						
Linear Poly(dimethylsiloxane)						
$x+1=188$	Undiluted	10–60	0.306–0.297			44
$x=9.85$	Cyclohexane, benzene	30	0.18–0.21		Cyclic PDMS	76
$x=1$, 102	Undiluted	25			Linear PDMS; $\langle\mu^2\rangle^{1/2}=2.07D$, $14.4D$	7
$x=4$, 95.0	Undiluted	25			Cyclic PDMS; $\langle\mu^2\rangle^{1/2}=1.50D$, $14.3D$	7
$x=69.6$	Cyclohexane, benzene	30	0.20,0.33			76
$x=14.8$	Cyclohexane, benzene	30	0.21,0.28		Cyclic PDMS	76
$x=70.55$	Cyclohexane, benzene	30	0.21,0.30			76
$x=15.8$	Cyclohexane, benzene	30	0.19,0.26			76
$x=10.5$	Cyclohexane, benzene	30	0.18,0.27			76
$x+1=239$	Undiluted	10–60	0.305–0.297			44
$x+1=97$	Undiluted	10–60	0.314–0.306			44
$x+1=1038$	Cyclohexane	10–60	0.398–0.444			44
$x+1=239$	Cyclohexane	10–60	0.377–0.412			44
$x+1=188$	Cyclohexane	10–60	0.377–0.369			44
$x+1=97$	Cyclohexane	10–60	0.387–0.407			44
$x+1=1038$	Undiluted	10–60	0.308–0.301			44
Poly(1,1-dimethylsilazane)						
Poly(1,1-dimethylsilazane)	Cyclohexane	20–50		0.370–0.326		104
	Hexamethyldisilazane	25		0.246		104
$M_n=750$	Hexane	20		0.330		104
	Carbon tetrachloride	20–50		0.310–0.310		104
	Benzene	20–50		0.342–0.359		104
Poly(methylphenyl siloxane)						
Poly(methylphenyl siloxane)						
$M_n=45000$	Cyclohexane	25	0.31			103
Poly(dimethyl siloxane-*co*-methylphenyl siloxane) (35.7/54.3)						
Poly(dimethyl siloxane-co-methylphenyl siloxane) (35.7/54.3)						
$M_n=4200$	Cyclohexane	25	0.22			103
Poly(dimethylsiloxane-*co*-methylphenylsiloxane) (90.5/9.5)						
Poly(dimethylsiloxane-co-methylphenylsiloxane) (90.5/9.5)						
$M_n=6400$	Cyclohexane	25	0.27			103
Poly(methylsilmethylene)						
Poly(methylsilmethylene)	Cyclohexane	20	0.391		m(Si–C) = 0.50D	49

[a] m(Si–O) = 0.60D.

TABLE 13. STYRENE COPOLYMERS*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
Poly[1-phenylethylene-*co*-(4-methoxyphenyl) ethylene]						
Poly(styrene-co-p-methoxystyrene)						
$x_p=0.157$	Toluene	25	1.07	1.56	$\mu_0=1.21D$; $\langle\mu^2\rangle/x$ is referred to the polar unit	31 30
$x_p=0.328$	Toluene	25	0.84	1.23		31 30
$x_p=0.480$	Toluene	25	0.74	1.08		31 30
$x_p=0.721$	Toluene	25	0.69	1.01		31 30
$x_p=1$	Toluene	25	0.54	0.78		31 30
Poly(1-phenylethylene-*co*-carbazolylethylene)						
Poly(styrene-co-vinylcarbazole)						
$x_p=0.074$	Toluene	25	0.53		$\mu_0=3.21D$	30
$x_p=1.00$	Toluene	25	0.36			30
$x_p=0.368$	Toluene	25	0.53			30
$x_p=0.665$	Toluene	25	0.39			30
Poly[1-phenylethylene-*co*-(4-pyvidyl) ethylene]						
Poly(styrene-co-4-vinylpyridine)						
$x_p=0.028$	Toluene	25	0.31		$\mu_0=2.655D$	30
$x_p=0.183$	Toluene	25	0.50			30
$x_p=0.154$	Toluene	25	0.34			30

* x_p is the molar fraction of polar comonomer and μ_0 is the dipole moment of the polar repeating unit.

TABLE 13. *cont'd*

Polymer	Solvent	Temp. (°C)	g or D_n	$\langle\mu^2\rangle/x$, D^2	Remarks	Refs.
$x_p = 0.118$	Toluene	25	0.29			30
$x_p = 0.051$	Toluene	25	0.29			30
$x_p = 0.082$	Toluene	25	0.23			30
Poly[1-phenylethylene-*co*-(4-chlorophenyl) ethylene]						
Poly(styrene-co-p-chlorostyrene)						
$x_p = 0.247$	Toluene	25	0.67	2.67	$\mu_0 = 2.0D$	31,30
$x_p = 0.802$	Toluene	25	0.44	1.76		31,30
$x_p = 1.00$	Toluene	25	0.41	1.4		31,30

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Heat, Entropy, and Volume Changes for Polymer–Liquid Mixtures

Robert A. Orwoll
Department of Chemistry, College of William and Mary Williamsburg, VA, USA

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A. INTRODUCTION

Tabulated below are references to the studies of the enthalpy, entropy, and volume changes that occur when polymer and solvent are mixed to form a homogeneous liquid solution. This bibliography follows closely the form employed by C. Booth (Manchester) in his contribution under the same title in the second edition of this Handbook. With several exceptions, references to work reported before 1972 were compiled by Professor Booth for the second edition.

1. Scope of the Table

This table includes literature citations to studies from which the thermodynamic properties named in the title can be deduced. The experimental methods utilized are also identified.

This tabulation is limited to reports of measurements on solutions that contain only one nonelectrolyte homopolymer; solutions with a copolymer, polyelectrolyte, or polymer mixture have been excluded. Solvents for the solutions in this compilation are liquids comprising single molecular entities; i.e., references to studies in which the solvent is a binary or ternary mixture or a mixture of oligomers are not included.

Most studies whose primary goal is to characterize the individual polymer molecule and its interaction in an infinitely dilute solution will not be found in this table. However, references to studies of dilute solutions are presented in some of the other tables of Part VII ("Solution Properties"). Most of the reports of changes in free energy on mixing or on dilution cited here have been limited to those that also provide sufficient data to determine the change in the enthalpy (or entropy). References to measurements of solvent activities which can yield information about changes in free energy can be found in "Polymer–Solvent Interaction Parameters".

These references were collected without regard for the quality of data.

2. Experimental Methods

Heat Several different kinds of enthalpy changes are recognized in the formation of solutions. The *integral heat of mixing or integral heat of solution,*

$$\Delta H_{\text{mix}} = H_{\text{soln}} - n_1 H_1^0 - n_2 H_2^0 \qquad \text{(A1)}$$

is the heat absorbed when pure solvent and pure polymer are combined to form a solution at constant temperature and pressure. Here H_{soln}, H_1^0, and H_2^0 are the molar enthalpies of solution, pure solvent, and pure solute respectively; and n_1 and n_2 the number of moles of each component. The value of ΔH_{mix} is dependent on the degree of crystallinity for semicrystalline polymers and, usually to a lesser extent, on the thermal history of glassy polymers. However, if a

polymer solution already exists and more solvent is added, the accompanying enthalpy change, which is called the *integral heat of dilution*, is independent of any crystalline or glassy aspect of the pure polymeric solute. The integral heats, both of mixing and of dilution, are usually determined calorimetrically. The latter is often preferable for experimental reasons, because its measurement is not complicated by the long dissolution times usually required in the direct measurements of integral heats of solution.

The *partial* or *differential heat of solution*, $\overline{\Delta H_2}$, is the change in enthalpy when a very small amount of pure solute is added to a large amount of either solution or pure solvent. In the latter instance, the resultant quantity which is properly identified as the *partial heat of solution at infinite dilution* is sometimes referred to more simply as the heat of solution. For polymer solutions, $\overline{\Delta H_2}$ is often expressed as the heat absorbed per unit mass of solute added and can be found as the derivative of the integral heat of mixing:

$$\overline{\Delta H_2} = (\partial \Delta H_{\text{mix}}/\partial m_2)_{T,p,n_1} \quad \text{(A2)}$$

Here m_2 is the mass of polymeric solute. Values of $\overline{\Delta H_2}$ at infinite dilution for some polymer–solvent systems are listed in "Heats of Solution of Some Common Polymers".

The *partial or differential heat of dilution* $\overline{\Delta H_1}$ differs from $\overline{\Delta H_2}$ in that it is a consequence of adding solvent, rather than solute, to a solution and is almost always expressed as the heat per mol of added solvent. Accordingly,

$$\overline{\Delta H_1} = (\partial \Delta H_{\text{mix}}/\partial n_1)_{T,p,m_2} = (\partial H_{\text{soln}}/\partial n_1)_{T,p,m_2} - H_1^0 \quad \text{(A3)}$$

It can also be obtained from the variation with concentration of the integral heat of dilution. Or it may be determined from the temperature dependence of the activity a_1 of solvent according to the Gibbs–Helmholtz equation

$$\Delta H_1 = \text{R}[\partial \ln a_1/\partial(1/T)]_{p,n_1,m_2} \quad \text{(A4)}$$

I turn, the activity a_1 of solvent in a polymer solution has a variety of sources including the osmotic pressure of the solution, the vapor pressure of solvent above the solution relative to that of the pure solvent, the gas-chromatographic retention volumes of volatile solvent on columns with polymeric solute as the stationary phase, swelling equilibria for polymer networks, the concentration dependence of Rayleigh scattering, and sedimentation equilibria. The first three methods are the ones used most frequently.

Entropy The entropy of mixing pure polymer with pure solvent can be obtained from the difference between the integral heat of mixing and the free energy of mixing

$$\Delta S_{\text{mix}} = (\Delta H_{\text{mix}} - \Delta G_{\text{mix}})/T \quad \text{(A5)}$$

Free energies of mixing can be determined by integrating concentration-dependent functions of the chemical potential of the solvent.

More often, the partial molar entropy of solvent

$$(\partial \Delta S_{\text{mix}}/\partial n_1)_{T,p,m_2} = \overline{\Delta S_1} \quad \text{(A6)}$$

is reported, using the temperature dependence of the activity of solvent

$$\overline{\Delta S_1} = -R[\ln a_1 + (\partial \ln a_1/\partial T)_{p,n_1,m_2}] \quad \text{(A7)}$$

Volume Volume changes reported in the literature cited below are measured directly (dilatometry) or from density determinations.

B. KEY FOR THE TABLES

The following abbreviations are used to identify the experimental methods utilized for the studies cited:

CD	Calorimetry: integral heat of dilution
CM	Calorimetry: integral heat of mixing
D	Density
DL	Dilatometry
GC	Gas chromatography with polymeric stationary phase
LS	Rayleigh light scattering
OS	Osmotic pressure
SD	Sedimentation equilibrium
SW	Swelling of polymer network
VP	Vapor pressure including manometry, isopiestic distillation, vapor phase osmometry, etc.
XS	X-ray scattering

A Chemical Abstracts Service registry number accompanies most of the polymers named in the table. Although some polymers have more than one registry number owing to particular stereochemistries, different terminal groups, etc., only the most common number appears in the table for each polymer.

C. TABLES OF LITERATURE REFERENCES FOR HEAT, ENTROPY, AND VOLUME CHANGES FOR POLYMER–SOLVENT MIXTURES

TABLE 1. MAIN-CHAIN CARBON POLYMERS

Polymer–Solvent	Method	Refs.
1.1. POLY(DIENES)		
Poly(1,3-butadiene) [9003-17-2]		
Benzene	CD	140
	CM	19,84
	GC	308,327
	VP	73
cis-Bicyclo[4.4.0]decane	CM	293
trans-Bicyclo[4.4.0]decane	CM	293
1,3-Butadiene	DL	374
	GC	327
Butane	DL	374
	GC	327

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Poly(1,3-butadiene) *cont'd*		
1-Butene	DL	374
cis-2-Butene	DL	374
trans-2-Butene	DL	374
Carbon dioxide	SW	350
Carbon tetrachloride	GC	308
1-Chlorobutane	GC	308
Chloroform	GC	308
	VP	119
Cyclohexane	CM	293
	GC	327
Cyclooctane	CM	293
Cyclopentane	CM	293
	GC	327
Decane	GC	327
3,3-Diethylpentane	CM	293
2,2-Dimethylbutane	GC	327
2,2-Dimethylpentane	CM	293
2,3-Dimethylpentane	CM	293
2,4-Dimethylpentane	CM	293
3,3-Dimethylpentane	CM	293
1,4-Dioxane	VP	165
Dodecane	CM	294
	GC	327
Ethane	SW	350
Ethylbenzene	GC	327
Ethylene	SW	350
3-Ethylpentane	CM	293
2,2,4,4,6,8,8-Heptamethylnonane	CM	294
Heptane	CM	294
	GC	327
Hexadecane	CM	294
Hexane	GC	327
2-Methylbutane	GC	327
3-Methylhexane	CM	293
2-Methylpropane	DL	374
	GC	327
2-Methylpropene	DL	374
Nonane	CM	294
	GC	327
Octane	CM	294
	GC	308,327
1-Octene	GC	308
2,2,4,6,6-Pentamethylheptane	CM	294
Pentane	GC	308,327
2,2,4,4-Tetramethylpentane	CM	293,294
2,3,3,4-Tetramethylpentane	CM	293
Toluene	CD	140
	GC	308,327
1,3,5-Trimethylbenzene	GC	327
2,2,4-Trimethylpentane	CM	294
m-Xylene	GC	327
Water	SW	388
Poly(chloroprene) [9010-98-4]		
Benzene	CM	19
	GC	308
Butyl alcohol	GC	308
Carbon tetrachloride	GC	308
2-Chloro-1,3-butadiene	VP	126
1-Chlorobutane	GC	308
Chloroform	GC	308
Decane	GC	308
Octane	GC	308
1-Octene	GC	308
2-Pentanone	GC	308

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Poly(*cis*-1,3-isoprene) [9003-31-0] and [104389-31-3]		
Acetone	SW	9,120
	VP	120
Benzene	CM	6,8,55
	DL	5,166
	OS	5,166
	SW	9,121,130
	VP	5,8,74,130,166
Butane	VP	46
2-Butanone	DL	120
	SW	9,120
	VP	120
Butyl acetate	SW	9
Butyl butyrate	SW	9
Carbon disulfide	SW	9
Carbon tetrachloride	SW	9
Chloroform	SW	9
Cyclohexane	SW	9
2,4-Dimethyl-3-pentanone	SW	9
2,2-Dimethylpropane	VP	46
Ethyl acetate	DL	120
	SW	9,120
	VP	63,120
Heptane	CM	6
	SW	9
Hexane	VP	59
Isoprene	VP	126
Methyl acetate	SW	9,120
Methyl alcohol	VP	6
2-Methylbutane	VP	46
2-Methylpropane	VP	46
Octane	VP	177
Pentane	SW	9
	VP	46
2-Pentanone	SW	120
Propyl acetate	SW	9
Toluene	OS	1
	SW	9
	VP	1
2,2,4-Trimethylpentane	VP	177
Poly(*trans*-1,3-isoprene) [9003-31-0] and [104389-32-4]		
Octane	VP	177
Toluene	OS	2
2,2,4-Trimethylpentane	VP	167,177

1.2. POLY(ALKENES)

Polymer–Solvent	Method	Refs.
Poly(1-butene) [9003-28-5]		
cis-Bicyclo[4.4.0]decane	CM	293
trans-Bicyclo[4.4.0]decane	CM	293
Cyclohexane	CM	293
Cyclooctane	CM	293
Cyclopentane	CM	293
Decane	CM	248
3,3-Diethylpentane	CM	293
2,2-Dimethylpentane	CM	293
2,3-Dimethylpentane	CM	293
2,4-Dimethylpentane	CM	293
3,3-Dimethylpentane	CM	293
Dodecane	CM	248
	VP	107
3-Ethylpentane	CM	293
2,2,4,4,6,8,8-Heptamethylnonane	CM	294
Heptane	CM	248
Hexadecane	CM	248

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Hexane	CM	248
3-Methylhexane	CM	293
Nonane	CM	248
Octane	CM	248
	VP	102
2,2,4,6,6-Pentamethylheptane	CM	294
Pentane	CM	248
Tetradecane	CM	248
	GC	281
2,2,4,4-Tetramethylpentane	CM	293,294
2,3,3,4-Tetramethylpentane	CM	293
2,2,4-Trimethylpentane	CM	294
Poly(1-decene) [25189-70-2]		
Toluene	VP	195
Poly(1-dodecene) [25067-08-7]		
Toluene	VP	195
Poly(ethylene) [9002-88-4]		
Benzene	GC	299
Bromomethane	VP	87
2-Butanone	GC	351
Butyl acetate	GC	351
Butyl alcohol	GC	299
Carbon tetrachloride	GC	299
Chlorobenzene	GC	299,351
1-Chlorobutane	GC	351,299
Chloroform	GC	299,351
1-Chlorohexane	GC	351
1-Chloronaphthalene	CM	151,367
Cyclohexane	CM	367
	GC	299,351
Cyclohexanol	GC	299
Cyclohexanone	GC	299,351
Cyclohexyl chloride	GC	299
Cyclopentane	CM	367
Decahydronaphthalene	CD	246
	CM	367,369
Decane	DL	252
	GC	299,351
2,6-Di-*tert*-butyl-4-methylphenol	VP	361
1,5-Dichloropentane	GC	351
N,N-Dimethylacetamide	GC	351
N,N-Dimethylformamide	GC	351
1,2-Dimethylnaphthalene	GC	234
1,3-Dimethylnaphthalene	GC	234
1,4-Dimethylnaphthalene	GC	234
1,5-Dimethylnaphthalene	GC	234
1,6-Dimethylnaphthalene	GC	234
1,7-Dimethylnaphthalene	GC	234
1,8-Dimethylnaphthalene	GC	234
2,3-Dimethylnaphthalene	GC	234
2,6-Dimethylnaphthalene	GC	234
2,7-Dimethylnaphthalene	GC	234
2,4-Dimethylpentane	CM	367
Dodecane	VP	100,107,351
1-Ethylnaphthalene	GC	234
2-Ethylnaphthalene	GC	234
Ethyl propionate	GC	351
2,2,4,4,6,8,8-Heptamethylnonane	CM	367
Heptane	GC	351
	VP	38
Hexadecane	CM	367
Hexane	VP	87
2-Methylbutane	CM	367
1-Methylnaphthalene	GC	234
2-Methylnaphthalene	GC	234

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Methyl sulfoxide	GC	351
Nonane	GC	299
Octacosane	SW	93
Octane	GC	281,351
1-Octene	GC	299
2-Pentanone	GC	299
Phenol	GC	299
Phenyl ether	VP	180
Propyl ether	GC	351
Propyl sulfide	GC	351
1,1,2,2-Tetrachloroethane	GC	351
Tetradecane	GC	281
1,2,3,4-Tetrahydronaphthalene	CM	151
Toluene	GC	351
1,2,4-Trichlorobenzene	CM	367
1,1,2-Trichloroethane	GC	351
p-Xylene	VP	131
Poly(1-heptene) [25511-64-2]		
Toluene	VP	195
Poly(isobutene) [9003-27-4], polyisobutylene		
Benzaldehyde	GC	291
Benzene	CD	72,98
	CM	19,88,94,116, 141,157,184,278
	D	73,82,128,211,254
	DL	69,137,159,184
	GC	263,287,291,378
	OS	61,159
	VP	56,73,159,259,318
cis-Bicyclo[4.4.0]decane	CM	293
trans-Bicyclo[4.4.0]decane	CM	293
Butane	VP	35
2-Butanone	GC	291
Butyl ether	CM	95
Butyl propionate	VP	105
Carbon tetrachloride	CD	104
	CM	104,116,278
	D	254
	VP	105
Chlorobenzene	CD	98
	CM	88,94,184
	D	82,254
	DL	137,184
	OS	96
Chloroform	D	254
	GC	291
Cyclohexane	CD	255
	CM	88,94,104,116, 184,278,293
	D	128
	DL	137,155,184
	GC	263,378
	LS	158
	OS	61
	VP	26,56,105,155
Cyclooctane	CM	293
Cyclopentane	CM	293
Decahydronaphthalene	D	254
Decane	CM	94
	D	254
	DL	137,160
Decyl alcohol	GC	291
o-Dichlorobenzene	D	254
p-Dichlorobenzene	D	254
3,3-Diethylpentane	CM	293

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
2,2-Dimethylbutane	GC	378
2,3-Dimethylbutane	GC	378
2,2-Dimethylhexane	GC	378
2,5-Dimethylhexane	GC	378
2,2-Dimethylpentane	CM	293
	GC	378
2,3-Dimethylpentane	CM	293
	GC	378
2,4-Dimethylpentane	CM	293
	GC	378
3,3-Dimethylpentane	CM	293
2,2-Dimethylpropane	VP	35
Dodecane	CM	94,278,294
	D	254
Ethyl acetate	GC	291
Ethylbenzene	CM	88,297,378
Ethyl decanoate	CM	95
Ethyl ether	CM	94,95
Ethyl heptanoate	CM	95
Ethyl hexadecanoate	CM	95
Ethyl hexanoate	CM	95
Ethyl nonanoate	CM	95
Ethyl octanoate	CM	95
3-Ethylpentane	CM	293
Ethyl tetradecanoate	CM	95
Heptadecane	D	254
2,2,4,4,6,8,8-Heptamethylnonane	CM	294
Heptane	CM	19,88,94,116,157, 184,278,294
	DL	69,137,160,184
	GC	263,378
	OS	221
Hexadecane	CM	94,278,294
	DL	160
Hexane	CM	94,184
	D	254
	DL	137,160,184
	GC	263,378
	OS	221
Hexyl ether	CM	95
Methyl alcohol	VP	105
2-Methylbutane	CM	94
	VP	35
Methylcyclohexane	CM	94,116,184
	DL	137,184
2-Methylheptane	GC	378
4-Methylheptane	GC	378
2-Methylhexane	GC	378
3-Methylhexane	CM	293
	GC	378
2-Methylpentane	GC	378
3-Methylpentane	CM	94
	GC	378
2-Methylpropane	VP	35
Naphthalene	GC	291
Nitrobenzene	GC	291
Nonane	CM	94,294
	GC	291,378
Octane	CM	94,294
	D	254
	DL	160
	GC	263,378
	OS	160
2,2,4,6,6-Pentamethylheptane	CM	294
Pentanal	GC	291
Pentane	CD	255
	CM	94,278
	D	254,338
	DL	97,160
	GC	263,378
	LS	238
	OS	221
	VP	35,97,156
Pentyl ether	CM	95
Propyl alcohol	GC	291
Propyl ether	CM	95
Pyridine	GC	291
Tetradecane	CM	94
1,2,3,4-Tetrahydronaphthalene	D	254
2,2,4,4-Tetramethylpentane	CM	293,294
2,3,3,4-Tetramethylpentane	CM	293
Toluene	CD	98,104
	CM	19,104,184
	D	254
	DL	69,137,184
	GC	291,378
	VP	105
Tridecane	CM	94
2,2,4-Trimethylpentane	CM	19,94,104,157,294
	D	211
	DL	69
	GC	287,378
	LS	145,158,238
	VP	14,237,259
2,3,4-Trimethylpentane	GC	378
Undecane	CM	94
Poly(1-octadecene) [25511-67-5]		
Toluene	VP	195
Poly(propylene) [9003-07-0]		
Benzene	CM	315
	D	315
	VP	101
cis-Bicyclo[4.4.0]decane	CM	293
trans-Bicyclo[4.4.0]decane	CD	293
Carbon tetrachloride	CD	280
	CM	315
	D	315
	VP	216
Chloroform	CD	280
	CM	315
	D	315
1-Chloronaphthalene	CM	151
Cyclohexane	CM	293,315
	D	315
Cyclooctane	CM	293
Cyclopentane	CM	293
Decane	CM	315
	GC	281
3,3-Diethylpentane	CM	293
2,2-Dimethylpentane	CM	293
2,3-Dimethylpentane	CM	293
2,4-Dimethylpentane	CM	293
3,3-Dimethylpentane	CM	293
2,4-Dimethyl-3-pentanone	VP	123
Dodecane	CM	294
	GC	281
	VP	125,171
Ethylbenzene	CM	315
3-Ethylpentane	CM	293
2,2,4,4,6,8,8-Heptamethylnonane	CM	294

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TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Heptane	CM	294,315
	D	315
	VP	101,217
Hexadecane	CM	294
Hexane	CM	315
	D	315
	VP	101
3-Methylhexane	CM	293
Nonane	CM	294,315
Nonyl alcohol	VP	134
Octane	CM	294,315
2,2,4,6,6-Pentamethylheptane	CM	294
Pentane	CM	315
	D	315
	VP	217
3-Pentanone	VP	117,123
Tetradecane	GC	281
1,2,3,4-Tetrahydronaphthalene	CM	151
2,2,4,4-Tetramethylpentane	CM	293,294
2,3,3,4-Tetramethylpentane	CM	293
Toluene	CM	315
2,2,4-Trimethylpentane	CM	294
	VP	101
m-Xylene	CM	315
o-Xylene	CM	315
p-Xylene	CM	315

1.3. POLY(ACRYLICS)

Polymer–Solvent	Method	Refs.
Poly(acrylamide) [9003-05-8]		
Water	CD	313
	D	196,313
Poly(acrylic acid) [9003-01-4]		
Butyl alcohol	CM	381
N,N-Dimethylformamide	CM	381
Ethyl alcohol	CD	343
	D	343
Ethylene glycol	CD	292
	CM	292
Formamide	CD	292
	CM	292
Water	CD	233,292,343
	CM	292,381
	D	196,343
	VP	366
Poly(butyl methacrylate) [9003-63-8]		
Benzene	GC	307
Butyl acetate	CM	55
	GC	307
Butyl alcohol	GC	307
Butylbenzene	GC	307
tert-Butylbenzene	GC	307
Butylcyclohexane	GC	307
Carbon tetrachloride	GC	307
Chlorobenzene	GC	307
1-Chlorobutane	GC	307
Chloroform	CM	260
	GC	307
Cyclohexane	GC	307
Cyclohexanol	GC	307
Decane	GC	307
Dichloromethane	GC	307
Octane	GC	307
2-Pentanone	GC	307
3,4,5-Trimethylheptane	GC	307
2,2,4 ~ -Trimethylpentane	GC	307
Poly(*N,N*-dimethylacrylamide) [26793-31-0]		
Water	CD	313
	D	313
Poly(ethyl methacrylate) [9003-42-3]		
Acetone	CD	284
Acetonitrile	CD	284
Acrylonitrile	CD	284
Benzene	CD	284
Bromobenzene	CD	284
1-Bromobutane	CD	284
2-Butanone	CD	284
Butyl acetate	CD	284
Butyl alcohol	CD	284
Butylamine	CD	284
Butyraldehyde	CD	284
Carbon tetrachloride	CD	284
Chlorobenzene	CD	284
Chloroform	CD	284
Cyclohexane	CD	284
Decane	CD	284
Ethane	D	360
Ethylbenzene	CD	284
Ethylcyclohexane	CD	284
Ethylene	D	360
Heptane	CD	284
Methylcyclohexane	CD	284
Nitroethane	CD	284
Nitromethane	CD	284
1-Nitropropane	CD	284
Nonane	CD	284
Octane	CD	284
1-Octene	CD	284
Pentyl alcohol	CD	284
Propane	D	360
	VP	341
Propionic acid	CD	284
Propionitrile	CD	284
Propyl acetate	CD	284
Propyl alcohol	CD	284
Propyl ether	CD	284
Toluene	CD	284
Poly(*N*-isopropylacrylamide) [25189-55-3]		
Acetic acid	GC	198
Butyl alcohol	GC	198,281
1-Chloronaphthalene	GC	198
Hexadecane	GC	198
Naphthalene	GC	198
Water	CM	353
	OS	368
Poly(methacrylic acid) [54193-36-1]		
Water	CM	381
Poly(*N*-methylacrylamide) [25722-14-9]		
Water	CD	313
	D	313
Poly(methyl acrylate) [9003-21-8]		
Benzene	GC	282
Butylbenzene	GC	282
tert-Butylbenzene	GC	282
Butylcyclohexane	GC	282
Cyclohexane	GC	282
cis-Decahydronaphthalene	GC	282
trans-Decahydronaphthalene	GC	282
Decane	GC	282
Dodecane	GC	282
Ethylbenzene	GC	282
Naphthalene	GC	282

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Octane	GC	282
Tetradecane	GC	282
1,2,3,4-Tetrahydronaphthalene	GC	282
3,3,4,4-Tetramethylhexane	GC	282
Toluene	GC	282
3,4,5-Trimethylheptane	GC	282
2,2,5-Trimethylhexane	GC	282
2,2,4-Trimethylpentane	GC	282
Poly(methyl methacrylate) [9011-14-7]		
Acetone	CD	148,161
	D	60,178
	OS	31,178,261
	VP	220
Benzene	CD	162,186
	CM	224
	D	60,178
	OS	31,178,261
	VP	220
2-Butanone	D	60
	OS	261
Butyl acetate	D	60
	OS	36
Carbon dioxide	DL	387
	VP	387
Carbon tetrachloride	D	60
Chlorobenzene	CD	162
	D	60
Chloroform	CD	212
	CM	193
	D	60
	DL	210
	OS	31
Cyclohexane	OS	261
o-Dichlorobenzene	CD	162
	CM	266
	D	60
Dichloroethane	CM	83
	VP	83
1,2-Dichloroethylene	OS	149
1,4-Dioxane	CD	148
	D	60
	OS	31,149
Ethyl acetate	D	60
	OS	36,261
Methyl isobutyrate	CM	83
	VP	83
3-Pentanone	D	60
	OS	31
Tetrahydrofuran	D	60
	OS	31
Toluene	CD	148,212
	D	60
	DL	210
	OS	31,261
m-Xylene	D	60
	OS	31

1.4. VINYL POLYMERS

Polymer–Solvent	Method	Refs.
Poly(acrylonitrile) [25014-41-9]		
Acrylonitrile	VP	126
Benzene	CM	47
	VP	47
N,*N*-Dimethylformamide	CM	47
Poly(vinyl acetate) [9003-20-7]		
Acetone	CM	75,184,345
	DL	184
	GC	354
	LS	158
	OS	261
	VP	37,75
Acetonitrile	GC	354
Benzene	CD	170
	CM	41,224
	GC	288,295,299,354
	OS	261
	VP	37,76,85
2-Butanone	CD	170
	CM	184
	DL	184
	GC	354
	LS	158
	OS	15,261
Butyl acetate	CM	55,184
	DL	184
Butyl alcohol	GC	299
Butylbenzene	GC	288
Butylcyclohexane	GC	288
Carbon tetrachloride	GC	299,354
Chlorobenzene	CM	41
	D	49,82
	GC	299,354
	LS	158
1-Chlorobutane	GC	299
Chloroform	CM	41,345
	GC	299,354
1-Chlorohexane	GC	354
1-Chloropropane	VP	37
3-Chloropropene	VP	37
Cyclohexane	GC	288,295,299,354
	OS	261
Cyclohexanol	GC	299
Cyclohexanone	GC	299
Cyclohexyl chloride	GC	299
cis-Decahydronaphthalene	GC	288
Decane	GC	288,299
Dichloroethane	CD	232
1,2-Dichloroethane	CM	41
	GC	295,354
1,5-Dichloropentane	GC	354
Diethyl adipate	CD	27
	D	27
Diethyl malonate	CD	27
	D	27
Diethyl oxalate	CD	27
	D	27
Diethyl sebacate	CD	27
	D	27
Diethyl succinate	CD	27
	D	27
N,*N*-Dimethylacetamide	GC	354
N,*N*-Dimethylformamide	GC	354
1,4-Dioxane	CM	342
	GC	295,354
Dodecane	GC	288
Ethyl acetate	CM	30,184
	D	211
	DL	184
	GC	354
	LS	158
	OS	261
	VP	237

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TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Heptane	GC	295,354
3-Heptanone	CM	141,184
	DL	184
Hexane	GC	354
Isopropyl alcohol	GC	295
Isopropylamine	VP	37
Methyl acetate	CM	184
	DL	184
Methyl alcohol	CD	271
	CM	41,48,345
	D	211,271
	LS	158
Methyl sulfoxide	GC	354
Nonane	GC	288,299
1-Octene	GC	299
2-Pentanone	CM	184
	DL	184
	GC	299
Propyl acetate	CM	184
	DL	184
Propyl alcohol	VP	37
Propylamine	VP	37
Propyl ether	GC	354
Propyl sulfide	GC	354
1,1,2,2-Tetrachloroethane	CM	41,48
Tetrahydrofuran	GC	354
1,2,3,4-Tetrahydronaphthalene	GC	288
3,3,4,4-Tetramethylhexane	GC	288
Toluene	CD	64,232
	CM	41
	GC	295,354
	OS	261
1,2,3-Trichloropropane	OS	15
Undecane	GC	288
Vinyl acetate	VP	85
Water	CM	342
Poly(vinyl alcohol) [9002-89-5]		
Carbon tetrachloride	CM	359
Chloroacetic acid	CM	112
1,4-Dioxane	CD	342
Ethyl alcohol	CM	30
Water	CD	57,58
	CM	30,55,342
	LS	219
	VP	86,219
Poly(*N*-vinylcarbazole) [25067-59-8]		
Benzene	CD	161
	VP	124
Poly(vinyl chloride) [9002-86-2]		
Benzene	GC	295
Cyclohexane	GC	295
Cyclohexanone	CD	231
	CM	106,231
	D	273
	DL	106
Cyclopentanone	CD	243
	CM	243
Dibutyl phthalate	VP	250
Dichloroethane	CM	55
1,2-Dichloroethane	GC	295
Diethyl phthalate	VP	250
Dioctyl phthalate	VP	250
1,4-Dioxane	GC	295
Dodecane	GC	281
Heptane	GC	295

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Isopropyl alcohol	GC	295
Tetrahydrofuran	CD	244
	CM	244
Toluene	GC	295
Poly(vinylidene fluoride) [24937-79-9]		
Acetophenone	GC	354
2-Butanone	GC	354
Butyl acetate	GC	354
Butylbenzene	GC	354
γ-Butyrolactone	GC	354
Chlorobenzene	GC	354
1-Chlorodecane	GC	354
2-Chloroethyl ether	GC	354
1-Chlorohexane	GC	354
1-Chlorooctane	GC	354
Cyclohexanone	GC	354
cis-Decahydronaphthalene	GC	354
1,2-Dichlorobenzene	GC	354
1,2-Dichloroethane	GC	354
1,5-Dichloropentane	GC	354
N,N-Dimethylacetamide	GC	354
N,N-Dimethylethyleneurea	GC	354
N,N-Dimethylformamide	GC	354
N,N-Dimethylpropyleneurea	GC	354
Dodecane	GC	354
Ethyl acetate	GC	354
Ethylbenzene	GC	354
Ethyl propionate	GC	354
Hexadecane	GC	354
Hexamethylphosphoramide	GC	354
1-Methyl-2-pyrrolidinone	GC	354
Methyl sulfoxide	GC	354
Pentachloroethane	GC	354
Propylene carbonate	GC	354
Propyl sulfide	GC	354
Pyridine	GC	354
1,1,2,2-Tetrachloroethane	GC	354
Tetradecane	GC	354
Tetrahydronaphthalene	GC	354
Tetramethylene sulfone	GC	354
1,1,3,3-Tetramethylurea	GC	354
Toluene	GC	354
1,1,2-Trichloroethane	GC	354
m-Xylene	GC	354
Poly(vinyl methyl ether) [9003-09-2]		
Cyclohexane	VP	372
Ethylbenzene	CM	332
	D	332
	OS	332
Toluene	CM	332
	D	332
	OS	332
Water	CM	353
Poly(2-vinylpyridine) [25014-15-7]		
Benzene	D	267
2-Butanone	D	267
Butyl alcohol	D	267
Cyclohexanone	D	267
1,4-Dioxane	D	267
Ethyl alcohol	D	267
	LS	111
Methyl alcohol	D	267
Propyl alcohol	D	267
Poly(*N*-vinylpyrrolidone) [9003-39-8]		
Butyl alcohol	CD	309

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Chloroform	CD	330
	CM	174
	D	174
Ethyl alcohol	CD	309
Methyl alcohol	CD	269
Propyl alcohol	CD	309
Water	CD	269
	CM	174
	D	174
	OS	214
1.5. POLY(STYRENES)		
Poly(*p*-bromostyrene) [24936-50-3]		
Toluene	VP	103
Poly(*p*-chlorostyrene) [24991-47-7]		
Benzene	GC	363
Ethyl acetate	VP	199
Heptane	GC	363
Hexane	GC	363
Isopropylbenzene	GC	363
Pentane	GC	363
Propylbenzene	GC	363
Toluene	GC	363
	VP	103
Poly(α-methylstyrene) [25014-31-7]		
Benzene	CM	223
Isopropylbenzene	VP	136
α-Methylstyrene	VP	136,355
Toluene	VP	355
Poly(*p*-methylstyrene) [24936-41-2]		
Toluene	VP	103
Poly(styrene) [9003-53-6]		
Acetic acid	GC	306
Acetone	CM	29,34,43
	D	43,60
	GC	306
	OS	261
	VP	51,220
Acetonitrile	GC	306,354
Acetophenone	CD	279
Aniline	GC	306
Anisole	CD	135,279,286
	GC	336
Benzaldehyde	GC	306
Benzene	CD	28,70,81,147, 191,192,225
	CM	19,29,32,44,55, 90,184,192 222, 333
	D	24,39,60,128,247, 283,296,329
	DL	12,69,184
	GC	235,282,305,306, 307,325,336,354
	LS	23,114,143, 145,158
	OS	12,33,147,261
	SW	147
	VP	13,28,32,147, 192,220
	XS	200
Benzyl alcohol	GC	306
Benzyl ether	CD	279
Bromobenzene	D	25

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Butane	VP	337
2-Butanone	CD	135,249,255
	CM	29,68,146
	D	24,39,45,60
	DL	12,207,256
	GC	235,306,354
	OS	12,18,33, 207,256,261
	VP	17
Butyl acetate	CM	29
	D	60
	GC	306
	OS	33
	VP	13
Butyl alcohol	GC	306
sec-Butyl alcohol	SW	115
Butylbenzene	CM	184
	DL	184
	GC	282,325
tert-Butylbenzene	GC	307
Butylcyclohexane	GC	282
Carbon dioxide	DL	339
Carbon tetrachloride	CD	104,240
	CM	104,240
	D	60
	GC	235,306,307
	LS	114
	OS	33
	VP	13,220
Chlorobenzene	CD	53
	CM	53,146
	D	25,60,82
	GC	306,354
	LS	114
	OS	127
	SW	115
1-Chlorobutane	GC	307
Chloroform	CD	54,191,225
	CM	29
	D	45,60,82
	GC	306,307,354
	OS	33
	SW	115
	VP	51
1-Chlorohexane	GC	354
Cyclohexane	CD	53,70,81,192,285
	CM	29,34,43,53, 184,192,359
	D	43,45,60,189, 211,296,329
	DL	12,69,184, 189,209
	GC	282,306, 307,325,354
	LS	114,143,190,206
	OS	18,33,71,80,261
	SD	189,229
	SW	115
	VP	13,52,80, 192,237,259
Cyclohexanone	CD	289
	GC	306,354
Cyclohexene	CD	192
	CM	29,192
	VP	201

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Decahydronaphthalene	CD	192
	CM	184,192,359
	D	24
	DL	184
	LS	114,145
	VP	201
cis-Decahydronaphthalene	GC	282
trans-Decahydronaphthalene	GC	282
	LS	238
	OS	290
Decane	GC	281,282,305,307
o-Dichlorobenzene	D	24,60
	GC	235
1,2-Dichloroethane	GC	306,354
Dichloromethane	GC	306,307
1,5-Dichloropentane	GC	354
N,*N*-Dimethylformamide	GC	354
2,2-Dimethylpropane	VP	245
1,4-Dioxane	CD	135
	CM	55,184
	D	24,60
	DL	184
	GC	235,306,354
	OS	127
	VP	13
1,3-Diphenylbutane	CD	113,147
	SW	113,147
Dodecane	GC	281,282
Ethane	VP	337
2-Ethoxyethyl acetate	CM	29
Ethyl acetate	CD	135,257
	CM	29,68
	D	24,60,296
	DL	257
	GC	306
	OS	18,33,261
	VP	52
Ethyl alcohol	GC	306
Ethylbenzene	CD	50,53,54,81,113, 147,192,228,255
	CM	30,44,53,78,90, 104,184,192, 228,264
	D	24,39,113,147,211
	DL	69,184,208
	GC	235,325,336,354
	LS	114
	OS	113,147,208
	SW	113,115,147
	VP	50,90.113,147, 237,259
Ethylene glycol	GC	306
Ethyl ether	GC	306
Formamide	GC	306
Heptane	GC	306,325,335,354
	SW	115
Hexadecane	GC	281,282
Hexane	GC	306,325,335,354
	SW	115
Hexyl alcohol	SW	115
Hexylbenzene	GC	325
Isobutyl alcohol	GC	306
Isopentyl alcohol	SW	115
Isopropyl alcohol	GC	306

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Isopropyl ether	GC	306
Methyl alcohol	GC	306
2-Methylbutane	VP	245
2-Methylheptane	GC	325
2-Methylpentane	GC	325
3-Methylpentane	GC	325
Naphthalene	GC	282
Nitrobenzene	GC	306
Nitromethane	VP	13
Nonane	GC	305,325
Octane	GC	305,306,307,325
	SW	115
	VP	13
1-Octene	GC	325
cis-2-Octene	GC	325
Octyl alcohol	GC	306
Pentane	GC	306
	SW	115
	VP	245
3-Pentanone	CD	319
	D	60
	VP	13
Pentyl alcohol	GC	306
Pentylbenzene	GC	325
Propane	VP	337
Propyl acetate	VP	51
Propyl alcohol	GC	306
	SW	115
Propylbenzene	CM	184
	DL	184
	GC	325
Propyl ether	GC	354
	VP	13
Propyl sulfide	GC	354
Pyridine	GC	306,336,354
Styrene	CM	10,29
	GC	235
	VP	126
Tetradecane	GC	281,282
Tetrahydrofuran	D	60
	GC	306
1,2,3,4-Tetrahydronaphthalene	CM	192
	GC	282
3,3,4,4-Tetramethylhexane	GC	282
Toluene	CD	28,53,54,81,135, 183,188,191,192, 225,228,240, 255,286
	CM	29,34,43,53,55,90, 146,154,184,192, 226,228,240, 264,332,333
	D	11,24,39,43, 45,60,189,332
	DL	12,69,184, 189,210
	GC	235,305,306, 325,336,354
	LS	114,190
	OS	12,18,33,71,144, 203,261,332
	SD	189
	SW	115
	VP	13,17,28,52,103

TABLE 1. *cont'd*

Polymer–Solvent	Method	Refs.
Trichloroethylene	GC	306
1,3,5-Trimethylbenzene	CM	29,184
	D	60
	DL	184
	GC	305
3,4,5-Trimethylheptane	GC	307
2,2,4-Trimethylpentane	GC	306,307,325
Water	GC	306
m-Xylene	CM	29,184
	D	60
	DL	184
	GC	305
	OS	33
	VP	13
o-Xylene	CM	29
	GC	235,306
	OS	33
1.6. OTHER COMPOUNDS		
Poly(nitro-1,4-phenylene)	VP	187
1,4-Dioxane		

TABLE 2. MAIN-CHAIN CARBON HETEROATOM POLYMERS

Polymer–Solvent	Method	Refs.
2.1. POLY(OXIDES) AND POLY(ESTERS)		
Epoxy from bis(4-glycidylphenyl) propane and 1,6 hexanediamine		
Chloroform	SW	110
	VP	110
1,4-Dioxane	SW	110
	VP	110
Poly(oxy-1,4-butanediyl) [25190-06-1], polytetrahydrofuran		
Acetone	GC	376
Acetonitrile	GC	376
Benzene	GC	376
2-Butanone	GC	376
Butyl acetate	GC	376
Carbon tetrachloride	GC	376
Chlorobenzene	GC	376
Chloroform	GC	376
1-Chlorohexane	GC	376
Cyclohexane	GC	376
Decane	GC	376
1,2-Dichloroethane	GC	376
Dichloromethane	GC	376
1,5-Dichloropentane	GC	376
1,4-Dioxane	GC	376
Ethyl acetate	GC	376
Ethylbenzene	GC	376
Heptane	GC	376
Propyl ether	GC	376
Propyl sulfide	GC	376
Pyridine	GC	376
Tetrahydrofuran	GC	376
Toluene	GC	376
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene) [24936-68-3] and [25037-45-0], poly(bisphenol A carbonate), poly(carbonate)		
Acetone	DL	386
Benzene	GC	362
Butyl acetate	GC	362
Butylbenzene	GC	362
tert-Butylbenzene	GC	362

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
Butylcyclohexane	GC	362
Carbon dioxide	CM	377,385
	DL	338,386
Chlorobenzene	GC	310,362
Chloroform	GC	362
Cyclohexanol	GC	362
Cyclohexanone	GC	362
Decane	GC	310,362
o-Dichlorobenzene	GC	310
Dichloromethane	GC	362
1,4-Dioxane	CD	161
Dodecane	GC	362
Ethylbenzene	GC	362
Methane	DL	386
Methylcyclohexane	GC	362
2-Pentanone	GC	362
Propyl alcohol	GC	362
1,1,2,2-Tetrachloroethane	GC	362
Tetradecane	GC	362
Toluene	GC	362
Water	DL	386
Poly(oxyethylene) [25322-68-3] and [9004-74-4], poly(ethylene glycol), poly(ethylene oxide)		
Acetone	GC	268,302,317,376
Acetonitrile	GC	268,320,376
Acetophenone	GC	316
Aniline	GC	239
Benzaldehyde	GC	239
Benzene	CD	262,312
	CM	138,277,312
	D	213,382
	GC	239,268,274,276, 302,317,320,376
	VP	175,213
Benzyl alcohol	GC	239
p-Bromoacetophenone	GC	316
2-Butanone	GC	268,302,320,376
Butyl acetate	GC	268,376
Butyl alcohol	CD	218
	GC	258,268,302
sec-Butyl alcohol	GC	258,302
Carbon tetrachloride	CM	129,185,277,357
	DL	185
	GC	268,302,376
	VP	185,357
p-Chloroacetophenone	GC	316
Chlorobenzene	GC	239,317
Chloroform	CD	230
	CM	185,230
	DL	185
	GC	268,302,320,376
	VP	117,185
1-Chlorohexane	GC	376
Chloromethane	CD	230
	CM	230
Cyclohexane	GC	302,317,320
Decane	GC	239,302,320,376
1,2-Dichloroethane	GC	268,376
Dichloromethane	GC	276,376
1,5-Dichloropentane	GC	376
1,2-Dimethoxyethane	GC	320
1,2-Dimethylnaphthalene	GC	234
1,3-Dimethylnaphthalene	GC	234
1,4-Dimethylnaphthalene	GC	234
1,5-Dimethylnaphthalene	GC	234

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TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
1,6-Dimethylnaphthalene	GC	234
1,7-Dimethylnaphthalene	GC	234
1,8-Dimethylnaphthalene	GC	234
2,3-Dimethylnaphthalene	GC	234
2,6-Dimethylnaphthalene	GC	234
2,7-Dimethylnaphthalene	GC	234
1,4-Dioxane	CM	129
	GC	302,320,376
Dodecane	GC	239,302,320
2-Ethoxyethyl ether	GC	317
Ethyl acetate	GC	276,317,320,376
Ethyl alcohol	CD	218
	CM	138,277
	GC	258,276,302,317
Ethylbenzene	GC	320,376
Ethyl ether	GC	302
1-Ethylnaphthalene	GC	234
2-Ethylnaphthalene	GC	234
o-Fluoroacetophenone	GC	316
p-Fluoroacetophenone	GC	316
Heptane	GC	239,302,320,376
3-Heptanone	GC	302
1-Heptene	GC	302
Heptyl alcohol	GC	258
Hexane	GC	239,276,302,317
2-Hexanol	GC	258
3-Hexanol	GC	258
1-Hexene	GC	302
Hexyl alcohol	GC	258
o-Hydroxyacetophenone	GC	316
p-Hydroxyacetophenone	GC	316
Isopropyl alcohol	GC	258,320
o-Methoxyacetophenone	GC	316
p-Methoxyacetophenone	GC	316
2-Methoxyethyl ether	GC	320
Methyl acetate	GC	302
o-Methylacetophenone	GC	316
p-Methylacetophenone	GC	316
Methyl alcohol	CD	218
	CM	138,277
	GC	258,268,274,317
	LS	242
1-Methylnaphthalene	GC	234
2-Methylnaphthalene	GC	234
o-Nitroacetophenone	GC	316
p-Nitroacetophenone	GC	316
Nitroglycerin	GC	346
Nitromethane	GC	302
Nonane	GC	239,302,344
Octane	GC	239,302,317
Octyl alcohol	GC	258
Pentane	GC	302
2-Pentanol	GC	258
Pentyl alcohol	GC	258
Phenol	GC	239
Phenyl acetate	GC	239
Propyl alcohol	GC	258,317,320,344
Propyl ether	GC	376
Propyl sulfide	GC	376
Pyridine	GC	302,320,376
Tetrahydrofuran	GC	268,376
Toluene	GC	268,302,317, 320,376
	LS	314
1,1,2-Trichloroethane	GC	268

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
2,2,2-Trifluoroethanol	GC	320
Undecane	GC	239,302
Water	CD	150,230,303,312, 324,352,365
	CM	62,91,139,194, 230,311,312,324, 348,356
	D	62,176,300, 365,382
	GC	268
	OS	214,368
	VP	62,176,375
m-Xylene	GC	302
o-Xylene	GC	268
Poly(oxyethyleneoxyadipoyl) [24937-05-1]		
1,2-Dimethylnaphthalene	GC	234
1,3-Dimethylnaphthalene	GC	234
1,4-Dimethylnaphthalene	GC	234
1,5-Dimethylnaphthalene	GC	231
1,6-Dimethylnaphthalene	GC	234
1,7-Dimethylnaphthalene	GC	234
1,8-Dimethylnaphthalene	GC	234
2,3-Dimethylnaphthalene	GC	231
2,6-Dimethylnaphthalene	GC	234
2,7-Dimethylnaphthalene	GC	234
1,4-Dioxane	CD	265
	CM	132
	D	265
	VP	132,165
1-Ethylnaphthalene	GC	234
2-Ethylnaphthalene	GC	234
1-Methylnaphthalene	GC	234
2-Methylnaphthalene	GC	234
Poly(oxyethyleneoxysebacoyl) [26762-06-11]		
Butyl butyrate	VP	197
1,4-Dioxane	CM	132
	VP	132
Poly(oxyethyleneoxysuccinyl) [25667-11-2]		
1,4-Dioxane	CM	132
	VP	132
Poly(oxyhexamethyleneoxyadipoyl) [24937-10-8]		
1,4-Dioxane	CD	265
	D	265
Poly(oxy-1-oxopentamethylene) [26354-94-9]		
1,4-Dioxane	CD	265
	D	265
Poly(oxypropylene) [25322-69-4], poly(propylene glycol), poly(propylene oxide)		
Benzene	CM	347,349
	GC	331
	VP	215
Butyl alcohol	CM	118
	DL	118
	SW	118
sec-Butyl alcohol	CM	118
	SW	118
tert-Butyl alcohol	CM	118
	SW	118
Carbon tetrachloride	CM	118,163,371
	DL	163
	SW	118
	VP	163,371
Chloroform	CM	163
	DL	163
	VP	163

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
Cyclohexane	CM	118
	GC	331
	SW	118
Cyclohexene	GC	331
Ethyl alcohol	CM	118,347,348
	DL	118
	SW	118
Heptane	GC	331
1-Heptene	GC	331
2-Heptene	GC	331
Hexane	CD	241
	CM	118,241
	D	241
	GC	331
	SW	118
1-Hexene	GC	331
cis-2-Hexene	GC	331
trans-2-Hexene	GC	331
Isobutyl alcohol	CM	118
	SW	118
Isopropyl alcohol	CM	118
	SW	118
Methyl alcohol	CM	89
	D	89
	VP	89
2-Methylhexane	GC	331
2-Methylpentane	GC	331
Nonane	GC	344
2-Pentanol	CM	118
	SW	118
Pentyl alcohol	CM	118
	SW	118
Propyl alcohol	CM	118
	GC	344
	SW	118
Pyridine	CM	347
Water	CD	241
	CM	62,91,164,241,272, 311,322,348,353,373
	D	62,241
	VP	62,323
Poly(oxytrimethyleneoxyadipoyl) [36221-42-8]		
1,4-Dioxane	CM	132
	VP	132
2.2. POLY(AMIDES)		
Poly[L-iminocarbonyl(benzyloxycarbonylethyl) methylene] [25038-53-3], poly(γ-benzyl-L-glutamate)		
Chloroform	CD	179
Dichloroacetic acid	CD	179
	CM	142
1,2-Dichloroethane	CM	142
	D	133
	VP	133
N,N-Dimethylformamide	VP	227
Pyridine	D	133
	VP	133
Poly[L-iminocarbonyl(benzyloxycarbonylmethyl) methylene] [25736-41-8], poly(γ-benzyl-L-aspartate)		
Chloroform	D	133
	VP	133
Poly[imino(1-oxohexamethylene)] [25038-54-4], nylon 6		
Decyl alcohol	VP	197
Water	VP	370

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
2.3. POLY(SILOXANES)		
Poly(oxydimethylsilylene) [9016-00-6], poly(dimethylsiloxane)		
Acetone	SW	182
Benzene	CD	253
	CM	20,116,169
	D	169
	SW	182
	VP	20,204
cis-Bicyclo[4.4.0]decane	CM	293
trans-Bicyclo[4.4.0]decane	CM	293
Bromocyclohexane	CM	184
	DL	184
Butane	VP	99
2-Butanone	CM	141,184,205,380
	DL	184
	GC	383
	LS	380
	SW	182
Butyl acetate	CM	122
Butyl ether	CM	122
Butyl propionate	CM	122
Carbon dioxide	CM	377
Carbon tetrachloride	CM	116
Chlorobenzene	CM	116
	GC	310
	OS	168
Cyclohexane	CM	116,169,293
	D	169
	OS	168
Cyclopentane	CM	293
Cyclooctane	CM	293
Decane	CD	253
	CM	95
	GC	270,310
Decyl acetate	CM	122
o-Dichlorobenzene	GC	310
Diethoxymethane	CM	122
3,3-Diethylpentane	CM	293
1,2-Dimethoxyethane	CM	122
2,3-Dimethylbutane	GC	270
2,5-Dimethylhexane	GC	270
2,2-Dimethylpentane	CM	293
	GC	270
2,3-Dimethylpentane	CM	293
2,4-Dimethylpentane	CM	293
3,3-Dimethylpentane	CM	293
2,2-Dimethylpropane	VP	99
Dodecane	CM	95,294
Ethyl acetate	CM	122,184,205
	DL	184
Ethylbenzene	CD	253
	CM	169
	D	169
	VP	204
Ethyl butyrate	CM	122
Ethyl decanoate	CM	122
Ethyl dodecanoate	CM	122
Ethyl ether	CM	122,205
Ethyl heptanoate	CM	122
Ethyl hexanoate	CM	122
Ethyl nonanoate	CM	122
Ethyl octanoate	CM	122
3-Ethylpentane	CM	293
Ethyl pentanoate	CM	122

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
Ethyl propionate	CM	122
Ethyl undecanoate	CM	122
2,2,4,4,6,8,8-Heptamethylnonane	CM	294
Heptane	CD	253
	CM	95,116,169,184
	D	169
	DL	184
	GC	270
Heptyl acetate	CM	122
Hexadecane	CM	95,294
Hexamethyldisiloxane	CD	253
	CM	181,184
	DL	184
Hexane	CD	253
	CM	95,184
	DL	184
	GC	270
	VP	204
Hexyl acetate	CM	122
Hexyl alcohol	SW	182
Hexyl ether	CM	122
Isopropylbenzene	CM	169
	D	169
Methyl alcohol	SW	182
Methyl butyrate	CM	122
Methylcyclohexane	CM	169
	D	169
Methyl decanoate	CM	122
Methyl heptanoate	CM	122
3-Methylhexane	CM	293
Methyl heptanoate	CM	122
Methyl nonanoate	CM	122
Methyl octanoate	CM	122
Methyl pentanoate	CM	122
2-Methylpropane	VP	99
Methyl propionate	CM	122
Nonane	CM	95
	GC	270
Nonyl acetate	CM	122
Octamethylcyclotetrasiloxane	CM	40,184
	DL	184
	VP	40
Octamethyltrisiloxane	CD	253
Octane	CD	253
	CM	95,294
	GC	270
	VP	204
Octyl acetate	CM	122
2,2,4,6,6-Pentamethylheptane	CM	294
Pentane	CD	253
	CM	95
	GC	270
	VP	99
2-Pentanone	SW	182
Pentyl acetate	CM	122
Pentyl ether	CM	122
Pentyl propionate	CM	122
Propyl acetate	CM	122,184
	DL	184
Propyl alcohol	SW	182
Propyl ether	CM	122
Propyl propionate	CM	122
Tetradecane	CD	253
	CM	95
2,2,4,4-Tetramethylpentane	CM	293,294

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
2,3,3,4-Tetramethylpentane	CM	293
Toluene	CD	253
	CM	169
	D	169
	OS	168
	SW	182
	VP	204,372
Tridecane	CM	95,205
1,3,5-Trimethylbenzene	CM	169
	D	169
2,2,4-Trimethylpentane	CM	294
	GC	270
Undecane	CM	95
m-Xylene	CM	169
	D	169
	SW	182
o-Xylene	CM	169
	D	169
	SW	182
p-Xylene	CD	253
	CM	169
	D	169
	SW	182

2.4. DERIVATIVES OF CELLULOSE

Polymer–Solvent	Method	Refs.
Cellulose acetate [9004-35-7]		
Acetone	D	65,152
	LS	304
	OS	65
	VP	65,108
Acetonitrile	D	152
Aniline	D	152
Chloroform	D	152
	VP	109
Chloromethane	D	152
N,N-Dimethylacetamide	CM	251
1,4-Dioxane	D	152
	VP	108
Ethyl alcohol	DL	335
Methyl acetate	D	152
	VP	108
Methyl sulfoxide	CM	251
	VP	109
Phenol	D	65
	OS	65
	VP	65
Pyridine	D	152
	VP	108
Tetrachloroethane	D	3
	OS	3
Cellulose nitrate [9004-70-0], nitrocellulose		
Acetone	CD	4,7
	CM	21,55
	D	4,7,128
	OS	202
	VP	4,7,16,42,67,108
Acetonitrile	VP	42
2-Butanone	D	128
Butyl acetate	CM	21,55
	D	128
Cyclopentanone	VP	42
Dibutyl phthalate	CM	21,328,379
2,4-Dimethyl-3-pentanone	VP	42
1,4-Dioxane	VP	42

TABLE 2. *cont'd*

Polymer–Solvent	Method	Refs.
Ethyl acetate	CM	21,22
	D	128
Ethyl propyl ether	VP	42
2-Heptanone	D	128
Methyl acetate	D	128
	VP	108
Methyl alcohol	CM	22,55
3-Methyl-2-butanone	VP	42
Nitroglycerin	VP	384
Nitromethane	VP	42
2-Pentanone	D	128
	VP	42
Pinacolone	VP	42
Propyl acetate	D	128
Triacetin	CM	326,334
Tritolyl phosphate	CM	21
Ethyl cellulose [9004-57-3]		
Acetone	D	172
	VP	66
Benzene	D	172
	VP	66
Butane	VP	77
2-Butanone	D	172
Butyl acetate	D	172
Carbon tetrachloride	D	172
Chloroform	D	172
	GC	364
Dichloromethane	GC	364
2,2-Dimethylpropane	VP	77
Ethyl acetate	D	172
Methyl alcohol	VP	66
2-Methylbutane	VP	77
Pentane	VP	77
1,1,1-Trichloroethane	GC	364
Water	VP	79
Hydroxyethyl cellulose [9004-62-0]		
Water	OS	214
Hydroxypropyl cellulose [9004-64-2]		
Water	CM	353
Methyl cellulose [9004-67-5]		
Water	CM	321,340
Cellulose tricarbanilate [9047-07-8]		
Cyclohexanol	CD	271
	D	271
5-Nonanone	CD	271
	D	271
2.5. OTHER COMPOUNDS		
Dextran [9004-54-0]		
Ethanolamine	CM	301
Ethylene glycol	CM	298,301
Formamide	CM	298,301
Glycerol	CM	301
Methyl sulfoxide	CD	298,301
	CM	298,301
Water	CD	298,301
	CM	275,298,301
	OS	214,358
	VP	236,375
Lignin [9005-53-2]		
N,*N*-Dimethylformamide	VP	153
1,4-Dioxane	VP	153
Methyl sulfoxide	VP	153
Starch [9005-25-8]		
Water	VP	173

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Heats of Solution of Some Common Polymers

Robert A. Orwoll
College of William and Mary, Williamsburg, VA, USA

A. Introduction VII-671
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A. INTRODUCTION

Heats of solution (at infinite dilution) are tabulated below for some common polymers dissolved in some common solvents. The values were determined calorimetrically and are reported here as the heat (in Joules) absorbed per gram of polymer as pure polymer and a large excess of pure solvent mixed isothermally to form a homogeneous solution.

The state of the polymer before dissolution is indicated in the fourth column. It can significantly affect the heat of solution. An amorphous polymer below its glass transition temperature (G) often dissolves with release of heat. The heat of solution for a glass is usually dependent on temperature and, to some extent, on the thermal history of the glass. The dissolving of a semicrystalline polymer (C) requires an additional amount of heat associated with the disordering of crystalline regions. Consequently its heat of solution is usually positive and depends on the extent of crystallinity of the sample. An amorphous polymer above its glass transition temperature (L) usually dissolves with the absorption of a small amount of heat but may also dissolve with the release of heat.

Most of the references to measurements made before 1972 were collected by D. R. Cooper (Manchester) for the second edition of this Handbook. A more complete listing of references to heats of solution can be found in the chapter "Heat, Entropy, and Volume Changes for Polymer–Liquid Systems."

B. TABLE OF HEATS OF SOLUTION

Solvent	ΔH (J/g)	Temp. (°C)	State	MW $\times 10^{-4}$ (g/mol)	Refs.
Poly(butadiene)					
Benzene	13	27	L	8	5
Cyclohexane	5.4	25	L	–	23
n-Hexadecane	4.9	25	L	–	24
Poly(dimethyl siloxane)					
Benzene	14	25	L	10	11
Carbon tetrachloride	2.4	25	L	10	11
Cyclohexane	5.1	25	L	10	11
Cyclohexane	5.2	25	L	2.0	23
n-Decane	3.9	25	L	10	7
Ethyl ether	– 1.3	25	L	8	10
n-Hexadecane	5.5	25	L	10	7
n-Hexadecane	5.5	25	L	2	24
n-Pentane	– 0.9	25	L	10	7
Poly(ethylene)					
Cyclohexane	205	106	C	90	32
1,2,3,4-Tetrahydronaphthalene[a]	39	130	L	67	12
1,2,3,4-Tetrahydronaphthalene[a]	560	80	C	67	12
1,2,3,4-Tetrahydronaphthalene[b]	88	150	L	14	12
1,2,3,4-Tetrahydronaphthalene[b]	1200	110	C	14	12
Toluene	262	126	C	90	32
Poly(isobutylene)					
Benzene	19	25	L	3	8
Benzene	19	30	L	4.8	25

Solvent	ΔH (J/g)	Temp. (°C)	State	MW × 10^{-4} (g/mol)	Refs.
Benzene	23	25	L	0.13	21
Carbon tetrachloride	4.1	–	L	200	9
Carbon tetrachloride	5.0	25	L	0.13	21
Cyclohexane	– 0.7	25	L	3	8
Cyclohexane	– 0.6	25	L	4.5	24
Cyclohexane	1.1	25	L	0.13	21
n-Decane	– 0.5	25	L	3	8
Ethylbenzene	3.5	69	L	4.8	25
Ethylbenzene	9.3	18	L	4.8	25
Ethyl ether	2.8	25	L	3	8
n-Hexadecane	0.04	25	L	3	1
n-Hexadecane	0.9	25	L	0.45	24
n-Hexadecane	1.0	25	L	0.13	21
n-Pentane	– 3.6	25	L	3	8
n-Pentane	– 3.2	25	L	0.13	21
Poly(isoprene)					
Benzene	12	16	L	0.4	2
Poly(methyl methacrylate)					
Chloroform	– 84	25	G	10	14
Chloroform	– 37	25	C	–	14
Poly(oxyethylene)					
Benzene	170	30	C	4.3	26
Carbon tetrachloride[c]	16	30	L	0.06	31
Carbon tetrachloride[d]	– 12	30	L	0.04	31
Chloroform	52	30	C	0.6	18
Water	– 120	80	L	0.5	4
Water[c]	– 160	25	L	0.02	30
Water[d]	– 200	25	L	0.02	30
Water	10	25	C	2	28
Water	24	30	C	0.6	18
Water	40	30	C	4.3	26
Poly(oxypropylene)					
Carbon tetrachloride	– 20	6	L	0.2	13
Carbon tetrachloride[c]	– 8	30	L	0.2	33
Carbon tetrachloride[d]	– 14	30	L	0.16	33
Chloroform	– 100	6	L	0.2	13
Methyl alcohol	– 7	27	L	0.1	6
Poly(propylene)					
Benzene	31	25	L	1.8	27
Carbon tetrachloride	6.4	25	L	1.8	22
Carbon tetrachloride	6.6	25	L	1.8	27
Chloroform	17	25	L	1.8	22
Chloroform	17	25	L	1.8	27
Cyclohexane	2.3	25	L	0.6	23
Cyclohexane	3.9	25	L	1.8	27
n-Decane	3.1	25	L	1.8	27
Ethylbenzene	14	25	L	1.8	27
n-Hexadecane	2.3	25	L	0.6	24
n-Pentane	– 4.7	25	L	1.8	27
1,2,3,4-Tetrahydronaphthalene	320	120	C	–	12
Toluene	16.5	25	L	1.8	27
Poly(styrene)					
Carbon tetrachloride	– 20	25	G	50	19
Chloroform	– 24	45	G	10	16
Cyclohexane	– 8.2	26	G	70	15
Ethylbenzene	– 6	110	L	11	20
Ethylbenzene	– 24	35	G	11	20
Ethylbenzene	– 22	30	G	6	17
Ethylbenzene	– 5	78	G	11	20
Toluene	– 3	100	L	11	20
Toluene	– 26	35	G	11	20
Toluene	– 22	26	G	70	15
Toluene	– 21	30	G	6	17
Toluene	– 7	78	G	11	20
Toluene	– 2.5	25	G	–	29
Poly(vinyl acetate)					

Solvent	ΔH (J/g)	Temp. (°C)	State	MW × 10^{-4} (g/mol)	Refs.
Benzene	2.3	25	G	14	3
Chloroform	– 45	25	G	14	3
Methyl alcohol	28	25	G	14	3

[a] High-pressure poly(ethylene).
[b] Low-Pressure poly(ethylene).
[c] Hydroxy terminated.
[d] Methoxy terminated.

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Solubility Parameter Values

Eric A. Grulke
Chemical and Materials Engineering, University of Kentucky, Lexington, KY, USA

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A. INTRODUCTION

Applications of solubility parameters include selecting compatible solvents for coating resins, predicting the swelling of cured elastomers by solvents, estimating solvent vapor pressure in polymer solutions for devolatilization and reaction systems (16), and predicting phase equilibria for polymer–polymer (107), polymer–binary (93), random copolymer (102), and multicomponent solvents (38, 98,108,109).

Cohesive energy density and solubility parameters are defined in the section on miscibility of solvents and polymers (Section B). In addition, the applicability of solubility parameters to thermodynamic calculations and their limitations are discussed. Section C contains methods for measuring, calculating and correlating solubility parameters of solvents and polymers. Section D contains

alphabetical listings of solubility parameters (Table 7), a list of solubility parameters in rank order (Table 8), a list of three-component solubility parameters of solvents (Table 9), and a list of solubility parameters of polymers (Table 10). With the exception of Table 7, solubility parameter values are reported in $MPa^{1/2}$ units. The table showing solubility parameter value ranges for polymers (Table 3.4 in the third edition) has not been reproduced here.

B. MISCIBILITY OF SOLVENTS AND POLYMERS

1. Cohesive Energy Density and the Solubility (Hildebrand) Parameter

Dissolution of an amorphous polymer in a solvent is governed by the free energy of mixing

$$\Delta G_m = \Delta H_m - T\Delta S_m \tag{B1}$$

where ΔG_m is the Gibbs free energy change on mixing, ΔH_m is the enthalpy change on mixing, T the absolute temperature, and ΔS_m is the entropy change on mixing. A negative value of the free energy change on mixing means that the mixing process will occur spontaneously. Otherwise, two or more phases result from the mixing process. Since the dissolution of a high molecular weight polymer is always connected with a small or modest increase in entropy, the enthalpy term (the sign and magnitude of ΔH_m) is the deciding factor in determining the sign of the Gibbs free energy change. Solubility parameters were developed to describe the enthalpy of mixing of simple liquids (nonpolar, nonassociating solvents), but have been extended to polar solvents and polymers.

Hildebrand and Scott (59) and Scatchard (101) proposed that

$$\Delta H_m = V\left(\left(\frac{\Delta E_1^v}{V_1}\right)^{1/2} - \left(\frac{\Delta E_2^v}{V_2}\right)^{1/2}\right)^2 \phi_1\phi_2 \tag{B2}$$

where V is the volume of the mixture, ΔE_i^v the energy of vaporization of species i, V_i the molar volume of species i, and ϕ_i the volume fraction of i in the mixture. ΔE_i^v is the energy change upon isothermal vaporization of the saturated liquid to the ideal gas state at infinite volume (94). The cohesive energy density (CED), ΔE_i^v, is the energy of vaporization per cm^3. The solubility parameter has been defined as the square root of the cohesive energy density and describes the attractive strength between molecules of the material.

$$\delta_i = \left(\frac{\Delta E_i^v}{V_i}\right)^{1/2} \tag{B3}$$

The dimensions of δ_i are

$$\begin{aligned}(\mathrm{cal/cm^3})^{1/2} &= (4.187\,\mathrm{J}/10^{-6}\,\mathrm{m^3})^{1/2} \\ &= 2.046\times 10^3(\mathrm{J/m^3})^{1/2} = 2.046\,\mathrm{MPa}^{1/2}\end{aligned} \tag{B4}$$

The solubility parameter can be interpreted as the "internal pressure" of the solvent (9–11). δ_i is called the Hildebrand parameter by some authors. Other researchers (13) prefer the term, "cohesion parameter", since it correlates with a large number of physical and chemical properties, and not just the miscibility of the components. The solubility parameter of a mixture is often taken as the sum of the products of the component solubility parameters with their volume fractions:

$$\delta_{\text{mixture}} = \sum_i \delta_i\phi_i \tag{B5}$$

Relation between δ_i and ΔH_m Equation (B2) can be rewritten to give the heat of mixing per unit volume for a binary mixture:

$$\frac{\Delta H_m}{V} = (\delta_1 - \delta_2)^2\phi_1\phi_2 \tag{B6}$$

Equation (B6) gives the heat of mixing of regular solutions in which the components mix with: (a) no volume change on mixing at constant pressure, (b) no reaction between the components, and (c) no complex formation or special associations (114). The heat of mixing must be smaller than the entropic term in Eq. (B1) for polymer–solvent miscibility ($\Delta G_m \le 0$). When $\delta_1 = \delta_2$, the free energy of mixing will always be less than zero for regular solutions and the components will be miscible in all proportions. In general, the solubility parameter difference, $(\delta_1 - \delta_2)$ must be small for miscibility over the entire volume fraction range.

Relation between δ_i and ΔH_i^v The energy change on isothermal vaporization can be related to the enthalpy of vaporization:

$$\Delta E_i^v = \Delta H_i^v + \Delta H_i^\infty - RT + p_i^s V_i \tag{B7}$$

where ΔH_i^v is the enthalpy of vaporization at standard conditions, ΔH_i^∞ the molar increase in enthalpy on isothermally expanding the saturated vapor to zero pressure, R the ideal gas constant, and p^s the saturation vapor pressure at temperature, T. At pressures below 1 atm, the ΔH_i^∞ and $p^s V_i$ terms are usually much less than the ΔH_i^v and RT terms, and Eq. (B7) reduces to Eq. (B8):

$$\Delta E_i^v = \Delta H_i^v - RT \tag{B8}$$

The solubility parameter of volatile materials (solvents for example) can be determined by measuring their enthalpy of vaporization or using a correlation for this quantity, and using Eq. (B9):

$$\delta_i = \left(\frac{\Delta H_i^v - RT}{V_i}\right)^{1/2} \tag{B9}$$

Equation (B9) should be used at pressures near 1 atm. Near the critical point, $\Delta H_i^v = 0$, and Eq. (B8) incorrectly

predicts a negative value for the cohesive energy density while Eq. (B7) yields a small positive value.

Dissolution of crystalline polymers The free energy of mixing for crystalline polymers contains terms for the free energy of fusion for the crystalline volume fraction of the material. The free energy of fusion may contain terms that account for the loss of crystallite surface area and the mixing of amorphous material with oriented material. These terms would be added to Eq. (B1). The enthalpy of mixing could still be modeled using Eqs. (B2) or (B6). Some crystalline polymers obey the solubility parameter model at temperatures near their melting point, $T > 0.9T_m$ (123). Solvent swelling experiments with crystalline polymers may fit Eq. (B1), particularly if the solvent is a poor one for the polymer and does not significantly dissolve crystalline regions.

2. Cohesive Energy Parameters for Polar Systems

The solubility parameter describes well the enthalpy change on mixing of nonpolar solvents but does not always give reliable results when extended to polar systems. The free energy change of mixing for polar systems is dominated by hydrogen-bonding forces between various groups in the solvent and polymer. Hydrogen-bonding forces are much stronger than van der Waals or dipole forces and often dominate the free energy of mixing. Complete miscibility is expected to occur if the solubility parameters are similar and the degree of hydrogen bonding (p: poor, m: moderate and s: strong) is similar between the components. Hydrocarbons, chlorinated hydrocarbons and nitrohydrocarbons are considered to be poor hydrogen-bonding solvents. Ketones, esters, and glycol monoethers give moderate hydrogen bonding. Alcohols, amines, acids, amides and aldehydes are strong hydrogen-bonding solvents. Table 7 classifies materials using these categories (21–24). Alternative classifications have been given by Lieberman (69), Gardon (41,85,86) and Dyck and Hoyer (32).

Other investigators have decomposed the Hildebrand parameter into several terms representing different contributions to the free energy of mixing. Hildebrand (59) used dispersive and polar solubility terms for solvents, with the complete parameter being given by

$$\delta^2 = \delta_d^2 + \delta_p^2 \tag{B10}$$

where δ_d is the dispersive term and δ_p the polar term. The additional term improved agreement between δ and experimental data. Prausnitz and coworkers accounted for polar bonding by including parameters for permanent dipole interactions and dispersion type interactions. This approach has been applied to polymer solutions (15) and complex formation (57). Crowley et al. (26,27) proposed a three-parameter system.

Hansen (49–53,56) and Hansen and Skaarup (54) assume that the cohesive energy arises from dispersive, permanent dipole–dipole interactions and hydrogen bonding forces:

$$\delta^2 = \delta_d^2 + \delta_p^2 + \delta_h^2 \tag{B11}$$

where δ_h accounts for a variety of association bonds, including hydrogen bonds and permanent dipole-induced dipole (47). The values of these components for solvents were calculated from a large number of solubility data sets. Polymer solubility parameters can also be decomposed to a three-term set. The Hansen parameters give improved agreement with data but are still not completely accurate in predicting solutions thermodynamics for every system. Peiffer (172) has related dispersion, polar and induced solubility parameters to intermolecular forces and molecular size. The dispersive component increases with molecular size, while the polar component decreases with molecular size.

Temperature effects The solubility parameter decreases with temperature. The individual terms have varied dependence on temperature, namely (Ref. 55)

$$\begin{aligned} \frac{d\delta_d}{dT} &= -1.25 \times \alpha \times \delta_d \\ \frac{d\delta_p}{dT} &= -\frac{\delta_p \times \alpha}{2} \\ \frac{d\delta_p}{dT} &= -\delta_h\left(1.22 \times 10^{-3} + \frac{\alpha}{2}\right) \end{aligned} \tag{B12}$$

where $\alpha(K^{-1})$ is the volumetric thermal expansion coefficient.

3. Relationship between Solubility Parameters and other Thermodynamic Parameters

Hildebrand and Hansen parameters can be calculated using other thermodynamic quantities. This section contains some of the relationships for binary systems. Extensions to multicomponent systems are described by Flory (37) and Olabisi et al. (89).

Activity coefficients Excess free energy calculations for regular solutions (93) can be used to relate solubility parameters and solvent activity coefficients:

$$RT \ln\gamma_1 = V_1\phi_2^2(\delta_1 - \delta_2)^2 \tag{B13}$$

$$RT \ln\gamma_2 = V_2\phi_1^2(\delta_1 - \delta_2)^2 \tag{B14}$$

where γ_i is the activity coefficient of component i. Equations (B13) and (B14) depend on the use of the geometric mean, $\delta_{12} = (\delta_1 \times \delta_2)^{1/2}$. Funk and Prausnitz (40) show that there are deviations from this rule for aromatic hydrocarbons.

Molar excess free energy of mixing The molar excess free energy of mixing for binary solutions is

$$\Delta G^E = \sum_i (\delta_{1-i} - \delta_{2-i})^2 \tag{B15}$$

where δ_{j-i} is the solubility term of group i for species j.

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Polymer–solvent interaction parameter The polymer–solvent interaction parameter, χ, is modeled as the sum of entropic and enthalpic components:

$$\chi = \chi_H + \chi_S \quad \text{(B16)}$$

where χ_H is the enthalpic component and χ_S is the entropic component. χ_S is usually taken to be a constant between 0.3 and 0.4 for nonpolar systems: $\chi_S = 0.34$ is often used (15,104). The enthalpic component can be related to the Hildebrand parameters:

$$\chi_H = \frac{V_1}{RT}(\delta_1 - \delta_2)^2 \quad \text{(B17)}$$

Substituting Eq. (B17) into Eq. (B16)

$$\chi = \frac{V_1}{RT}(\delta_1 - \delta_2)^2 + 0.34 \quad \text{(B18)}$$

Equation (B18) permits only positive values of the interaction parameter. Since the Flory–Huggins criterion for complete solvent–polymer miscibility is $\chi < 0.5$, the enthalpic contribution must be small and the solubility parameters of the solvent and polymer must be similar (21). The molar volume of the solvent also affects miscibility and phase equilibria: a Hildebrand parameter needed for phase separation or miscibility cannot be specified without specifying V_1.

Interchange energy density Equation (B18) works well for nonpolar systems for which Eq. (B17) is a good description of the enthalpic component of the interaction parameter. The geometric mean assumption of regular solution theory is not appropriate for polar systems, and better models include an extra term describing the interchange energy density for the solvent–polymer pair. For example

$$\chi = \chi_S + \frac{V_1 A_{12}}{RT} \quad \text{(B19)}$$

with

$$A_{12} = \delta_1^2 + \delta_2^2 - 2 \times l_{12}\delta_1\delta_2 \quad \text{(B20)}$$

where l_{12} characterizes the intermolecular forces between molecules (rather than using the geometric mean assumption). Equation (B20) allows the modeling of specific interactions between components 1 and 2. Mixed solvents can be treated as a single solvent by determining the solubility parameter of the solvent mixture, and then using this value in Eq. (B18). If both the solvents and the polymers interact, the description is more complicated. An alternative definition of A_{12} uses the two-component solubility parameter (Ref. 25)

$$A_{12} = (\delta_{1d} - \delta_{2d})^2 + (\delta_{1p} - \delta_{2p})^2 \quad \text{(B21)}$$

The Hansen parameters may also be used to model A_{12}.

Several recent theories for polymer solution thermodynamics include entropic, enthalpic and free-volume contributions to the free energy of mixing. The free-volume contributions modify the entropic components, and have the opposite temperature dependence from the combinatorial term, helping to explain the lower critical solution temperature. Since Eq. (B18) assumes a constant value for the entropic component, it may not be valid over large temperature ranges. However, Eq. (B18) will predict the upper critical solution temperature, and, from this standpoint, is adequate for a number of phase equilibria applications near this condition.

The Lattice Fluid model (170) can be used to predict the solubilities of hydrocarbon and chlorinated hydrocarbons in nonpolar polymers. Three-dimensional solubility parameters can be used to provide an empirical correction to the geometric mean approximation (171). This correction predicts the solubility of polar and nonpolar solvents in polymers using only the pure component equation-of-state and solubility parameters.

Guide to polymer–solvent miscibility A region of solubility has been characterized by the distance between solvent and solute coordinates (Ref. 14)

$$R_{ij} = \left(4(\delta_{1d} - \delta_{2d})^2 + (\delta_{1p} - \delta_{2p})^2 + (\delta_{1h} - \delta_{2h})^2\right)^{1/2} \quad \text{(B22)}$$

A more general definition of the region of solubility is

$$R_{ij} = \delta_1 - \delta_2 = (a(\delta_{1d} - \delta_{2d})^2 + b(\delta_{1p} - \delta_{2p})^2 + b(\delta_{1h} - \delta_{2h})^2)^{1/2} \quad \text{(B23)}$$

where a and b are empirical weighing factors. If the distance between the solvent and the solute Hansen coordinate position exceeds R_{ij}, the two components are not soluble, or swelling is less than expected. R_{ij} reduces the need for three-dimensional plots. Some investigators have used two-dimensional plots for polar and hydrogen bonding terms, but the technique may be misleading for materials with large dispersion contributions. Barton (12) gives a number of models and contour map examples. As mentioned previously, Eqs. (B17)–(B19) suggest that the solvent molar volume can have a significant effect on miscibility.

Zeller (131) reviewed graphical three-dimensional solubility parameter estimation methods (12,14,49,55,172,173) as applied to solvent swelling of crosslinked elastomers. In general, the graphical method (Eqs. B22 and B23) does not account for the known influence of molar volume and crosslink density of solubility, and incorrectly assumes a linear relationship between the solubility parameter difference and solubility. An improved method used the Flory–Rehner equation to modify the interaction parameter for the effects of crosslink density (132).

Guide to polymer–polymer miscibility In many polymer–polymer systems, miscibility can be predicted by comparing the solubility parameters (139). The following table proposes misciblity guidelines. Polymer–polymer miscibility is enhanced when hydrogen bonding is present.

TABLE OF MISCIBILITY GUIDELINES[a]

Intermolecular interaction	Polymer blend example	Critical value of the interaction parameter, χ_{crit}	Upper limit of the non-hydrogen bonded solubility parameter difference, $\Delta\delta$ ($MPa^{1/2}$)
Dispersive forces only	Polyisoprene–Poly-(vinylethylene)	<0.002	<0.02
Dipole–dipole interactions	Poly(methyl methyacrylate)–poly(ethylene oxide)	0.002–0.001	0.2–1.0
Weak hydrogen bonds	Poly(vinyl chloride)–polycaprolactone	0.02–0.2	1.0–2.0
Moderate hydrogen bonds	Poly(vinyl phenol)–poly(vinyl acetate)	0.2–1.0	2.0–5.0
Strong hydrogen bonds	Poly(vinyl phenol)–poly(vinyl methyl ether	1.0–1.5	5.0–6.0

[a] Ref. 139.

C. SOLUBILITY PARAMETER MEASUREMENTS, CALCULATIONS, AND CORRELATIONS

Solubility parameters can be determined by direct measurements, indirect calculations, or correlations with other physical parameters. The solubility parameters of solvents usually can be determined directly by measuring the energy of vaporization. The solubility parameters of polymers can only be determined indirectly and may be affected by variations in their chemical constitutions, i.e., the number of crosslinks and the distribution of chain branches or substitutive groups along the polymer backbone. The methods presented in this section can be used to develop correlations of solubility parameters with other physical properties for specific commercial polymer products or to estimate the solubility parameters of new polymers.

1. Solvents

Calculation of the solubility term (δ) by relating the enthalpy of vaporization to the energy of vaporization Equation (B8) can be used to calculate ΔE_i^v when ΔH_i^v is available. The molar volume of the solute is needed to complete the calculation of δ, using Eq. (B3). This is the most direct and accurate method of determining the solubility parameter. However, δ's determined in this way may not give the best prediction of solution behavior. The solubility parameter values in Tables 7–9 reflect the solvent's behavior in a variety of systems.

Correlations Both the enthalpy of vaporization and the molar volume of a solvent can be estimated from correlations. When ΔH_i^v is known at the normal boiling point, it can be converted to the appropriate value at a second temperature using (126)

$$\frac{\Delta H_i^v(T_2)}{\Delta H_i^v(T_1)} = \left(\frac{T_c - T_2}{T_c - I_1}\right)^{0.38} \quad \text{(C1)}$$

This corresponding state-type procedure gives estimates within 2% of experimental values over a wide range of temperatures (13). Hildebrand and Scott (59) proposed an empirical correlation between ΔH_i^v at 25°C and the normal boiling point, T_b:

$$\Delta H_i^v(298K) = 0.2950 + 23.6T_b + 0.020T_b^2 \quad \text{(C2)}$$

with enthalpy units of kcal/mol. Lawson (67) suggests different coefficients to include fluorocarbon liquids. The Clausius–Clapeyron equation can be applied if vapor pressure data are available. Eq. (C2) is reasonably accurate only for liquids that are not hydrogen bonded. The Hildebrand parameter calculated by Eq. (C2) should be adjusted as follows for different solvents (24): add 1.4 $(cal/cm^3)^{1/2}$ for alcohols, add 0.6 $(cal/cm^3)^{1/2}$ for esters, and add 0.5 $(cal/cm^3)^{1/2}$ for ketones if the boiling point is less than 100°C. Jayasri and Yaseen (64) suggest adding 1.7 $(cal/cm^3)^{1/2}$ for alcohols.

Solvent molar volumes are available or can be calculated by group molar volume methods at 25°C (35,163–165). The molar volume for solids at 25°C can be extrapolated from liquid state values (the liquid is assumed to be subcooled).

Thermodynamic coefficients The internal pressure, π, is defined as (Ref. 88)

$$\pi = \frac{\partial E}{\partial V} = T\beta - P \quad \text{(C3)}$$

where β is the constant volume thermal pressure coefficient (the ratio of the coefficient of thermal expansion, α, to the isothermal compressibility, κ). Since the external pressure is usually small with respect to $T\beta$, the internal pressure is approximated by

$$\pi = T\beta = T\frac{\alpha}{\kappa} = T\left(\frac{\partial P}{\partial T}\right) \quad \text{(C4)}$$

The Hildebrand parameter is the square root of the internal pressure. Eq. (C4) provides a method for scaling the Hildebrand parameter with temperature. This equation also provides a method for the direct estimation for δ of polymers; α and κ are measurable when ΔH_i^v is not meaningful (B7). The thermal pressure coefficient (C4) can be evaluated from vapor-pressure data and is easier to apply than the Clausius–Clapeyron equation. For high pressure applications, such as phase equilibria in reverse osmosis membranes, the external pressure term in Eq. (C3) may not be negligible. Solubility parameters generally decrease with increasing pressure.

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van der Waals gas constant Tables are available in many Handbooks for the van der Waals correction constants to the ideal gas law, a and b, where a has units of l^2/atm. For some liquids, these values may be at hand when other data are not available. They can be used to check Hildebrand parameter values obtained from other sources.

$$\delta = 1.2\frac{\sqrt{a}}{V} \tag{C5}$$

The form of Eq. (C5) can be obtained by substituting the van der Waals equation of state into Eq. (C3).

Critical pressure The solubility parameter is related to the critical pressure, P_c of a substance through the empirical equation

$$\delta = 1.25\,P_c^{1/2} \tag{C6}$$

where the critical pressure is expressed in atmospheres. Equation (C6) is not very accurate, but is simple to apply when critical pressure data are available.

Surface tension Michaels (83) has shown that the surface tension can be related to the cohesive energy density:

$$\frac{\Delta E_i^{v}}{V_i} = A\left(\frac{1}{V_i}\right)^{1/3}\gamma_L \tag{C7}$$

where γ_L is the surface tension and A is a constant. Koenhen and Smolders (65) correlated surface tension and two Hansen parameters:

$$\delta_d^2 + \delta_p^2 = 13.8\left(\frac{1}{V_i}\right)^{1/3}\gamma_L \tag{C8}$$

δ_h is probably not related to the liquid–vapor interfacial energy as these interactions do not involve breaking hydrogen bonds. Eq. (C8) does not describe cyclic compound, acetonitrile, carboxylic acids, polyfunctional alcohols, and other polar compounds well. Hildebrand and Scott (59) have proposed a different equation, which has been discussed by Lee (68).

Index of refraction The dispersive Hansen parameter can be related to the index of refraction, n_D (65,105).

$$\delta_d = 9.55\,n_D - 5.55 \tag{C9}$$

The interaction energy between nonpolar molecules should depend on polarizability (London dispersion forces) and, therefore, on the index of refraction.

Dipole moment Hansen and Skaarup (54) related the polar Hansen parameter to the dielectric constant, ε, and the dipole moment, μ:

$$\delta_p^2 = \frac{12108}{V^2}\frac{\varepsilon - 1}{2\varepsilon + n_D^2}(n_D^2 + 2)\mu^2 \tag{C10}$$

Beerbower and Dicky (14) proposed an empirical relationship:

$$\delta_p^2 = 9.5\frac{\mu}{V_i^{1/2}} \tag{C11}$$

Kauri butanol values Proprietary hydrocarbon solvents are usually mixtures with boiling ranges and unknown molecular weights. Solubility parameter values may be estimated from Kauri butanol values (ASTM Method D1133-54T) using the equation

$$\delta = 6.3 + 0.03\,\mathrm{KB} \tag{C12}$$

2. Polymers

Hildebrand parameters cannot be calculated for polymers from heat of vaporization data because of their nonvolatility. Indirect methods are described below. The solubility parameter values in Table 10 may only be representative of a given polymer since variations in compositions can lead to changes in δ.

2.1. Indirect Measurements

Solvency testing (screening procedure) The classic method for determining solubility parameter of a commercial polymer is solvency testing, or the solvency screening procedure. This technique compares polymer solubility in solvent groups with different hydrogen bonding characteristics (poor, moderate and strong). The midpoints of the polymer's solubility range may be used as single-valued quantities for some purposes, but may not agree with values determined by other methods (43). A gram or two of solid polymer is placed in a test tube and an approximate amount of a selected solvent is added such that the final solution would have about the correct solid content for the expected commercial use, e.g., 50% for alkyds, 20% for vinyls, etc. The exact amount is often unimportant, except for poor solvents. A typical phase diagram for binary polymer–solvent systems may show upper and lower critical solution temperatures. The one-phase region expands away from the UCST and LCST points, which often occur in the range of 20–80 wt.% polymer. The usual purpose of these experiments is to find good solvents for commercial product formulation, and this screening procedure will help identify such solvents. The mixture may be warmed and stirred to speed up solution, but it should be cooled and observed at room temperature. The resulting mixture should be a single phase, clear and free of gel particles or cloudiness, otherwise the polymer is judged insoluble. The solvents to be used are selected from Table 1.

This grouping of solvents has been selected so that the Hildebrand parameter values increase by reasonably constant steps within each hydrogen bonding class. The object of using these solvent spectra is to establish a solubility parameter range for a polymer rather than a single-valued number. This range has the advantage of showing the difference, $(\delta_1 - \delta_2)^2$ (see Eqs. B13, B14 and

B18), which can be tolerated between the solubility values of the polymer and solvent for miscibility. Van Dyk et al. (120) have shown that the molar volume improves the correlation between solvency and the solubility parameters. A better measure of solubility might be the group, $V_1(\delta_1 - \delta_2)^2$.

In carrying out the procedure, it is convenient to select the first trials about 1/2 and 2/3 of the way down the column; for example, in the poorly hydrogen bonded group, toluene and nitroethane would be chosen. If the polymer is soluble in both, there is no need to try intermediate solvents because experience has shown that the polymer will be soluble in every case. The solvents at the end of the spectrum should be tried next. If the polymer is soluble in one but not both of the initial trials, the third trial should be half-way between the two. By successive choices, sets of two adjacent solvents will be found, one of which dissolves the polymer and one that does not. The parameter values of the solvents which do dissolve the polymer mark the ends of the range. The procedure is repeated for the other two hydrogen bonding classes.

Osmotic pressure Fedors (35) used the osmotic pressure of polymer solutions to determine solubility parameters.

Swelling values Another method for measuring the solubility parameter of polymers is to prepare a sparsely crosslinked sample and immerse it in a series of liquids of varying δ (166,167). The crosslinked material will swell to varying degrees, with the maximum amount of swelling occurring when the solvent has the same Hildebrand parameter as the polymer. The amount of swelling can be measured by length, weight, or volume changes. By inference, the soluble, uncrosslinked materials has the same value. An example of a crosslinked sample is styrene polymerized with 1% divinyl benzene.

Turbidity Polymer can be precipitated from dilute solution by adding a non-solvent. The cloud point defines the onset of two phases. The enthalpic component of the interaction parameter, χ_H, can be related to the solubility parameter difference between the solvent and the polymer (Eq. B17). Two different non-solvents are used: one having a solubility parameter above that of the solvent, and another having a solubility parameter below that of the solvent. The enthalpic components of the interaction parameter for each phase are equal at the cloud point, which can be used to measure the solubility parameter of the polymer (116). The two expressions for χ_H are

$$\frac{V_{\text{ml}}(\delta_2 - \delta_{\text{ml}})^2}{RT} = \frac{V_{\text{mh}}(\delta_2 - \delta_{\text{mh}})^2}{RT} \tag{C13}$$

where V_{ml} and V_{mh} represent the molar volumes at the cloud points of the solvent-lower solubility parameter nonsolvent and solvent-higher solubility parameter non-solvent, respectively. δ_{ml} and δ_{mh} are the solubility parameters of the mixed solvents. The mixture properties are calculated using

$$\delta_{\text{m}} = \phi_1\delta_1 + \phi_3\delta_3 \tag{C14}$$

$$V_{\text{m}} = \frac{V_1 V_3}{\phi_1 V_3 + \phi_3 V_1} \tag{C15}$$

where the subscripts, 1 and 3, refer to the solvent and the nonsolvent. Eq. (C13) is simplified to determine the solubility parameter of the polymer:

$$\delta_2 = \frac{(\sqrt{V_{\text{ml}}}\delta_{\text{ml}} + \sqrt{V_{\text{mh}}}\delta_{\text{mh}})}{(\sqrt{V_{\text{ml}}} + \sqrt{V_{\text{mh}}})} \tag{C16}$$

The volume fraction of the nonsolvent at the cloud point is used to compute the solvent mixture solubility parameter and molar volume. Cloud point experiments are done for a series of solvents with the two nonsolvents, generating a set of points, (δ_1, δ_2). The intersection of the line defined by this set of points with the line, $\delta_1 = \delta_2$, determines the polymer's solubility parameter.

Specific volume The specific volume of polymers varies with the solvent. Good solvents give higher values of the specific volume while poor solvents give lower values. A plot of the polymer specific volume as a function of solubility parameter gives a maximum value, which is taken to be the solubility parameter of the polymer. High precision density measurements at carefully controlled temperatures are needed for this method (168). The partial specific volume is defined as

$$\bar{V}_i = \left.\frac{\partial V}{\partial c_i}\right|_{T,p,i \neq j} \tag{C17}$$

The specific volume of a nonideal two-component system is

$$V_{\text{spec}} = \phi_1\bar{V}_1 + \phi_2\bar{V}_2 \tag{C18}$$

where $\bar{V}_2$ is the rate of change in volume of the solution when a very small amount of polymer is added. As the solvent volume fraction goes to one, the partial molar volume of solvent is constant and Eq. (C18) becomes

$$V_{\text{spec}} = \bar{V}_{1(c_2=0)} + \phi_2\bar{V}_2 \tag{C19}$$

The maximum of the polymer partial specific volume is estimated by fitting a quadratic to the data (Ref. 142):

$$\bar{V}_2 = \bar{V}_{2,\max} - A(\delta_1 - \delta_2)^2 \tag{C20}$$

It is possible to estimate the polymer solubility parameter with only two reference solvents (168), but more reliable values are found by using a range of solvents.

Intrinsic viscosity A number of researchers have used intrinsic viscosity to estimate Hildebrand parameters (74).

Flory (37) related intrinsic viscosity to polymer molecular weight and the chain-expansion factor. The chain-expansion factor can, in turn, be related to the polymer–solvent interaction parameter using the Flory–Huggins theory. Maximum coil extension should occur in solvents near the polymer's solubility parameter. A variety of models can be used to relate the interaction parameter to Hildebrand parameters (19,80,115,167–169). These equations are quadratic (Eq. C21) or take the form of a gaussian curve (Eq. C22):

$$[\eta] = [\eta]_{\max} - A(\delta_1 - \delta_2)^2 \qquad \text{(C21)}$$

$$[\eta] = [\eta]_{\max}\exp(-A(\delta_1 - \delta_2)^2) \qquad \text{(C22)}$$

where $[\eta]$ is the intrinsic viscosity, $[\eta]_{\max}$ the maximum intrinsic viscosity, and A the constant. These researchers have shown that Eq. (C14) gives a good correlation between solvency and Hansen parameters for methacrylate polymers.

Inverse phase gas chromatography This method has been used by a number of investigators to measure infinite dilution weight fraction activity coefficients (6,29–31,63,71,72,84,90,91,113). These coefficients can be related to Hildebrand parameters by using a thermodynamic theory for polymer solutions, such as Flory–Huggins theory. The polymer is the stationary phase in a gas chromatography column. Both binary and multicomponent equilibria (46,99,100) can be studied using this method. Chromatographic techniques have the advantage of rapid measurement of thermodynamic values once the columns have been made. The solubility parameter can be related to the specific retention volume of the solvent on the column. Both V_i and ΔH_i^{v} must be known at the temperature of the column. Molar volumes for the solvents can be determined by using literature density equations or generating equations from density data. Values for the enthalpy of vaporization can be determined at the experimental temperature (71).

The inverse phase gas chromatography method has the advantage of providing values for the infinite dilution solubility parameter, δ_i^{∞}, over a range of temperatures. This is particularly valuable for the prediction of phase equilibria at elevated temperatures. The value of δ_i^{∞} at 25°C can be estimated by using the expected temperature dependence for χ (Eq. B18) of

$$\chi = \alpha + \frac{\beta}{T} \qquad \text{(C23)}$$

One potential problem with this technique is that χ is known to be a function of concentration and the polymer Hildebrand parameter is determined at infinite dilution of solvent. For a number of binary systems, the change in χ with solvent weight fraction is the largest as $\omega \to 0$. The concentration dependence of the interaction parameter can be modeled using methods given in the chapter on interaction parameters in this Handbook.

2.2. Correlation Methods

Refractive index Koenhen and Smolders (65) have predicted dispersive Hansen parameters from refractive index measurements of polymers. Wu (128) has suggested an effective cross-sectional area to relate the cohesive energy density and surface tension

$$\delta_{\text{d}}^2 = A\left(\frac{n_{\text{s}}}{V_{i,\text{s}}}\right)^{1/3} \gamma_{\text{s}}^{\text{d}} \qquad \text{(C24)}$$

where n_{s} is the number of atoms in a segment, $V_{i,\text{s}}$ the molar volume of a segment, and $\gamma_{\text{s}}^{\text{d}}$ the dispersion contribution to the free surface energy of the polymer.

Dipole moment Equation (C10) has been applied to polymers by Koenhen and Smolders (65). The dipole moments of polymers are between 70% and 90% of those of the corresponding monomer units.

Hydrogen-bonding parameter Hansen and Beerbower (55) compiled enthalpy data for hydrogen bonding groups. The following values are suggested:

Group	Cohesive energy, E_{h}, (kJ/mol)	Refs.
Alcohol	20.9	–
Amide	16.3	83
Ester	5.2	54
Nitrile	2.1	54
Ether	2.3	54
Monochloro substituent	0.4	54
Phenylene ring	0.4	54

The hydrogen-bonding parameter is given by

$$\delta_{\text{h}}^2 = \frac{E_{\text{h}}}{V_i} \qquad \text{(C25)}$$

Group contribution methods These methods have been used to estimate the solubility parameter (17,20,28,33,35, 58,60,61,96,112,121,122). van Krevelen (123), Fedors (35), and Barton (12) have reviewed these techniques and given tables of group values. The molar volume of solvents and polymers can also be estimated by group contribution techniques (108).

The sets of group constants of Small (112), Hoy (61) van Krevelen (121) and van Krevelen and Hoftyzer (122) seem to be most comprehensive. Table 2 gives the group molar attraction constants at 25°C. Small's values were derived from measurements of the heat of vaporization. Hoy's values were derived from vapor pressure measurements. The group contribution values of van Krevelen and Hoftyzer are based on cohesive energy data of polymers.

The group contribution techniques are based on the assumption that the contributions of different functional groups to the thermodynamic property are additive. The energy of vaporization of a solvent or polymer is

$$\Delta E_i^{\text{v}} = \sum_j n_j \Delta e_j \qquad \text{(C26)}$$

where Δe_j is the energy of vaporization contribution of group j, and n_j the number of groups of type j in the molecule. The solubility parameter is obtained by combining Eqs. (B3) and (C26):

$$\delta_i = \left(\frac{\Delta E_i^{\mathrm{v}}}{V_i}\right)^{1/2} = \left(\frac{\sum_j n_j \Delta e_j}{V_i}\right)^{1/2} \tag{C27}$$

Small (112) defined the molar attraction constant as

$$F_j = (\Delta E_{i,j}^{\mathrm{v}} V_{i,j})^{1/2} \tag{C28}$$

that can be used to calculate the solubility parameter by

$$\delta_i = \left(\frac{\Delta E_i^{\mathrm{v}} V_i}{V_i^2}\right)^{1/2} = \frac{\sum_j F_j}{V_i} = \frac{\rho_i \sum_j F_j}{M_i} \tag{C29}$$

where ρ_i is the polymer density and M_i is the polymer molecular weight. δ_i can be evaluated for polymer repeating group by using group contribution calculations for the molar volume and the cohesive energy density or molar attraction constant. Table 2 gives sets of molar attraction constants and the energy of vaporization provided by several different authors. It is preferrable to use parameters from only one set when determining the solubility parameter of a repeating unit. Table 3 gives the cohesive energy densities and group molar volumes determined by Fedors. This set may give less accurate estimates than those in Table 2, but it has value because it is more comprehensive and can be applied to more systems.

Hansen parameters The terms in Eq. (B11) can be estimated by group contribution methods. In general, the resulting factors are known less accurately than the group molar attraction constants or energy of vaporizations. The interaction of structural groups within molecules may not follow simple additive rules. However, the estimate of Hansen parameters can be very useful. Under the method of Hoftyzer and van Krevelen (Table 4), the terms are estimated as

$$\delta_{\mathrm{d}} = \frac{\sum F_{\mathrm{d}i}}{V} \qquad \delta_{\mathrm{p}} = \frac{\sqrt{\sum F_{\mathrm{p}i}^2}}{V} \qquad \delta_{\mathrm{h}} = \sqrt{\frac{\sum E_{\mathrm{h}i}}{V}} \tag{C30}$$

The dispersive Hansen parameter treats the molar attraction constants as additive. The polar Hansen parameters also are additive, unless more than one polar group is present. Methods for treating additional polar groups are given in the last three rows of Table 4: additional polar groups do not add linearly to the polar Hansen term. The molar attraction constant is not applied to the hydrogen-bonding Hansen parameter. Rather, a hydrogen bonding energy, $E_{\mathrm{h}i}$, is used.

Hoy (178–179) has an alternative group contribution method (Table 5). It includes a molar attraction function, $F_{t,i}$ a polar component of this function, $F_{\mathrm{p},i}$, the molar volume of the solvent or polymer structural unit, the Lyderson correction for solvent non-ideality, $\Delta_{\mathrm{T},i}$, and a similar correction for polymer non-ideality, $\Delta_{\mathrm{T},i}^{(\mathrm{P})}$.

Bicerano (164) and Porter (165) have developed new group contribution techniques for a wide variety of polymer properties. These approaches consider how the different functional groups are connected in the molecule or in the polymeric repeating unit. Bicerano's method uses Fedor's (35) and van Krevelen's (123,163) group contribution values. Both references provide solubility parameter predictions of a number of polymers.

TABLE 1. SELECTED SOLVENTS FOR USE IN POLYMER SOLVENCY TESTING

Solvent	δ (MPa$^{1/2}$)
POORLY HYDROGEN BONDED	
n-Pentane	14.3
n-Heptane	15.1
Methylcyclohexane	16.0
Solvesso 150	17.4
Toluene	18.2
Tetrahydronaphthalene	19.4
o-Dichlorobenzene	20.5
1-Bromonaphthalene	21.7
Nitroethane	22.7
Acetonitrile	24.1
Nitromethane	26.0
MODERATELY HYDROGEN BONDED	
Diethyl ether	15.2
Diisobutyl ketone	16.0
n-Butyl acetate	17.4
Methyl propionate	18.2
Dibutyl phthalate	19.0
Dioxane	20.3
Dimethyl phthalate	21.9
2,3-Butylene carbonate	24.8
Propylene carbonate	27.2
Ethylene carbonate	30.1
STRONGLY HYDROGEN BONDED	
2-Ethyl hexanol	19.4
Methyl isobutyl carbinol	20.5
2-Ethyl butanol	21.5
n-Pentanol	22.3
n-Butanol	23.3
n-Propanol	24.3
Ethanol	26.0
Methanol	29.7

TABLE 2. GROUP CONTRIBUTIONS TO COHESIVE ENERGY DENSITY

	F [MPa$^{1/2}$ cm^3/mol]		ΔE_i^v(J/mol)	
Group	Small (112)	van Krevelen (121)	Hoy (61)	van Krevelen and Hoftyzer (163)
2.1. CARBON-CONTAINING GROUPS				
$-CH_3$	437	420	303	9630
$>CH_2$	272	280	269	4190
$>CH-$	57	140	176	420
$>C<$	− 190	0	65	− 5580
$=CH_2$	388	–	259	–
$=CH-$	277	222	249	–
$=C<$	39	82	173	–
$-CH=$(aromatic)	–	–	240	–
$-C=$(aromatic)	–	–	201	–
$-CH(CH_3)-$	495	560	(479)	(10060)
$-C(CH_3)_2-$	685	841	(672)	(13700)
$-CH=CH-$	454	444	497	10200
$-C=CH-$	265	304	421	4860
$CH_3(H)C=C<$	(704)	724	(725)	(14500)
$H-C\equiv C-$	583	–	–	–
$-C\equiv C-$	454	–	–	–
Cyclopentyl	–	1380	1300	–
Cyclohexyl	–	1660	1470	–
Phenyl	1500	1520	(1400)	31000
p-Phenylene	1350	1380	(1440)	25140
Naphthyl	2340	–	–	–
2.2. OXYGEN-CONTAINING GROUPS				
$-O-$, ether	143	255	235	6290
$-O-$, epoxide	–	–	360	–
$-OH$	–	754	462	–
$-OH$, aromatic	–	–	350	–
$-(C=O)-$	562	685	538	–
$-(C=O)-O-$	634	511	688	13410
$-(C=O)-OH$	–	651	(998)	–
$-O-(C=O)-O-$	–	767	(904)	–
$-(C=O)-O-(C=O)-$	–	767	1160	–
2.3. NITROGEN-CONTAINING GROUPS				
$-NH_2$	–	–	464	–
$-NH-$	–	–	368	–
$-N<$	–	–	125	–
$-CH-CN$	(896)	1120	(901)	25420
$-CN$	839	982	725	25000
$-(C=O)-NH-$	–	1290	(906)	60760
$-O-(C=O)-NH$	–	1480	(1040)	–
$-N=C=O$	–	–	734	–
2.4. OTHER GROUPS				
$-H$	164–205	140	− 103 (acidic dimer)	–
$-S-$	460	460	428	8800
$-SH$	644	–	–	–
$-F$	(250)	164	84	4470
$-Cl$ (primary)	552	471	420	12990
$-Br$ (primary)	695	614	528	15500
$-I$	870	–	–	–
$-CF_2-$	307	–	–	–
$-CF_3$	561	–	–	–
$-O-N=O$	900	–	–	–
$-NO_2$	900	–	–	–
$-PO_4$	1020	–	–	–
$-Si-$	− 77	–	–	–

TABLE 2. *cont'd*

Group	F [$MPa^{1/2}$ cm^3/mol]		ΔE_i^v(J/mol)	
	Small (112)	van Krevelen (121)	Hoy (61)	van Krevelen and Hoftyzer (163)
2.5. STRUCTURAL FEATURES				
Conjugation	41–61	–	48	–
cis	–	–	−15	–
trans	–	–	−28	–
Ring, 4 member	–	–	159	–
5 member	215–235	–	43	–
6 member	194–215	–	−48	–
Subscription, ortho	–	–	20	–
meta	–		14	–

TABLE 3. CONTRIBUTIONS TO E_{coh} AND V[a]

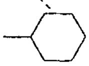
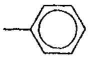
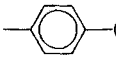
Group	E_{coh} (J/mol)	V (cm^3/mol)
$-CH_3$	4710	33.5
$>CH_2$	4940	16.1
$>CH-$	3430	−1.0
$>C<$	1470	−19.2
$=CH_2$	4310	28.5
$=CH-$	4310	13.5
$=C<$	4310	−5.5
$H-C\equiv$	3850	27.4
$-C\equiv$	7070	6.5
Phenyl	31940	71.4
Phenylene: *o*, *m*, *p*	31940	52.4
Phenyl (trisubstituted)	31940	33.4
(tetrasubstituted)	31940	14.4
(pentasubstituted)	31940	−4.6
(hexasubstituted)	31940	−23.6
Ring closure, 5+ atoms	1050	16.0
3 or 4 atoms	3140	18.0
Conjugation in ring for each double bond	1670	−2.2
Halogen attached to carbon atom with double bond	−20% of E_{coh} of halogen	4.0
−F	4190	18.0
−F, disubstituted	3560	20.0
trisubstituted	2300	22.0
$-CF_2-$, perfluoro compounds	4270	23.0
$-CF_3$, perfluoro compounds	4270	57.5
−Cl	11550	24.0
−Cl, disubstituted	9630	26.0
trisubstituted	7530	27.3
−Br	15490	30.0
−Br, disubstituted	12350	31.0
trisubstituted	10670	32.4
−I	19050	31.5
−I, disubstituted	16740	33.5
trisubstituted	16330	37.0
−CN	25530	24.0
−OH	29800	10.0
−OH, disubstituted or adjacent C atoms	21850	13.0
−O−	3350	3.8
−CHO, aldehyde	21350	22.3
−CO−	17370	10.8
−COOH	27630	28.5
−COO−	18000	18.0
$-CO_3-$, carbonate	17580	22.0
$-C_2O_3-$, anhydride	30560	30.0
HCOO−, formate	18000	32.5
$-CO_2CO_2-$, oxalate	26790	37.3
$-HCO_3$	12560	18.0
−COF	13400	29.0
−COCl	17580	38.1
−COBr	24150	41.6
−COI	29300	48.7
$-NH_2$	12560	19.2
−NH−	8370	4.5
$-N<$	4190	−9.0
−N=	11720	5.0
$-NHNH_2$	21980	–
$-N(NH_2)-$	16740	16.0
$-NH-NH-$	16740	16.0
$-N_2$, diazo	8370	23
−N=N−	4190	–
$>C-N=N-C<$	20090	–
−N=C=N−	11470	–
$-N\equiv C$	18840	23.1
$-NF_2$	7660	33.1
−NF−	5070	24.5
$-CONH_2$	41860	17.5
−CONH−	33490	9.5
$-C(=O)-N<$	29510	−7.7
$>CH-O-N<$	27630	11.3
HCONH−	43950	27.0
−NHCOO−	26370	18.5
−NHCONH−	50230	–
$-NH-C(=O)-N<$	41860	–
$>N-C(=O)-N<$	20930	−14.5
NH_2COO-	37000	–
−NCO	28460	35.0
$-ONH_2$	19050	20.0

TABLE 3. *cont'd*

Group	E_{coh} (J/mol)	V (cm^3/mol)
>C=N–OH	25120	11.3
$-CH{=}NOH$	25120	24.0
$-NO_2$, aliphatic	29300	24.0
$-NO_2$, aromatic	15360	32.0
$-NO_3$	20930	33.5
$-NO_2$, nitrate	11720	33.5
$-NHNO_2$	39770	28.7
$-NNO-$	27210	10.0
$-SH$	14440	28.0
$-S-$	14150	12.0
$-S_2-$	23860	23.0
$-S_3-$	13400	47.2
>S=O	39140	–
SO_3	18840	27.6
SO_4	28460	31.6
$-SO_2Cl$	37070	43.5
$-SCN$	20090	37.0
$-NCS$	25120	40.0
P	9420	– 1.0
PO_3	14230	22.7
PO_4	20930	28.0
PO_3-OH	31810	32.2
Si	3390	0
SiO_4	21770	20.0
B	13810	– 2.0
BO_3	0	20.4
Al	13810	– 2.0
Ga	13810	– 2.0
In	13810	– 2.0
Tl	13810	– 2.0
Ge	8080	– 1.5
Sn	11300	1.5
Pb	17160	2.5
As	12980	7.0
Sb	16330	8.9
Bi	21350	9.5
Se	17160	16.0
Te	20090	17.4
Zn	14480	2.5
Cd	17790	6.5
Hg	22810	7.5

[a] Ref. 35.

TABLE 4. SOLUBILITY PARAMETER I: COMPONENT GROUP CONTRIBUTIONS[a]

Structural Group	F_{di} (J$^{1/2}$ cm$^{3/2}$/mol)	F_{pi} (J$^{1/2}$ cm$^{3/2}$/mol)	E_{hi} (J/mol)
$-CH_3$	420	0	0
>CH_2	270	0	0
>CH–	80	0	0
>C<	– 70	0	0
$=CH_2$	400	0	0
$=CH-$	200	0	0
=C<	70	0	0
	1620	0	0
	1430	110	0
 (*o, m, p*)	1270	110	0
–F	(220)	-	-
–Cl	450	550	400
–Br	(550)	-	-
–CN	430	1100	2500
–OH	210	500	20000
–O–	100	400	3000
–COH	470	800	4500
–CO–	290	770	2000
–COOH	530	420	10000
–COO–	390	490	7000
HCOO–	530	–	–
$-NH_2$	280	–	8400
–NH–	160	210	3100
–N<	20	800	5000
$-NO_2$	500	1070	1500
–S–	440	–	–
$=PO_4-$	740	1890	13000
Ring	190	–	–
One plane of symmetry	–	0.50 ×	
Two planes of symmetry	–	0.25 ×	–
More planes of symmetry	–	0 ×	0 ×

[a] Ref. 163.

TABLE 5. SOLUBILITY PARAMETER II: COMPONENT GROUP CONTRIBUTIONS[a]

Group	$F_{t,i}$ ((J cm^3)$^{1/2}$/mol)	$F_{p,i}$ ((J cm^3)$^{1/2}$/mol)	V_i (cm^3/mol)	$\Delta_{T,i}{}^*$	$\Delta_{T,i}^{(P)}$
$-CH_3$	303.5	0	21.55	0.023	0.022
>CH_2	269.0	0	15.55	0.020	0.020
>CH–	176.0	0	9.56	0.012	0.013
>C<	65.5	0	3.56	0	0.04
$=CH_2$	259	67	19.17	0.018	0.019
$=CH-$	249	59.5	13.18	0.018	0.0185
=C<	173	63	7.18	0	0.013
$CH_{aromatic}$	241	62.5	13.42	0.011	0.018
$C_{aromatic}$	201	65	7.42	0.011	0.015
$-HC{=}O$	600	532	23.3	0.048	0.045

TABLE 5. *cont'd*

Group	$F_{t,i}$ $((\mathrm{J\ cm^3})^{1/2}/\mathrm{mol})$	$F_{p,i}$ $((\mathrm{J\ cm^3})^{1/2}/\mathrm{mol})$	V_i $(\mathrm{cm^3/mol})$	$\Delta_{T,i}$[a]	$\Delta_{T,i}^{(P)}$
-CO-	538	525	17.3	0.040	0.040
-COOH	565	415	26.1	0.039	0.039
-COO-	640	528	23.7	0.047	0.050
-CO-O-CO-	1160	1160	41.0	0.086	0.086
-CN	725	725	23.1	0.060	0.054
-N=C=O	736	8.2	25.9	0.054	0.054
-N(HCO)-	1020	725	35.8	0.062	0.055
$-CONH_2$	1200	900	34.3	0.071	0.084
-CONH-	1131	895	28.3	0.054	0.073
-OCONH-	1265	890	34.8	0.078	0.094
-OH→H-bonded	485	485	10.65	0.082	0.034
-OH, primary	675	675	12.45	0.082	0.049
secondary	591	591	12.45	0.082	0.049
tertiary	(500)	(500)	12.45	0.082	0.049
phenolic	350	350	12.45	0.031	0.006
-O-, ether	235	216	6.45	0.021	0.018
acetal	236	102	6.45	0.018	0.018
epoxide	361	156	6.45	0.027	0.027
$-NH_2$	464	464	17.0	0.031	0.035
-NH-	368	368	11.0	0.031	0.275
$-N<$	125	125	12.6	0.014	0.009
-S-	428	428	18.0	0.015	0.032
-F	845	73.5	11.2	0.018	0.006
-Cl, primary	419.5	307	19.5	0.017	0.031
secondary	426	315	19.5	0.017	0.032
aromatic	330	81.5	19.5	0.017	0.025
$>C(Cl)_2$	705	572	39.0	0.034	0.052
-Br, aliphatic	528	123	25.3	0.010	0.039
aromatic	422	100	25.3	0.010	0.031
Base value, B	277				
Ring, non-aromatic 4-member	159	203	–	0	0.012
5-member	43	85	–	0	0.003
6-member	– 48	61	–	0	– 0.0035
7-member	92	0	–	0	0.007
Conjugation, isomerism	47.5	–19.8	–	0	0.0035
cis	– 14.6	– 14.6	–	0	– 0.001
trans	– 27.6	– 27.6	–	0	– 0.002
Aromatic substitution, ortho	20.2	– 13.3	–	0	0.0015
meta	13.5	– 24.3	–	0	0.001
para	83	– 34.0	–	0	0.006

[a] Ref. (178–179).

TABLE 6. EQUATIONS TO BE USED FOR HOY'S SYSTEM[a]

Formulae	Solvents	Amorphous polymers
Additive molar functions	$F_t = \sum n_i F_{t,i}$ $F_p = \sum n_i F_{p,i}$ $V = \sum n_i V_i$ $\Delta_T = \sum n_i \Delta_{T,i}$	$F_t = \sum n_i F_{t,i}$ $F_p = \sum n_i F_{p,i}$ $V = \sum n_i V_i$ $\Delta_T^{(P)} = \sum n_i \Delta_{T,i}^{(P)}$
Auxiliary equations	$\log \alpha = 3.39 \dfrac{T_b}{T_{cr}} - 0.1585 - \log V,$ T_b = boiling point, T_{cr} = critical temp. $\left(\dfrac{T_b}{T_{cr}}\right) = 0.567 + \Delta_T - (\Delta_T)^2,$ Lyderson equation	$\alpha^{(P)} = \dfrac{777\Delta_T^{(P)}}{V}$ $\bar{n} = \dfrac{0.5}{\Delta_T^{(P)}}$
Expressions for δ and δ-components	$\delta_t = \dfrac{F_t + B}{V}$; $B = 277$	$\delta_t = \dfrac{F_t + \frac{B}{\bar{n}}}{V}$; $B = 277$

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TABLE 6. *cont'd*

Formulae	Solvents	Amorphous polymers
	$\delta_p = \delta_t\left(\frac{1}{\alpha}\frac{F_p}{F_t+B}\right)^{1/2}$	$\delta_p = \delta_t\left(\frac{1}{\alpha^{(P)}}\frac{F_p}{F_t+B/\bar{n}}\right)^{1/2}$
	$\delta_h = \delta_t\left(\frac{\alpha-1}{\alpha}\right)^{1/2}$	$\delta_h = \delta_t\left(\frac{\alpha^{(P)}-1}{\alpha^{(P)}}\right)^{1/2}$
	$\delta_d = (\delta_t^2 - \delta_p^2 - \delta_h^2)^{1/2}$	$\delta_d = (\delta_t^2 - \delta_p^2 - \delta_h^2)^{1/2}$

[a] In the equations given here, F_t is always combined with a Base value, α is the molecular aggregation number, and $\bar{n}$ the number of repeating units per polymer chain segment.

D. SOLUBILITY PARAMETER TABLES

TABLE 7. SOLUBILITY PARAMETERS OF SOLVENTS IN ALPHABETICAL ORDER

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	(cal/cm)$^{1/2}$	H-bonding group
Acetaldehyde	75-07-0	21.1	10.3	m
Acetic acid	64-19-7	20.7	10.2	s
Acetic anhydride	108-24-7	21.1	10.3	s
Acetone	67-64-1	20.3	9.9	m
Acetonitrile	75-07-8	24.3	11.9	p
Acetophenone	98-86-2	21.7	10.6	m
Acetyl chloride	75-36-5	19.4	9.5	m
Acetylmorpholine (*N*)	1696-20-4	23.7	11.6	m
Acetylpiperidine (*N*)	618-42-8	22.9	11.2	s
Acetylpyrrolidine (*N*)	1072-83-9	23.3	11.4	s
Acrolein	107-02-8	20.1	9.8	s
Acrylic acid	79-10-7	24.6	12.0	s
Acrylonitrile	107-13-1	21.5	10.5	p
Allyl acetate	591-87-7	18.8	9.2	m
Allyl alcohol	107-18-6	24.1	11.8	s
Allyl chloride	107-05-1	18.0	8.8	m
Ammonia	7664-41-7	33.4	16.3	s
Amyl acetate (iso)	625-16-1	16.0	7.8	m
(normal)	628-63-7	17.4	8.5	m
(secondary)	626-38-0	17.0	8.3	m
Amyl alcohol	75-85-4	20.5	10.0	s
Amyl alcohol (normal)	71-41-0	22.3	10.9	s
Amylamine (normal)	110-58-7	17.8	8.7	s
Amyl bromide (1-bromopentane)	110-53-2	15.6	7.6	m
Amyl chloride (1-chloropentane)	543-59-9	17.0	8.3	m
Amylene (2-methyl-2-butene)	513-35-9	14.1	6.9	p
Amyl ether (pentyl ether)	693-65-2	14.9	7.3	m
Amyl formate (iso)	110-45-2	16.4	8.0	m
(normal)	638-49-3	17.2	8.5	m
Amyl iodide (1-iodopentane)	628-17-1	17.2	8.4	m
Anethole (*para*)	4180-23-8	17.2	8.4	m
Aniline	65-53-3	21.1	10.3	s
Anthracene	120-12-7	20.3	9.9	p
Apco #18 solvent		15.3	7.5	p
Apco #140 solvent		14.9	7.3	p
Apco thinner		16.0	7.8	p
Aroclor 1248	12672-29-6	18.0	8.8	p
Benzaldehyde	100-52-7	19.2	9.4	m
Benzene	71-43-2	18.8	9.2	p
Benzonitrile	100-47-0	17.2	8.4	p
Benzyl alcohol	100-51-6	24.8	12.1	s
Bicyclohexyl	92-51-3	17.4	08.5	p
Bromobenzene	108-86-1	20.3	09.9	p
1-Bromonaphthalene	90-11-9	21.7	10.6	p
Bromostyrene (*ortho*)	2039-88-5	20.1	9.8	p
1,3-Butadiene	106-99-0	14.5	7.1	p

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TABLE 6. *cont'd*

Formulae	Solvents	Amorphous polymers
	$\delta_p = \delta_t\left(\frac{1}{\alpha}\frac{F_p}{F_t+B}\right)^{1/2}$	$\delta_p = \delta_t\left(\frac{1}{\alpha^{(P)}}\frac{F_p}{F_t+B/\bar{n}}\right)^{1/2}$
	$\delta_h = \delta_t\left(\frac{\alpha-1}{\alpha}\right)^{1/2}$	$\delta_h = \delta_t\left(\frac{\alpha^{(P)}-1}{\alpha^{(P)}}\right)^{1/2}$
	$\delta_d = (\delta_t^2 - \delta_p^2 - \delta_h^2)^{1/2}$	$\delta_d = (\delta_t^2 - \delta_p^2 - \delta_h^2)^{1/2}$

[a] In the equations given here, F_t is always combined with a Base value, α is the molecular aggregation number, and $\bar{n}$ the number of repeating units per polymer chain segment.

D. SOLUBILITY PARAMETER TABLES

TABLE 7. SOLUBILITY PARAMETERS OF SOLVENTS IN ALPHABETICAL ORDER

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	Solubility parameter δ (cal/cm)$^{1/2}$	H-bonding group
Acetaldehyde	75-07-0	21.1	10.3	m
Acetic acid	64-19-7	20.7	10.2	s
Acetic anhydride	108-24-7	21.1	10.3	s
Acetone	67-64-1	20.3	9.9	m
Acetonitrile	75-07-8	24.3	11.9	p
Acetophenone	98-86-2	21.7	10.6	m
Acetyl chloride	75-36-5	19.4	9.5	m
Acetylmorpholine (*N*)	1696-20-4	23.7	11.6	m
Acetylpiperidine (*N*)	618-42-8	22.9	11.2	s
Acetylpyrrolidine (*N*)	1072-83-9	23.3	11.4	s
Acrolein	107-02-8	20.1	9.8	s
Acrylic acid	79-10-7	24.6	12.0	s
Acrylonitrile	107-13-1	21.5	10.5	p
Allyl acetate	591-87-7	18.8	9.2	m
Allyl alcohol	107-18-6	24.1	11.8	s
Allyl chloride	107-05-1	18.0	8.8	m
Ammonia	7664-41-7	33.4	16.3	s
Amyl acetate (iso)	625-16-1	16.0	7.8	m
(normal)	628-63-7	17.4	8.5	m
(secondary)	626-38-0	17.0	8.3	m
Amyl alcohol	75-85-4	20.5	10.0	s
Amyl alcohol (normal)	71-41-0	22.3	10.9	s
Amylamine (normal)	110-58-7	17.8	8.7	s
Amyl bromide (1-bromopentane)	110-53-2	15.6	7.6	m
Amyl chloride (1-chloropentane)	543-59-9	17.0	8.3	m
Amylene (2-methyl-2-butene)	513-35-9	14.1	6.9	p
Amyl ether (pentyl ether)	693-65-2	14.9	7.3	m
Amyl formate (iso)	110-45-2	16.4	8.0	m
(normal)	638-49-3	17.2	8.5	m
Amyl iodide (1-iodopentane)	628-17-1	17.2	8.4	m
Anethole (*para*)	4180-23-8	17.2	8.4	m
Aniline	65-53-3	21.1	10.3	s
Anthracene	120-12-7	20.3	9.9	p
Apco #18 solvent		15.3	7.5	p
Apco #140 solvent		14.9	7.3	p
Apco thinner		16.0	7.8	p
Aroclor 1248	12672-29-6	18.0	8.8	p
Benzaldehyde	100-52-7	19.2	9.4	m
Benzene	71-43-2	18.8	9.2	p
Benzonitrile	100-47-0	17.2	8.4	p
Benzyl alcohol	100-51-6	24.8	12.1	s
Bicyclohexyl	92-51-3	17.4	08.5	p
Bromobenzene	108-86-1	20.3	09.9	p
1-Bromonaphthalene	90-11-9	21.7	10.6	p
Bromostyrene (*ortho*)	2039-88-5	20.1	9.8	p
1,3-Butadiene	106-99-0	14.5	7.1	p

TABLE 7. *cont'd*

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	(cal/cm)$^{1/2}$	H-bonding group
n-Butane	106-97-8	13.9	6.8	p
1,3-Butanediol	107-88-0	23.7	11.6	s
1,4-Butanediol	110-63-4	24.8	12.1	s
2,3-Butanediol	513-85-9	22.7	11.1	s
Butyl acetate (iso)	540-88-5	17.0	8.3	m
n-Butyl acetate	123-86-4	17.4	8.5	m
sec-Butyl acetate	105-46-4	16.8	8.2	m
Butyl acrylate (iso)	1663-39-4	17.4	8.5	m
n-Butyl acrylate	141-32-2	18.0	8.8	m
Butyl alcohol (iso) (2-methyl-1-propanol)	78-83-1	21.5	10.5	s
n-Butyl alcohol (1-butanol)	71-36-3	23.3	11.4	s
sec-Butyl alcohol (2-butanol)	15892-23-6	22.1	10.8	s
tert-Butyl alcohol (2-methyl-2-propanol)	75-65-0	21.7	10.6	s
n-Butylamine	109-73-9	17.8	8.7	s
n-Butyl bromide (1-bromobutane)	109-65-9	17.8	8.7	m
sec-Butyl bromide (2-bromobutane)	78-76-2	17.2	8.4	m
Butyl (iso) butyrate (normal)	539-90-2	16.0	7.8	m
Butyl (normal) butyrate (normal)	109-21-7	16.6	8.1	m
Butyl chloride (iso) (2-chloro-2-methylpropane)	507-20-0	16.6	8.1	m
Butylene-2,3 carbonate	4437-85-9	24.8	12.1	m
Butylene (iso) (2-methylpropene)	115-11-7	13.7	6.7	p
Butyl ether	142-96-1	16.0	7.8	m
Butyl formate (iso)	762-75-4	16.8	8.2	m
(normal)	592-84-7	18.2	8.9	m
Butyl iodide (normal) (1-iodobutane)	542-69-8	17.6	8.6	m
Butyl lactate (normal)	138-22-7	19.2	9.4	m
Butyl methacrylate	97-88-1	16.8	8.2	m
Butyl propionate	590-01-2	18.0	8.8	m
Butyl stearate	123-95-5	15.3	7.5	m
Butyraldehyde	123-72-8	18.4	9.0	m
Butyric acid (iso) (2-methylpropionic acid)	79-31-2	21.1	10.3	s
(normal)	107-92-6	21.5	10.5	s
Butyrolactone, γ	96-48-0	25.8	12.6	m
Butyronitrile (iso)	78-82-0	20.1	9.8	p
(normal)	109-74-0	21.5	10.5	p
Caprolactam, ε	105-60-2	26.0	12.7	m
Caprolactone, ε	502-44-3	20.7	10.1	m
Capronitrile (heptyl cyanide)	124-12-9	19.2	9.4	p
Carbon disulfide	75-15-0	20.5	10.0	p
Carbon tetrachloride	56-23-5	17.6	8.6	p
Celanese solvent 601		18.8	9.2	m
Chloroacetonitrile	920-37-6	25.8	12.6	p
Chlorobenzene	108-90-7	19.4	9.5	p
Chloroethyl acetate (β)	542-58-5	19.8	9.7	m
Chloroform	67-66-3	19.0	9.3	p
Chlorostyrene (*ortho* or *para*)	2039-87-4	19.4	9.5	p
Chlorotoluene (*para*)	106-43-4	18.0	8.8	p
Cresol (meta)	108-39-4	20.9	10.2	s
Cyclobutanedione	14406-53-3	22.5	11.0	m
Cyclohexane	110-82-7	16.8	8.2	p
Cyclohexanol	108-93-0	23.3	11.4	s
Cyclohexanone	108-94-1	20.3	9.9	m
Cyclopentane	287-92-3	17.8	8.7	p
Cyclopentanone	120-92-3	21.3	10.4	m
Cymene (*para*) (2-isopropyl toluene)	99-87-6	16.8	8.2	p
Decahydronaphthalene (*cis* and *trans*) (Decalin)	91-17-8	18.0	8.8	p
Decane (normal)	124-18-5	13.5	6.6	p
Decyl acrylate (iso)	2156-96-9	16.8	8.2	m
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	123-42-2	18.8	9.2	m
Diacetone alcohol methyl ether (Pentoxone)	107-70-0	16.8	8.2	m
Diacetylpiperazine (*N,N*)	18940-57-3	28.0	13.7	m
Diamyl phthalate	131-18-0	18.6	9.1	m
Dibenzyl ether	103-50-4	19.2	9.4	m

TABLE 7. *cont'd*

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	(cal/cm)$^{1/2}$	H-bonding group
Dibromoethane-1,2	106-93-4	21.3	10.4	p
Dibromoethylene-1,2 (*cis* and *trans*)	540-49-8	20.7	10.1	p
Dibutoxyethyl phthalate (Kronisol)	117-83-9	16.4	8.0	m
Dibutylamine	111-92-2	16.6	8.1	s
Dibutyl fumarate	105-75-9	18.4	9.0	m
Dibutyl maleate	105-76-0	18.4	9.0	m
Dibutyl phenyl phosphate	2528-36-1	17.8	8.7	m
Dibutyl phthalate	84-74-2	19.0	9.3	m
Dibutyl sebacate	109-43-3	18.0	9.2	m
Dichloroacetic acid	79-43-6	22.5	11.0	s
Dichlorobenzene (*ortho*)	95-50-1	20.5	10.0	p
Dichlorodifluoromethane (Freon 12)	75-71-8	11.3	5.5	p
Dichloroethyl ether	623-46-1	20.1	9.8	m
Dichloroethylene, *cis*-1,2	156-59-2	18.6	9.1	p
trans-1,2	156-60-5	18.4	9.0	p
Dichlorofluoromethane (Freon 21)	75-43-4	17.0	8.3	p
Dichloropropane-1,2	78-87-5	18.4	9.0	p
Dichloropropane-2,2	594-20-7	16.8	8.2	p
Diethylacetamide (*N*,*N*)	685-91-6	20.3	9.9	m
Diethylamine	109-89-7	16.4	8.0	s
Diethyl carbonate	105-58-8	18.0	8.8	m
Diethylene glycol	111-46-6	24.8	12.1	s
Diethylene glycol monobutyl ether (normal)	112-34-5	19.4	9.5	m
Diethylene glycol monobutyl ether	112-34-5	20.9	10.2	m
Diethylene glycol monobutyl ether acetate	124-17-4	17.4	8.5	m
Diethylene glycol monolaurate	141-20-8	17.8	8.7	m
Diethyl ether	60-29-7	15.1	7.4	m
Diethylformamide (*N*,*N*)	617-84-5	21.7	10.6	m
Diethyl ketone	96-22-0	18.0	8.8	m
Diethyl maleate	141-05-9	20.3	9.9	m
Diethyl oxalate	95-92-1	17.6	8.6	m
Diethyl phthalate	84-66-2	20.5	10.0	m
Diethyl-2,2-propanediol-1,2 (heptylene glycol)	115-76-4	20.3	9.9	s
Diethyl sulfone	597-35-3	25.4	12.4	m
Difluorotetrachloroethane (Freon 112)	76-11-9	16.0	7.8	p
Diformylpiperazine (*N*,*N*)	4164-39-0	31.5	15.4	m
Dihexyl ether	112-58-3	16.4	8.0	m
Di-*n*-hexyl phthalate	108-83-8	18.2	8.9	m
Diisobutylene	107-39-1	15.8	7.7	p
Diisobutyl ketone	108-83-8	16.0	7.8	m
Diisodecyl phthalate	26761-40-0	14.7	7.2	m
Diisopropyl ether	108-20-3	14.1	6.9	m
Diisopropyl ketone	565-80-0	16.4	8.0	m
Dimethylacetamide (*N*,*N*)	127-19-5	22.1	10.8	m
Dimethylaniline	121-69-7	19.8	9.7	m
Dimethyl-2,2-butanediol-1,2 (isobutylene glycol)	558-43-0	22.9	11.2	s
Dimethyl-2,2-butanediol-1,3	76-09-3	20.5	10.0	s
Dimethyl carbonate	616-38-6	20.3	9.9	m
Dimethyl ether	115-10-6	18.0	8.8	m
Dimethylformamide (*N*,*N*)	68-12-2	24.8	12.1	m
Dimethyl malonate	108-59-8	22.5	11.0	m
Dimethylnitroamine (*N*,*N*)	62-75-9	26.8	13.1	s
Dimethyl oxalate	553-90-2	22.5	11.0	m
Dimethyl phosphite	868-85-9	25.6	12.5	m
Dimethyl phthalate	131-11-3	21.9	10.7	m
Dimethyl siloxane	9016-00-6	10.0–12.1	4.9–5.9	p
Dimethyl sulfide	75-18-3	19.2	9.4	p
Dimethyl sulfoxide	67-68-5	29.7	14.5	m
Dimethyltetramethylene sulfone	1003-78-7	24.6	12.0	m
Dioctyl adipate	103-23-1	17.8	8.7	m
Dioctyl phthalate	117-81-7	24.8	12.1	m
Dioctyl sebacate	1222-62-3	17.8	8.7	m
Dioxane-1,4	123-91-1	20.5	10.0	m

TABLE 7. *cont'd*

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	Solubility parameter δ (cal/cm)$^{1/2}$	H-bonding group
Dioxolane-1,3	646-06-0	17.6	8.6	m
Dipentene	138-86-3	20.5	10.0	m
Diphenyl ether	101-84-8	20.9	10.2	m
Diphenyl 2-ethylhexyl phosphate	1241-94-7	17.4	8.5	p
Dipropylene glycol	110-98-5	20.7	10.1	m
Dipropylene glycol monomethyl ether	34590-94-8	17.6	8.6	m
Dipropyl phthalate	131-16-8	20.5	10.0	s
Dipropyl sulfone	598-03-8	23.1	11.3	m
Dodecane	112-40-3	16.2	7.9	p
Dodecanol-1	112-53-8	20–21	9.8	s
Epichlorohydrin	106-89-8	22.5	11.0	s
Ethane	74-84-0	12.3	6.0	p
Ethylacetamide (*N*)	625-50-3	25.2	12.3	s
Ethyl acetate	141-78-6	18.6	9.1	m
Ethyl acrylate	140-88-5	17.6	8.6	m
Ethyl alcohol	64-17-5	26.0	12.7	s
Ethylamine	75-04-7	20.5	10.0	s
Ethyl amyl ketone (3-octanone)	106-68-3	16.8	8.2	m
Ethylbenzene	100-41-4	18.0	8.8	p
Ethyl benzoate	93-89-0	16.8	8.2	m
Ethyl bromide (bromoethane)	74-96-4	19.6	9.6	m
Ethyl-2-butanol-1	97-95-0	21.5	10.5	s
Ethyl *n*-butyrate	105-54-4	17.4	8.5	m
Ethyl caprylate	106-32-1	14.9	7.3	m
Ethyl chloride	75-00-3	18.8	9.2	m
Ethyl cyanoacetate	105-56-6	22.5	11.0	m
Ethylene bromide	593-60-2	19.8	9.7	p
Ethylene carbonate	96-49-1	30.1	14.7	m
Ethylene chlorohydrin (2-chloroethanol)	107-07-3	25.0	12.2	s
Ethylene cyanohydrin (3-hydroxypropionitrile)	109-78-4	31.1	15.2	s
Ethylenediamine	107-15-3	25.2	12.3	s
Ethylene dichloride (1,2-dichloroethane)	107-06-2	20.1	9.8	p
Ethylene glycol	107-21-1	29.9	14.6	s
Ethylene glycol diacetate	111-55-7	20.5	10.0	m
Ethylene glycol diethyl ether	629-14-1	17.0	8.3	m
Ethylene glycol dimethyl ether	110-71-4	17.6	8.6	m
Ethylene glycol methyl ether acetate	110-49-6	18.8	9.2	m
Ethylene glycol monobenzyl ether	622-08-2	22.3	10.9	m
Ethylene glycol monobutyl ether	111-76-2	19.4	9.5	m
Ethylene glycol monoethyl ether (2-ethoxyethanol; Cellusolve)	110-80-5	21.5	10.5	m
Ethylene glycol monomethyl ether (2-methoxyethanol)	109-86-4	23.3	11.4	m
Ethylene glycol monophenyl ether	122-99-6	23.5	11.5	m
Ethylene oxide	75-21-8	22.7	11.1	m
Ethylene formamide (*N*)		28.4	13.9	s
Ethyl formate	109-94-4	19.2	9.4	m
Ethyl-2-hexanediol-1,3 (octylene glycol)	94-96-2	19.2	9.4	s
Ethylhexanol	104-76-7	19.4	9.5	s
Ethyl hexyl acrylate	103-11-7	16.0	7.8	m
Ethylidene chloride	75-34-3	18.2	8.9	p
Ethyl iodide (iodoethane)	75-03-6	19.2	9.4	m
Ethyl isobutyl ether	627-02-1	15.3	7.5	m
Ethyl isobutyrate	97-62-1	16.2	7.9	m
Ethyl lactate	687-47-8	20.5	10.0	m
Ethyl mercaptan (ethane thiol)	75-08-1	18.8	9.2	p
Ethyl methacrylate	97-63-2	17.0	8.3	m
Ethyl morpholine (*N*)	100-74-3	18.2	8.9	s
Ethyl orthoformate (triethyl orthoformate)	122-51-0	17.0	8.3	m
Ethyl propionate	105-37-3	17.2	8.4	m
Fluorocarbons, aliphatic		11.3–12.7	5.5–6.2	p
aromatic		15.3–16.8	7.5–8.2	p
Formamide	75-12-7	39.3	19.2	s
Formic acid	64-18-6	24.8	12.1	s

TABLE 7. *cont'd*

Solvent	CAS number	Solubility parameter δ MPa$^{1/2}$	(cal/cm)$^{1/2}$	H-Bonding Group
Formylmorpholine (*N*)	4394-85-8	26.6	13.0	m
Formylpiperidine (*N*)	2591-86-8	23.5	11.5	m
Furan	110-00-9	19.2	9.4	m
Furfural (2-furaldehyde)	98-01-1	22.9	11.2	m
Furfuryl alcohol	98-00-0	25.6	12.5	s
Glycerol	56-81-5	33.8	16.5	s
Heptane (normal)	142-82-5	15.1	7.4	p
Heptyl alcohol (normal)	111-70-6	21.7	10.6	s
Hexamethylphosphoramide	680-31-9	21.5	10.5	s
Hexane (normal)	110-54-3	14.9	7.3	p
Hexanediol-2,5	2935-44-6	21.2	10.3	s
Hexene-1	592-41-6	15.1	7.4	p
Hexyl alcohol (normal)	111-27-3	21.9	10.7	s
Hydrazine	302-10-2	37.3	18.1	s
Hydrogen	1333-74-0	6.9	3.0	p
Hydrogenated terphenyl (Monsanto HB-40)		18.4	9.0	p
Hydrogen cyanide	74-90-8	24.8	12.1	s
Iodobenzene	591-50-4	20.7	10.1	p
Isophorone	78-59-1	18.6	9.1	m
Isoprene	78-79-5	15.1	7.4	p
Lauryl alcohol	112-53-8	16.6	8.1	s
Low odor mineral spirits		14.1	6.9	p
Maleic anhydride	108-31-6	27.8	13.6	s
Malononitrile	109-77-3	30.9	15.1	p
Mesitylene	108-67-8	18.0	8.8	p
Mesityl oxide	141-79-7	18.4	9.0	m
Methacrylic acid	79-41-4	22.9	11.2	s
Methane	74-82-8	11.0	5.4	p
Methanol	67-56-1	29.7	14.5	s
Methoxy-4-methyl-4-pentanol-2		17.4	8.5	s
Methoxy-4-methyl-4-pentanone-2	107-70-0	17.0	8.3	m
Methylacetamide	79-16-3	29.9	14.6	s
Methyl acetate	79-20-9	19.6	9.6	m
Methyl acrylate	96-33-3	18.2	8.9	m
Methylamine	74-89-5	22.9	11.2	s
Methyl amyl acetate	108-84-9	16.4	8.0	m
Methyl amyl ketone	110-43-0	17.4	8.5	m
Methyl benzoate	95-58-3	21.5	10.5	m
Methyl bromide	74-83-9	19.6	9.6	m
Methyl *n*-butyl ketone	591-78-6	17.0	8.3	m
Methyl *n*-butyrate	623-42-7	18.2	8.9	m
Methyl caprolactone		18.2	8.9	m
Methyl chloride	74-87-3	19.8	9.7	m
Methylcyclohexane	10120-28-2	16.0	7.8	p
Methylcyclohexanone	589-92-4	19.0	9.3	m
Methylene chloride	75-09-2	19.8	9.7	p
Methylene glycolate	61192-32-3	25.4	12.4	m
Methylene iodide	75-11-6	24.1	11.8	p
Methyl ethyl ketone	78-93-3	19.0	9.3	m
Methyl ethyl sulfone	594-43-4	27.4	13.4	m
Methylformamide (*N*)	123-39-7	32.9	16.1	s
Methyl formate	107-31-3	20.9	10.2	m
Methyl *n*-hexyl ketone	111-13-7	17.0	8.3	m
Methyl iodide	74-88-4	20.9	10.2	m
Methyl isoamyl ketone	110-12-3	17.2	8.4	m
Methyl isobutyl carbinol	108-11-2	20.5	10.0	s
Methyl isobutyl ketone	108-10-1	17.2	8.4	m
Methyl isobutyrate	547-63-7	17.0	8.3	m
Methyl isopropyl ketone	563-80-4	17.4	8.5	m
Methyl isovalerate	624-24-8	16.2	7.9	m
Methyl methacrylate	80-62-6	18.0	8.8	m
Methyl nonyl ketone	112-12-9	16.0	7.8	m
Methyl-2-pentanediol-1,3	149-31-5	21.1	10.3	s

TABLE 7. *cont'd*

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	(cal/cm)$^{1/2}$	H-bonding group
Methyl-2-pentanediol-2,4	107-41-5	19.8	9.7	s
Methyl-2-pentanediol monoethyl ether (Pentoxol)		17.4	8.5	m
Methyl propionate	554-12-1	18.2	8.9	m
Methyl propyl ketone	107-87-9	17.8	8.7	m
Methyl propyl sulfone	1977-37-3	25.6	12.5	m
Methyl pyrrolidone-2 (1-methyl-2-pyrrolidinone)	872-50-4	23.1	11.3	m
Methyl salicylate	119-36-8	21.7	10.6	m
Methyl styrene (α)	98-83-9	17.4	8.5	p
Methyltetramethylene sulfone		26.4	12.9	m
Methyl *n*-valerate	624-24-8	16.2	7.9	m
Morpholine	110-91-8	22.1	10.8	s
Naphthalene	91-20-3	20.3	9.9	p
Neopentane	463-82-1	12.9	6.3	p
Neopentyl glycol	126-30-7	22.5	11.0	s
Nitrobenzene	98-95-3	20.5	10.0	p
Nitroethane	79-24-3	22.7	11.1	p
Nitromethane	75-52-5	26.0	12.7	p
Nitro-*n*-octane		14.3	7.0	p
Nitro-1-propane	108-03-2	21.1	10.3	p
Nitro-2-propane	79-46-9	20.3	9.9	p
Nonyl phenol	25154-52-3	19.2	9.4	s
Octane (normal)	111-65-9	15.6	7.6	p
Octyl alcohol (normal)	111-87-5	21.1	10.3	s
Pentachloroethane	76-01-7	19.2	9.4	p
Pentane (normal)	109-66-0	14.3	7.0	p
Pentanediol-1,5	111-29-5	23.5	11.5	s
Pentanediol-2,4	625-69-4	22.1	10.8	s
Perchloroethylene	127-18-4	19.0	9.3	p
Perfluoroheptane	335-57-9	11.9	5.8	p
Perfluoromethylcyclohexane	355-02-2	12.3	6.0	p
Phenanthrene	85-01-8	20.1	9.8	p
Phenylhydrazine	100-63-0	25.6	12.5	s
Pine oil		17.6	8.6	p
Piperidine	110-89-4	17.8	8.7	p
Piperidone	675-20-7	27.8	13.6	s
Propane	74-98-6	13.1	6.4	p
Propiolactone	57-57-8	27.2	13.3	m
Propionic acid	79-09-4	20.3	9.9	s
Propionic anhydride	123-62-6	20.5	10.0	s
Propionitrile	107-12-0	22.1	10.8	p
Propyl acetate (iso)	108-21-4	17.2	8.4	m
Propyl acetate (normal)	109-60-4	18.0	8.8	m
Propyl alcohol (2-propanol)	67-63-0	23.5	11.5	s
Propyl alcohol (1-propanol)	71-23-8	24.3	11.9	s
Propylbenzene (normal)	103-65-1	17.6	8.6	p
Propyl bromide (1-bromopropane)	106-94-5	18.2	8.9	m
Propyl butyrate	105-66-8	17.2	8.4	m
Propyl butyrate (iso)	638-11-9	16.2	7.9	m
Propyl chloride (2-chloropropane)	75-29-6	16.6	8.1	m
Propyl chloride (1-chloropropane)	540-54-5	17.4	8.5	m
Propylene-1,2-carbonate	108-32-7	27.2	13.3	m
Propylene glycol (1,2-propanediol)	57-55-6	25.8	12.6	s
Propylene glycol methyl ether (1,2-dimethoxypropane)	7778-85-0	20.7	10.1	m
Propylene oxide	75-56-9	18.8	9.2	m
Propyl ether (di-, normal)	111-43-3	16.0	7.8	m
Propyl ether (iso)	108-20-3	14.5	7.1	m
Propyl formate	110-74-7	18.8	9.2	m
Propyl propionate	106-36-5	17.4	8.5	m
Pyridine	110-86-1	21.9	10.7	s
Pyrone (γ)	504-31-4	27.4	13.4	m
Pyrrolidine (α)	123-75-1	30.1	14.7	s
Quinoline	00-02-2	22.1	10.8	s
Santicizer 8		24.3	11.9	m

TABLE 7. *cont'd*

Solvent	CAS number	Solubility parameter δ (MPa$^{1/2}$)	(cal/cm)$^{1/2}$	H-bonding group
Shell Sol 72		14.7	7.2	p
Shell TS28 solvent		15.1	7.4	p
Silicon tetrachloride		15.1	7.4	p
Socal solvent No. 1		16.6	8.1	p
Socal solvent No. 2		16.2	7.9	p
Socal solvent No. 3		15.8	7.7	p
Solvesso 100		17.6	8.6	p
Solvesso 150		17.4	8.5	p
Styrene	100-42-5	19.0	9.3	p
Styrene oxide	96-09-3	21.5	10.5	m
Succinic anhydride	108-30-5	31.5	15.4	s
Terpene B		17.2	8.4	p
Tetrachloroethane-1,1,2,2	79-34-5	19.8	9.7	p
Tetrachloroethylene (perchloroethylene)	127-18-4	19.0	9.3	p
Tetraethylene glycol	112-60-7	20.3	9.9	s
Tetrahydrofuran	109-99-9	18.6	9.1	m
Tetrahydronaphthalene (tetralin)	119-64-2	19.4	9.5	p
Tetramethylene sulfone (sulfolane, tetrahydrothiophene 1,1-dioxide)	126-33-0	27.4	13.4	m
Tetramethyloxamide		23.3	11.4	m
Thiophene	110-02-1	20.1	9.8	m
Toluene	108-88-3	18.2	8.9	p
Tolylene diisocyanate (4-methyl-1,3-phenylene diisocyanate)	584-84-9	23.7	11.6	s
Tributylamine	102-82-9	15.8	7.7	s
Trichloroethane-1,1,2	79-00-5	19.6	9.6	p
Trichloroethylene	79-01-6	18.8	9.2	p
Trichlorofluoromethane	75-69-4	15.5	7.6	p
Trichlorotrifluoroethane (1,1,2-trichlorotrifluoroethane)	76-13-1	14.9	7.3	p
Tricresyl phosphate (tritolyl phosphate)	1330-78-5	17.2	8.4	m
Triethylamine	121-44-8	15.1	7.4	s
Triethylene glycol	112-27-6	21.9	10.7	s
Triethylenetetramine	112-24-3	22.7	11.1	s
Trimethyl-3,5,5-hexanol (nonyl alcohol)	3452-97-9	17.2	8.4	s
Triphenyl phosphate	115-86-6	17.6	8.6	m
Triphenyl phosphite	101-02-0	19.0	9.3	m
Tripropylene glycol	24800-44-0	18.8	9.2	s
Tripropylene glycol methyl ether	20324-33-8	17.8	8.7	m
Turpentine	8006-64-2	16.6	8.1	p
Valeric acid (normal)	109-52-4	20.1	9.8	s
Valeronitrile (normal)	110-59-8	19.6	9.6	p
Varnolene (Varsol #2)		15.6	7.6	p
Vinyl acetate	108-05-4	18.4	9.0	m
Vinyl chloride	75-01-4	16.0	7.8	m
Vinyl toluene	622-97-9	18.6	9.1	p
V M & P naphtha		15.6	7.6	p
Water	7732-18-5	47.9	23.4	s
Xylene (*p*-xylene)	106-42-3	18.0	8.8	p

TABLE 8. SOLUBILITY PARAMETERS OF SOLVENTS IN INCREASING ORDER OF δ

Solvent	δ (MPa$^{1/2}$)
Hydrogen	6.9
Dimethyl siloxane	10.0–12.1
Methane	11.0
Dichlorodifluoromethane (Freon 12)	11.3
Fluorocarbons, aliphatic	11.3–12.7
Perfluoroheptane	11.9
Ethane	12.3
Perfluoromethylcyclohexane	12.3
Neopentane	12.9

TABLE 8. *cont'd*

Solvent	δ (MPa$^{1/2}$)
Propane	13.1
Decane (normal)	13.5
Butylene (iso) (2-methylpropene)	13.7
n-Butane	13.9
Amylene (2-methyl-2-butene)	14.1
Diisopropyl ether	14.1
Low odor mineral spirits	14.1
Nitro-*n*-octane	14.3
Pentane (normal)	14.3
1,3-Butadiene	14.5

TABLE 8. *cont'd*

Solvent	δ (MPa$^{1/2}$)
Propyl ether (iso)	14.5
Diisodecyl phthalate	14.7
Shell Sol 72	14.7
Amyl ether (pentyl ether)	14.9
Apco #140 solvent	14.9
Ethyl caprylate	14.9
Hexane (normal)	14.9
Trichlorotrifluoroethane (1,1,2-trichlorotrifluoroethane)	14.9
Diethyl ether	15.1
Heptane (normal)	15.1
Hexene-1	15.1
Isoprene	15.1
Shell TS28 solvent	15.1
Silicon tetrachloride	15.1
Triethylamine	15.1
Apco #18 solvent	15.3
Butyl stearate	15.3
Ethyl isobutyl ether	15.3
Fluorocarbons (aromatic)	15.3–16.8
Trichlorofluoromethane	15.5
Amyl bromide (1-bromopentane)	15.6
Octane (normal)	15.6
Varnolene (varsol #2)	15.6
V M & P naphtha	15.6
Diisobutylene	15.8
Socal solvent No. 3	15.8
Tributylamine	15.8
Amyl acetate (iso)	16.0
Apco thinner	16.0
Butyl (iso) butyrate (normal)	16.0
Butyl ether	16.0
Difluorotetrachloroethane (Freon 112)	16.0
Diisobutyl ketone	16.0
Ethyl hexyl acrylate	16.0
Methylcyclohexane	16.0
Methyl nonyl ketone	16.0
Propyl ether (di-, normal)	16.0
Vinyl chloride	16.0
Dodecane	16.2
Ethyl isobutyrate	16.2
Methyl isovalerate	16.2
Methyl *n*-valerate	16.2
Propyl butyrate (iso)	16.2
Socal solvent No. 2	16.2
Amyl formate (iso)	16.4
Dibutoxyethyl phthalate (Kronisol)	16.4
Diethylamine	16.4
Dihexyl ether	16.4
Diisopropyl ketone	16.4
Methyl amyl acetate	16.4
Butyl (normal) butyrate (normal)	16.6
Butyl chloride (iso) (2-chloro-2-methylpropane)	16.6
Dibutylamine	16.6
Lauryl alcohol	16.6
Propyl chloride (2-chloropropane)	16.6
Socal solvent No. 1	16.6
Turpentine	16.6
sec-Butyl acetate	16.8
Butyl formate (iso)	16.8
Butyl methacrylate	16.8
Cyclohexane	16.8
Cymene (*para*) (2-isopropyl toluene)	16.8
Decyl acrylate (iso)	16.8
Diacetone alcohol methyl ether (Pentoxone)	16.8
Dichloropropane-2,2	16.8
Ethyl amyl ketone (3-octanone)	16.8
Ethyl benzoate	16.8
Ethyl benzoate (secondary)	17.0
Amyl chloride (1-chloropentane)	17.0
Butyl acetate (iso)	17.0
Dichlorofluoromethane (Freon 21)	17.0
Ethylene glycol diethyl ether	17.0
Ethyl methacrylate	17.0
Ethyl orthoformate (triethyl orthoformate)	17.0
Methoxy-4-methyl-4-pentanone-2	17.0
Methyl *n*-butyl ketone	17.0
Methyl *n*-hexyl ketone	17.0
Methyl isobutyrate	17.0
Amylformates (normal)	17.2
Methyl isobutyrate (normal)	17.2
Amyl iodide (1-iodopentane)	17.2
Anethole (*para*)	17.2
Benzonitrile	17.2
sec-Butyl bromide (2-bromobutane)	17.2
Ethyl propionate	17.2
Methyl isoamyl ketone	17.2
Methyl isobutyl ketone	17.2
Propyl acetate (iso)	17.2
Propyl butyrate	17.2
Terpene B	17.2
Tricresyl phosphate (tritolyl phosphate)	17.2
Trimethyl-3,5,5-hexanol (nonyl alcohol)	17.2
Trimethyl-3,5,5-hexanol (normal)	17.4
Bicyclohexyl	17.4
n-Butyl acetate	17.4
Butyl acrylate (iso)	17.4
Diethylene glycol monobutyl ether acetate	17.4
Diphenyl 2-ethylhexyl phosphate	17.4
Ethyl *n*-butyrate	17.4
Methoxy-4-methyl-4-pentanol-2	17.4
Methyl amyl ketone	17.4
Methyl isopropyl ketone	17.4
Methyl-2-pentanediol monoethyl ether (Pentoxol)	17.4
Methyl styrene (α)	17.4
Propyl chloride (1-chloropropane)	17.4
Propyl propionate	17.4
Solvesso 150	17.4
Butyl iodide (normal) (1-iodobutane)	17.6
Carbon tetrachloride	17.6
Diethyl oxalate	17.6
Dioxolane-1,3	17.6
Dipropylene glycol monomethyl ether	17.6
Ethyl acrylate	17.6
Ethylene glycol dimethyl ether	17.6
Pine oil	17.6
Propylbenzene (normal)	17.6
Solvesso 100	17.6
Triphenyl phosphate	17.6
Amylamine (normal)	17.8
n-Butylamine	17.8
n-Butyl bromide (1-bromobutane)	17.8
Cyclopentane	17.8
Dibutyl phenyl phosphate	17.8
Diethylene glycol monolaurate	17.8
Dioctyl adipate	17.8
Dioctyl sebacate	17.8
Methyl propyl ketone	17.8
Piperidine	17.8
Tripropylene glycol methyl ether	17.8
Aroclor 1248	18.0

TABLE 8. *cont'd*

Solvent	δ (MPa$^{1/2}$)
Allyl chloride	18.0
n-Butyl acrylate	18.0
Butyl propionate	18.0
Chlorotoluene (*para*)	18.0
Decahydronaphthalene (*cis* and *trans*) (decalin)	18.0
Dibutyl sebacate	18.0
Diethyl carbonate	18.0
Diethyl ketone	18.0
Dimethyl ether	18.0
Ethylbenzene	18.0
Mesitylene	18.0
Methyl methacrylate	18.0
Propyl acetate (normal)	18.0
Xylene (*p*-xylene)	18.0
Butyl formate(normal)	18.2
Di-*n*-hexyl phthalate	18.2
Ethylidene chloride	18.2
Ethyl morpholine (normal)	18.2
Methyl acrylate	18.2
Methyl *n*-butyrate	18.2
Methyl caprolactone	18.2
Methyl propionate	18.2
Propyl bromide (1-bromopropane)	18.2
Toluene	18.2
Butyraldehyde	18.4
Dibutyl fumarate	18.4
Dibutyl maleate	18.4
Dichloroethylene *trans*-1,2	18.4
Dichloropropane-1,2	18.4
Hydrogenated terphenyl (Monsanto HB-40)	18.4
Mesityl oxide	18.4
Vinyl acetate	18.4
Diamyl phthalate	18.6
Dichloroethylene, *cis*-1,2	18.6
Ethyl acetate	18.6
Isophorone	18.6
Tetrahydrofuran	18.6
Vinyl toluene	18.6
Allyl acetate	18.8
Benzene	18.8
Celanese solvent 601	18.8
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	18.8
Ethyl chloride	18.8
Ethylene glycol methyl ether acetate	18.8
Ethyl mercaptan (ethane thiol)	18.8
Propylene oxide	18.8
Propyl formate	18.8
Trichloroethylene	18.8
Tripropylene glycol	18.8
Chloroform	19.0
Dibutyl phthalate	19.0
Methylcyclohexanone	19.0
Methyl ethyl ketone	19.0
Perchloroethylene	19.0
Styrene	19.0
Tetrachloroethylene (perchloroethylene)	19.0
Triphenyl phosphite	19.0
Benzaldehyde	19.2
Butyl lactate (normal)	19.2
Capronitrile (heptyl cyanide)	19.2
Dibenzyl ether	19.2
Dimethyl sulfide	19.2
Ethyl formate	19.2
Ethyl-2-hexanediol-1,3 (octylene glycol)	19.2
Ethyl iodide (iodoethane)	19.2

TABLE 8. *cont'd*

Solvent	δ (MPa$^{1/2}$)
Furan	19.2
Nonyl phenol	19.2
Pentachloroethane	19.2
Acetyl chloride	19.4
Chlorobenzene	19.4
Chlorostyrene (*ortho* or *para*)	19.4
Diethylene glycol monobutyl ether (normal)	19.4
Ethylene glycol monobutyl ether	19.4
Ethylhexanol	19.4
Tetrahydronaphthalene (tetralin)	19.4
Ethyl bromide (bromoethane)	19.6
Methyl acetate	19.6
Methyl bromide	19.6
Trichloroethane-1,1,2	19.6
Valeronitrile (normal)	19.6
Chloroethyl acetate (β)	19.8
Dimethylaniline	19.8
Ethylene bromide	19.8
Methyl chloride	19.8
Methylene chloride	19.8
Methyl-2-pentanediol-2,4	19.8
Tetrachloroethane-1,1,2,2	19.8
Dodecanol-1	20–21
Acrolein	20.1
Bromostyrene (*ortho*)	20.1
Butyronitrile (iso)	20.1
Dichloroethyl ether	20.1
Ethylene dichloride (1,2-dichloroethane)	20.1
Phenanthrene	20.1
Thiophene	20.1
Valeric acid (normal)	20.1
Acetone	20.3
Anthracene	20.3
Bromobenzene	20.3
Cyclohexanone	20.3
Diethylacetamide (*N,N*)	20.3
Diethyl maleate	20.3
Diethyl-2,2-propanediol-1,2 (heptylene glycol)	20.3
Dimethyl carbonate	20.3
Naphthalene	20.3
Nitro-2-propane	20.3
Propionic acid	20.3
Tetraethylene glycol	20.3
Amyl alcohol	20.5
Carbon disulfide	20.5
Dichlorobenzene (*ortho*)	20.5
Diethyl phthalate	20.5
Dimethyl-2,2-butanediol-1,3	20.5
Dioxane-1,4	20.5
Dipentene	20.5
Dipropyl phthalate	20.5
Ethylamine	20.5
Ethylene glycol diacetate	20.5
Ethyl lactate	20.5
Methyl isobutyl carbinol	20.5
Nitrobenzene	20.5
Propionic anhydride	20.5
Acetic acid	20.7
Caprolactone (ε)	20.7
Dibromoethylene-1,2 (*cis* and *trans*)	20.7
Dipropylene glycol	20.7
Iodobenzene	20.7
Propylene glycol methyl ether (1,2-dimethoxypropane)	20.7
Cresol (*meta*)	20.9
Diethylene glycol monobutyl ether	20.9

TABLE 8. *cont'd*

Solvent	δ (MPa^1/2^)
Diphenyl ether	20.9
Methyl formate	20.9
Methyl iodide	20.9
Acetaldehyde	21.1
Acetic anhydride	21.1
Aniline	21.1
Butyric acid (iso) (2-methylpropionic acid)	21.1
Methyl-2-pentanediol-1,3	21.1
Nitro-1-propane	21.1
Octyl alcohol (normal)	21.1
Hexanediol-2,5	21.2
Cyclopentanone	21.3
Dibromoethane-1,2	21.3
Acrylonitrile	21.5
Butyl alcohol (iso) (2-methyl-1-propanol)	21.5
Butyric acid (normal)	21.5
Butyronitrile (normal)	21.5
Ethyl-2-butanol-1	21.5
Ethylene glycol monoethyl ether (2-ethoxyethanol; Cellusolve)	21.5
Hexamethylphosphoramide	21.5
Methyl benzoate	21.5
Styrene oxide	21.5
Acetophenone	21.7
1-Bromonaphthalene	21.7
tert-Butyl alcohol (2-methyl-2-propanol)	21.7
Diethylformamide (*N*,*N*)	21.7
Heptyl alcohol (normal)	21.7
Methyl salicylate	21.7
Dimethyl phthalate	21.9
Hexyl alcohol (normal)	21.9
Pyridine	21.9
Triethylene glycol	21.9
sec-Butyl alcohol (2-butanol)	22.1
Dimethylacetamide (*N*,*N*)	22.1
Morpholine	22.1
Pentanediol-2,4	22.1
Propionitrile	22.1
Quinoline	22.1
Quinoline (normal)	22.3
Ethylene glycol monobenzyl ether	22.3
Cyclobutanedione	22.5
Dichloroacetic acid	22.5
Dimethyl malonate	22.5
Dimethyl oxalate	22.5
Epichlorohydrin	22.5
Ethyl cyanoacetate	22.5
Neopentyl glycol	22.5
2,3-Butanediol	22.7
Ethylene oxide	22.7
Nitroethane	22.7
Triethylenetetramine	22.7
Acetylpiperidine (*N*)	22.9
Dimethyl-2,2-butanediol-1,2 (isobutylene glycol)	22.9
Furfural (2-furaldehyde)	22.9
Methacrylic acid	22.9
Methylamine	22.9
Dipropyl sulfone	23.1
Methyl pyrrolidone-2 (1-methyl-2-pyrrolidinone)	23.1
Acetylpyrrolidine (*N*)	23.3
n-Butyl alcohol (1-butanol)	23.3
Cyclohexanol	23.3
Ethylene glycol monomethyl ether (2-methoxyethanol)	23.3
Tetramethyloxamide	23.3
Ethylene glycol monophenyl ether	23.5
Formylpiperidine (normal)	23.5
Pentanediol-1,5	23.5
Propyl alcohol (2-propanol)	23.5
Acetylmorpholine (*N*)	23.7
1,3-Butanediol	23.7
Tolylene diisocyanate (4-methyl-1,3-phenylene diisocyanate)	23.7
Allyl alcohol	24.1
Methylene iodide	24.1
Acetonitrile	24.3
Propyl alcohol (1-propanol)	24.3
Santicizer 8	24.3
Acrylic acid	24.6
Dimethyltetramethylene sulfone	24.6
Benzyl alcohol	24.8
1,4-Butanediol	24.8
Butylene-2,3 carbonate	24.8
Diethylene glycol	24.8
Dimethylformamide (*N*,*N*)	24.8
Dioctyl phthalate	24.8
Formic acid	24.8
Hydrogen cyanide	24.8
Ethylene chlorohydrin (2-chloroethanol)	25.0
Ethylacetamide (normal)	25.2
Ethylenediamine	25.2
Diethyl sulfone	25.4
Methylene glycolate	25.4
Dimethyl phosphite	25.6
Furfuryl alcohol	25.6
Methyl propyl sulfone	25.6
Phenylhydrazine	25.6
Butyrolactone (γ)	25.8
Chloroacetonitrile	25.8
Propylene glycol (1,2-propanediol)	25.8
Caprolactam (ε)	26.0
Ethyl alcohol	26.0
Nitromethane	26.0
Methyltetramethylene sulfone	26.4
Formylmorpholine (*N*)	26.6
Dimethylnitroamine (*N*,*N*)	26.8
Propiolactone	27.2
Propylene-1,2-carbonate	27.2
Methyl ethyl sulfone	27.4
Pyrone (γ)	27.4
Tetramethylene sulfone (sulfolane, tetrahydrothiophene 1,1-dioxide)	27.4
Maleic anhydride	27.8
Piperidone	27.8
Diacetylpiperazine (*N*,*N*)	28.0
Ethylene formamide (*N*)	28.4
Dimethyl sulfoxide	29.7
Methanol	29.7
Ethylene glycol	29.9
Methylacetamide	29.9
Ethylene carbonate	30.1
Pyrrolidine (α)	30.1
Malononitrile	30.9
Ethylene cyanohydrin (3-hydroxypropionitrile)	31.1
Diformylpiperazine (*N*,*N*)	31.5
Succinic anhydride	31.5
Methylformamide (*N*)	32.9
Ammonia	33.4
Glycerol	33.8
Hydrazine	37.3
Formamide	39.3
Water	47.9

TABLE 9. HANSEN SOLUBILITY PARAMETERS OF LIQUIDS AT 25°C

Solvent	CAS Number	Molar volume (cm^3/mol)	Solubility parameters ($MPa^{1/2}$) δ_d	δ_p	δ_h	δ
9.1. PARAFFINIC HYDROCARBONS						
n-Butane	106-97-8	101.4	14.1	0	0	14.1
n-Pentane	109-66-0	116.2	14.5	0	0	14.5
Pentane (iso)	78-78-4	117.4	13.7	0	0	13.7
n-Hexane	110-54-3	147.4	14.9	0	0	14.9
n-Heptane	142-82-5	147.4	15.3	0	0	15.3
n-Octane	111-65-9	163.5	15.6	0	0	15.6
2,2,4-Trimethylpentane	540-84-1	166.1	14.3	0	0	14.3
n-Nonane	111-84-2	179.7	15.8	0	0	15.8
n-Decane	124-18-5	195.9	15.8	0	0	15.8
n-Dodecane	112-40-3	228.6	16	0	0	16
n-Hexadecane	544-76-3	294.1	16.4	0	0	16.4
n-Eicosane	112-95-8	359.8	16.6	0	0	16.6
Cyclohexane	110-82-7	108.7	16.8	0	0.2	16.8
Methylcyclohexane	108-87-2	128.3	16	0	1	16
cis-Decahydronaphthalene	493-01-6	156.9	18.8	0	0	18.8
trans-Decahydronaphthalene	493-02-7	159.9	18.8	0	0	18.8
9.2. AROMATIC HYDROCARBONS						
Benzene	71-43-2	89.4	18.4	0 [a]	2	18.6
Toluene	108-88-3	106.8	18	1.4	2	18.2
Naphthalene [b]	91-20-3	111.5	19	2	5.9	20
Styrene	1-42-5	115.6	18.6	1	4.1	19
o-Xylene	95-47-6	121.2	17.8	1	3.1	18
Ethylbenzene	1-41-4	123.1	17.8	0.6	1.4	17.8
1-Methylnaphthalene	90-12-0	138.8	20.6	0.8	4.7	21.2
Mesitylene	108-67-8	139.8	18	0	0.6	18
Tetrahydronaphthalene	119-64-2	136.0 [a]	19.6 [a]	0	2.9	20
Biphenyl	92-52-4	154.1	21.5	1	2	21.7
p-Diethylbenzene	105-05-5	156.9	18	0	0.6	18
9.3. HALOHYDROCARBONS						
Methyl chloride	74-87-3	55.4	15.3	6.1	3.9	17
Methylene dichloride	75-09-2	63.9	18.2	6.3	6.1	20.3
Bromochloromethane	74-97-5	65	17.4	5.7	3.5	18.6
Chlorodifluoromethane	75-45-6	72.9	12.3	6.3	5.7	14.9
Dichlorofluoromethane	75-43-4	75.4	15.8	3	5.7	17
Ethyl bromide	74-96-4	76.9	16.6	8	5.1	19
1,1-Dichloroethylene	75-35-4	79	17	6.8	4.5	18.8
Ethylene dichloride	107-06-2	79.4	19.0 [a]	7.4	4.1	20.9
Methylene diiodide [c]	75-11-6	80.5	17.8	3.9	5.5	19
Chloroform	67-66-3	80.7	17.8	3.1	5.7	19
1,1-Dichloroethane	75-34-3	84.8	16.6	8.2	0.4	18.4
Ethylene dibromide	106-93-4	87	19.6	6.8	12.1	23.9
Bromoform	75-25-2	87.5	21.5 [a]	4.1	6.1 [a]	22.7
n-Propyl chloride	540-54-5	88.1	16	7.8	2	17.8
Trichloroethylene	79-01-6	90.2	18	3.1	5.3	19
Dichlorodifluoromethane	75-71-8	92.3	12.3	2	0	12.5
Trichlorofluoromethane	75-69-4	92.8	15.3	2	0	15.5
Bromotrifluoromethane	75-63-8	97	9.6	2.5	0	10
Carbon tetrachloride	56-23-5	97.1	17.8	0	0.6	17.8
1,1,1-Trichloroethane	71-55-6	1.4	17	4.3	2	17.6
Tetrachloroethylene	127-18-4	101.1	19	6.5 [a]	2.9 [a]	20.3
Chlorobenzene	108-90-7	102.1	19	4.3	2	19.6
n-Butylchloride	109-69-3	104.9	16.4	5.5	2	17.4
1,1,2,2-Tetrachloroethane	79-34-5	105.2 [a]	18.8	5.1	9.4	21.7
Bromobenzene	222-22-2	105.3	20.5	5.5	4.1	21.7
o-Dichlorobenzene	95-50-1	112.8	19.2	6.3	3.3	20.5
Benzyl chloride	100-44-7	115	18.8 [a]	7.2	2.7	20.3
1,1,2,2-Tetrabromoethane [c]	79-27-6	116.8	22.7	5.1	8.2	24.8
1,2-Dichlorotetrafluoroethane [c]	76-14-2	117	12.7	1.8	0	12.9
1,1,2-Trichlorotrifluoroethane	76-13-1	119.2	14.7	1.6	0	14.7
Cyclohexyl chloride	542-18-7	121.3	17.4	5.5	2	18.4

TABLE 9. *cont'd*

Solvent	CAS Number	Molar volume (cm^3/mol)	Solubility parameters ($MPa^{1/2}$)			
			δ_d	δ_p	δ_h	δ
1-Bromonaphthalene	90-11-9	140	20.3	3.1	4.1	20.9
Trichlorobiphenyl[d]	7012-37-5	187	19.2	5.3	4.1	20.5
Perfluoromethylcyclohexane	355-02-2	196	12.5	0	0	12.5
Perfluorodimethylcyclohexane	335-27-3	217.4	12.5	0	0	12.5
Perfluoro-*n*-heptane	335-57-9	227.3	12.1	0	0	12.5
9.4. ETHERS						
Furan	110-00-9	72.5	17.8	1.8	5.3	18.6
Epichlorohydrin	106-89-8	79.9	19	10.2	3.7	21.9
Tetrahydrofuran	109-99-9	81.7	16.8	5.7	8	19.4
1,4-Dioxane	123-91-1	85.7	19	1.8	7.4	20.5
Methylal (dimethoxymethane)	109-87-5	88.8	15.1	1.8	8.6	17.6
Diethyl ether	60-29-7	104.8	14.5	2.9	5.1	15.8
Bis(2-chloroethyl) ether	107-30-2	117.6	18.8	9	5.7	21.7
Anisolec	100-66-3	119.1	17.8	4.1	6.8	19.4
Bis-(2-methoxyethyl) ether	111-96-6	142	15.8	6.1	9.2	19.2
Dibenzyl ether[c]	103-50-4	192.7	17.4	3.7	7.4	19.2
Di-(chloro-iso-propyl) ether	108-60-1	146	19	8.2	5.1	21.3
Bis-(*m*-phenoxyphenyl) ether	748-30-1	373	19.6	3.1	5.1	20.5
9.5. KETONES						
Acetone	67-64-1	74	15.5	10.4	7	20.1
Methyl ethyl ketone (2-butanone)	78-93-3	90.1	16	9	5.1	19
Cyclohexanone	108-94-1	104	17.8	6.3	5.1	19.6
Diethyl ketone (3-pentanone)	96-22-0	106.4	15.8	7.6	4.7	18.2
Mestiyl oxide (4-methyl-3-pentene-2-one)	141-79-7	115.6	16.4	7.2	6.1	18.8
Acetophenone	98-86-2	117.4	19.6[a]	8.6	3.7	21.7
Methyl iso-butyl ketone (2-hexanone)	591-78-6	125.8	15.3	6.1	4.1	17
Methyl iso-amyl ketone		142.8	16	5.7	4.1	17.4
Isophorone	78-59-1	150.5	16.6	8.2	7.4	19.8
Di-iso-butyl ketone (2,6-dimethyl-4-heptanone)	108-83-8	177.1	16	3.7	4.1	16.8
9.6. ALDEHYDES						
Acetaldehyde	75-07-0	57.1	14.7	8	11.3	20.3
2-Furfuraldehyde (furfural)	98-01-1	83.2	18.6	14.9	5.1	24.3
Butyraldehyde	123-72-8	88.5	14.7	5.3	7	17.2
Benzaldehyde	100-52-7	101.5	19.4	7.4	5.3	21.5
9.7. ESTERS						
Ethylene carbonate (1,3-dioxolan-2-one)	96-41-9	66	19.4	21.7	5.1	29.5
γ-Butyrolactone (4-hydroxybutryic acid γ-lactone)	96-48-0	76.8	19	16.6	7.4	26.2
Methyl acetate	79-20-9	79.7	15.5	7.2	7.6	18.8
Ethyl formate	109-94-4	80.2	15.5	8.4	8.4	19.6
Propylene carbonate (1,2-propanediol cyclic carbonate)	108-32-7	85	20.1	18	4.1	27.2
Ethyl chloroformate	541-41-3	95.6	15.5	10	6.8	19.6
Ethyl acetate	141-78-6	98.5	15.8[a]	5.3	7.2[a]	18.2
Trimethyl phosphate	512-56-1	99.9	16.8	16	10.2	25.4
Diethyl carbonate	105-58-8	121	16.6	3.1	6.1	18
Diethyl sulfate	64-67-5	131.5	15.8	14.7	7.2	22.7
n-Butyl acetate	123-86-4	132.5	15.8	3.7	6.3	17.4
Iso-butyl acetate	540-88-5	133.5	15.1	3.7	6.3	16.8
2-Ethoxyethyl acetate (Cellusolve acetate)	111-15-9	136.2	16	4.7	10.6	19.6
Iso-amyl acetate	628-63-7	148.8	15.3	3.1	7	17.2
Iso-butyl iso-butyrate	109-21-7	163	15.1	2.9	5.9	16.6
Dimethyl phthalate	131-11-3	163	18.6[a]	10.8[a]	4.9	22.1
Ethyl *trans*-cinnamate	103-36-6	166.8	18.4	8.2	4.1	20.5
Triethyl phosphate	78-40-0	171	16.8	11.5	9.2	22.3
Diethyl phthalate	84-66-2	198	17.6	9.6	4.5	20.5
Di-*n*-butyl phthalate	84-74-2	266	17.8[a]	8.6	4.1	20.3
n-Butyl benzyl phthalate	85-68-7	306	19	11.3	3.1	22.3
Tricresyl phosphate (tritolyl phosphate)	1330-78-5	613	19	12.3	4.5	23.1
Tri-*n*-butyl phosphate	126-73-8	345	16.4	6.3	4.3	18

TABLE 9. *cont'd*

Solvent	CAS Number	Molar volume (cm^3/mol)	Solubility parameters ($MPa^{1/2}$) δ_d	δ_p	δ_h	δ
Iso-propyl palmitate[c]	2239-78-3	330	14.3	3.9	3.7	15.3
Di-*n*-butyl sebacate	109-43-3	339	14.5	3.9	3.7	15.5
Methyl oleate[d]	112-62-9	340	14.5	3.9	3.7	15.5
Dioctyl phthalate (bis(2-ethylhexyl) phthalate)	117-81-7	377	16.6	7	3.1	18.2
Di-butyl stearate[c]		382	14.5	3.7	3.5	15.3
9.8. NITROGEN-CONTAINING COMPOUNDS						
Acetonitrile	75-05-8	52.6	15.3	18	6.1	24.6
Acrylonitrile	107-13-1	67.1	16.5	17.4	6.8	24.8
Propionitrile	107-12-0	70.9	15.3	14.3	5.5	21.7
Butyronitrile	109-74-0	87	15.3	12.5	5.1	20.5
Benzonitrile	100-47-0	102.6	17.4	9	3.3	19.8
Nitromethane	75-52-5	54.3	15.8	18.8	5.1	25
Nitroethane	79-24-3	71.5	16	15.5	4.5	22.7
2-Nitropropane	79-46-9	86.9	16.2	12.1	4.1	20.7
Nitrobenzene	98-95-3	102.7	20.1	8.6	4.1	22.1
Ethanolamine (2-aminoethanol)	141-43-5	60.2	17.2	15.5	21.3	31.5
Ethylene diamine	107-15-3	67.3	16.6	8.8	17	25.4
1,1-Dimethylhydrazine[c]	57-14-7	76	15.3	5.9	11	19.8
2-Pyrrolidone (2-pyrrolidinone)	616-45-5	76.4	19.4	17.4	11.3	28.4
Pyridine	110-86-1	80.9	19	8.8	5.9	21.7
n-Propylamine	107-10-8	83	17	4.9	8.6	19.6
Morpholine	110-91-8	87.1	18.8	4.9	9.2	21.5
Aniline	62-53-3	91.5	19.4	5.1	10.2	22.5
N-Methyl-2-pyrrolidone (1-methyl-2-pyrrolidinone)	872-50-4	96.5	18	12.3	7.2	22.9
n-Butylamine	109-73-9	99	16.2[a]	4.5[a]	8	18.6
Diethylamine	109-87-7	103.2	14.9	2.3	6.1	16.4
Diethylenetriamine	111-40-0	108	16.8	13.3	14.3	25.8
Cyclohexylamine	108-91-8	115.2	17.4	3.1	6.5	18.8
Quinoline	91-22-5	118	19.4	7	7.6	22.1
Di-*n*-propylamine	142-84-7	136.9	15.3	1.4	4.1	16
Formamide	75-12-7	39.8	17.2	26.2	19	36.6
Dimethylformamide	68-12-2	77	17.4	13.7	11.3	24.8
N,N-Dimethylacetamide	127-19-5	92.5	16.8	11.5	10.2	22.7
1,1,3,3-Tetramethylurea	632-22-4	120.4	16.8	8.2	11	21.7
Hexamethyl phosporamide[c] (hexamethyl phosphoric triamide)	680-31-9	175.7	18.4	8.6	11.3	23.3
9.9. SULFUR-CONTAINING COMPOUNDS						
Carbon disulfide	75-15-0	60	20.5	0	0.6	20.5
Dimethyl sulfoxide (methyl sulfoxide)	67-68-5	71.3	18.4	16.4	10.2	26.6
Ethanethiol[c] (ethyl mercaptan)	75-08-1	74.3	15.8	6.5	7.2	18.4
Dimethyl sulfone[b] (methyl sulfone)	67-71-0	75	19	19.4	12.3	29.9
Diethyl sulfide (ethyl sulfide)	352-93-2	108.2	17	3.1	2	17.4
9.10. ACID HALIDES AND ANHYDRIDES						
Acetyl chloride	75-36-5	71	15.8	10.6	3.9	19.4
Succinic anhydride[b]	108-30-5	66.8	18.6	19.2	16.6	31.5
Acetic anhydride	108-24-7	94.5	16.0[a]	11.7[a]	10.2[a]	22.3
9.11. ALCOHOLS						
Methanol	67-56-1	40.7	15.1	12.3	22.3	29.7
Ethanol	64-17-5	58.5	15.8	8.8	19.4	26.6
Ethylene cyanohydrin (hydracrylonitrile; 3-hydroxypropionitrile)	109-78-4	68.3	17.2	18.8	17.6	30.9
Allyl alcohol (2-propen-1-ol)	107-18-6	68.4	16.2	10.8	16.8	25.8
1-Propanol	71-23-8	75.2	16	6.8	17.4	24.6
2-Propanol	67-63-0	76.8	15.8	6.1	16.4	23.5
3-Chloropropanol (trimethylene chlorohydrin)	627-30-5	84.2	17.6	5.7	14.7	23.7
Furfuryl alcohol	98-00-0	86.5	17.4	7.6	15.1	24.3
1-Butanol (butyl alcohol)	71-36-3	91.5	16	5.7	15.8	23.1
2-Butanol	4221-99-2	92	15.8	5.7	14.5	22.1

TABLE 9. *cont'd*

Solvent	CAS Number	Molar volume (cm^3/mol)	Solubility parameters ($MPa^{1/2}$)			
			δ_d	δ_p	δ_h	δ
2-Methyl-1-propanol (isobutyl alcohol)	78-83-1	92.8	15.1	5.7	16	22.7
Benzyl alcohol	100-51-6	103.6	18.4	6.3	13.7	23.7
Cyclohexanol	108-93-0	106	17.4	4.1	13.5	22.5
1-Pentanol	71-41-0	109	16	4.5	13.9	21.7
2-Ethyl-1-butanol	97-95-0	123.2	15.8	4.3	13.5	21.3
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	123-42-2	124.2	15.8	8.2	10.8	20.9
1,3-Dimethyl-1-butanol	105-30-6	127.2	15.3	3.3	12.3	19.8
Ethyl lactate	687-47-8	115	16	7.6	12.5	21.7
n-Butyl lactate	138-22-7	149	15.8	6.5	10.2	19.8
Ethylene glycol monomethyl ether (2-methoxyethanol)	109-86-4	79.1	16.2	9.2	16.4	24.8
Ethylene glycol monoethyl ether (2-ethoxyethanol) Cellusolve	111-15-9	97.8	16.2	9.2	14.3	23.5
Diethylene glycol monomethyl ether (2-(2-methoxyethoxy)ethanol)	111-77-3	118	16.2	9.2	12.3	22.3
Diethylene glycol monoethyl ether (2-(2-ethyoxyethyoxy)ethanol)	111-90-0	130.9	16.2	9.2	12.3	21.9
Ethylene glycol mono-*n*-butyl ether (2-butoxyethanol) Butyl Cellusolve	111-76-2	131.6	16	5.1	12.3	22.3
2-Ethyl-1-hexanol	104-76-7	157	16	3.3	11.9	20.1
1-Octanol (capryl alcohol)	111-87-5	157.7	17	3.3	11.9	20.9
2-Octanol	123-96-6	159.1	16.2	4.9	11	20.3
Diethylene glycol mono-*n*-butyl ether (2-(2-butoxyethoxy)ethanol)	112-34-5	170.6	16	7	10.6	20.5
1-Decanol	112-30-1	191.8	17.6	2.7	10	20.5
Tridecyl alcohol[d]	112-70-9	242	14.3	3.1	9	17.2
Nonyl phenoxy ethanol[d]	27986-36-3	275	16.8	10.2	8.4	21.3
Oleyl alcohol[d]	143-28-2	316	14.3	2.7	8	16.6
Triethylene glycol mono-oleyl ether		418.5	13.3	3.1	8.4	16
9.12. ACIDS						
Formic acid	64-18-6	37.8	14.3	11.9	16.6	25
Acetic acid	64-19-7	57.1	14.5	8	13.5	21.3
Benzoic acid[b]	65-85-0	100	18.2	7	9.8	21.9
n-Butyric acid[c]	107-92-6	110	14.9	4.1	10.6	18.8
n-Octanoic acid[c]	124-07-2	159	15.1	3.3	8.2	17.6
Oleic acid	112-80-1	320	14.3	3.1	5.5	15.8
Stearic acid[b]	57-11-4	326	16.4	3.3	5.5	17.6
9.13. PHENOLS						
Phenol	108-95-2	87.5	18	5.9	14.9	24.1
1,3-Benzenediol[b] (resorcinol)	108-46-3	87.5	18	8.4	21.1	28.8
m-Cresol	108-39-4	104.7	18	5.1	12.9	22.7
o-Methoxyphenol (guaiacol)	90-05-1	109.5	18	8.2	13.3	23.7
Methyl salicylate	119-36-8	129	16	8	12.3	21.7
Nonyl phenol[d]	25154-52-3	231	16.6	4.1	9.2	19.4
9.14. WATER						
Water[c]	7732-18-5	18	15.5[a]	16.0[a]	42.4[a]	47.9
9.15. POLYHYDRIC ALCOHOLS						
Ethylene glycol	107-21-1	55.8	17	11	26	32.9
Glycerol	56-81-5	73.8	17.4	12.1	29.3	36.2
Propylene glycol (1,2-propanediol)	57-55-6	73.6	16.8	9.4	23.3	30.3
1,3-Butanediol	107-88-0	89.9	16.6	10	21.5	28.8
Diethylene glycol	111-46-6	95.3	16.2	14.7	20.5	29.9
Triethylene glycol	112-27-6	114	16	12.5	18.6	27.4
Hexylene glycol (2-methyl-2,4-pentanediol)	107-41-5	123	15.8	8.4	17.8	25.2
Dipropylene glycol[d]	110-98-5	131.3	16	20.3	18.4	31.7

[a] Altered from previously published value.
[b] Solid, treated as supercooled liquid.
[c] Values uncertain.
[d] Impure commercial product of this nominal formula.

TABLE 10. SOLUBILITY PARAMETERS OF POLYMERS

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
10.1. MAIN CHAIN CARBON POLYMERS								
10.1.1. POLY(DIENES)								
Poly(butadiene)					14.65	Calc.		28
					17.19			66
					17.09			110
					17.15	Calc.		112
					17.2–17.6	Obs.		112
					16.6			118
					17.6			72
					16.2 ± 0.2	IPGC	75	70
Emulsion					17.19			79
Sodium					17.6			79
					16.6	Calc.		62
					17.09			104
Hydrogenated					16.6	Swelling		75
					16.47			75
					16.6	Av.		75
		16.98	–[a]	1.02	17.02			98
					16.1	^{129}Xe shift		152
Poly(1,2-butadiene)	58.85				17.06	Calc.[HK b]		3
Poly(3-methyl 1,2-butadiene)	73.88				17.39	Calc.[HK]		3
Poly(1,3-butadiene)	58.85				17.06	Calc.[HK]		3
Poly(2,3-dimethyl 1,3 butadiene)	88.91				17.60	Calc.[HK]		3
Poly(*cis*-butadiene) elastomer (Bunahyls CB10, Chemische Werke Huels)		17.53	2.25	3.42	18			56
Poly(butadiene-*co*-acrylonitrile)								
BUNA N (82/18)					17.90–17.72			19
(82/20)					18.4	Calc.		66
					19.4	Obs.		66
BUNA N (75/25)					18.93	Calc.	25	112
					19.19	Obs.		42
					19.4	Obs.		104
					18.2			118
					19.4			79
(70/30)					20.11–20.26			19
					19.19			43
(61/39)					21.1			19
					21.28–21.38			19
					20.5 ± 0.6	IPGC	75	70
Hycar (BFGoodrich)		18.6	8.8	4.2	21			56
Poly(butadiene-*co*-styrene)								
BUNA S (94/6)					16.45–16.64			19
(90/10)					17.13			110
(87.5/12.5)					16.39–16.57			19
					16.55			43
					17.6			104
(85/15)					17.31			112
					17.19			110
					17.35	Calc.		112
					17.4	Obs.		112
					17.39			79
					17.41	Calc.		66
					17.39	Obs.		66
					17.5			104
(75/25)					17.29			110
					17.47	Calc.		112
					16.55	Obs.		112
					16.49	Obs.		112
					16.6			118
					17.5			79
					17.56	Calc.		66
					17.5	Obs.		66
					17.6			104

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters (MPa)$^{1/2}$				Method	T(°C)	Refs.
		δ_d	δ_p	δ_h	δ			
(71.5/28.5)					16.55–16.72			19
					17.51			112
(70/30)					17.35			110
(60/40)					17.5			110
					17.7	Calc.		112
					17.74	Obs.		112
					17.74			79
					17.76	Calc.		66
					17.74	Obs.		66
					17.8			104
Poly(butadiene-*co*-styrene) (Polysar 5630, Polymer Corp.)		17.55	3.36	2.7	18.07			56
Poly(butadiene-*co*-vinylpyridine)					19.13			79
Poly(chloroprene)					18.42		25	110
					16.59	Calc.		28
					19.19	Calc.		112
					16.74	Obs.		42
					18.93	Obs.		104
					17.6			118
					16.8			44
					18.8			72
					16.6			79
					17.6	Swelling		43
					17.54–17.74			19
					15.18			19
					18.0 ± 0.4	IPGC	75	70
					17.6	^{129}Xe shift		152
Poly(1,4-*cis*-isoprene)					15.18	Calc.	25	28
					16.64			42
					16.68		25	74
					16.57		35	74
					20.46	Swelling	35	74
					16.47	Av.	35	74
					16.47	Swelling	35	74
					16.57	Swelling	35	74
					16.68	Calc.	35	74
					16.6	Swelling		75
					16.4			76
					16.47	Av.		76
					16.82		25	110
					16.68	Calc.	25	112
					16.2	Obs.		112
					16.33	Obs.		112
					17.09	Obs.		112
					16.2			72
Poly(isoprene) elastomer (Cariflex IR 305, Shell)		16.57	1.41	−0.82	16.65			56
Natural Rubber					16.2			43
					16.6			19
					16.68			112
					17.09			104
					17			124
					16.6			118
					16.4			19,10
					17.09			79
					16.33			43
					16.6			19
					16.42–16.49			19
					16.2	^{129}Xe shift		152
Gutta percha					16.6	Calc.		73
Chlorinated					19.2			21–24
10.1.2. POLY(ALKENES)								
Poly(2,3-dimethyl 1-butene)	93.15				18.05	Calc.^{HK}		3
Poly(3,3-dimethyl 1-butene)	93.15				18.05	Calc.^{HK}		3

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
Poly(3-methyl 1-butene)	78.12				17.76	Calc.[HK]		3
Poly(2-methyl 1-butene)	78.12				17.92	Calc.[HK]		3
Poly(2-methyl 2-butene)	78.12				17.68	Calc.[HK]		3
Polyethylene					15.76			110
					16.6	Calc.		112
					16			58
					16.2			97
					17.09			8
					16.4	Calc.		124
					16.2			118
					16.2			72
					16.8	Calc.		97
					16.2	Obs.		73
					18.4	^{129}Xe shift		152
					17.99	Calc.		119
Poly(ethylene)	33.03				16.96	Calc.[HK]		3
Poly(1,1-diphenyl ethylene)	166.29				19.93	Calc.[HK]		3
Poly(methylene)					14.3	Extrapol.	20	45
Poly(ethylene-*co*-vinyl acetate)					18.6 ± 0.9	IPGC	25	71
					17.0 ± 0.4	IPGC	75	70
Poly(isobutene)					14.5	Calc.		28
					16.06	Av.	35	74
					16	Swelling		74
					16.47	Swelling		74
					16.25			19,10
					16.06		25	110
					15.76	Calc.		112
					16.47	Obs.		112
					16.4			58
					16.47			104
					16.6			21–24
					16			19
					17	Calc.		124
					16.47			72
					16.47			79
Poly(isobutylene) (Lutonal IC/123, BASF)		14.53	2.52	4.66	15.47			56
					15	^{129}Xe shift		152
Poly(isobutene-*co*-isoprene) butyl rubber					15.9–16.06			19
					16.47			104
					15.76			112
Poly(propylene)					18.8		25	58
					19.2	Calc.		124
Poly(propylene)	48.06				17.49	Calc.[HK]		3
Poly(propylene), isotactic (Profax 6701, Hercules)		17.19	–	–	17.19			81
Poly(propylene), chlorinated (Parlon P10, Hercules)		20.26	6.32	5.4	21.89			56
Poly(2-methyl propene)	63.09				17.72	Calc.[HK]		3
10.1.3. POLY(ACRYLICS) AND POLY(METHACRYLICS)								
Poly(acrylic acid), butyl ester					18		35	75
					18.01	Av.		75
					18.52	Swelling		75
					17.4	Calc.		75
					18.6	Swelling		77
					18.52			77
					19.77	Calc.		119
Poly(acrylic acid), ethyl ester					19.13	Av.		75
					19.2	Swelling		75
					19.8	Calc.		75
					19.2	Swelling		77
					19.13			77
					19.19			45
					18.8	Calc.		62
					20.4	Calc.		119

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$				Method	T(°C)	Refs.
		δ_d	δ_p	δ_h	δ			
Poly(acrylic acid), isobornyl ester					16.8	Calc.		62
Poly(acrylic acid), methyl ester					20.7	Av.		75
					20.77	Swelling		75
					20.1	Calc.		75
					20.77	Swelling		77
					21.3			77
					20.7	Swelling		77
Poly(acrylic acid), propyl ester					18.52			75
					18.42	Av.		75
					18.4	Calc.		75
Poly(α-chloroacrylic acid), methyl ester					20.7	Calc.		112
Poly(methacrylic acid), butyl ester					17.9	Swelling		77
					17.8			77
					18.01	Swelling		77
					17.9			77
					17	Calc.		73
					14.7	IPGC	140	31
Poly(methacrylic acid), isobutyl ester					14.7	IPGC	140	31
Poly(methacrylic acid), *sec*-butyl ester					14.7	IPGC	140	31
Poly(methacrylic acid), ethoxyethyl ester					18.4	Swelling		77
					20.3			77
Poly(methacrylic acid), ethyl ester					18.31	Swelling		77
					18.2			77
					18.6	Calc.		73
Poly(ethyl methacrylate) (Lucite 2042, DuPont)		18.64	10.52	7.51	22.69			56
					20.4	^{129}Xe shift		152
Poly(methacrylic acid), *n*-hexyl ester					17.6	Calc.		73
Poly(methacrylic acid), isobornyl ester					16.6			62
Poly(methacrylic acid), lauryl ester					16.8	Calc.		73
Poly(methacrylic acid), methyl ester					18.58		25	19
					18.52–18.66			19
					19.4	Swelling		77
					19.34			77
					26.27			110
					18.93	Calc.		112
					18.4–19.4			7
					18.58			118
					19.5	Calc.		119
Poly(methyl methacrylate) (Rohm and Haas)		18.64	10.52	7.51	22.69			56
Poly(methacrylic acid), octyl ester					17.2	Calc.		73
Poly(methacrylic acid), propyl ester					18	Calc.		73
Poly(methacrylic acid), stearyl ester					16	Calc.		73
Poly(methacrylonitrile)					21			118
					21.9	Calc.		112
10.1.4. POLY(VINYL ALCOHOLS)								
Poly(vinyl alcohol)					25.78			110
					21.7			139
Poly(4-vinyl phenol)					22.5			139
10.1.5. POLY(VINYL ESTERS)								
Poly(vinyl acetate)					19.62	Calc.	25	28
					19.13		35	78
					20.93	Calc.		119
					19.2	Calc.		78
					18			78
					22.61		25	110
					19.2	Calc.		112
					19.2			118
Poly(vinyl acetate) (Mowilith 50, Hoechst)		20.93	11.27	9.66	25.66			56
Poly(vinyl acetate-*co*-vinyl alcohol)					21.94	Calc.		119
Poly(vinyl butyral) (Butvar B76, Shawinigan)		18.6	4.36	13.03	23.12			56
Poly(vinyl propionate)					18.01		35	78
					18.52	Calc.		78

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters (MPa)$^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
10.1.6. POLY(ALLYL ETHERS) AND POLY(VINYL ETHERS)								
Poly(allyl methyl ether)	70.79				19.44	Calc.^{HK}		3
Poly(allyl ethyl ether)	85.82				19.29	Calc.^{HK}		3
Poly(allyl propyl ether)	100.85				19.21	Calc.^{HK}		3
Poly(allyl isopropyl ether)	100.85				19.21	Calc.^{HK}		3
Poly(allyl phenyl ether)	122.39				20.19	Calc.^{HK}		3
Poly(allyl 2, tolyl ether)	137.41				20.03	Calc.^{HK}		3
Poly(allyl 3, tolyl ether)	137.41				20.03	Calc.^{HK}		3
Poly(allyl 4, tolyl ether)	137.41				20.03	Calc.^{HK}		3
Poly(diallyl ether)	96.61				18.84	Calc.^{HK}		3
Poly(vinyl methyl ether)	55.76				19.66	Calc.^{HK}		3
Poly(vinyl ethyl ether)	70.79				19.44	Calc.^{HK}		3
Poly(vinyl propyl ether)	85.82				19.29	Calc.^{HK}		3
Poly(vinyl butyl ether)	100.85				19.21	Calc.^{HK}		3
Poly(vinyl isopropyl ether)	85.82				19.29	Calc.^{HK}		3
Poly(vinyl isobutyl ether)	100.85				19.21	Calc.^{HK}		3
Poly(vinyl isoamyl ether)	115.88				19.13	Calc.^{HK}		3
Poly(vinyl-1-amyl methyl ether)	119.91				20.83	Calc.^{HK}		3
Poly(vinyl-2-ethyl hexyl ether)	160.96				18.99	Calc.^{HK}		3
Poly(vinyl-2-methoxyethyl ether)	93.52				20.44	Calc.^{HK}		3
Poly(vinyl phenyl ether)	107.36				20.19	Calc.^{HK}		3
Poly(vinyl-1-phenyl methyl ether)	122.39				20.19	Calc.^{HK}		3
Poly(vinyl-1-methyl phenyl ether)	122.39				20.19	Calc.^{HK}		3
Poly(vinyl-1-phenyl phenyl ether)	174.01				20.50	Calc.^{HK}		3
Poly(1-methyl vinyl ethyl ether)	85.82				19.29	Calc.^{HK}		3
Poly(1-ethyl vinyl ethyl ether)	100.85				19.21	Calc.^{HK}		3
Poly(1-phenyl vinyl ethyl ether)	137.41				20.03	Calc.^{HK}		3
Poly(divinyl ether)	66.55				18.93	Calc.^{HK}		3
10.1.7. POLY(VINYL HALIDES) AND POLY(VINYL NITRILES)								
Poly(acrylonitrile)					25.27	Calc.		119
					25.6			66
					26.09	Calc.	25	112
					31.5			118
		18.21	16.16	6.75	25.27			98
Poly(allyl acetonitrile)	81.13				24.18	Calc.^{HK}		3
Poly(1-methyl acrylonitrile)	66.09				25.45	Calc.^{HK}		3
Poly(2-methyl acrylonitrile)	66.09				25.45	Calc.^{HK}		3
Poly(acrylonitrile-*co*-isopropyl methacrylate)					19.84			141
Poly(tetrafluoroethylene)					12.7	Calc.		112
					12.7			118
Poly(vinyl bromide)					19.42			34
					19.6			112
Poly(vinyl chloride)					19.19–19.34			19
					19.28	Calc.		28
					20.67			110
					19.54	Calc.		112
					19.8	Obs.		72
					19.2			19
					19.8			21–24
					22.1			58
					20.1			124
					19.5			118
					19.8			72
					20.32	Calc.		119
Poly(vinyl chloride) (Vipla KR, K = 50, Montecatini)		18.23	7.53	8.35	21.42			56
Poly(vinyl chloride)		18.72	10.03	3.07	21.46			33
		18.82	10.03	3.07	21.54			98
Poly(vinyl chloride), high molecular weight					20.13	Turbidity		162
					20.25	Swelling		162
					20.3	Visc.		162
Poly(vinyl chloride), chlorinated					19	Visc.	25	117

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
Poly(vinyl chloride-*co*-vinyl acetate) (87/13)					21.7	Calc.		28
					21.3			21–24
VYHH					20.42	Calc.		119
Poly(vinyl chloride-*co*-vinyl acetate-*co*-maleic acid)					20.44	Calc.		119
Poly(vinyl chloride-*co*-vinyl acetate-*co*-vinyl alcohol)					20.77	Calc.		119
Poly(allyl cyanide)	66.09				25.45	Calc.[HK]		3
Poly(allyl isocyanide)	66.09				25.45	Calc.[HK]		3
Poly(vinylidene chloride)					25			21–24
Poly(vinylidene cyanide-*co*-vinyl acetate)					22.67	Calc.		128
Poly(vinylidene fluoride)		–	–	–	23.2	Visc.		147
		17.2	12.5	9.2	23.2	Obs.		147
		16.6, 17.9				Calc.		147
		16.6				Refract. index		147
		13.7	10.6	8.2	19.2	Contact ang.		149
					24.6, 25.2	Swelling		148
10.1.8. POLY(STYRENES)								
Poly(styrene)					17.52			19
					17.45–17.58			19
					20.16	Calc.		28
					17.86–17.92			48
					17.84–18.56	Visc.		116
					18.6			66
					18.72		35	74
					18.62	Av.		74
					18.62	Swelling		74
					18.66	Calc.		74
					19.09		25	110
					18.66	Calc.		112
					18.6	Obs.		112
					17.6–19.8	Obs.		112
					17.4			18
					17.6			19
					18.4			58
					19.28	Calc.		119
					21.1	Calc.		124
					17.52			118
					17.84			19,97
					18.6			104
					17.6–17.8			72
					18.6			79
					15.6	IPGC	140	31
Poly(styrene) (Polystyrene LG, BASF)		21.28	5.75	4.3	22.47			56
Poly(*o*-methyl styrene)	114.69				19.33	Calc.[HK]		3
Poly(*m*-methyl styrene)	114.69				19.33	Calc.[HK]		3
Poly(*p*-methyl styrene)	114.69				19.33	Calc.[HK]		3
Poly(1-methyl styrene)	114.69				19.33	Calc.[HK]		3
Poly(methoxy styrene)	122.39				20.19	Calc.[HK]		3
Poly(cyano styrene)	124.28				22.36	Calc.[HK]		3
Poly(nitro styrene)	113.29				22.71	Calc.[S']		3
Poly(2-nitro styrene)	113.29				22.20	Calc.[S]		3
Poly(styrene-*co*-divinylbenzene)					18.6	Obs.		112
					17.39			18
5% crosslinking					14.8			137
10% crosslinking					15.7			137
20% crosslinking					17.8			137
Poly(styrene-*co*-*n*-butyl methacrylate)					15.1	IPGC	140	31
Poly(styrene-*co*-isobutyl methacrylate)					15.1	IPGC	140	31
Poly(4-chlorostyrene)		17.6	6.1	4.1	19.02			151
Poly(α-methylstyrene-*co*-acrylonitrile)					16.4	IPGC	140	111
Poly(4-acetoxystyrene)		17.8	9	8.4	21.7			138
Poly(4-hydroxystyrene)		17.6	10	13.7	24.55			138

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TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
Poly(4-α-acetoxystyrene), $-CH_2-C-(OCOCH_3)-(C_6H_5-OCOR)-$, $R=CH_3$, C_2H_5, n-C_3H_7, OCH_3		15.7	10.2	7.4	21.9			161
Poly(vinylidene cyanide-*co*-4-α-acetoxystyrene), $-CH_2-C(CN)_2-CH_2-C-(OCOCH_3)-(C_6H_5-OCOR)-$, $R=CH_3$		21.5	11.3	7.2	25.3			161
Poly(vinylidene cyanide-*co*-4-α-acetoxystyrene), $R=OCOCH_3$		17	13.5	6.5	23.5			161
Poly(vinylidene cyanide-*co*-4-α-acetoxystyrene), $R=OCOCH_3$		17	12.1	8.2	22.4			161
Poly(vinylidene cyanide-*co*-4-α-acetoxystyrene), $R=OCOCH_3$		17	11.9	7.2	21.9			161
10.2. MAIN CHAIN C–O POLYMERS								
10.2.1. POLY(VINYL ESTERS)								
Poly(vinyl acetate)	74.25				18.21	Calc.[HK]		3
Poly(allyl acetate)	89.28				18.27	Calc.[HK]		3
Poly(diethylaminoethyl acrylate)-palladium ion					20.50			136
Poly(methyl acrylate)	74.25				18.21	Calc.[HK]		3
Poly(ethyl acrylate)	89.28				18.27	Calc.[HK]		3
Poly(allyl acrylate)	100.07				17.94	Calc.[HK]		3
Poly(butyl acrylate)	119.34				20.42	Calc.[HK]		3
Poly(isobutyl acrylate)	119.34				18.37	Calc.[HK]		3
Poly(2-ethyl hexyl acrylate)	179.46				18.45	Calc.[HK]		3
Poly(2-cyanoethyl acrylate)[a]	89.36				31.77	Calc.[HK]		3
Poly(benzyl acrylate)	140.88				19.38	Calc.[HK]		3
Poly(vinyl butyrate)	104.31				18.33	Calc.[HK]		3
Poly(dimethyl citraconate)	130.5				18.58	Calc.[HK]		3
Poly(diethyl citraconate)	160.58				18.58	Calc.[HK]		3
Poly(vinyl crotonate)	100.07				17.94	Calc.[HK]		3
Poly(methyl dimethyl fumarate)	130.5				18.58	Calc.[HK]		3
Poly(methyl diethyl fumarate)	160.56				18.58	Calc.[HK]		3
Poly(dimethyl fumarate)	115.47				18.56	Calc.[HK]		3
Poly(diethyl fumarate)	145.53				18.58	Calc.[HK]		3
Poly(dipropyl fumarate)	165.58				19.72	Calc.[HK]		3
Poly(di-*n*-butyl fumarate)	205.65				18.60	Calc.[HK]		3
Poly(di-*n*-amyl fumarate)	235.71				18.60	Calc.[HK]		3
Poly(di-isopropyl fumarate)	165.58				19.72	Calc.[HK]		3
Poly(di-isobutyl fumarate)	205.65				18.60	Calc.[HK]		3
Poly(di-isoamyl fumarate)	235.71				18.60	Calc.[HK]		3
Poly(dinitrile fumarate)	46.32				48.45	Calc.[HK]		3
Poly(diphenyl fumarate)	217.67				19.91	Calc.[HK]		3
Poly(vinyl-2-ethyl hexoate)	157.83				19.21	Calc.[HK]		3
Poly(dimethyl maleate)	115.47				18.56	Calc.[HK]		3
Poly(diethyl maleate)	145.53				18.58	Calc.[HK]		3
Poly(di-*n*-propyl maleate)	165.58				19.70	Calc.[HK]		3
Poly(di-*n*-butyl maleate)	205.65				18.60	Calc.[HK]		3
Poly(di-*n*-amyl maleate)	235.71				18.60	Calc.[HK]		3
Poly(di-isobutyl maleate)	205.65				18.60	Calc.[HK]		3
Poly(di-isoamyl maleate)	235.71				18.60	Calc.[HK]		3
Poly(diphenyl maleate)	217.67				19.91	Calc.[HK]		3
Poly(3-chloropropyl methacrylate)					19.60			160
Poly(methyl methacrylate)	89.28				18.27	Calc.[HK]		3
Poly(ethyl methacrylate)	110.9				17.25	Calc.[HK]		3
Poly(propyl methacrylate)	119.34				18.37	Calc.[HK]		3
Poly(butyl methacrylate)	134.37				18.41	Calc.[HK]		3
Poly(hexyl methacrylate)	191.91				15.80	Calc.[HK]		3
Poly(allyl methacrylate)	115.1				17.51	Calc.[S]		3
Poly(isopropyl methacrylate)	119.34				18.39	Calc.[HK]		3
Poly(isobutyl methacrylate)	134.37				18.39	Calc.[HK]		3
Poly(vinyl propionate)	89.32				18.27	Calc.[HK]		3

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
10.3. MAIN CHAIN C–N POLYMERS								
10.3.1. POLY(AMIDES)								
Poly(lactams)								
Nylon 3					26.2	Calc.		139
Nylon 4					23.9	Calc.		139
		19.44	–[a]	14.12	24.02			81
Nylon 5					22.5	Calc.		139
Nylon 6					21.5	Calc.		139
Nylon 7					20.7	Calc.		139
Nylon 8					20.3	Calc.		139
Nylon 9					19.8	Calc.		139
Nylon 10					19.4	Calc.		139
Nylon 11					19.2	Calc.		139
Nylon 12					19	Calc.		139
Nylon 2-I					27.2	Calc.		139
Nylon 3-I					26	Calc.		139
Nylon 4-I					25	Calc.		139
Nylon 5-I					24.1	Calc.		139
Nylon 6-I					23.5	Calc.		139
Nylon 6I, poly(hexamethylene isophthalamide)					26.3	Calc.[HK]		150
					23.2	Calc.[H']		150
Nylon 7-I					22.9	Calc.		139
Nylon 8-I					22.5	Calc.		139
Nylon 9-I					22.1	Calc.		139
Nylon 10-I					21.7	Calc.		139
Nylon 12-I					21.1	Calc.		139
Nylon 66		18.62	5.11	12.28	22.87			98
Nylon 66 (Zytel, DuPont)		18.62	0	14.12	23.37			56
Poly(iminohexamethylene iminoadipoyl)					27.8			118
Poly(amide), thermoplastics (Versamid 930, General Mills)		17.43	– 1.92	14.89	23.02			56
Poly(*p*-benzamide)		18	11.9	7.9	23	Swelling		143
Poly(*p*-phenylene terephthalamide)		18	11.9	7.9	23	Swelling		143
Poly(*p*-benzanilide terephthalamide)		18	11.9	7.9	23	Swelling		143
Poly(*n*-isopropyl acrylamide)					22.8	Calc.		154
Gel					23.5	Swelling		153
10.3.2. CELLULOSE AND DERIVATIVES								
Benzyl cellulose					25.23			110
Cellulose					32.02			110
		12.69	–[a]	22.3	25.66			81
Cellulose		8.27	8	13.88	18.03			140
Cellulose–alkylketene dimer treatment		8.1	12.35	7.96	16.78			140
Cellulose acetate (56% acetate groups)					27.83			110
(48% acetate groups)					27.19			110
Cellulose acetate (Cellidore A. Bayer)		18.6	12.73	11.01	25.08			56
Cellulose acetate		15.55	–[a]	11.87	19.56			81
Cellulose acetate butyrate		15.75	–[a]	8.59	17.94			81
Cellulose acetate propionate		15.75	–[a]	10.23	18.76			18
Cellulose diacetate					23.22	Calc.		112
					22.3			118
					22.3			72
Cellulose nitrate (11.83% N)					30.39			110
					21.44			112
					21.7			72
					23.5			21–24
(11.4% N)					21.93			72
Cellulose nitrate (1/2 sec; H-23 Hagedon)		15.41	14.73	8.84	23.08			56
Cellulose triacetate		15.55	–[a]	10.64	18.84			81
Cellulose tridecanoate		19.85	–[a]	6.14	20.77			81
Ethyl cellulose					21.1			21–24

TABLE 10. *cont'd*

Polymer	Molar volume (cm³/gmol)	Solubility parameters (MPa)$^{1/2}$				Method	T(°C)	Refs.
		δ_d	δ_p	δ_h	δ			
10.4. OTHER POLYMERS								
Alcohol soluble resin (Pentalyn 255, Hercules)		17.5	9.3	14.3	24.4			56
Alcohol soluble rosin resin (Pentalyn 830, Hercules)		20	5.8	10.9	23.5			56
Alkyd, short oil (coconut oil 34% phthalic anhydride, Plexal C34)		18.5	9.21	4.91	21.24			56
Alkyd resin, medium oil length					19.2			21–24
Alkyd, long oil (66% oil length, Plexal P65, Polyplex)		20.42	3.44	4.56	12.2			56
Coumarone-indene resin (Piccoumarone 450L, Penn. Ind. Chem.)		19.42	5.48	5.77	20.99			56
Epoxy resin					22.3			118
Epoxy (Epikote 1001, Shell)		20.36	12.03	11.48	26.29			56
Epoxy DBEBA–DDMe*	32				22		35	135
DGEBA–DMM	22				22.2		35	135
TGAP–DDMe	22.4				22.5		35	135
TGAP–ANI					23.9		35	135
TGAP–DDM					24.8		35	135
TGAP–DDS					27.1		35	135
Ester gum (ester gum BL, Hercules)		19.64	4.73	7.77	21.65			56
Furfuryl alcohol resin (Durez 14383, Hooker Chemical)		21.16	13.56	12.81	28.21			56
Hexamethoxymethyl melamine (Cymel 300, American Cyanimid)		20.36	8.53	10.64	24.51			56
Pentaerythritol ester of rosin, modified (Cellolyn 102, Hercules)		21.73	0.94	8.53	23.37			56
Petroleum hydrocarbon resin (Piccopale 110, Penn. Ind. Chem.)		17.55	1.19	3.6	17.96			56
Phenolic resin (resole, Phenodur 373U Chemische Werke Albert)		19.74	11.62	14.59	27.15			56
Phenolic resin (Super Beckacite 1001, Reichhold)		23.26	6.56	8.35	25.57			56
Poly(2-acrylamide-2-methyl propane sulphonamide) (tested in formamide/water mixtures)					43.6	Visc.	25	159
Poly(3,3-dimethyl oxetane)		15.35	2.46	4.09	16.16	Visc.		92
Poly(3,3-diethyl oxetane)		15.55	2.05	3.48	16.16	Visc.		92
Poly(1,3-dioxolane)					20.66	Visc.	25	175
Poly(ether urethane)					17.99 ± .02	IPGC	25	158
					17.38 ± 0.16	IPGC	100	158
					17.20 ± 0.15	IPGC	120	158
					17.14 ± 0.14	IPGC	130	158
					17.06 ± 0.15	IPGC	140	158
					16.96 ± 0.15	IPGC	150	158
Poly(DL-lactic acid)					21.0 ± 0.3	Density	25	142
					20.5 ± 0.4	Visc.	25	142
					19.8	Calc.[S]	25	142
					20.3	Calc.[H]	25	142
					19.2	Calc.[HK]	25	142
Poly(oxetane)		17.39	5.12	5.12	19.23			92
Poly(oxydimethylsilylene)					15.04			110
					14.9	Obs.		21–24
					15.45	Swelling		76
					15.6	Av.		76
					14.9			118
					15.59			45
					15.4		25	125
					15	Vapor sorp.		145
					15.1	IPGC		146

* DGEBA – diglycidyl ether of bisphenol A; DDMe – tetraethyl derivative of DDM; DDM – diamino diphenyl methane; TGAP – triglycidyl derivative of amino phenol; ANI – aniline; DDS – diamino diphenylsulfone.

TABLE 10. *cont'd*

Polymer	Molar volume (cm^3/gmol)	Solubility parameters $(MPa)^{1/2}$ δ_d	δ_p	δ_h	δ	Method	T(°C)	Refs.
$\delta_2 = (15.7 - 0.026)t$, t in °C					15.1	IPGC		144
					17.5	^{129}Xe shift		152
Poly(ethylene adipate)		16.3 ± 2	6.1 ± 0.5	9.4 ± 0.1	19.8 ± 2			157
Poly(ethylene oxide)					20.2 ± 2	IPGC	25	31
		17.3 ± 2	3.0 ± 1	9.4 ± 0.5	19.9 ± 2.2			157
					17.8	Calc.		157
					19.64	IPGC	70	176
Poly(oxyethyleneoxyterephthaloyl)					21.9			118
					21.9			112
Poly(oxytrimethylene) polyoxetane					19.2	Visc.	25	31
-3,3 dimethyl					16.2	Visc.	25	92
-3,3 diethyl					16.2	Visc.	25	92
Poly(propylene oxide)					16.3		81	156
					16.2		86	156
					16.1		91	156
		16.3 ± 1	4.7 ± 0.5	7.4 ± 0.5	18.5 ± 1.2			157
					15.9	Calc.		157
Poly(sulfone), Bisphenol A (Udel)		19.03	0	6.96	20.26			81
Poly(thioethylene)					19.23			110
					19.19	Swelling		43
					18.4	Swelling		43
Poly(thiophenylethylene)					19.0 ± 1.0			87
Poly(urethane) (unknown composition)					20.5	Swelling		76
					20.5	Av.		76
Poly(urethane), amorphous					22.9			155
Poly(vinyl ethylene)					16.5	^{129}Xe shift		152
Poly(vinyl pyrrolidone)					25.6	Visc.		177
Poly(vinyl methyl ketone)	66.59				22.92	Calc.^{HK}		3
Poly(vinyl ethyl ketone)	81.58				22.14	Calc.^{HK}		3
Poly(vinyl methyl sulfide)	66.63				19.52	Calc.^{HK}		3
Poly(vinyl phenyl sulfide)	118.35				20.28	Calc.^{HK}		3
Terpene resin (Piccolyte S-1000, Penn. Ind. Chem.)		16.47	0.37	2.84	16.72			56
Urea-formaldehyde resin (Plastopal H, BASF)		20.81	8.29	12.71	25.74			56
Viton		17	10.3	6.1	20.8			130

[a]Altered from previously published value.
[b]Method of van Krevelen and Hoftyzee.
[c]Method of Small.
[d]Method of Hoy.

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Optically Active Polymers

Katsuhiro Inomata
Department of Polymer Chemistry, Tokyo Institute of Technology, Tokyo, Japan

Akihiro Abe
Department of Industrial Chemistry, Tokyo Institute of Polytechnics, Atsugi, Japan

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By definition the optical activity, $[M]_\lambda$, of polymers and their low molecular weight analogs is given by

$$[M]_\lambda = [\alpha]_\lambda \times (\text{mean residue weight})/100$$

A. ABBREVIATIONS USED

AcAc	Acetylacetonate
AIBN	Azobisisobutyronitrile
BPO	Benzoyl peroxide
DBP	Dibenzoyl peroxide
DCA	Dichloroacetic acid
DCM	Dichloromethane
DDB	2,3-Dimethoxy-1,4-bis(dimethylamino)butane
DMAc	Dimethylacetamide
DMF	Dimethylformamide
DMSO	Dimethylsulfoxide
DPEDA-Li	*N,N'*-diphenylethylenediamine monolithium amide
EDC	Ethylene dichloride
M	Monomer
MC	Model compound
NCA	*N*-Carboxylic anhydride
P	Polymer
RT	Room temperature
TMEDA	*N,N,N',N'*-tetramethylethylenediamine
TCA	Trichloroacetic acid
TFA	Trifluoroacetic acid
TFEL	Trifluoroethanol
THF	Tetrahydrofuran

B. OPTICALLY ACTIVE POLYMERS FROM CHIRAL MONOMERS

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or initiator	Solvent	*T* (°C)	[α]D	[M]D	[α]D	[M]D	Solvent	*T* (°C)	Refs.
1.1. POLY(ALKENES)									
Poly[(*R*)(−)3,7-dimethyl-1-octene]									
$Al(i\text{-}C_4H_9)_3/TiCl_4$				−20 to −120		14.4 (MC)	Toluene	25	4,7
$Al(i\text{-}C_4H_9)_3/TiCl_3$				−35.3 to −144		14.4 (MC)	Toluene	25	
$LiAlH_4/TiCl_4$/monomer	Benzene	30–40	−78.1	−111	6.25	8.88 (MC)	Carbon tetrachloride	25	
Poly[(*S*)(+)5-methyl-1-heptene]									
$Al(i\text{-}C_4H_9)_3/TiCl_3$	Isooctane	RT		27.4–68.1		11.7 (MC)	Benzene		2–6
Poly[(*S*)(+)4-methyl-1-hexene]									
$Al(i\text{-}C_4H_9)_3/TiCl_4$	Isooctane	RT		205–288		21.3 (MC)	Benzene (MC); toluene (P)	25	2–6,9
$Al(i\text{-}C_4H_9)_3/TiCl_3$	Isooctane	RT		149–279		21.3(MC)	Benzene (P)	25	
Poly[(*S*)(+)6-methyl-1-octene]									
$Al(i\text{-}C_4H_9)_3/TiCl_3$	Isooctane	RT		16.0		13.3 (MC)	Benzene	25	4
				20.4		13.3 (MC)			5
Poly[(*S*)(+)3-methyl-1-pentene]									
$Al(i\text{-}C_4H_9)_3/TiCl_4$	–	20–25		29.4–158		−11.4 (MC)	Tetralin (P)	25 (P); 20 (MC)	2–6, 8,9
$Al(i\text{-}C_4H_9)_3/TiCl_3$	–	20–25		75.8–157		−11.4 (MC)	Tetralin (P)	25 (P); 20 (MC)	
				161					5
Poly[(*S*)5-phenyl-1-heptene]									
$Al(i\text{-}C_4H_9)_3/TiCl_3$	2,2,4-Trimethylpentane	25–60	26.6		4.80 (M)		Cyclohexane (P); neat (M)	25	118
Poly[(*R*)4-phenyl-1-hexene]									
$Al(i\text{-}C_4H_9)_3/TiCl_3$	2,2,4-Trimethylpentane	60	−61.6		−8.99 (M)		Chloroform (P); neat (M)	25	118
1.2. POLY(ACRYLICS) AND RELATED POLYMERS									
Poly(acryloyl-L-glutamic acid)									
AIBN	Dioxane	60	−21.0		−21.0 (MC)		Dioxane	25	12
Poly(L-bornyl acrylate)									
AIBN	–	65		−46.1		−56.4 (M)	Toluene	25	10
AIBN	Benzene	60		−47.2		−56.4 (M)	Toluene	25	
AIBN	Toluene	35		−47.4		−56.4 (M)	Toluene	25	
C_6H_5MgBr	Toluene	−70		−43.0		−56.4 (M)	Toluene	25	
UV benzoin	Toluene	−78		−47.2		−56.4 (M)	Toluene	25	
Poly(*d*-*sec*-butyl α-chloroacrylate)									
BPO	–	50–100		23.4		55.5 (M)	Chloroform (P); neat (M)	21 (P); 22 (M)	13
BPO	Dioxane	RT		17.9		42.2 (M)	Dioxane	25	14
Poly(*d*-*sec*-butyl α-bromoacrylate)									
BPO	Dioxane	RT		15.3		37.4 (M)	Dioxane	30	13
Poly(L-menthyl acrylate)									
AIBN	–	50	−79.0		−99.3 (M)		Benzene	22	11
AIBN	Benzene	60	−73.9		−88.3 (M)		Chloroform (P); neat (M)	25	215

Poly[(+)*N*-methyl-*N*-α-methylbenzyl-acrylamide]									
AIBN	–	60		278		504 (M)	Benzene	25	29
n-BuLi	Toluene	22		397		504 (M)	Benzene	25	
n-BuLi	Toluene	– 50		366		504 (M)	Benzene	25	
C_6H_5MgBr	Toluene	– 50		337		504 (M)	Benzene	25	
Poly[(–)*N*-propyl-*N*-α-methylbenzyl-acrylamide]									
AIBN	Toluene	70		– 167		– 444 (M)	Benzene	25	29
n-BuLi	Toluene	22		– 318		– 444 (M)	Benzene	25	

1.3. POLY(METHACRYLICS) AND RELATED POLYMERS

Poly(L-bornyl methacrylate)									
AIBN	Benzene	55		– 70.8		– 50.1 (M)	Toluene	20	10
Poly(1,2;5,6-diisopropylidene-D-glucofuranosyl-3-methacrylate)									
BPO	Benzene	80	– 49.0		– 32.2 (M)		EDC (P); ethanol (M)	25	23,24
AIBN	Benzene	40–50	– 48.4		– 28.8 (M)		Benzene	20	25–27
Poly(2,3;4,6-diisopropylidene-L-sorbofuranosyl-1-methacrylate)									
AIBN	Carbon tetrachloride	60	– 84.5		– 8.6 (M)		Benzene	19	26
Poly[(+)1,3-dimethylbutyl methacrylate]									
BPO	–	82–110	18.2	30.9	23.4 (MC)	43.5 (MC)	DCM	20	17,18
Poly[(+)(*S*)-diphenyl(1-methyl-pyrrolidin-2-yl)methyl methacrylate]									
DPEDA-Li/TMEDA	Toluene	– 78	780 ($[\alpha]_{365}$)		– 82.2 (M) ($[\alpha]_{365}$)		Benzene (M); methanol – 0.01% CH_3SO_3H(P)	25	225
			– 410 ($[\alpha]_{365}$)				Methanol – 0.01%CH_3SO_3H after 1 h	25	
			779 ($[\alpha]_{365}$)				Methanol – 13%CH_3SO_3H	25	
Poly(l-menthyl methacrylate)									
AIBN	Benzene	55		– 193		– 202 (M)	Benzene	25	16,11
BPO	–	40–85		– 256.8		– 202 (M)	Chloroform	20	
C_6H_5MgBr	Toluene	RT		– 158.9		– 202 (M)	Chloroform	20	
C_6H_5MgBr	Toluene	– 75		– 177.0		– 202 (M)	Benzene	25	
γ-Ray	–	– 75		– 194.0		– 202 (M)	Benzene	25	
BuLi	THF	– 78	– 96.9				Chloroform	25	205
Poly(methacryloyl-D-alanine)									
AIBN	Dioxane	60	42.0		48.9 (MC)		Dioxane	25	28
Poly(*N*-methacryloyl-L-alanine)									
AIBN	Dioxane		– 42 ($[\alpha]_{546}$)		– 41 (M) ($[\alpha]_{546}$)		Water	20	119
Poly(*N*-methacryloyl-L-asparagine)									
AIBN	Dioxane	60	– 24.4 ($[\alpha]_{546}$)		– 36 (MC) ($[\alpha]_{546}$)		Water	20	215
Poly(methacryloyl-L-glutamic acid)									
AIBN	Dioxane	60	– 23.0		– 26.0 (MC)		Dioxane	25	28
Poly(ε-*N*-methacryloyl-L-lysine)									
Potassium persulfate	Water	65	12.1		7 (M)		Water	20	222
Poly(1-α-methylbenzyl methacrylate)									
UV AIBN	–	35	– 79.5	– 151	– 54.4 (M)	– 103 (M)	Dioxane	25	19–21
UV benzoin	–	– 65	– 72.5	– 138	– 54.4 (M)	– 103 (M)	Dioxane	25	
n-BuLi	Toluene	– 60	– 100	– 190	– 54.4 (M)	– 103 (M)	Dioxane	25	
AIBN	Dioxane	35		– 147		– 78.8 (M)	Dioxane (P); neat (M)	25	
Poly(2-methylbutyl methacrylate)									
BPO	–	100		5.93		6.99 (M)	Chloroform (P); isooctane (M)	20	16,22
C_6H_5MgBr	Toluene	RT		6.84		6.99 (M)	Chloroform (P); isooctane (M)	20	
Poly[(*S*)4-methyl-2-*N*,*N*-dimethylaminopentyl methacrylate]									
AIBN	Benzene	60	2.2		– 2.1 (M)		Benzene		120

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TABLE 1. *cont'd*

Polymer Catalyst or initiator	Polymerization system: Solvent	T (°C)	Polymer (P) values: $[\alpha]_D$	$[M]_D$	Monomer (M) or model compound (MC) values: $[\alpha]_D$	$[M]_D$	Optical activity measured: Solvent	T (°C)	Refs.
Poly[(+)phenyl-2-pyridyl-*o*-tolylmethyl methacrylate]									
n-BuLi	THF	−78	395		88.6 (M)		Benzene (M); THF (P)	−78 (P); 25 (M)	223
			−321				THF	25 (P)	
Diisopropyl peroxydicarbonate	Toluene	40	−617 ($[\alpha]_{365}$)		190.1 (M) ($[\alpha]_{365}$)		Chloroform(M); 90% chloroform-10% TFEL (P)	25	185
Poly[(+)phenyl-2-pyridyl-*m*-tolylmethyl methacrylate]									
DPEDA-Li/(−)DDB	Toluene	−78	−845 ($[\alpha]_{365}$)		14.0 (M) ($[\alpha]_{365}$)		Chloroform (P); benzene (M)	25	224
			1481 ($[\alpha]_{365}$)				Chloroform (after heating at 60°C)	25	
DPEDA-Li/TMEDA	Toluene	−78	262 ($[\alpha]_{365}$)		14.0 (M) ($[\alpha]_{365}$)		Chloroform (P); benzene (M)	25	224
			1370 ($[\alpha]_{365}$)				Chloroform (after heating at 60°C)	25	

1.4. POLY(VINYL ETHERS), POLY(VINYL KETONES), POLY(VINYL ESTERS)

1.4.1. POLY(VINYL ETHERS)

Polymer Catalyst or initiator	Polymerization system: Solvent	T (°C)	Polymer (P) values: $[\alpha]_D$	$[M]_D$	Monomer (M) or model compound (MC) values: $[\alpha]_D$	$[M]_D$	Optical activity measured: Solvent	T (°C)	Refs.
Poly[(−)(*S*)2,2′-bis(2-vinyloxyethoxy)-1,1′-binaphthyl]									
$SnCl_4$	DCM	0	−131.6		−47.6 (M)		Chloroform	25	121
$BF_3{\cdot}OEt_2$	Nitromethane	0	−131.9		−47.6 (M)		Chloroform	25	
Poly[(−)(*S*)2,2′-bis[2-(2-vinyloxyethoxy)ethoxy]-1,1′-binaphthyl]									
$SnCl_4$	DCM	0	−93.9		−37.7 (M)		Chloroform	25	121
$BF_3{\cdot}OEt_2$	DCM	0	−95.8		−37.7 (M)		Chloroform	25	
Poly[(−)(*S*)2,2′-bis[2-(2-vinyloxyethoxy)ethoxy]-3,3′-dimethyl-1,1′-binaphthyl]									
$SnCl_4$	DCM	0	44.5		−99.7 (M)		Chloroform	25 (P); 29 (M)	245
Poly(1-bornyloxyethylene)									
$BF_3{\cdot}OEt_2$				−142		−122.4 (M)	Benzene	25	31
Poly(1-cholesteryloxyethylene)				−93		−131.4 (M)			31
Poly(1,2:5,6-diisopropylidene-α-D-glucofuranosyl-3-oxyethylene)									
$BF_3{\cdot}OEt_2$	*n*-Hexane + DCM	−78		5.7		−77.2	EDC (P); ethanol (M)	25	36,24
Poly(1-menthyloxyethylene)									
C_4H_9MgBr	Toluene	80		−358		−121.9 (M)	Benzene (P); chloroform (M)	25	31
$BF_3{\cdot}OEt_2$	*n*-Hexane	−78		−396		−121.9 (M)	Benzene (P)	25	
$SnCl_4$	Petroleum ether	25		−373		−121.9 (M)	Benzene (P)	25	
$Mn{-}MoO_3{-}H_2SO_4$	*n*-Hexane	−10		−357		−118.8 (M)	Chloroform (M); benzene (P)	25	33
$Mn{-}MoO_3{-}H_2SO_4$	*n*-Hexane	−30		−353		−118.8 (M)	Benzene (P)	25	
$Al(i\text{-}OC_3H_7)_3/H_2SO_4$	*n*-Pentane	−15 to RT	−198		−72.2 (M)		Neat (M); benzene (P)	25	123
$BF_3{\cdot}OEt_2$	Toluene	−78	−220		−61.5 (M)		Toluene (M); benzene (P)	25 (P)	124
Poly(1-α-methylbenzyloxyethylene)									
$BF_3{\cdot}OEt_2$	Propane	−78		68.6		−71.9 (M)	Benzene	25	35
Poly[(S)2-methylbutyloxyethylene]									
$Al(i\text{-}C_4H_9)Cl_2$	Propylene + Toluene	−78		4.9		1.1 (MC) 7.6 (M)	Toluene (P); neat (M,MC)	25	34
$Al(i\text{-}C_4H_9)_3/H_2SO_4$	Ether	15–20		−5.9		1.1 (MC) 7.6 (M)	Toluene (P)	25	
$Al(i\text{-}OC_3H_7)_3/H_2SO_4$	Ethyl acetate	0–20		6.4		1.1 (MC) 7.6 (M)	Toluene (P)	25	

Poly[(*S*)1-methylpropyloxyethylene]									
$Al(i\text{-}C_4H_9)Cl_2$	Propylene + Toluene	−78		246		13.24 (M)	Toluene (P); neat (M)	25	32
$Al(i\text{-}C_4H_9)_3/H_2SO_4$	Diethyl ether	15–20		206		13.67 (M)	Toluene (P)	25	
$Al(i\text{-}OC_3H_7)_3/H_2SO_4$	*n*-Pentane	−15 to RT	285		13.8 (M)		Benzene (P); neat (M)	25	123
Poly[(*S*)2-phenylvinyl 2-methylbutyl ether]									
$BF_3{\cdot}OEt_2$	Toluene	−78	11.4		3 (MC)		DCM	25 (MC)	125
$SnCl_4$	Toluene	−78	12.0		3 (MC)		DCM	25 (MC)	
Poly[(*S*)2-phenylvinyl 3-methylpentyl ether]									
$BF_3{\cdot}OEt_2$	Toluene	−78	7.8		7.12 (MC)		DCM	25 (MC)	125
$SnCl_4$	Toluene	−78	7.8		7.12 (MC)		DCM	25 (MC)	

1.4.2. POLY(VINYL KETONES)

Poly[(*S*)2-methylbutyl vinyl ketone]									
Spontaneous	–	20–25		−10.0		11.5 (MC)	Chloroform (P); neat (MC)	25	30
$LiAlH_4$	Toluene	−16 to 50		−43.0		11.5 (MC)	Chloroform (P)	25	
Poly[(*S*)3-methylpentyl vinyl ketone]									
Spontaneous	–	20–25		15.6		15.2 (MC)	Chloroform (P); neat (MC)	25	30
$LiAlH_4$	Toluene	0		11.7		15.2 (MC)	Chloroform (P)	25	
Poly[(*S*)1-methylpropyl vinyl ketone]									
$LiAlH_4$	Toluene	0		−118		33.4 (MC)	Chloroform (P); neat (MC)	25	30
Spontaneous	–	RT		−42.5		33.4 (MC)	Chloroform (P)	25	
AIBN	Toluene	60		−39.1	44.08 (M)		EDC	25	126
$LiAlH_4$	Toluene	−15		−139.0	44.08 (M)		EDC	25	

1.4.3. POLY(VINYL ESTERS)

Poly(*d*-*sec*-butyl *p*-vinyl-benzoate)									
BPO	–	40	22.9		24.0 (M)		Benzene	50	40
Poly(vinyl l-2-phenylbutyrate)									
BPO	Dioxane	100	−29.1		−20.4 (M)		Dioxane	25	13

1.5. POLY(STYRENES), POLY(CARBAZOLES)

Poly(4-*sec*-butoxymethylstyrene)									
BPO	Dioxane	55	10.15		12.07 (M)		Dioxane	25	41
Poly[(*S*)3-*sec*-butyl-9-vinylcarbazole]									
AIBN	Benzene	60	−2.5		3.5 (M)		DCM (P); acetone (M)	25	127
$EtAlCl_2$	Toluene	−78	−6.2		3.5 (M)		DCM (P)	25	
$C_7H_7SbCl_6$	DCM	0	−3.8		3.5 (M)		DCM (P)	25	
Poly[(*S*)9-(2-methylbutyl)-2-vinylcarbazole]									
$EtAlCl_2$	DCM	−78	−13.4		−11.6 (M)		DCM (P); heptane (M)	25	127
n-BuLi	THF	25	−39.4		−11.6 (M)		DCM (P)	25	
AIBN	–	60	−21.4		−11.6 (M)		DCM (P)	25	
Poly[(*S*)9-(2-methylbutyl)-3-vinylcarbazole]									
AIBN	Benzene	60	−14.5		−7.5 (M)		DCM (P); heptane (M)	25	127
$C_7H_7SbCl_6$	DCM	0	−19.6		−7.5 (M)		DCM (P)	25	
–	–	200	−12.2		−7.5 (M)		DCM (P)	25	
Poly[2-(2-thio-3-methylpentyl)styrene]									
AIBN	–	76	9.57		13.97 (M)		Benzene (P); neat (M)	24.7	42
Poly[*p*-(*p*-tolylsulfinyl)styrene]									
AIBN	Benzene	70	−8.5 to −11.0		2.70 (M)		Chloroform	20	128

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TABLE 1. *cont'd*

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	$[\alpha]_D$	$[M]_D$	Solvent	*T* (°C)	Refs.
1.6. POLY(DIENES)									
Poly[1-(*d*-bornylammonium carboxylate)-1,3-butadiene]									
AIBN	Methanol	50	14.4		6.8 (M)		Methanol	25	177
Poly[1-((−)1-cyclohexylethylammonium carboxylate)-1,3-butadiene]									
AIBN	Methanol	50	−3.6		−3.7 (M)		Methanol	25	177
Poly[(3*E*)(5*S*)3,5-dimethyl-1,3-heptadiene]									
$K_2S_2O_8$	Aq. emulsion	55		44.0	42.8 (M)		Benzene	20 (P); 25 (M)	129
$Al(i\text{-}C_4H_9)_3/TiCl_4$	Benzene	25		33.2	42.8 (M)		Benzene	20 (P)	
Poly[(3*Z*)(5*S*)3,5-dimethyl-1,3-heptadiene]									
$K_2S_2O_8$	Aq. emulsion	55		41.4	41.6 (M)		Benzene	20 (P); 25 (M)	129
$Al(i\text{-}C_4H_9)_3/TiCl_4$	Benzene	25		31.7	41.6 (M)		Benzene	20 (P)	
Poly[1-((−)menthyloxycarbonyl)-1,3-pentadiene]									
AIBN	Benzene	50	−71.3		−84.5 (M)		THF (P); benzene (M)	25	190
Poly[1-((*S*)(−)α-phenylethylammonium carboxylate)-1,3-butadiene]									
AIBN	Methanol	50	−11.4		−8.0 (M)		Methanol	20	178
Poly[*trans*-(*R*)6-phenyl-1,3-heptadiene]									
$Al(i\text{-}C_4H_9)_3/TiCl_3$	*n*-Heptane	25		−46.87	−16.6 (M)		Benzene	25 (P); 15 (M)	130
$AlEt_3/VCl_3$	*n*-Heptane	25		−45.82	−16.6 (M)		Benzene	25 (P)	
n-BuLi	*n*-Heptane	25		−40.30	−16.6 (M)		Benzene	25 (P)	
Poly[*trans*-(*R*)5-phenyl-1,3-hexadiene]									
$Al(i\text{-}C_4H_9)_3/TiCl_3$	*n*-Heptane	25		−39.84	−18.74 (M)		Benzene	25 (P); 15 (M)	130
$AlEt_3/VCl_3$	*n*-Heptane	25		−42.86	−18.74 (M)		Benzene	25 (P)	
n-BuLi	*n*-Heptane	25		−37.54	−18.74 (M)		Benzene	25 (P)	
1.7. POLY(ISONITRILES)									
Poly[((*S*)(1-(acetoxymethyl)ethyl)imino)methylene]									
$NiCl_2{\cdot}6H_2O$	Methanol	RT	−150 ($[\alpha]_{578}$)	−190 ($[M]_{578}$)	58.3 ($[\alpha]_{578}$)	74.0 (M) ($[M]_{578}$)	Chloroform	20–22	132
Poly[((*S*)(1-(acetoxymethyl)-2-methylpropyl)imino)methylene]									
$NiCl_2{\cdot}6H_2O$	Methanol	RT	−111 ($[\alpha]_{578}$)	−172 ($[M]_{578}$)	46.8 ($[\alpha]_{578}$)	72.5 (M) ($[M]_{578}$)	Chloroform	20–22	132
Poly[((*R*)(2-acetoxy-1-phenylethyl)imino)methylene]									
$NiCl_2{\cdot}6H_2O$	Methanol	RT	−82 ($[\alpha]_{578}$)	−156 ($[M]_{578}$)	−68.5 ($[\alpha]_{578}$)	−129 (M) ($[M]_{578}$)	Chloroform	20–22	132
Poly[(L-alanyl-(*O*-acetyl)L-serine methylester)methylene]									
$NiCl_2{\cdot}6H_2O$	Chloroform		205		−58.1 (M)		Chloroform–methanol (5 : 2) (P); chloroform (M)	20	231
Poly[(L-alanyl-(*O*-acetyl)D-serine methylester)methylene]									
$NiCl_2{\cdot}6H_2O$	Chloroform		−33		−12.0 (M)		Chloroform–methanol	20	231
Poly[(L-alanyl-(*N*(Im)-tosyl)L-histidine methylester)methylene]									
$NiCl_2{\cdot}6H_2O$	Chloroform/Methanol	RT	144 ($[\alpha]_{578}$)		40.6 ($[\alpha]_{578}$)		Chloroform	22	249
Poly[(D-alanyl-(*N*(Im)-tosyl)L-histidine methylester)methylene]									
$NiCl_2{\cdot}6H_2O$	Chloroform/Methanol	RT	−170 ($[\alpha]_{578}$)		18.6 ($[\alpha]_{578}$)		Chloroform	22	249
Poly[(L-alanyl-(*N*(Im)-tosyl) L-histidyl-(*O*-acetyl)L-serine methylester)methylene]									
$NiCl_2{\cdot}6H_2O$	Chloroform		−58.9		−13.5 (M)		Chloroform–methanol (5 : 2) (P); chloroform (M)	20	230

Poly[(L-alanyl-(*N*(Im)-tosyl)L-histidyl-(*O*-acetyl)D-serine methylester)methylene]									
$NiCl_2 \cdot 6H_2O$	Chloroform		− 29.3		− 2.1 (M)		Chloroform–methanol (5 : 2) (P); chloroform (M)	20	230
Poly[(D-alanyl-(*N*(Im)-tosyl)L-histidyl-(*O*-acetyl)L-serine methylester)methylene]									
$NiCl_2 \cdot 6H_2O$	Chloroform		− 8.0		9.2 (M)		Chloroform–methanol (5 : 2) (P); chloroform (M)	20	230
Poly[((*S*)(1-benzylethyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	15 ($[\alpha]_{578}$)	22 ($[M]_{578}$)	48.7 ($[\alpha]_{578}$)	70.6 (M) ($[M]_{578}$)	Chloroform	20–22	132
Poly[(((*S*)1-(*tert*-butoxycarbonyl)-2-methylpropyl)imino)methylene]									
$NiCl_2$	–	45	32.5		29.5 (M)		Chloroform	20	236
Poly[((*S*)(1-carbethoxyethyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	–	RT	− 280 ($[\alpha]_{578}$)	− 355 ($[M]_{578}$)	16.7 ($[\alpha]_{578}$)	21.2 (M) ($[M]_{578}$)	Chloroform	20–22	132
Poly[(((1*S*,2*S*)1-carbomethoxy-2-methylbutyl)imino)methylene]									
$NiCl_2$	–	45	− 32.2		35.0 (M)		Chloroform	20	236
Poly[((*S*)(−)α-cyclohexylethylimino)methylene]									
$NiCl_2 \cdot 6H_2O$	Neat	65	− 295		27.4 (MC)		THF (P); hexane (MC)	24 (P); 20 (MC)	209
Poly[(((*S*)2,2-dimethyl-1,3-dioxolane-4-yl)methylimino)methylene]									
$NiCl_2 \cdot 6H_2O$	–	RT	68.5 ($[\alpha]_{546}$)		38.5 (M) ($[\alpha]_{546}$)		Dioxane	25	227
Poly[(((*R*)1,2-dimethylpropyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	16.7 ($[\alpha]_{578}$)		− 24.2 (M) ($[\alpha]_{578}$)		Chloroform	22	236
Poly[((*R*)(2-(diphenyl phosphinyl)propyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	− 338 ($[\alpha]_{578}$)	− 910 ($[M]_{578}$)	13.1 ($[\alpha]_{578}$)	35.3 (M) ($[M]_{578}$)	Chloroform	20–22	132
Poly[((*S*)(1-ethyl-2-propenyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	29 ($[\alpha]_{578}$)	27.6 ($[M]_{578}$)	95 ($[\alpha]_{578}$)	90.2 (M) ($[M]_{578}$)	Chloroform (P); neat (M)	20	132
Poly[((*S*)(1-ethyl-2-propynyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	− 110 ($[\alpha]_{578}$)	− 102 ($[M]_{578}$)	− 12.8 ($[\alpha]_{578}$)	− 11.9 (M) ($[M]_{578}$)	Chloroform (P); neat (M)	20–22	132
Poly[(((*S*)1-(isopropyloxycarbonyl)-2-methylpropyl)imino)methylene]									
$NiCl_2$	–	5	− 24		32.7 (M)		Chloroform	20	236
Poly[((−)menthylimino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	65	− 207		− 106.4 (MC)		Hexane	25 (P); 20 (MC)	209
Poly[(((*S*)1-(methoxycarbonyl)-2-methylpropyl)imino)methylene]									
$NiCl_2$	–	RT	− 110		5.5 (M)		Chloroform	20	236
Poly[((*R*)3-methyl-2-butyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	− 16.7 ($[\alpha]_{578}$)	− 16.2 ($[M]_{578}$)	− 24.2 ($[\alpha]_{578}$)	− 23.5 (M) ($[M]_{578}$)	Chloroform	22	131
Poly[((*R*)4-methyl-2-pentyl)imino)methylene]									
$NiCl_2 \cdot 6H_2O$		RT	62 ($[\alpha]_{578}$)	68.9 ($[M]_{578}$)	− 61.9 ($[\alpha]_{578}$)	− 68.8 (M) ($[M]_{578}$)	Chloroform	22	131
Poly[((*R*)2-octylimino)methylene]									
$NiCl_2 \cdot 6H_2O$	Methanol	RT	34 ($[\alpha]_{578}$)	47.3 ($[M]_{578}$)	− 47.6 ($[\alpha]_{578}$)	− 66.3 (M) ($[M]_{578}$)	Chloroform	22	131
Poly[(*d*-α-phenylethylimino)methylene]									
DBP-O_2	Heptane	60	365		37.2 (M)		Toluene	27	39
Poly[(l-α-phenylethylimino)methylene]									
H_2SO_4-O_2	Heptane	50	− 382		− 35.8 (M)	− 179.7 (M)	Toluene	27	39
$NiCl_2 \cdot 6H_2O$	–	0–5	− 350 ($[\alpha]_{578}$)	− 458 ($[M]_{578}$)	− 40.9	− 55.0 (M) ($[M]_{578}$)	Chloroform (P); methanol (M)	20	132

1.8. POLY(ALKYNES)

Poly[(*S*)3,4-dimethyl-1-pentyne]									
$Al(i\text{-}C_4H_9)_3/Fe(AcAc)_3$	*n*-Heptane	20–35		470		42.2 (MC)	*n*-Heptane (P); neat (MC)	25	133
Poly[*p*-(L-(−)-menthoxycarbonyl)phenylacetylene]									
$[Rh(norbornadiene)Cl]_2$	Triethylamine	RT	− 605		− 68.8 (M)		Chloroform	20	197
Poly[*p*-((+)-2-methylbutoxy)phenylacetylene]									
$[Rh(norbornadiene)Cl]_2$	Triethylamine	RT	19.2		5.90 (M)		Chloroform	20	197

TABLE 1. *cont'd*

Polymer / Catalyst or initiator	Polymerization system: Solvent	Polymerization system: T (°C)	Polymer (P) values: $[\alpha]_D$	Polymer (P) values: $[M]_D$	Monomer (M) or model compound (MC) values: $[\alpha]_D$	Monomer (M) or model compound (MC) values: $[M]_D$	Optical activity measured: Solvent	Optical activity measured: T (°C)	Refs.
Poly[(*S*)4-methyl-1-hexyne]									
$Al(i\text{-}C_4H_9)_3/Fe(AcAc)_3$	Isooctane	20–30	−22.9		−2.97 (MC)		Isooctane	25	1
$Al(i\text{-}C_4H_9)_3/Fe(AcAc)_3$	*n*-Heptane	20–35		−10.6		−3.0 (MC)	*n*-Heptane (P); neat (MC)	25	133
Poly[(*S*)5-methyl-1-heptyne]									
$Al(i\text{-}C_4H_9)_3/Fe(AcAc)_3$	*n*-Heptane	20–35		−146		12.2 (MC)	*n*-Heptane (P); neat (MC)	25	133
Poly[(*S*)6-methyl-1-octyne]									
$Al(i\text{-}C_4H_9)_3/Fe(AcAc)_3$	*n*-Heptane	20–35		−34		13.7 (MC)	*n*-Heptane (P); neat (MC)	25	133
Poly[(*S*)3-methyl-1-pentyne]									
$Al(i\text{-}C_4H_9)_3/Fe(AcAc)_3$	*n*-Heptane	20–35		498		32.1 (MC)	*n*-Heptane (P); neat (MC)	25	133

1.9. POLY(MALEIMIDES) AND RELATED POLYMERS

Polymer / Catalyst or initiator	Solvent	T (°C)	$[\alpha]_D$ (P)	$[M]_D$ (P)	$[\alpha]_D$ (M/MC)	$[M]_D$ (M/MC)	Solvent	T (°C)	Refs.
Poly(*N*-bornyl maleimide)									
BPO	THF	50	8.4		−9.6 (M)		THF (P); ethanol (M)	25 (P)	43
AIBN	THF	50	10.1		−9.6 (M)		THF (P)	25 (P)	
n-BuLi	THF	50	−9.1		−9.6 (M)		THF (P)	25 (P)	
Poly[*N*-(cholesteroxycarbonylmethyl)maleimide]									
AIBN	THF	70	−25.9		−26.8 (MC)		THF	RT	203
n-BuLi	THF	0	−37.1		−26.8 (MC)		THF	RT	
Poly(*N*-maleoyl-L-alanine)									
AIBN	THF	60	−42.1		−49.9 (MC)		THF	25	201
Poly(*N*-maleoyl-L-phenylalanine)									
AIBN	THF	60	−144.1		−138.3 (MC)		THF	25	201
Poly[*N*-maleoyl-L-phenylalanine ethyl ester]									
AIBN	Dioxane	60	−120.0		−136.3 (MC)		THF	25	252
BuLi	THF	0	−222.0		−136.3 (MC)		THF	25	
Poly[*N*-((*N*′-((*R*)-α-methylbenzyl)aminocarbonyl)methyl)maleimide]									
AIBN	DCM	70	59.9		115.5 (MC)		THF	25	200
Poly[*N*-(*N*′-((*R*)-α-methylbenzyl)aminocarbonyl-*n*-pentyl) maleimide]									
AIBN	Dioxane	60	50.1		56.6 (MC)		THF	25	183
Poly[*N*-(4-*N*′-((*R*)-α-methylbenzyl)aminocarbonylphenyl)maleimide]									
AIBN	THF	50	−141.4		−26.9 (MC)		THF	25	192
n-BuLi	THF	0	−78.0		−26.9 (MC)		THF	25	
Poly[*N*-(4-*N*′-((*S*)-α-methylbenzyl)aminocarbonylphenyl)maleimide]									
AIBN	THF	50	163.4		28.9 (MC)		THF	25	206
Poly[*N*-(*N*′-((*R*)-α-methylbenzyl)aminocarbonylundecyl)maleimide]									
AIBN	Dioxane	60	44.6		44.8 (MC)		THF	25	183
Poly(*N*-α-methylbenzyl citraconimide)									
AIBN	Benzene	50	56.7		55.3 (MC)		THF	25	233
Poly(*N*-α-methylbenzyl maleimide)									
AIBN	THF	50	11.1–13.0		57.9 (M)		THF	25	137
Poly[*N*-(2-phenyl-1-phenyloxycarbonyl)ethyl maleimide]									
AIBN	Benzene	60	−69.7		−106.8 (MC)		THF	25	187
n-BuLi	Toluene	0	−65.2		−106.8 (MC)		THF	25	

1.10. OTHER COMPOUNDS

Poly[(2,2′-bis(hexyloxy)-1,1′-binaphthyl-6,6′-ylene)-1,4-phenylenevinylene-1,4-phenylenevinylene-1,4-phenylene]									
$Pd(PPh_3)_4$	THF/K_2CO_3(aq.)		−351		35.6 (M)		THF (P); DMSO (M)		166
Poly(bis-2-methylbutyl itaconate)									
–	–	RT	4.92		4.97 (M)				15
BPO	–	40–85	4.75		5.57 (M)		Heptane	20	16
Poly[N^3-(1,2-diethoxycarbonylethyl)ureidoethylene]									
AIBN	Benzene	60	24.3	63.1	43.5 (M)	112.5 (M)	Dioxane	25	38
			31.7	82.0	43.5 (M)	112.5 (M)	Benzene	25	
Poly[N^3-(1,3-diethoxycarbonylpropyl)ureidoethylene]									
AIBN	Benzene	60	7.83	21.3	21.6 (M)	58.9 (M)	Benzene	25	38
Poly[(*R*)3,7-dimethyloctanal divinylacetal]									
AIBN	–	80	3.18	7.19	2.48 (MC)		Chloroform	25	72
$BF_3{\cdot}OEt_2$	–	−78	−6.78	−14.32	2.48 (MC)		Chloroform	25	
Poly[N^3-(1-ethoxycarbonyl-3-methylbutyl)ureidoethylene]									
AIBN	Benzene	60	0.5	1.1	20.3 (M)	46.3 (M)	Benzene	25	38
Poly(ethylidene-1-propenylidene) (from (*R*)2,3-pentadiene)									
π-allyl-Ni-iodide		−20	−232.10		−47.39 (M)		Carbon tetrachloride (P); neat (M)	25	243
Poly(L-menthyloxycarbonylaminoethylene)									
AIBN	–	95	−60.4	−136.0	−79.9 (M)	−179.7 (M)	Benzene	25	38
AIBN	Benzene	60	−60.4	−136.0	−79.9 (M)	−179.7 (M)	Benzene	25	
γ-ray	Benzene	22	−58.5	−131.8	−79.9 (M)	−179.7 (M)	Benzene	25	
tert-BuOOH	SO_2	−25	−66.2		−79.9 (M)	−179.7 (M)	Benzene	25	
Poly[*N*-(4-*N*′-((*R*)-α-methylbenzyl)aminocarbonylphenyl)itaconimide]									
AIBN	THF	60	52.1		−23.8 (MC)		THF	25	191
Poly[(−)3-(β-styryloxy)menthane]									
$BF_3{\cdot}OEt_2$	DCM	−72	−114		−15.9 (M)		THF	25 (P)	122
Poly[*N*-(*p*-(*p*-tolylsulfinyl)phenyl)-2,5-dioxo-pyrrolidin-3,4-diyl]									
BPO	THF	60	−22.0		−25.9 (M)		Chloroform	20	135
Poly(*m*-tolyl vinyl sulfoxide)									
n-BuLi/(−)-sparteine	Toluene	−78	311		486 (M)				246
Poly(*p*-tolyl vinyl sulfoxide)									
n-BuMgBr	THF	30	194		443 (M)		Acetone	23	134
Poly[(*S*)*N*-vinyl-3-methyl-2-pyrrolidone]									
AIBN	Water	95	28		69.3 (M)		Methanol (P); benzene (M)	25	136

TABLE 2. MAIN-CHAIN ACYCLIC HETROATOM POLYMERS

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or Initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	$[\alpha]_D$	$[M]_D$	Solvent	*T* (°C)	Refs.
2.1. POLY(OXIDES)									
Poly[(*R*)(+)citronellal]									
$Al(i\text{-}C_4H_9)_3$	Ether	−78	−82.7 to −90.1	−127 to −139		11.2 (MC)	Chloroform	25	44
n-BuLi	*n*-Hexane	−78	−91.1	−140		11.2 (MC)	Chloroform	25	
$BF_3{\cdot}OEt_2$	Ether	−78	−89.5	−138		11.2 (MC)	Chloroform	25	

TABLE 2. *cont'd*

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or Initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	$[\alpha]_D$	$[M]_D$	Solvent	*T* (°C)	Refs.
Poly(D-oxy-2,3-dimethylethylene)									
$Al(i\text{-}C_4H_9)_3/H_2O$	*n*-Heptane	–78	0		58.8 (M)		Benzene or chloroform (P); neat (M)	25	47
Poly[(*R*)(+)oxy-5-methoxy-3-methyl-hexylidene]									
$ZnEt_2$	*n*-Hexane	–75	36.7	52.8	2.47 (M)	8.24 (MC)	Chloroform	25	45
Poly[(*R*)oxy-2-methylbutylidene]									
$ZnEt_2$	*n*-Hexane	–75	36.7		30.7 (M)		Chloroform	25	45
Poly[(+)oxy-1-methyl-2-carbomethoxyethylene]									
$BF_3{\cdot}OEt_3/AlEt_3$	–	25	–36.9		24.6 (M)		DCM (P); neat (M)	25	48
Poly[oxymethylene-(*R,R*)-dibenzo-19-crown-6]									
KOH	DMSO	RT	5.0 ($[\alpha]_{435}$)		1.22 (M) ($[\alpha]_{435}$)		Chloroform	25 (P); 24 (M)	208
Poly[oxymethylene-(*S,S*)-dibenzo-19-crown-6]									
KOH	DMSO	RT	–6.0 ($[\alpha]_{435}$)		–1.07 (M) ($[\alpha]_{435}$)		Chloroform	25 (P); 28 (M)	208
Poly(L-oxypropylene)									
KOH	–	RT	–16 ± 5		15 (M)		Benzene (P); ether (M)	20 (P); 21 (M)	46
			25 ± 5		15 (M)		Chloroform (P)	20 (P)	
$FeCl_3$-monomer	Ether	RT	–20 ± 5		15 (M)		Benzene (P)	20 (P)	
			25 ± 5		15 (M)		Chloroform (P)	20 (P)	
$ZnEt_2/CH_3OH$	Benzene	33	24.9		11.55 (M)		Cyclohexane (P); neat (M)	25	138
			–32.0		11.55 (M)		Benzene (P)	25	
Ferric acetate hydroxide	Heptane	70		–9.50	15.0 (M)		Benzene (P); ethyl ether (M)	25 (P); 27 (M)	139
				7.36	15.0 (M)		Dibutyl ether (P)	25 (P)	
2.2. POLY(ESTERS)									
Poly[L(–)oxycarbonylethylidene]									
$ZnCl_2$	Heptane	175–195	–153.3 ($[\alpha]_{578}$)		–275.8 (M) ($[\alpha]_{578}$)		Chloroform	25	51
Pyridine	Pyridine	20	–140.0		–19.2 (M)		Chloroform	20	175
Poly(L-oxycarbonylisobutylidene)									
ZnO	–	180–190	–20		–50 (MC)		Cyclohexane		52
ZnO	–	180–190	–67		–256 (M)		Chloroform	20 (P); 25 (M)	140
Poly(L-α-oxycarbonylisopentylidene)									
ZnO	–	175	–50		–226 (M)		DCM (P); chloroform (M)	20 (P); 25 (M)	140
Poly[(*R*)(+)oxycarbonyl-3-methylhexamethylene]									
$Sb_2O_3/Zn(CH_3COO)_2$	–	215	8.55		0.94 (M)		TFEL	25	49
Poly[(*R*)(–)oxycarbonyl-3-methylhexamethylene]									
$Sb_2O_3/Zn(CH_3COO)_2$	–	215	3.36		–0.96 (M)		Benzene	25	49
Poly[(*R*)(–)oxycarbonyl-2-methylpentamethylene] (Poly[(*R*)(–)-β-methylcaprolactone])									
$Al(i\text{-}C_4H_9)_3/H_2O$	Benzene	50	32.57 ($[\alpha]_{450}$)		29.78 (MC) ($[\alpha]_{350}$)		TFEL	25	53
Poly[(*R*)oxycarbonyl-3-methylpentamethylene]									
$Al(i\text{-}C_4H_9)_3/H_2O$	Benzene	50	26.95 ($[\alpha]_{450}$)		51.77 (M)		TFEL (P); chloroform (M)	25	53
Poly[(*R*)oxycarbonyl-4-methylpentamethylene]									
$Al(i\text{-}C_4H_9)_3/H_2O$	Benzene	50	8.78 ($[\alpha]_{450}$)		–15.91 (MC) ($[\alpha]_{350}$) –36.11 (M)		TFEL (P,MC); chloroform (M)	25	53
Poly[oxycarbonyl-1,4-phenylene-oxyterephthaloyloxy-1,4-phenylene-carbonyloxy-(*S*)1-methylethylene]									
–	EDC	Reflux		42		22.3 (M)	Fuming sulfuric acid	25	237

Poly[oxycarbonyl-1,4-phenylene-oxyterephthaloyloxy-1,4-phenylene-carbonyloxy-1,2-bis(2,2-dimethyl-1,3-dioxolane-4-yl)ethylene]								
–	DCM	85		228	4.0 (M)	Dioxane (P); methanol (M)	25	226
Poly(D-oxycarbonylpropylene)								
AlEt$_3$	Ether	RT	19 ($[\alpha]_{300}$)			Chloroform		50
Natural polymer			44 ($[\alpha]_{300}$)			Chloroform		
Poly(oxycarbonyl-1,2,3-trimethoxytetramethylene) (Poly(2,3,4-trimethyl-1-arabonolactone))								
CH_3COCl/HCl	–	RT	39 ($[\alpha]_{546}$)		203.5 (M) ($[\alpha]_{546}$)	Benzene	21	54
Poly[oxyisophthaloyloxy-(2-acetamide-1-phenyl)trimethylene]								
–	Chloroform	60	– 30.8		24.9 (M)	DMF (P); methanol (M)	25	167
Poly[oxyterephthaloyloxy-(1*R*,3*R*)-1,3-dimethyltrimethylene]								
–	EDC	82	– 295		– 136 (MC)	Chloroform	25	202
Poly[oxyterephthaloyloxy-(1-methyl-3-oxo)trimethylene-oxyethyleneoxy-(3-methyl-1-oxo)trimethylene-oxycarbonyl]								
–	DCM	Reflux	– 62		– 41.8 (M)	Chloroform	25	189

2.3. POLY(SULFIDES), POLY(THIOESTERS)

Poly(*tert*-butyl thiirane)								
tert-BuOK	DMSO	RT	268		– 39.0 (M)	Benzene (P); neat (M)	25	142
ZnEt$_2$	Toluene	RT	231–240		– 39.0 (M)	Benzene (P); neat (M)	25	
Poly[thio-1-(*N*-(*S*)*sec*-butyl-*N*-methylaminomethyl)ethylene]								
ZnEt$_2$/methanol	–	RT	26.1			Benzene	25	232
Poly[(*S*)thio(carbonyl)-1-(*p*-chlorobenzenesulfonamide)ethylene]								
PhCH$_2$SH	DMF	25	– 85.52		– 11.08 (M)	DMF	24 (M)	143
Poly[(*R*)thio(carbonyl)-1-methyl-1-ethylethylene]								
Tetrabutylammonium versatate	–	100	151.7		56.9 (M)	Benzene	23 (P); 26 (M)	141
Poly[(*S*)thio(carbonyl)-1-(*p*-methyloxybenzenesulfonamide)ethylene]								
PhCH$_2$SH	DMF	25	– 92.44		25.25 (M)	DMF	20 (M)	143
Poly[(*R*)(–)thiocarbonyl-3-methylpentamethylene]								
n-BuLi	–	RT	– 5.39		– 3.21 (M)	Dioxane	25	57
Poly[(*R*)(+)thiocarbonyl-2-methylpentamethylene]								
n-BuLi	–	190	15.66		9.03 (M)	Dioxane	25	57
			18.62			THF	25	
Poly[(*S*)thio(carbonyl)-1-(*p*-nitrobenzenesulfonamide)ethylene]								
PhCH$_2$SH	DMF	25	– 100.25		– 46.01 (M)	DMF	28 (M)	143
Poly[thio(carbonyl)-1-tosylaminoethylene]								
PhCH$_2$SH	DMF	25	– 90.6		19.87 (M)	DMF		143
–	–	112	– 80.6		19.87 (M)	DMF		
Poly[(–)thiopropylene]								
$BF_3{\cdot}OEt_2$	DCM		– 62.8		– 32.6 (M)	DCM	22	55
			– 126.9		32.6 (M)	Chloroform	22	
KOH	–	15	– 189		– 35 (MC)	Chloroform	18 (P); 20 (MC)	56
			– 159		– 35 (MC)	Benzene (P)	18 (P)	

2.4. POLY(URETHANES), POLY(UREAS)

2.4.1. POLY(URETHANES)

Poly[oxycarbonylimino-(1-ethoxycarbonyl)pentamethyleneiminocarbonyloxyethylene]								
–	Neat	140–160	– 12			DMSO		174
Poly[oxycarbonylimino-(L)2-isobutylethylene-ureylene-(L)1-isobutylethylene)]								
Na$_2$CO$_3$	H$_2$O/THF	< 0	– 48.2			Methanol	20	63
Poly[oxycarbonylimino-(L)2-isobutylethylene-ureylene-(L)1-isopropylethylene)]								
Na$_2$CO$_3$	H$_2$O/THF	< 0	– 27.2			Methanol	20	63
Poly[oxycarbonylimino-(L)2-isobutylethylene-ureylene-(L)1-methylethylene)]								
Na$_2$CO$_3$	H$_2$O/THF	< 0	– 19.2			Methanol	20	63

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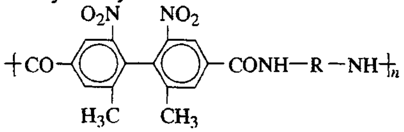
TABLE 2. *cont'd*

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or Initiator	Solvent	T (°C)	$[\alpha]_D$	$[M]_D$	$[\alpha]_D$	$[M]_D$	Solvent	T (°C)	Refs.
Poly[oxycarbonyliminomethylene-1,3-phenylenemethylene-ureylene-(1-(methoxymethyl)-2-phenyl)ethylene]									
Dibutyltin dilaurate	DMSO	80	20.48		15.20 (MC)		DMSO	25	168
Poly[oxycarbonyliminomethylene-1,3-(1,5,5-trimethyl)cyclohexylene-iminocarbonyloxy-2,3-bornanediyl]									
–	Methyl ethyl ketone	80	–7.4		–11.67 (MC)		DMF	30	216
Poly[oxycarbonylimino-(D)2-methylethylene-ureylene-(L)1-isobutylethylene)]									
Na_2CO_3	H_2O/THF	<0	–54.7				Methanol	20	63
Poly[oxycarbonylimino-(L)2-methylethylene-ureylene-(L)1-isobutylethylene)]									
Na_2CO_3	H_2O/THF	<0	–47.9				Methanol	20	63
Poly[oxycarbonylimino-(D)2-methylethylene-ureylene-(L)1-isopropylethylene)]									
Na_2CO_3	H_2O/THF	<0	–53.2				Methanol	20	63
Poly[oxycarbonylimino-(L)2-methylethylene-ureylene-(L)1-isopropylethylene)]									
Na_2CO_3	H_2O/THF	<0	–26.0				Methanol	20	63
Poly[oxycarbonylimino-(D)2-methylethylene-ureylene-(L)1-methylethylene)]									
Na_2CO_3	H_2O/THF	<0	–16.0				*m*-Cresol	20	63
Poly[oxycarbonylimino-(L)2-methylethylene-ureylene-(L)1-methylethylene)]									
Na_2CO_3	H_2O/THF	<0	–50.0				*m*-Cresol	20	63
Poly[oxycarbonylimino-1,4-phenylenemethylene-1,4-phenylene-ureylene-(1-(methoxymethyl)-2-phenyl)ethylene]									
Dibutyltin dilaurate	DMSO	80	–14.40		–8.72 (MC)		DMSO	25	168
Poly[oxycarbonylimino-2,4-toluyleneiminocarbonyloxy-(2-acetamide-1-phenyl)trimethylene]									
–	Chloroform	75	–20.6		–38.6 (MC)		DMF	25	167
Poly[oxycarbonylimino-2,4-toluyleneiminocarbonyloxy-2,3-bornanediyl]									
–	Methyl ethyl ketone	80	–27.6		–14.8 (MC)		DMF	30	216
2.4.2. POLY(UREAS)									
Poly[((*R*)5-ethyl-1,3-diazolidin-2-one-1,3-diyl)ethyleneoxyethylene]									
Methyl iodide	Benzonitrile	150	–19.4		39.4 (M)		Chloroform	24	250
Poly[((*R*)5-ethyl-1,3-diazolidin-2-one-1,3-diyl)methylene-1,2-phenylenemethylene]									
Methyl iodide	Benzonitrile	150	–28.0		32.1 (M)		Chloroform	24	250
Poly[((*R*)5-ethyl-1,3-diazolidin-2-one-1,3-diyl)tetramethylene]									
Methyl iodide	Benzonitrile	150	–54.0		38.8 (M)		Chloroform	24	250
Poly[((*S*)5-isopropyl-1,3-diazolidin-2-one-1,3-diyl)tetramethylene]									
Methyl iodide	Benzonitrile	150	–40.5		–34.4 (M)		Chloroform	24	250
Poly[((*S*)5-phenylmethyl-1,3-diazolidin-2-one-1,3-diyl)tetramethylene]									
Methyl iodide	Benzonitrile	150	–71.4		32.0 (M)		Chloroform	24	250
2.5. POLY(AMIDES)									
Poly[iminocarbonyl-1,2-(3,4-bis(2-hydroxyphenyl))cyclobutylenecarbonyliminohexamethylene]									
–	DMAc	80		–241		–295 (MC)	DMAc		235
Poly[iminocarbonyl-1,2-(3,4-bis(2-hydroxyphenyl))cyclobutylenecarbonylimino-1,4-phenylene]									
–	DMAc	80		–358		–456 (MC)	DMAc		235
Poly[iminocarbonyl-1,2-(3,4-bis(2-methoxyphenyl))cyclobutylenecarbonyliminohexamethylene]									
Benzyltriethylammonium chloride	1.0M NaOH/chloroform	RT	–70.3		–81.0 (MC)		*m*-Cresol	20	218
Poly[iminocarbonyl-1,2-(3,4-bis(2-methoxyphenyl))cyclobutylenecarbonylimino-1,4-phenylene]									
Benzyltriethylammonium chloride	1.0M NaOH/chloroform	RT	5.7		–32.7 (MC)		DMAc	20	218
Poly(*trans*-iminocarbonyl-1,2-cyclohexylene)									
Triethylamine	DMF	60	75.2–84.8		–60.0 (MC)		DCA (P); ethanol (M)	20	144

Poly[iminocarbonyl-(1*S*,2*S*)1,2-*trans*-cyclohexylene-carbonyliminoethylene]								
–	DMAc		56.5	19.4 (M)		DCA (P); acetone (M)	25 (P); 20 (M)	221
Poly[iminocarbonyl-(1*S*,2*S*)1,2-*trans*-cyclohexylene-carbonylimino-1,4-phenylene]								
–	DMAc		239	19.4 (M)		DCA (P); acetone (M)	25 (P); 20 (M)	221
Poly[imino-((2*S*,3*S*)-2,3-dimethoxytetramethylene)-imino-(1,4-dioxotetramethylene)]								
–	Chloroform	50	– 14.1	– 8.2 (M)		Formic acid (P); chloroform (M)	23	184
Poly[imino-(1,5-dioxohexamethylene)imino-(1*R*,2*R*)1,2-*trans*-cyclohexylene]								
–	DMAc		65.4	– 33.4 (M)		DCA (P); water (M)	25 (P); 20 (M)	221
Poly[iminoethylideneimino-(2,3-dimethoxy-1,4-dioxo)tetramethylene]								
–	Chloroform	RT	175.2	– 38.25 (M)		Formic acid (P); chloroform (M)	23	199
Poly[threo-imino-(1-oxo-2,3-dimethyltrimethylene)]								
K-Pyrrolidone	DMSO	25	– 25.0	– 50.6 (M)		TFA (P); neat (M)	25	62
Poly[(*S*)imino-(1-oxo-3-ethyltrimethylene)] (Poly[(*S*)β-aminovalerate])								
K-Pyrrolidone	DMSO	25	– 32.7	– 2.4 (M)		DCA (P); neat (M)	25	62
Poly[(–)imino-(1-oxo-3-methylhexamethylene)]								
H_2O	–	200	39.7	– 36.15 (M)		Cresol (P); water (M)	25	59,60
NaH	–	160	43.07	– 36.15 (M)		Cresol (P); water (M)	25	61
Poly[(+)imino-(1-oxo-4-methylhexamethylene)]								
NaH	–	150	19.24			TFEL	25	61
Poly[(+)imino-(1-oxo-5-methylhexamethylene)]								
NaH	–	194	25.15			TFEL	25	61
Poly[(+)imino-(1-oxo-3-methyl-6-isopropylhexamethylene)]								
K-C_6H_5COCl	–	150	9.5	– 53.6 (M)		Formic acid	19	58
Poly[(*S*)imino-(1-oxo-3-methyltrimethylene)] (Poly[(*S*)-β-aminobutyrate])								
K-Pyrrolidone	DMSO	25	– 9.3	– 8.3 (M)		TCA (P); neat (M)	25	62
			– 26.1	– 8.3 (M)		DCA (P)	25	
			– 33.5	– 8.3 (M)		TCA–chlorobenzene (P)	25	
Poly[(*R*)imino-(1-oxo-3-vinyltrimethylene)]								
K-Pyrrolidone	DMSO	25	– 19.5	25 (M)		DCA (P); neat (M)	25	62
Poly[iminoterephthaloylimino-(1*R*,2*R*)1,2-*trans*-cyclohexylene]								
	DMAc		– 211	– 33.4 (M)		DCA (P); water (M)	25 (P); 20 (M)	221
Poly[(+)iminoterephthaloylimino-2,8-naphthylene-8,2-naphthylene]								
			– 15 ($[\alpha]_{578}$)	66.6 (MC) ($[\alpha]_{578}$)		THF	21	71
Poly[methyliminocarbonyl-1,2-(3,4-bis(2-hydroxyphenyl))cyclobutylenecarbonyl-methylimino-hexamethylene]								
–	DMAc	80		– 437	– 474 (MC)	DMAc		235
Poly[*N*-(phenylethylidene)iminoethylene-*N*-(phenylethylidene)iminoterephthaloyl]								
			– 74 ($[\alpha]_{289}$)	– 294 ($[\alpha]_{289}$)			20	70
Poly[*N*-(phenylethylidene)iminohexamethylene-*N*-(phenylethylidene)iminodipicolinoyl]								
			– 139 ($[\alpha]_{289}$)	– 610 ($[\alpha]_{289}$)			20	70
Poly[1,4-piperazinediylcarbonyl-1,2-(3,4-bis(2-hydroxyphenyl))cyclobutylenecarbonyl]								
–	DMAc	80		116	– 391 (MC)	DMAc		235
Poly[1,4-piperazinediylcarbonyl-1,2-(3,4-bis(2-methoxyphenyl))cyclobutylenecarbonyl]								
Benzyltriethylammonium chloride	1.0 M NaOH/chloroform	RT	– 40.7	– 83.0 (MC)		DMAc	20	218



(–) R = 1,2-phenylene			– 4.94			5% LiCl–DMF	20	73
(+) R = 1,3-phenylene			– 0.50			5% LiCl–DMF	20	73
(+) R = 1,4-phenylene			6.53			5% LiCl–DMF	20	73

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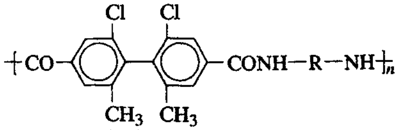
TABLE 2. *cont'd*

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or Initiator	Solvent	T (°C)	$[\alpha]_D$	$[M]_D$	$[\alpha]_D$	$[M]_D$	Solvent	T (°C)	Refs.
(−) R = 1,2-pyrazolidene			5.4				TFEL	20	73
(−) R = 2,5-dimethyl-1,4-piperazinediyl			28.0				TFEL	20	73
									
(−) R = 1,2-phenylene			−19.6				5% LiCl–DMF	20	73
(−) R = 1,3-phenylene			−19.4				5% LiCl–DMF	20	73
( ) R = 1,4-phenylene			−18.2				5% LiCl–DMF	20	73
(−) R = 1,2-piperazinediyl			−6.7				TFEL	20	73
(−) R = 1,4-piperazinediyl			−10.0				TFEL	20	73
(−) R = 2,5-dimethyl-1,4-piperazinediyl			−6.7				TFEL	20	73

2.6. POLY(ISOCYANATES)

Poly[((*R*)1-deuterio-1-hexyl)iminocarbonyl]									
NaCN	DMF	−58	−367		0.65 (M)		Chloroform (P); neat (M)	25	229
Poly[(((*S*)2,2-dimethyl-1,3-dioxolane-4-yl)methyl)iminocarbonyl]									
NaCN	DMF	−65	−311 ($[\alpha]_{546}$)		−21.1 (M) ($[\alpha]_{546}$)		Chloroform(P); ethylether (M)	25	228
Poly[(*S*)(+)*N*-(2-methylbutyl)iminocarbonyl]									
NaCN	DMF	−75	160	180.8	3.08 (M)		Chloroform	25	64
					−6 (MC)	−10.3 (MC)			
Poly[*N*-(3-methyl-1-carbomethoxybutyl)iminocarbonyl]									
Methyllithium	DMF	−50	62				TFA	25	182
Poly[*d*-*N*-(phenylpropyl)iminocarbonyl]									
NaCN	DMF	RT	−468.0	−754.8	35 (M)	44.8 (M)	Chloroform	25	65
					114.4 (MC)				

2.7. POLY(IMINES)

Poly(D-conidine)									
$BF_3 \cdot OEt_2$	Ether	RT	−140.8		71.7 (M)		Chloroform		69
Poly(L-conidine)									
$BF_3 \cdot OEt_2$	Ether	RT	140.8		−71.0 (M)		Chloroform		69
Poly[(*S*)decyliminoisobutylethylene]									
$BF_3 \cdot OEt_2$	Neat	−78	−68.6		17.9 (M)		Benzene (P); ethanol (M)	19–21	173
Poly[(*R*)ethyliminoethylethylene]									
$BF_3 \cdot OEt_2$	Neat	−78	155.13		−41.80 (M)		Dioxane (P); methanol (M)	25	234
Poly[imino-1-butyl-(*R*)2-ethylethylene]									
$BF_3 \cdot OEt_2$	–	98–100	137.66		2.73 (M)		Benzene (P); ethanol (M)		145
Poly[imino-1-(*R*)2-diethylethylene]									
$BF_3 \cdot OEt_2$	–	98–100	155.13		−20.33 (M)		Dioxane (P); ethanol (M)	25	145
Poly[(*R*)imino-2-ethylethylene]									
$BF_3 \cdot OEt_2$	–	100	−127.4		17.6 (M)		Benzene (P); neat (M)	23 (P); 18 (M)	67

$AlCl_3$	–	100	– 108.9		17.6 (M)	Benzene (P)	16 (P)	
From (*R*)-2-amino-1-bromobutane			– 109.2			Benzene	16	
Poly[imino-(*R*)2-ethyl-1-pentylethylene]								
$BF_3{\cdot}OEt_2$	–	98–100	132.39		4.16 (M)	Benzene (P); ethanol (M)		145
Poly(imino-*N*-formyl-isopropylethylene)								
Methyl triflate	Acetonitrile	80	199.3		– 130.5 (M)	Chloroform (P); ethanol (M)	25	146
$BF_3{\cdot}OEt_2$	Acetonitrile	80	86.8		– 130.5 (M)	Chloroform (P)	25	
Poly(imino-*N*-formyl-propylene)								
Ethyl trifluoromethane-sulfonate	Acetonitrile	80	130		– 148 (M)	Methanol (P); ethanol (M)	25 (P); 30 (M)	148
Dimethyl sulfate	–	120	107		14.4 (M)	H_2O (P); neat (M)	20	149
Poly[(*S*)iminoisobutylethylene]								
$BF_3{\cdot}OEt_2$	–	80–100	66.7		– 24.6 (M)	Benzene	20 (P); 32 (M)	68
Poly(iminoisopropylethylene)								
$BF_3{\cdot}OEt_2$	–	80	82.8		– 27.1 (M)	Ethanol	24	146
Poly[imino-(*S*)*N*-1-methylbenzylethylene]								
$BF_3{\cdot}OEt_2$	–	0–60	7.09		– 81.8 (M)	Benzene (P); neat (M)	20	147
			– 8.15		– 81.8 (M)	Chloroform (P)	20	
Poly(D-iminopropylene)								
$BF_3{\cdot}OEt_2$	–	80	– 101.5		12.4 (M)		22	66
Poly(L-iminopropylene)								
$BF_3{\cdot}OEt_2$	–	80	109.3		– 12.8 (M)		22	66
Poly[(*S*)methyliminoisobutylethylene]								
$BF_3{\cdot}OEt_2$	Neat	– 78	– 163.5		33.7 (M)	Benzene (P); ethanol (M)	19–21	173

2.8. POLY(AMINO ACIDS)

Poly(*O*-acetyl-L-hydroxyproline)								
NCA	Pyridine		25 (Form I)			90% HCOOH	25	110
			– 175 (Form II)			90% HCOOH after 6 h	25	
Poly(*O*-acetyl-L-serine)								
NCA, triethylamine	Nitrobenzene		31 ($[\alpha]_{546}$)			DCA	25	114
			159 ($[\alpha]_{546}$)			10% DCA–90% EDC	25	
Poly(L-alanine)								
NCA, tributylamine	Benzene–dioxane			21 ($[m']_D$)		99% $CHCl_3$–1% DCA		81,84
				– 90 ($[m']_D$)		TFA		
Poly(D-α-amino-*n*-butyric acid)								
NCA, benzylamine	Nitrobenzene			– 19 ($[m']_D$)		90% $CHCl_3$–10% DCA		81,84
				107 ($[m']_D$)		TFA		
Poly(L-arginine·HCl)								
From poly(L-nitroarginine)			– 21.3			H_2O	20	85
Poly(α-L-aspartic acid)								
From poly(β-benzyl-L-aspartate) (NCA, 120°C in vac.)			6.2			c =31 N NaOH		87
			– 11.2			c =51 N NaOH		88
Poly(β-L-aspartic acid)								
Active ester method		140	– 14 ($[\alpha]_{546}$)			0.2 M NaCl, pH 2	25	89
			– 23 ($[\alpha]_{546}$)			0.1 M NaCl, pH 4	25	
Poly(β-benzyl-D-aspartate)								
NCA, NaOMe	Chloroform		174 ($[\alpha]_{546}$)			Chloroform	22	86
			19 ($[\alpha]_{546}$)			DCA	22	
Poly(β-benzyl-L-aspartate)								
NCA, NaOMe	Chloroform		– 168 ($[\alpha]_{546}$)			Chloroform	22	86
			– 18 ($[\alpha]_{546}$)			DCA	22	

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TABLE 2. *cont'd*

Polymer	Polymerization system		Polymer (P) values		Monomer (M) or model compound (MC) values		Optical activity measured		
Catalyst or Initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	$[\alpha]_D$	$[M]_D$	Solvent	*T* (°C)	Refs.
Poly(γ-benzyl-D-glutamate)									
NCA, NaOMe	Chloroform		− 18 ($[\alpha]_{546}$)				Chloroform	22	86
	Chloroform		17 ($[\alpha]_{546}$)				DCA	22	
Poly(γ-benzyl-L-glutamate)									
NCA			− 30				Hydrazine	20	96
			− 46				TFA	20	
NCA, NaOMe	Chloroform		14 ($[\alpha]_{546}$)				Chloroform	22	86,98
	Chloroform		− 15 ($[\alpha]_{546}$)				DCA	22	86
NCA, NaOMe	Chloroform		15				Chloroform	25	97
	Chloroform		− 14				DCA	25	
NCA, Ni-dl-2-methyl-	Dioxane	30	− 17.0		− 17.1 (NCA)		DCA (P); ethylacetate (NCA)	20	151
butyrate-*n*-Bu_3P			15.3		− 17.1 (NCA)		Chloroform (P)	20	
NCA, benzylamine	Dioxane	30	− 17.0		− 17.1 (NCA)		DCA (P); ethylacetate (NCA)	20	
			16.0		− 17.1 (NCA)		Chloroform (P)	20	
NCA, benzylamine	THF	30	− 15.3		− 17.6 (NCA)		DCA (P); ethylacetate (NCA)	25	152
Poly(1-benzyl-L-histidine)									
NCA, triethylamine	Dioxane		11 ($[\alpha]_{546}$)				Chloroform	25	101
Triethylamine			− 208 ($[\alpha]_{546}$)				DCA–$CHCl_3$	25	
NCA, triethylamine	Dioxane		− 21.1				Acetic acid	20	102
Poly(ε-*N*-carbobenzoxy-L-lysine)									
NCA, NaOMe	Dioxane		5 ($[\alpha]_{546}$)				Chloroform	25	84,103
			− 25 ($[\alpha]_{546}$)				50% $CHCl_3$–50% DCA	25	
Poly(*S*-carbobenzoxymethyl-L-cysteine)									
NCA, NaOMe	Nitrobenzene		− 128 ($[\alpha]_{546}$)				0.2 M NaCl, pH 7	25	90
			− 125 ($[\alpha]_{546}$)				0.2 M NaCl, pH 5	25	
			− 33 ($[\alpha]_{546}$)				0.2 M NaCl, pH 3	25	
Poly(3,4-dehydro-L-proline)									
NCA	Pyridine		− 500				99% formic acid	25	109
			− 1250				TFA	25	
Poly(L-glutamic acid)									
From poly(γ-benzyl-L-glutamate) (NCA, aliphatic amine, DMF)			3				Dioxane–H_2O, 0.2 M NaCl, pH 4.7	22	84,92
			− 77				Dioxane–H_2O, 0.2 M NaCl, pH 6.5	22	
			7				2-Chloroethanol–H_2O, 0.1 M RbCl, pH 5		84,93
			− 75				2-Chloroethanol–H_2O, 0.1 M RbCl, pH 7.5		
From poly(γ-benzyl-L-glutamate) (NCA, NaOMe)			− 6				0.2 M NaCl, pH 4.5	20	84,94
			− 102				0.2 M NaCl, pH 8.0	20	
Poly(γ-D-glutamic acid)									
Active ester method			23.6				H_2O	23	95
Poly(γ-L-glutamic acid)									
Active ester method			− 23.6				H_2O	23	95

Poly(L-histidine)						
From poly(1-benzyl-L-histidine)						
(NCA, triethylamine, dioxane)		-65 ($[\alpha]_{546}$)		0.2 M NaCl, pH 2.4	25	101
		-210 ($[\alpha]_{546}$)		0.2 M NaCl, pH 5.85	25	
		-67 ($[\alpha]_{546}$)		0.2 M NaCl, pH 6.00	25	
		28 ($[\alpha]_{546}$)		DCA	25	
		-20		Acetic acid	22	102
Poly(δ-hydroxy-*O*-acetyl-L-α-aminovaleric acid)						
NCA, triethylamine	Nitrobenzene	10.1 ($[\alpha]_{546}$)		DMF	25	83
		-26.5 ($[\alpha]_{546}$)		TFEL	25	
		-31.4 ($[\alpha]_{546}$)		DCA	25	
Poly(L-hydroxyproline)						
From poly(*O*-acetyl hydroxy-L-proline)		-400		H_2O	25	110
Poly(L-leucine)						
NCA, tributylamine	Benzene		-12 ($[m']_D$)	Benzene		81,84
			-111 ($[m']_D$)	TFA		81
Poly(L-lysine)						
From poly(ε-*N*-carbobenzoxy-L-lysine)		-144		H_2O, pH 7		105
		-35		H_2O, pH 12		
		-51		H_2O, pH 10.10	21.4	
		-77		H_2O, pH 9.98	23.2	
		-108		H_2O, pH 9.72	25.6	
Poly(L-lysine hydrochloride)						
From poly(ε-*N*-carbobenzoxy-L-lysine)		-78.8		6 N HCl	25	106
Poly(L-methionine)						
NCA, NaOMe	Nitrobenzene	24.4 ($[\alpha]_{546}$)		90% $CHCl_3$–10% DCA	25	107
		16.8 ($[\alpha]_{546}$)		DCA	25	
		-115.3 ($[\alpha]_{546}$)		TFA	25	
		22 ($[\alpha]_{546}$)		Chloroform		108
		-107 ($[\alpha]_{546}$)		80% TFA – 20% DCA		
Poly(L-methionine-*S*-carboxymethylthetin)						
From poly(L-methionine)		-44 ($[\alpha]_{546}$)		HCl, H_2O (pH 1.1–2.0)	25	107
Poly(L-methionine-*S*-methylsulfonium bromide)						
From poly(L-methionine)		-74.3 ($[\alpha]_{546}$)		H_2O	24	107
		-38.6($[\alpha]_{546}$)		10M LiBr	24	
Poly(*N*-methyl-L-alanine)						
NCA, benzylamine	Dioxane	-3.04		TFEL	24	82
Poly(γ-methyl-L-glutamate)						
NCA		-31.3		DCA	25	99
		-76.1		TFA	25	
		10		DMF	25	100
Poly(L-nitroarginine)						
NCA	DMF	-16.6		DMF	30	85
Poly(γ-phthalimidomethyl-L-glutamate)						
NCA, triethylamine		12.5		DMF	25	91
Poly(L-pipecolic acid)						
NCA, diethylamine	Benzene or dioxane	-325 (Form I)		Acetic acid	25	109
		-50 (Form II)		Acetic acid after 2 h	25	

TABLE 2. *cont'd*

Polymer Catalyst or Initiator	Polymerization system Solvent	 T (°C)	Polymer (P) values [α]D	 [M]D	Monomer (M) or model compound (MC) values [α]D	 [M]D	Optical activity measured Solvent	 T (°C)	 Refs.
Poly(L-proline)									
			50 (Form I)				Acetic acid		111
			– 540 (Form II)				Acetic acid		
NCA, pyridine			48 (Form I)				10% Pyridine 90% H_2O	25	112
			– 420 (Form II)				10% Pyridine after 50 h	25	
			33 (Form I)				H_2O		113
			– 540 (Form II)				0.1 M KCl		
Poly(β-proline)									
Triethylamine	DMF	30	– 10 to – 11		7.6 (MC)		Chloroform	25	150
Poly(L-serine)									
From poly(*O*-acetyl-L-serine)			– 22 $[\alpha]_{546}$				H_2O	25	114
			– 7.3 $[\alpha]_{546}$				10 M LiBr	25	
			– 25.2 $[\alpha]_{546}$				8 M urea	25	
			– 9.3 $[\alpha]_{546}$				Hydrazine	25	
			– 9.7 $[\alpha]_{546}$				DCA	25	
Poly(*O*-*p*-tolylsulfonyloxy-L-proline)									
NCA	Pyridine		0 (Form I)				Acetic acid	25	110
			– 120 (Form II)				Acetic acid after 3 h		
Poly(ε-*N*-trifluoroacetyl-L-lysine)									
NCA, diethylamine	DMF		– 6.8 ($[\alpha]_{546}$)				Methanol	20	104
			– 36.8 ($[\alpha]_{546}$)				DCA	20	
Poly(L-tryptophan)									
NCA, diethylamine	Dioxane		218 ($[\alpha]_{546}$)				DMF	20	115
			343 ($[\alpha]_{546}$)				40% DMF – 60% DCA	20	
Poly(L-tyrosine)									
From poly(*O*-carbobenzoxy-L-tyrosine) (NCA, 110°C in vac.)									
			184				DMF		116
			73				20% DMF–80% DCA		
			150				0.15 M NaCl, pH 10.85		
			28				0.15 M NaCl, pH 12.27		
			8.7				1 N NaOH	20	117

TABLE 3. POLY(SACCHARIDES)

Polymer Catalyst or initiator	Polymerization system Solvent	 T (°C)	Polymer (P) values [α]D	 [M]D	Monomer (M) or model compound (MC) values [α]D	 [M]D	Optical activity measured Solvent	 T (°C)	 Refs.
Poly[(1→6)-2,5-anhydro-3,4-di-*O*-decyl-D-glucitol]									
$BF_3 \cdot OEt_2$	DCM	0	16.0		6.8 (M)		Chloroform	22	211
tert-BuOK	THF	60	23.7		6.8 (M)		Chloroform	22	
Poly[(1→6)-2,5-anhydro-3,4-di-*O*-ethyl-D-glucitol]									
$BF_3 \cdot OEt_2$	DCM	– 30	32.7		54.1 (MC); – 5.2 (M)		Chloroform	22	210

Poly[(1→6)-2,5-anhydro-3,4-di-*O*-methyl-D-glucitol]							
tert-BuOK	Toluene	60	84.5 ($[\alpha]_{546}$)		Chloroform	23	212
KOH	Toluene	60	75.5 ($[\alpha]_{546}$)		Chloroform	23	
$BF_3 \cdot OEt_2$ (from D-mannitol)	DCM	0	41.3 ($[\alpha]_{546}$)	−12.3 (M) ($[\alpha]_{546}$)	Chloroform	22	213
$BF_3 \cdot OEt_2$ (from L-iditol)	DCM	0	43.1 ($[\alpha]_{546}$)	−9.8 (M) ($[\alpha]_{546}$)	Chloroform	22	
Poly(2,5-anhydro-3,4-di-*O*-methyl-D-mannitol)							
$BF_3 \cdot OEt_2$	DCM	0	50.2 ($[\alpha]_{546}$)	−9.6 (M) ($[\alpha]_{546}$); 44.1 (MC)	Chloroform	22 (P, M); 23 (MC)	214
Poly[(1→6)-2,5-anhydro-3,4-di-*O*-pentyl-D-glucitol]							
$BF_3 \cdot OEt_2$	DCM	0	25.8	9.3 (M)	Chloroform	22	211
tert-BuOK	THF	60	32.8	9.3 (M)	Chloroform	22	
Poly[α-(1→6′)-anhydro-D-galactopyranose]							
From 2,3,4-tri-*O*-benzyl derivative			207.1		10% LiOH − 0.5% borate	25	75
Poly(1,6-anhydro-β-D-glucopyranose)							
Chloroacetic acid	−	21−127	91		H_2O	22	77
Poly(α-1,6-anhydro-D-mannopyranose)							
From 2,3,4-tri-*O*-benzyl derivative			122.8		1% DMSO	30	80
Poly(α-1,6-anhydro-2,3,4-tri-*O*-acetyl-β-D-mannopyranose)							
PF_5	DCM	0	96		DMSO	30	80
Poly[α(1→6′)-anhydro-2,3,4-tri-*O*-benzyl-β-D-galactopyranose]							
PF_5	DCM	−78	105.1	−46.1 (M)	Chloroform	25	75
Poly[α-1,6-anhydro-2,3,4-tri-*O*-benzyl-β-D-mannopyranose]							
PF_5	DCM	−78	57.5	−32 (M)	Chloroform	30 (P); 25 (M)	80
Poly[1,6-anhydro-2,3,4-tri-*O*-methyl-β-D-glycopyranose]							
$BF_3 \cdot OEt_2$	Toluene	RT	199	−63.7 (M)	Chloroform	25 (P); 20 (M)	78
$BF_3 \cdot OEt_2$	Toluene	RT	204	−63.7 (M)	Chloroform	25 (P); 20 (M)	
Poly(D-galactose)							
HCl	DMSO	40	79.1		H_2O	20	74
Poly(D-glucose)							
HCl	DMSO	40	90.3		H_2O	20	74
Polyphosphate formamide		50−60	16				76
Poly(D-mannose)							
HCl	DMSO	40	102.9		H_2O	20	74
Poly(2,3,6-tri-*O*-methyl-D-glucose)							
$HBr-HCl-P_2O_5$	DMSO	RT	136.6		Chloroform	20	79
Poly(D-xylose)							
HCl	DMSO	40	96.1		H_2O	20	74

C. OPTICALLY ACTIVE POLYMERS FROM ACHIRAL MONOMERS

TABLE 4. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Polymerization system		Polymer (P) Values			Optical activity measured		
Catalyst or initiator	Solvent	T (°C)	$[\alpha]_D$	$[M]_D$	Origin of optical activity	Solvent	T (°C)	Refs.
4.1. POLY(ACRYLICS) AND RELATED POLYMERS								
Poly(*N*-acryloylcarbazole)								
Fluorenyllithium/(−)-sparteine	Toluene	−97	57.4		Helix-sense asymmetry	Chloroform	25	188
Poly(*N*-acryloyliminodibenzyl)								
Fluorenyllithium/(−)-sparteine	Toluene	−97	−0.5		Helix-sense asymmetry	Chloroform	25	188

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TABLE 4. *cont'd*

Polymer Catalyst or initiator	Polymerization system Solvent	 *T* (°C)	Polymer (P) Values $[\alpha]_D$	 $[M]_D$	 Origin of optical activity	Optical activity measured Solvent	 *T* (°C)	 Refs.
Poly(*N*-acryloylphenothiazine)								
Fluorenyllithium/(−)-sparteine	Toluene	−97	8.2		Helix-sense asymmetry	Chloroform	25	188
Poly(*N*,*N*-diphenylacrylamide)								
BuLi/(−)-sparteine	Toluene	−96	−44.2 to −50.9		Helix-sense asymmetry	THF	25	153
Fluorenyllithium/(−)-sparteine	Toluene	−97	−101			Chloroform	25	188
Poly[*N*,*N*-di(2-pyridyl)-acrylamide]								
Fluorenyllithium/(−)-sparteine	Toluene	−97	−23.7		Helix-sense asymmetry	Chloroform/DCA (22/1)	25	188
Poly[*N*-methyl-*N*-triphenylmethyl-acrylamide]								
n-BuLi/(−)-sparteine	Toluene	−78	−2.4		Helix-sense asymmetry	THF	25	188
Poly(1-phenyldibenzosuberyl acrylate)								
DPEDA-Li/(+)-DBB	Toluene	−40	−129		Helix-sense asymmetry	Chloroform	25	219
Poly(*N*-phenyl-*N*-1-naphthylacrylamide)								
BuLi/(−)-sparteine	Toluene	−78	8.7		Helix-sense asymmetry	Toluene	25	153,188
Poly(*N*-phenyl-*N*-2-naphthylacrylamide)								
BuLi/(−)-sparteine	Toluene	−78	81.7		Helix-sense asymmetry	Toluene	25	153,188
Poly[*N*-phenyl-*N*-(1-phenylethyl)-acrylamide]								
Fluorenyllithium/(−)-sparteine	Toluene	−97	−0.3		Helix-sense asymmetry	THF	25	188
Poly(triphenylmethyl acrylate)								
DPEDA-Li/(+)1-(2-pyrrolidinylmethyl)pyrrolidine	Toluene	−78	102 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	186

4.2. POLY(METHACRYLICS) AND RELATED POLYMERS

Polymer Catalyst or initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	Origin of optical activity	Solvent	*T* (°C)	Refs.
Poly(benzyl methacrylate)								
(*S*)2,3 : 4,5-bis[1,2-(3-methylnaphtho)]-1,6,9,12,15,18-hexaoxacycloeicosa-2,4-diene-*KO-tert*-Bu	95% Toluene–5% THF	−78	350 ($[\alpha]_{578}$)		Miscellaneous	THF	25	164
Poly(*tert*-butyl methacrylate)								
(*S*)2,3 : 4,5-bis[1,2-(3-methylnaphtho)]-1,6,9,12,15,18-hexaoxacycloeicosa-2,4-diene-*KO-tert*-Bu	95% Toluene–5% THF	−78	117 ($[\alpha]_{578}$)		Miscellaneous	THF	25	164
Poly(*m*-chlorophenyldiphenylmethyl methacrylate)								
DPEDA-Li/(+)-DDB	Toluene	−78	314		Helix-sense asymmetry	THF	25	220
Poly(cyclohexyldiphenylmethyl methacrylate)								
DPEDA-Li/(+)1-(2-pyrrolidinylmethyl)pyrrolidine	Toluene	−78	758 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	240
			770 ($[\alpha]_{365}$)			Chloroform	60	
			−480 ($[\alpha]_{365}$)			Chloroform after 1 h	60	
Poly(cyclopropyldiphenylmethyl methacrylate)								
DPEDA-Li/(+)-DDB	Toluene	−78	−44 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	240
Poly(diphenyl-*m*-fluorophenylmethyl methacrylate)								
DPEDA-Li/(+)-DDB	Toluene	−78	297		Helix-sense asymmetry	THF	25	220
Poly(diphenyl-2-pyridylmethyl methacrylate)								
DPEDA-Li/(−)-DDB	Toluene	−78	−1403 ($[\alpha]_{365}$)		Helix-sense asymmetry	90% Chloroform – 10% TFEL	25	155
Poly(diphenyl-4-pyridylmethyl methacrylate)								
BuLi/(−)-sparteine	Toluene	−78	−40 ($[\alpha]_{546}$)		Helix-sense asymmetry	90% Chloroform – 10% TFEL	25	154
Poly(methyl methacrylate)								
From poly(methacrylic acid) (potassium persulfate/dextrin, water, 0°C)			6.4 ($[\alpha]_{350}$)		Induced asymmetry	Benzene	25	162

From poly(methacrylic acid) (potassium persulfate/chitosan, water, 30°C)							
			16.6	Induced asymmetry	Chloroform	21	163
(*S*)2,3 : 4,5-bis[1,2-(3-methylnaphtho)]-1,6,9,12,15,18-hexaoxacycloeicosa-2,4-diene-*KO-tert*-Bu							
	95% Toluene–5% THF	−78	250 ($[\alpha]_{578}$)	Miscellaneous	THF	25	164
From poly(2,3-*O*-isopropylidene-1,4-di-*O*-methacryloyl-L-threitol) (AIBN, toluene, 60°C)							
			−4.3 ($[\alpha]_{405}$)	Induced asymmetry	Chloroform	20	244
Poly(1-phenyldibenzosuberyl methacrylate)							
Diisopropyl peroxydicarbonate	(+)Menthol/toluene	50	−200 ($[\alpha]_{365}$)	Helix-sense asymmetry	THF	25	196
Diisopropyl peroxydicarbonate	(−)Menthol/toluene	50	180 ($[\alpha]_{365}$)		THF	25	196
Diisopropyl peroxydicarbonate/ (+)neomenthanethiol	Toluene	40	−140 ($[\alpha]_{365}$)		THF	25	253
(−)Dimethyl peroxydicarbonate	Toluene	50	40 ($[\alpha]_{365}$)		THF	25	253
DPEDA-Li/(−)-sparteine	Toluene	−78	1670 ($[\alpha]_{365}$)		Chloroform	25	196
Poly[1-(2-pyridyl)dibenzosuberyl methacrylate]							
DPEDA-Li/(−)-sparteine	Toluene	−78	1290 ($[\alpha]_{365}$)	Helix-sense asymmetry	Chloroform	25	251
Poly(triphenylmethyl methacrylate)							
Li(R)-*N*-(1-phenylethyl)anilide	THF	−78	−104	Helix-sense asymmetry	Toluene	20	156
BuLi/(−)-sparteine	Toluene	−78	363		Toluene	20	
(*S*)-6-(2-dimethylaminoethyl)-1,11-dimethyl-6,7-dihydro-5H-dibenz[c,e]azepine							
	Toluene	−78	373		THF	25	157
Poly[tris(*m*-chlorophenyl)methyl methacrylate]							
DPEDA-Li/(−)-DDB	Toluene	−78	−251	Helix-sense asymmetry	THF	25	220
Poly[tris(*m*-tolyl)methyl methacrylate]							
DPEDA-Li/(−)-DDB	Toluene	−78	−234 ($[\alpha]_{546}$)	Helix-sense asymmetry	Chloroform	25	220

4.3. POLY(VINYL ETHERS)

Poly(benzofuran)							
$AlCl_3$/phenylalanine	Toluene	−75	24–56.7	Induced asymmetry	Benzene		169
$AlCl_3/Et_3SnCl$/(−)menthoxy-triethyltin	Toluene	−75	73.8		Benzene	18	242
Poly(α-naphthofuran)							
$2AlCl_3$/(−)-β-phenylalanine	Toluene	−75	41	Induced asymmetry	Chloroform	20	170
Poly(β-naphthofuran)							
$2AlCl_3$/(−)-β-phenylalanine	Toluene	−75	−145	Induced asymmetry	Chloroform	20	170
Poly(2-phenyl-1,3-dioxane-4,6-diyl) (Poly(benzaldehyde divinyl acetal))							
$ZnCl_2 \cdot OEt_2$/(+)-10-camphor-sulfonic acid	Toluene	0	−17.1 ($[\alpha]_{435}$)	Induced asymmetry	Chloroform	20	198
$ZnCl_2 \cdot OEt_2$/(−)-10-camphor-sulfonic acid	Toluene	0	13.7 ($[\alpha]_{435}$)		Chloroform	20	198

4.4. POLY(STYRENES)

Poly(4-iodostyrene)							
From copolymer of 3,4-*O*-cyclohexylidene-D-mannitol-1,2 : 5,6-bis-*O*-[(4-vinylphenyl)boronate] and styrene (AIBN, toluene, 60–70°C)							
			0 to −4.5 ($[\alpha]_{436}$)	Induced asymmetry	THF	30	179,180
Polystyrene							
From copolymer of 3,4-*O*-cyclohexylidene-D-mannitol-1,2 : 5,6-bis-*O*-[(4-vinylphenyl)boronate] and styrene (AIBN, toluene, 60–70°C)							
			−0.5 to −3.5 ($[\alpha]_{365}$)	Induced asymmetry	THF	30	179,180

4.5. POLY(DIENES)

Poly(3-carboxy-1-butenylene)							
From poly[1-(*d*-bornylammonium carboxylate)-1,3-butadiene] (AIBN, methanol, 50°C. See Section B. Table 1, 1.6)							
			0.2	Induced asymmetry	Methanol	25	177

TABLE 4. *cont'd*

Polymer	Polymerization system		Polymer (P) Values			Optical activity measured		
Catalyst or initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	Origin of optical activity	Solvent	*T* (°C)	Refs.
From poly[1-(*S*(−)α-phenylethylammonium carboxylate)-1,3-butadiene] (AIBN, methanol, 50°C. See Section B. Table 1, 1.6)								
			−4.8	−4.7		Methanol	20	178
Poly(3-carboxy-4-methyl-1-butenylene) (Poly(sorbic acid))								
Potassium persulfate/chitosan	Water	50	2.32		Induced asymmetry	Methanol	20	161
From poly[1-((−)menthyloxycarbonyl)-1,3-pentadiene] (AIBN, benzene, 50°C. See Section B. Table 1, 1.6)								
			−58.3			THF	25	190
Poly[3-(ethoxycarbonyl)-1-butenylene]								
n-BuLi/sodium 1-menthoxide	Toluene	−78	−14.0		Induced asymmetry	Benzene	RT	176
n-BuLi/sodium *d*-bornoxide	Toluene	−78	6.0			Benzene	RT	
Poly[3-(methoxycarbonyl)-1-butenylene]								
n-BuLi/sodium 1-menthoxide	Toluene	−78	−2.4		Induced asymmetry	Benzene	RT	176
n-BuLi/sodium *d*-bornoxide	Toluene	−78	2.7			Benzene	RT	
Poly(*trans*-2-methyl-1,3-pentadiene)								
γ-ray/apocholic acid	–	50	−106		Induced asymmetry	Carbon tetrachloride	20	159
γ-ray/deoxycholic acid	–	50	90			Carbon tetrachloride	20	160
Poly(*cis*-2-methyl-1,3-pentadiene)								
γ-ray/apocholic acid	–	50	−66		Induced asymmetry	Carbon tetrachloride	20	159
γ-ray/deoxycholic acid	–	50	320			Carbon tetrachloride	20	160
Poly(1,3-pentadiene)								
$Al(C_2H_5)$/(−)titanium tetramenthoxide	Benzene	0	−22.8		Induced asymmetry	Hexane	18	171
Poly(*trans*-1,3-pentadiene)								
γ-ray/apocholic acid	–	50	−6.5		Induced asymmetry	Carbon tetrachloride	20	159
γ-ray/deoxycholic acid	–	RT	0.3			Chloroform	26	158
γ-ray/*trans*,anti,*trans*,anti,*trans*-perhydrotriphenylene								
Poly(*cis*-1,3-pentadiene)	–		2.5			Chloroform	25	172
γ-ray/apocholic acid	–	50	−3.7		Induced asymmetry	Carbon tetrachloride	20	159
γ-ray/deoxycholic acid	–	RT	−21			Chloroform	26	158

4.6. POLY(ISONITRILES)

Polymer / Catalyst or initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	Origin of optical activity	Solvent	*T* (°C)	Refs.
Poly[(*tert*-butylimino)methylene]								
tris(*tert*-butyl isocyanide)[(*S*)(−)-(1-phenylethyl)amino(*tert*-butylamino)carbene]-nickel(II) perchlorate								
	Neat	RT	−28.7		Helix-sense asymmetry	Chloroform	20	207
Poly[5,8-dimethyl-6,7-bis(propoxymethyl)-quinoxaline-2,3-diyl] (Poly[1,2-diisocyano-3,6-dimethyl-4,5-bis(propoxymethyl)benzene])								
(+)oligo(5,8-di-*p*-tolylquinoxaline-2,3-diyl)/Pd(II)								
	THF	RT	−171		Helix-sense asymmetry			204

4.7. POLY(MALEIMIDES)

Polymer / Catalyst or initiator	Solvent	*T* (°C)	$[\alpha]_D$	$[M]_D$	Origin of optical activity	Solvent	*T* (°C)	Refs.
Poly(*N*-benzyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	11.3		Induced asymmetry	Chloroform or THF		181
Poly(*N*-*n*-butyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−7.1		Induced asymmetry	Chloroform or THF		181
Poly(*N*-sec-butyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	6	−21.0		Induced asymmetry	Chloroform or THF		181

Poly(*N-tert*-butyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	2.8		Induced asymmetry	Chloroform or THF		181
Poly(*N*-cyclohexyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−39.5		Induced asymmetry	Chloroform or THF		181
Poly(*N*-2-fluorenyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−0.4		Induced asymmetry	Chloroform or THF		181
Poly(*N*-isobutyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−13.4		Induced asymmetry	Chloroform or THF		181
Poly(*N*-isopropyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−18.7		Induced asymmetry	Chloroform or THF		181
Poly(*N*-1-naphthyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	0.9		Induced asymmetry	Chloroform or THF		181
Poly(*N*-phenyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−15.4		Induced asymmetry	Chloroform or THF		181
n-BuLi/(−)-sparteine/CuI	Toluene	0	−23.7 ($[\alpha]_{435}$)			Chloroform	25	241
Poly(*N-n*-propyl maleimide)								
n-BuLi/(−)-sparteine	Toluene	0	−4.9		Induced asymmetry	Chloroform or THF		181
4.8. OTHER COMPOUNDS								
Poly(methylene-1,3-cyclopentylene) (from 1,5-hexadiene)								
(+)(*S,S*)ethylene-1,2-bis(η^5-4,5,6,7-tetrahydro-1-indenyl)zirconium-1,1′-bi-2-naphtholate/methylaluminoxane								
	Toluene	RT		51.0 ($[M]_{405}$)	Induced asymmetry	Chloroform	28	239
Poly[1-(*m*-tolylsulfonyl)ethylene]								
From poly(*m*-tolyl vinyl sulfoxide) (*n*-BuLi/(−)-sparteine, toluene, −78°C. See Section B, Table 1, 1.10)								
			42		Miscellaneous			246

TABLE 5. MAIN-CHAIN ACYCLIC HETROATOM POLYMERS

Polymer	Polymerization system		Polymer (P) values			Optical activity measured		
Catalyst or initiator	Solvent	T (°C)	$[\alpha]_D$	$[M]_D$	Origin of optical activity	Solvent	T (°C)	Refs.
5.1. POLY(OXIDES) AND POLY(SULFIDES)								
Poly(chloral)								
Tetramethylammonium (−) acetyl mandelate								
	–	0–75	242–668		Helix-sense asymmetry	Film (soaked in diphenyl ether)	25	165
Lithium coprostan-3β-oxide	Hexane	<58	2970			Film (soaked in diphenyl ether)	RT	247
Poly(oxy-1,2-cyclohexylidene)								
$ZnEt_2$/(1*S*,2*R*)-ephedrine	–	80	−9.1 to 12.3		Induced asymmetry	Benzene	25	194
Poly(oxy-1,2-dimethylethylene)								
$ZnEt_2$/(1*S*,2*R*)-ephedrine	–	80	15		Induced asymmetry	Benzene	25	238
Poly(thio-1,2-cyclohexylidene)								
$ZnEt_2$/(*R,R*)-1,2-diphenyl-1,2-ethandiol								
	Toluene	RT	59		Induced asymmetry	Trichlorobenzene	25	238
Poly(thio-1,2-dimethylethylene)								
$ZnEt_2$/(*R,R*)-1,2-diphenyl-1,2-ethandiol								
	–	RT	154		Induced asymmetry	Chloroform	25	238

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TABLE 5. *cont'd*

Polymer / Catalyst or initiator	Polymerization system: Solvent	Polymerization system: T (°C)	Polymer (P) values: [α]D	Polymer (P) values: [*M*]D	Origin of optical activity	Optical activity measured: Solvent	Optical activity measured: T (°C)	Refs.
5.2. POLY(ISOCYANATES)								
Poly[(butyl)iminocarbonyl]								
(*R*)*N*-benzyl-1-phenylethylamine lithium amide	Toluene	− 78	− 40 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	248
Poly[*N*-(*p*-chlorophenyl)iminocarbonyl]								
tert-BuLi/(*S*)(-)-(2-methyoxymethyl)pyrrolidine	THF	− 98	377 ($[\alpha]_{365}$)		Helix-sense asymmetry	THF	25	193
Poly[*N*-(3,4-dimethylphenyl)iminocarbonyl]								
tert-BuLi/(*S*)(−)-(2-methyoxymethyl)pyrrolidine	THF	− 98	569 ($[\alpha]_{365}$)		Helix-sense asymmetry	DCM	25	193
Poly[*N*-(*p*-methoxyphenyl)iminocarbonyl]								
tert-BuLi/(*S*)(−)-(2-methyoxymethyl)pyrrolidine	THF	− 98	588 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	193
Poly[*N*-(*m*-methylphenyl)iminocarbonyl]								
tert-BuLi/(*S*)(−)-(2-methyoxymethyl)pyrrolidine	THF	− 98	819 ($[\alpha]_{365}$)		Helix-sense asymmetry	THF	25	193
Poly[*N*-(*p*-methylphenyl)iminocarbonyl]								
tert-BuLi/(*S*)(−)-(2-methyoxymethyl)pyrrolidine	THF	− 98	748 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	193
Poly[*N*-(1-naphthyl)iminocarbonyl]								
tert-BuLi/(*S*)(−)-(2-methyoxymethyl)pyrrolidine	THF	− 98	529 ($[\alpha]_{365}$)		Helix-sense asymmetry	DCM	25	193
Poly[(4-phenylbutyl)iminocarbonyl]								
(*R*)*N*-benzyl-1-phenylethylamine lithium amide	Toluene	− 78	− 17 ($[\alpha]_{365}$)		Helix-sense asymmetry	Chloroform	25	248

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Anisotropy of Segments and Monomer Units of Polymer Molecules

V. N. Tsvetkov, L. N. Andreeva, N. V. Tsvetkov
Institute of High Molecular Weight Compounds, Russian Academy of Sciences,
St. Petersburg, Russian Federation

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A. INTRODUCTION

Segmental anisotropy $(\alpha_1 - \alpha_2)^*$ of a chain molecule may be determined experimentally from measurements of flow birefringence in the solution of a polymer with a sufficiently high molecular weight, so that the conformation of its molecules would correspond to that of a Gaussian coil.

For calculating $(\alpha_1 - \alpha_2)^*$, Kuhn's equation was used (Ref. 1):

$$\frac{\Delta n}{\Delta \tau} = \left[\frac{\Delta n}{g(\eta - \eta_0)}\right]_{\substack{g\to 0\\ c\to 0}} \equiv \frac{[n]}{[\eta]} = \frac{4\pi}{45kT} \times \frac{(n^2+2)^2}{n}(\alpha_1 - \alpha_2)^* \quad \text{(A1)}$$

where $\Delta\tau$ is the tangential flow stress (shearing stress), Δn is the observed flow birefringence of the solution, g is the velocity gradient, c and η are the concentration and the viscosity of the solution, respectively, $[\eta]$ and $[n]$ are intrinsic values of viscosity and flow birefringence of the solution, and η_0 and n are the viscosity and the refractive index of the solvent. The value $\Delta n/\Delta\tau = [n]/[\eta]$ may be called the shear optical coefficient.

Another method of determining segmental anisotropy (which is seldom used) is through the measurement of stress birefringence in swollen polymers (74). The stress optical coefficient $\varepsilon = \Delta n/\Delta p$ (where Δp is the normal stress in the sample) determined experimentally is equal to $\Delta n/2\Delta\tau$ (2), where $\Delta n/\Delta\tau$ is also related to $(\alpha_1 - \alpha_2)^*$ according to Eq. (A1). Data obtained by this method are marked in the table with the symbol sw. p. (swollen polymer).

If the refractive indices of the polymer and the solvent are not equal, the experimental value of $(\alpha_1 - \alpha_2)^*$ includes not only the intrinsic segmental $(\alpha_1 - \alpha_2)$, but also a part produced by the form effect (3,4). In this case the value $\alpha_1 - \alpha_2$ may be calculated using $(\alpha_1 - \alpha_2)^*$ and the theoretical equation for macro- and micro-form effects (3,4).

For determining $\alpha_1 - \alpha_2$, it is preferable to use the "matching" solvent in which the increment of index of the polymer, dn/dc, is equal to zero

The tables give the intrinsic segmental anisotropy, $\alpha_1 - \alpha_2$, obtained directly from measurements in the "matching" solvent, as well as the $(\alpha_1 - \alpha_2)^*$ values including the form effect. The corresponding figures are marked with the symbol *.

In some of the reviewed works in which measurements were carried out in "nonmatching" solvents, the segmental anisotropy was calculated on the basis of the theory of the form effect (3,4). In these cases the figures are marked with the symbol **.

Intrinsic segmental anisotropy of the polymer chain in various solvents, even in the absence of the form effect, may differ owing to a "specific" effect of the solvent (see, e.g., poly(vinyl acetate)) (5–11). "Specific" effect may probably includes phenomena such as a change in the type of rotation of the side groups (5,6,8,12), a change in the polarizability of its bonds, and the short-range ordering of the solvent molecules (11).

Principal values which effect the intrinsic segmental anisotropy of the chain are the anisotropy of the monomer unit and the equilibrium rigidity of the chain.

The Kuhn segment with the length A is the measure of the equilibrium rigidity of the chain. If the chain adopts the conformation of the Gaussian coil, then we have $A = \langle r^2 \rangle / L$, where L is the complete length of the extended chain and $\langle r^2 \rangle$ is the mean square end-to-end distance.

Also, $a_\parallel - a_\perp$ is the difference between the polarizabilities of the monomer unit in the parallel and perpendicular directions of the chain. Values of $a_\parallel - a_\perp$ presented in the table were calculated from

$$a_\parallel - a_\perp = (\alpha_1 - \alpha_2)\lambda / A \qquad \text{(A2)}$$

where λ is the length of the monomer unit in the chain direction. For cellulose esters, $a_\parallel - a_\perp$ and correspondingly, $\alpha_1 - \alpha_2$ depend on the degrees of substitution (DS), which are also given in the table.

For heterocyclic polycondensation polymers, the term "monomer unit" means the repeat unit of the polymer chain.

Many rigid-chain polymers have been investigated in the molecular-weight range in which their molecules exhibit a conformation intermediate between the rodlike conformation and the Gaussian coil. The best model for these polymers is the wormlike chain. Under these conditions the shear optical coefficient $\Delta n / \Delta \tau$ varies with the molecular weight M of the polymer and is given by the equation (100)

$$\Delta n / \Delta \tau = B \langle \gamma_1 - \gamma_2 \rangle \langle h^4 \rangle / \langle h^2 \rangle^2 \qquad \text{(A3)}$$

where $B = (4\pi / 45kT)(n^2 + 2)^2 / n$, $\langle \gamma_1 - \gamma_2 \rangle$ is the mean value of the wormlike chain optical anisotropy, $\langle h^2 \rangle$ and $\langle h^4 \rangle$ are the mean square and fourth degree end-to-end distance of the wormlike chain.

For the wormlike chain, the value of $\langle \gamma_1 - \gamma_2 \rangle$ as a function of the reduced chain length $x = 2L/A$ is given by the equations

$$\langle \gamma_1 - \gamma_2 \rangle = \frac{3}{5}(\alpha_1 - \alpha_2)\frac{f_1(x)}{1 - 0.8 f_1(x)/x} \qquad \text{(A4)}$$
$$f_1(x) = 1 - (1 - e^{-x})/x$$

According to Eqs. (A3) and (A4) the limit values of $\Delta n / \Delta \tau$ for wormlike chains are as follows: at $x \to 0$, $(\Delta n / \Delta \tau)_0 = B \langle \gamma_1 - \gamma_1 \rangle x \to 0$ as for a thin rod, and at $x \to \infty$, $(\Delta n / \Delta \tau)_\infty = B(\alpha_1 - \alpha_2)$ as for a kinetically flexible Gaussian coil.

The dependence of $\Delta n / \Delta \tau$ on M for the wormlike chains given by the Eqs. (A3) and (A4) may be approximated (100,101) by a linear relationship (A5) between the inverse values $(\Delta n / \Delta \tau)^{-1}$ and M^{-1}:

$$\frac{4\pi}{45kT} \times \frac{(n^2+2)^2}{n} (\Delta n / \Delta \tau)^{-1} = (\alpha_1 - \alpha_2)^{-1} + (M_0 / \Delta a) \times M^{-1} \qquad \text{(A5)}$$

where M_0 is the molecular weight of the repeat unit of the chain. If the experimental dependence of $(\Delta n / \Delta \tau)^{-1}$ on $1/M$ is plotted, the slope of the straight line obtained makes it possible to calculate $\Delta a = a_\parallel - a_\perp$, and its intercept with the ordinate gives $\alpha_1 - \alpha_2$.

B. TABLES OF ANISOTROPY OF SEGMENTS AND MONOMER UNITS OF POLYMER MOLECULES

TABLE 1. MAIN-CHAIN ACYCLIC CARBON POLYMERS

Polymer	Solvent	$(\alpha_\parallel - \alpha_\perp) \times 10^{25}$ cm^3	$(a_\parallel - a_\perp) \times 10^{25}$ cm^3	Refs.
1.1. POLY(DIENES)				
Poly(butadiene) 1,4-*cis*	Benzene, sw. p.	61.3–63	30.8	52–54
	Carbon tetrachloride, sw. p.	53.5*	31.7*	53
	sw. p.	55.2*		54
	Cyclohexane, sw. p.	57.3	33.9	53
	Toluene, sw. p.	72	42.6	53
	p-Xylene, sw. p.	86.9	51.4	53

TABLE 1. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
Poly(butadiene) 1,4-*trans*	Benzene	71	37.4	52
	sw. p.	70.4		53
	Carbon tetrachloride, sw. p.	58.1*		55
	sw. p.	61.1*	36.3*	53
	Cyclohexane, sw. p.	57.3	33.1*	53
	Toluene, sw. p.	81.6	48.6	53
	p-Xylene, sw. p.	101	60.2	53
Poly(chloroprene)	α-Bromonaphthalene	110*		11
	Carbon tetrachloride	33		11
	Chlorobenzene	64		11
	Dichloroethane	39		11
	α-Methylnaphthalene	99*		11
	Tetrachloroethylene	46		11
	Toluene	67		11
	p-Xylene	88		11
Poly(isoprene) *cis*	Benzene	48	30.5	52
	Squalene, sw. p.	53.1		56
trans	Benzene	49	31	52

1.2. POLY(ALKENES)

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
Poly(1-butene) atactic	Toluene	33.4		13
isotactic	Toluene	25.2		13
Poly(1-decene) isotactic	Toluene	− 82.5		13
Poly(1-dodecene)	Toluene	− 120		13
Poly(ethylene)	Tetralin, xylene	60		14
	Decalin	30		14
Poly(1-heptene) isotactic	Toluene	− 24.5		13
Poly(1-hexadecene) isotactic	Toluene	− 205 to − 213		13
Poly(1-hexene) atactic	Toluene	12.1		13
isotactic	Toluene	− 6.5		13
Poly(isobutene)	Benzene, chlorobenzene, tetrachloroethylene, *m*-xylene	45–59		11,14,15
	Carbon tetrachloride	35		11
	Decalin	30		14
	p-Xylene	69		11
Poly(1-octadecene) isotactic	Toluene	− 257		13
Poly(1-octene) isotactic	Toluene	− 39		13
Poly(1-pentene) isotactic	Toluene	8.0		13
		9.3		13
Poly(diphenylpropylene)	Bromoform	80		16
Poly(propylene) atactic	Benzene, xylene	45		14
	Carbon tetrachloride	30	3.5	17
	Decalin	30		14
	Toluene	55		13
isotactic	Carbon tetrachloride	30	3.5	17
Poly(1-tetradecene) isotactic	Toluene	− 176		13
		− 171		13

1.3. POLY(ACRYLIC ACID) AND DERIVATIVES

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
Poly(acrylic acid)	Dioxane	∼ − 0.5**	∼ − 0.1**	18
–, sodium salt	0.0012 M Nacl, pH 7	20**		
	Water, pH 6.1	− 4** to + 10**		19
Poly(*n*-butyl acrylate)	Benzene	− 11	− 1.5	20
	Decalin	− 17.8	− 1.9	21
	Toluene	− 10.1	− 1.1	21
		− 6.5	− 0.9	20
Poly(cetyl acrylate)	Decalin	− 141	− 6.5	22
	Toluene	− 164	− 7.5	21
Poly(cholesteryl acrylate)	Benzene	− 360	− 16	23

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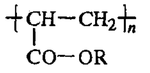
TABLE 1. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel} - a_{\perp}) \times 10^{25}\,cm^3$	Refs.
Poly(decyl acrylate)	Decalin	−74	−3.7	21
	Toluene	−95	−4.7	21
Poly(ethyl acrylate)	Benzene, sw. p.	3.0	0.36	24
	Bromobenzene, sw. p.	10 **	1.2**	24
	Bromoform, sw. p.	−37 **	4.5**	24
	Dibromoethane, sw. p.	−14 **	−1.7**	24
	Dimethylformamide, sw. p.	−11 **	−1.7**	24
Poly(methyl acrylate)	Benzene	17	2.5	20
	Toluene	16	1.9	21
		26	3.6	20
Poly(octadecyl acrylate)	Decalin	−190	−6.6	21
	Toluene	−232	−8.0	21
Poly(octyl acrylate)	Decalin	−57.4	−4.3	21
	Toluene	−47.9	−3.6	21

1.4. POLY(METHACRYLIC ACID) AND DERIVATIVES

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel} - a_{\perp}) \times 10^{25}\,cm^3$	Refs.
Poly(*n*-butyl methacrylate) atactic	Benzene	−14	−2.1	25
isotactic	Benzene	−2.0	−0.3	26
Poly(*tert*-butyl methacrylate) atactic	Benzene	2.1	0.3	20
isotactic	Benzene	19.3	3.0	20
Poly(*p*-*tert*-butylphenyl methacrylate)	Bromobenzene	−90	−7.5	22,28
Poly(*p*-carbethoxy-*N*-phenylmethacrylamide)	*o*-Toluidine	−230	−23	40
Poly(*p*-carboxyphenyl methacrylate)	Dioxane	180 *	8.0*	35
	0.1 M NaCl	370 *		35
Poly(cetyl methacrylate)	Benzene	−160	−8.9	29
Poly(*p*-chloro-*N*-phenylmethacrylamide)	*o*-Toluidine	−160	−20	40
Poly(glycol methacrylate)	Dimethylformamide	1.0	0.18	30
	Ethyl alcohol	−6.0**	−1.1**	30
	Water	−6.0**	−1.1**	30
Poly(hexyl methacrylate)	Benzene	−40	−4.6	31
	Carbon tetrachloride	−9.7	−1.1	31
Poly(methacrylic acid)	Methanol	50 *		32
	0.002 M HCl	150 *		32
–, sodium salt	0.012 M NaCl, pH 7	150 *		33
	0.0012 M NaCl, pH 7	400		33
	Water	56 *–300 *		34
Poly(*p*-methylcarboxy-phenyl methacrylate)	Dibromoethane	−77	−7	35
Poly(methyl methacrylate) atactic	Benzene	2.0	0.3	38
isotactic	Benzene	25	3.5	38
Poly(β-naphthyl methacrylate)	Tetrabromoethane	−60	−8.5	4
Poly(octyl methacrylate)	Benzene	−47	−5.9	31
	Carbon tetrachloride	−12.5	−1.6	31
Poly(*N*-phenylmethacrylamide)	*o*-Toluidine	−103	−13	40
Poly(phenyl methacrylate)	Bromobenzene	−10.5	−1.5	4

1.5. POLY(ACRYLIC ACID) DERIVATIVES WITH MESOGENIC SIDE GROUPS



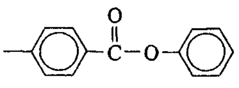
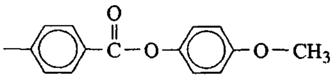
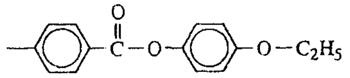
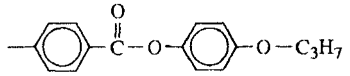
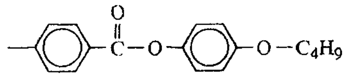
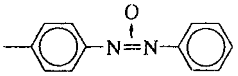
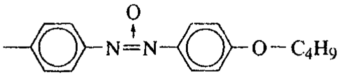
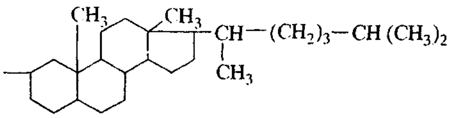
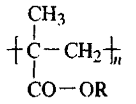
Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel} - a_{\perp}) \times 10^{25}\,cm^3$	Refs.
R = 	Tetrachloroethane	−520*		100
	Tetrachloroethane	−520*		100

TABLE 1. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
	Tetrachloroethane	– 630*		100
	Tetrachloroethane	– 810*		100
	Tetrachloroethane	– 800*		100
	Tetrachloroethane	– 450*	– 19 *	100,102
	Tetrachloroethane	– 510*	– 21	100,102
	Benzene	– 300*	– 15 *	100,103

1.6. POLY(METHACRYLIC ACID) DERIVATIVES WITH MESOGENIC SIDE GROUPS



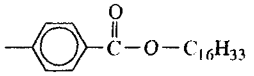
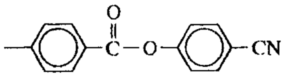
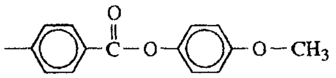
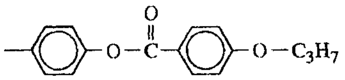
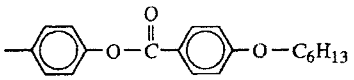
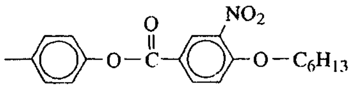
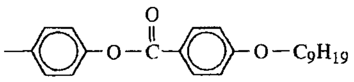
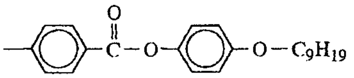
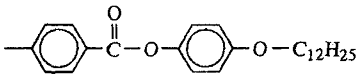
Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
R = 	Carbon tetrachloride	– 445*	– 18*	100,105
	Dimethylformamide	– 240*		100,106
	Tetrachloroethane	– 500*		100
	Dimethylformamide/ toluene (1/1)	– 320*		36,100
	Benzene	– 370*		100,107
	Dioxane	– 1200*		100,106
	Carbon tetrachloride	– 600*	– 40*	100,108
	Carbon tetrachloride	– 2700*	– 110*	100,109
	Carbon tetrachloride	– 2350*		100

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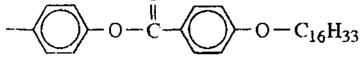
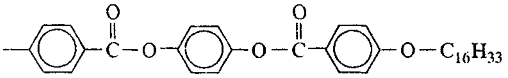
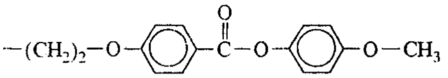
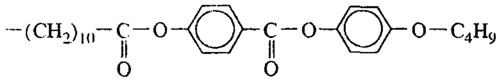
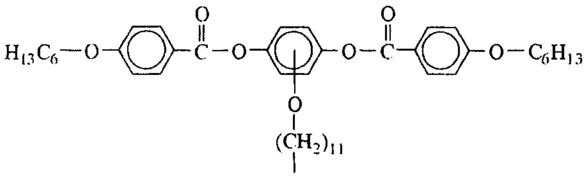
TABLE 1. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp})$ 10^{25} cm^3	Refs.
	Benzene	– 1600*		36
	Bromoform	– 1000*	– 40*	36
	Chloroform	– 1400*		36
	Carbon tetrachloride	– 2700*	– 110*	37,100
	Tetrahydrofuran	– 890*		36
	Benzene/heptene (52/48), (66/34)	– 4200*		36
Copolymer with cetylmethacrylate				
mol% 70/30	Carbon tetrachloride	– 1050*	– 44*	100,93
50/50	Carbon tetrachloride	– 680*	– 28*	100,93
	Benzene	– 3000*	– 150*	100,111
	Chloroform	– 4900*	– 100*	100,111
	Carbon tetrachloride	– 117*		100,109
	Dioxane	– 90*		100,109
	Tetrachloromethane	– 180*		153
		– 250*		153

1.7. VINYL POLYMERS

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp})$ 10^{25} cm^3	Refs.
Poly(acrylonitrile)	Dimethylformamide	– 23	– 1.8	4
Poly(*p*-chlorostyrene)	Bromoform	– 230	– 35	41
Poly(2,5-dichlorostyrene)	Bromoform	– 265	– 30	41
Poly(3,4-dichlorostyrene)	Tetrabromoethane	– 300	– 25	15
Poly(α-methylstyrene)	Tetrabromoethane	– 133	– 17	128
Poly(*p*-methylstyrene) atactic	Bromoform	– 147	– 20	42
isotactic	Bromoform	– 140	– 19	42
Poly(2,5-dimethylstyrene)	Bromoform	– 180	– 25	41
Poly(2-methyl-5-vinyl-*N*-butylpyridinium bromide)	0.01 M NaCl	– 900 *		43
	0.1 M NaCl	– 270 *		43
Poly(2-methyl-5-vinyl-pyridine)	Bromoform	– 260	– 29	44
Poly(2-methyl-5-vinyl-pyridinium chloride)	0.1 M HCl	– 300 *		45
Poly(styrene) atactic	Bromoform	– 145	– 18	46,41
isotactic	Bromoform	– 224	– 23	46
Poly(vinyl acetate)	Acetone	– 20 **	– 5.3**	7
	sw. p.	– 37 **	– 5.3**	10
	Benzene	4.0–5.9	0.5 to 0.8	6,8,9,11
	sw. p.	5.1**	0.75**	10
	Bromobenzene, sw. p.	9.4**	1.3**	10
	Bromoform	– 20 **		7
	sw. p.	– 18.7**	– 2.7**	10
	Carbon tetrachloride	– 16	– 2.0	9,11
		– 26		6
	sw. p.	– 25.2	– 3.6	10
	Chlorobenzene	14 **	1.75**	11
	Chloroform	– 34.9**	– 2.6**	6
		– 24	– 3.0	9,11
	sw. p.	– 17.9		10
	Cyclohexanone	– 23	– 2.9	9,11
	Dichloroethane	– 36	– 4.5	11
		– 39	– 4.9	11

TABLE 1. *cont'd*

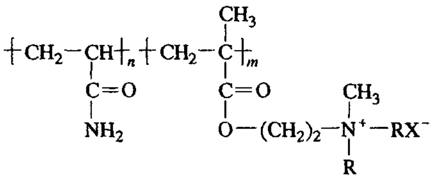
Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel} - a_{\perp})$, $\times 10^{25}\,cm^3$	Refs.
	Tetrabromoethane	− 25 **	− 3.1 **	11
		− 33 **		7
	sw. p.	− 46.4 **	− 6.6 **	10
	Toluene	10	1.25	9,11
		13.5	2.0	8
		19		6
	sw. p.	9.4 **	1.3 **	10
	o-Xylene	2.0	0.25	9,11
	sw. p.	9.8 **	1.4 **	10
Poly(vinyl butyral)	Chloroform	81		11,47
	Toluene/phenol (79/21)	173		11,47
Poly(vinyl butyrate)	Benzene	− 8.0		11,47
	Carbon tetrachloride	− 36		11,47
	Chloroform	− 48		11,47
Poly(vinyl chloride)	Tetrahydrofuran	40		48
Poly(vinyl cinnamate)	Bromoform	− 420	− 35	49
Poly(β-vinylnaphthalene)	Tetrabromoethane	− 430	− 30	4
	Bromoform	− 440	− 20 to − 30	39
Poly(vinyl propionate)	Benzene	− 4.4		11,47
	Carbon tetrachloride	− 31		11,47
	Chloroform	− 40		11,47
	Toluene	1.3		11,47
Poly(4-vinylpyridine)	Bromoform	− 240	− 22	50
Poly(4-vinylpyridinium chloride)	0.1 M HCl	− 260 *		50
	0.05 M HCl	− 440 *		50
Poly(vinylpyrrolidone)	Benzyl alcohol	− 75	− 10	4
Poly(vinyl stearate)	Carbon tetrachloride	− 130	− 4.7	51

1.8. POLY(VINYL) DERIVATIVES WITH MESOGENIC SIDE GROUPS

Poly[4-(4-nonyloxy-benzamido)styrene]	Benzene	− 2500 *	− 100 *	100,104

1.9. COPOLYMERS, GRAFT AND BLOCK COPOLYMERS

Poly(acryl amide-*co*-methacrylic acid ether)



$R = -C_2H_5$; $X^- = -Cl^-$				
n mol% = 0	0.001 M NaCl	2.5 *		157
6		15		
30		35 *		
69		90 *		
80		80 *		
100	Water	40 *		
Poly(*p*-(4-cetoxybenzoxy)-phenyl methacrylate-*co*-cetyl methacrylate)	Carbon tetrachloride			93
mol% 81/19		− 2000 *		
60/40		− 920 *		
59/41		540 *		
22/78		− 400 *		
15/85		− 277 *		
8/92		− 180 *		
4/96		− 16 *		

TABLE 1. *cont'd*

Polymer	Solvent	$(\alpha_\parallel - \alpha_\perp) \times 10^{25}\,cm^3$	$(a_\parallel - a_\perp) \times 10^{25}\,cm^3$	Refs.
Poly(methyl methacrylate-*co*-*p*-*tert*-butylphenyl methacrylate) mol% 91/9	Chlorobenzene	1.5		94
80/29		−7.4		
50/50		−30.4		
25/75		−44		
Poly(phenylbutyl isocyanate-*co*-chloral) mol% 50/50	Carbon tetrachloride	12 *		60
Poly(styrene-*co*-chlorostyrene) mol% 89.7/10.3	Bromoform	−165		95
83.2/16.8		−172		
68.7/31.3		−198		
55/45		−202		
39.5/60.5		−226		
Poly(styrene-*co*-*N*-methylcitraconimide) mol% 54/46	Bromoform	−26		63
48/52		−34		
Poly(styrene-*co*-methyl methacrylate) mol% 70/30	Bromobenzene	−88		96
50/50		−68		
30/70	Chlorobenzene	−34		
Poly(styrene-*block*-propylene), atactic mol% 64/36	Chlorobenzene	−8		97
Poly(*n*-butyl methacrylate-*graft*-styrene) mol% 8/92	Bromoform	1190		98
Poly(*tert*-butyl methacrylate-*graft*-styrene) mol% 8/92	Bromoform	540		98
Poly(methyl methacrylate-graft-styrene) mol% 10/90	Bromoform	700–7000		98,99
87/13		30		98
(70–90)/(30–10)		100–1100		16
Poly(propylene-*graft*-atactic styrene) mol% 30/70	Chlorobenzene	22		93
Poly(vinyl chloride-*graft*-styrene) wt.% 5.2/94.8	Benzene	330		48
5.6/94.4		180		
12.1/87.9		155		
30.7/69.3		110		

TABLE 2. MAIN-CHAIN CARBOCYCLIC POLYMERS

Polymer	Solvent	$(\alpha_\parallel - \alpha_\perp) \times 10^{25}\,cm^3$	$(a_\parallel - a_\perp) \times 10^{25}\,cm^3$	Refs.
Poly(acenaphthylene) helix 4_1	Bromoform	−300 **	−13.6**	39
trans	Bromoform	−300 **	−20 **	39
Poly(1,2,3-trimethyl-2,3-dihydro-1,6-indendiyl)	Bromoform	78		92
Poly(1,2,3-trimethyl-2,3-dihydro-1,6-indendiyl-1,4-phenylene-ethylene)	Bromoform	142		92

TABLE 3. MAIN-CHAIN HETEROATOM POLYMERS

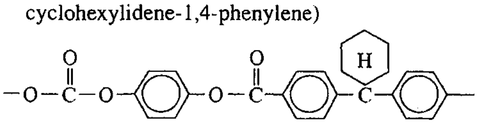
Polymer	Solvent	$(\alpha_\parallel - \alpha_\perp) \times 10^{25}\,cm^3$	$(a_\parallel - a_\perp) \times 10^{25}\,cm^3$	Refs.
3.1. POLY(OXIDES)				
Poly(oxypropylene)	Cyclohexanone	18	6	57
3.2. POLY(ESTERS)				
Poly(oxycarbonyloxy-1,4-phenylene-cyclohexylidene-1,4-phenylene) 	Bromoform	−114	−76	58
Poly(oxyethyleneoxyterephthaloyl)	Dichloroethane/phenol (1/1)	70		59
	Dichloroacetic acid	48.7*	33.7*	89

TABLE 3. *cont'd*

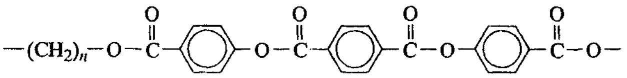
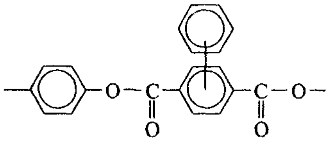
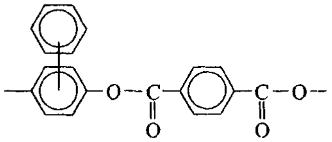
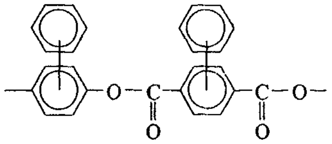
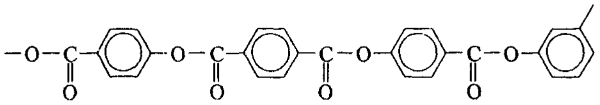
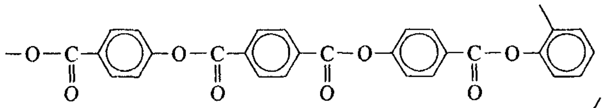
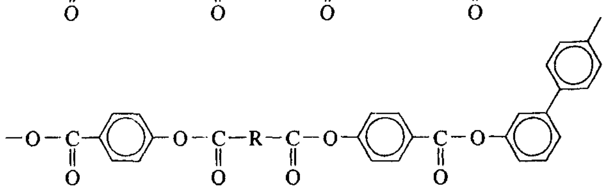
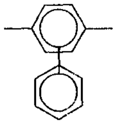
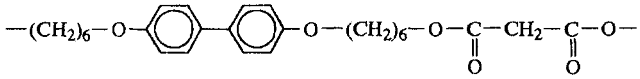
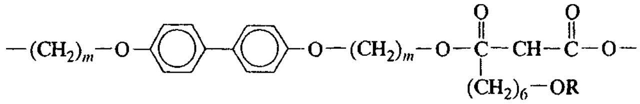
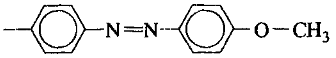
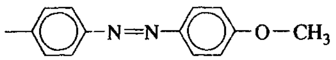
Polymer	Solvent	$(\alpha_{\parallel}-\alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel}-a_{\perp}) \times 10^{25}\,cm^3$	Refs.
Poly(oxy-*n*-methyleneoxycarbonyl-1,4-phenylene-oxyterephthaloyloxy-1,4-phenylene-carbonyl)				
				
$n = 4$	Dichloroacetic acid	280 *		89
$n = 5$	Dichloroacetic acid	250 *		89
$n = 10$	Dichloroacetic acid	200 *	132 * -165 *	89
Poly[1,4-phenylene (phenylterephthalate)]				
	Dichloroacetic acid	1800 *		158
	Tetrachloroethane	1800 *		158
Poly[(phenyl(1,4-phenylene)-terephthalate]				
	Dichloroacetic acid	3000 *		159
	Dichloroacetic acid	1600 *		160
	Dioxane	1600 *		160
	Dichloroacetic acid	600 *		161
	Dichloroacetic acid	18.2 *		162
				
R = 	Dioxane	375 *		163
$-(CH_2)_6-$	Dioxane	185 *		163
	Tetrachloroethane	153 *	315 *	164
				
$m = 2$, R = 	Tetrachloroethane	150 *	136 *	165
$m = 6$, R = 	Tetrachloroethane	200 *	365	166

TABLE 3. *cont'd*

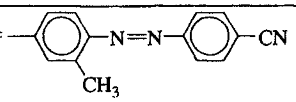
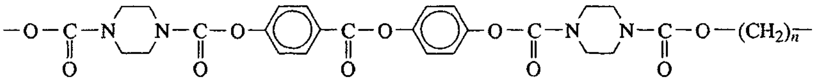
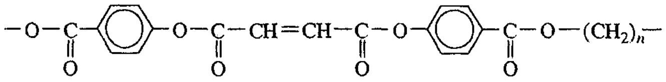
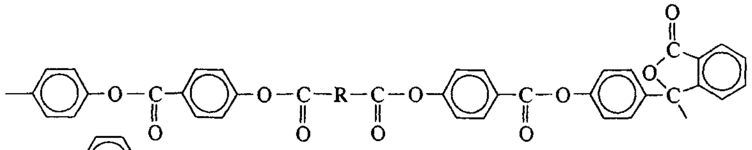
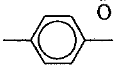
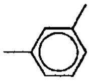
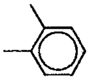
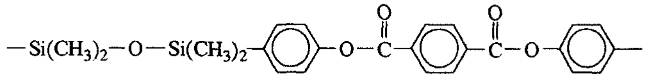
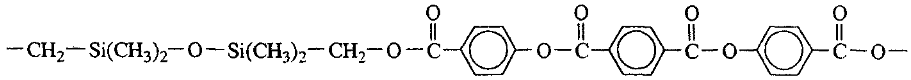
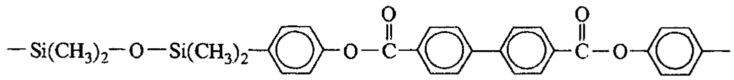
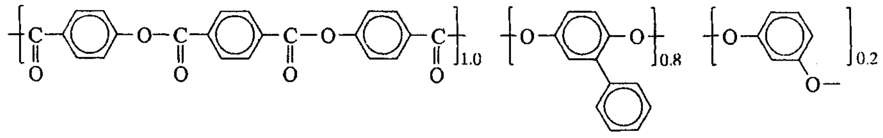
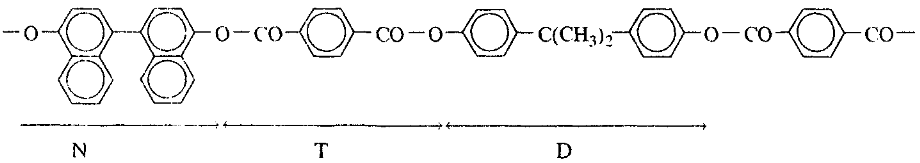
Polymer	Solvent	$(\alpha_{\parallel}-\alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel}-a_{\perp}) \times 10^{25}\,cm^3$	Refs.
$m = 6$, R = 	Dioxane	260*	513*	167
				
$n = 2$	Tetrachloroethane	186*		168
$n = 9$	Chloroform	270*		168
	Dioxane	254*		168
	Tetrachloroethane	256*		168
				
$n =$ 3	Dichloroacetic acid	268*		169
4	Trifluoroacetic acid	594*		
5	Tetrachloroethane	221*		
	Trifluoroacetic acid	396*		
6	Tetrachloroethane	249*		
7	Tetrachloroethane	187*		
8	Tetrachloroethane	179*		
9	Tetrachloroethane	188*		
10	Tetrachloroethane	196*		
				
R = 	Tetrachloroethane	380*		170
	Tetrachloroethane	228*		170
	Tetrachloroethane	57.5*		170
	Tetrachloroethane	259*	144*	171
	Tetrachloroethane	139*	146*	171
	Tetrachloroethane	353*	196*	171
	Dichloroacetic acid	2120*		172

TABLE 3. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.



Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
N : T : D (mol%) = 0 : 1 : 1	Tetrachloroethane	229*		91
0.1 : 1 : 0.9		250*		
0.2 : 1 : 0.8		335*		
0.3 : 1 : 0.7		410*		
0.4 : 1 : 0.6		510*		
0.5 : 1 : 0.5		630*		
0.6 : 1 : 0.4		740*		
0.7 : 1 : 0.3		1100*	280*	91

3.3. POLY(AMIDES)

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
Poly(*n*-butyliminocarbonyl) (Poly(butylisocyanate))	Carbon tetrachloride	4100	11	60,100
	Carbon tetrachloride/ pentafluorophenol (0.9/0.1)	800	11	100
Poly(chlorohexyliminocarbonyl)	Carbon tetrachloride	3000		60
Poly(hydrazocarbonyl-1,4-phenylene iminoterephthaloyl)	Dimethylsulfoxide	3630*	85*	100,123
Poly(iminocarbonyl-cyclohexylene)	Sulfuric acid	390*		100,115
Poly(iminocarbonyl-1,4-phenylene)	Sulfuric acid	10500*	103*	100,117,118
Poly[imino-(4,6-dicarboxyisophthaloyl -imino) biphenyl-4,4′-diyl]	Dimethylacetamide	75*		100
Poly[imino (1-oxohexamethylene)] (Poly(ε-caprolactam))	Sulfuric acid	63*		100,115
Poly[imino-1,4-phenyleneimino-(4,6-dicarboxyisophthaloylimino)-1,4-phenyleneimino-terephthaloyl]	Dimethylacetamide	88*		100
Poly(imino-1,3-phenyleneiminoisophthaloyl)	Sulfuric acid	360*	100*	100,121,122
Poly(imino-1,4-phenyleneiminoterephthaloyl)	Sulfuric acid	5250*	206*	100,119,120
Poly(imino-1,4-phenyleneimino-terephthaloyl), copolymer with poly(iminocarbonyl-1,4-phenylene) (ratio 1/9)	Sulfuric acid	4380*		110,119
Poly(iminio-terephthaloylimino-1,4-phenylenediphenylmethyl-1,4-phenylene)	Sulfuric acid	130*		100,127
Poly(*n*-tolyliminocarbonyl)	Bromoform	− 39	− 5	60,100

3.4. POLY(PEPTIDES) AND NUCLEIC ACIDS

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
Poly(γ-benzyl-L-glutamate) helix	Dichloroethane	25000*	25*	86,87,100
coil	Dichloroacetic acid	230*	25*	88,100
Poly(*S*-carbobenzoxymethyl-L-cystein)	Dichloroacetic acid	22*		86
Poly(ε,*N*-carbobenzoxy-L-lysine) helix	Dimethylformamide	3600*	12*	86
coil	Dichloroacetic acid	< +		86
Poly(L-glutamic acid)	Phosphate buffer			
helix	0.1 M, pH 4.2	1900*		86
coil	0.1 M, pH 12.5	136*		86
DNA	aqueous 0.2 M NaCl	− 30000*	− 67*	100
	< 2 M NaCl	− 33000*		154,157
	> 3 M NaCl	− 41000*		154,157

3.5. POLY(PHOSPHAZENES)

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp}) \times 10^{25}$ cm^3	Refs.
Poly(fluoroalkoxy phosphazene)				
$-PR_2=N-$				
R = $-OCH_2-CF_3$	Ethyl acetate	160		155
$-OCH_2-(CF_2)_2-H$	Ethyl acetate	145		156
$-OCH_2-(CF_2)_4-H$	Ethyl acetate	106		156

TABLE 3. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel}-\alpha_{\perp}) \times 10^{25}$ cm^3	$(a_{\parallel}-a_{\perp}) \times 10^{25}$ cm^3	Refs.
3.6. POLY(SILOXANES)				
Poly(oxydimethylsilylene)	Petroleum ether	4.7	0.96	77
Poly(oxyethylphenylsilylene) 14 : 86	Benzene	– 230 *	– 29.5	173
Poly(oxymethylphenylsilylene) 90 : 10	Petroleum ether	– 2.3	– 0.47	77
87.5 : 12.5	Decalin	– 10	– 2.0	78
75 : 25	Benzene	– 13.6	– 2.7	79
	Decalin	– 21	– 4.0	78
62.5 : 37.5	Decalin	– 36 **	– 7.2**	78
50 : 50 atactic	Benzene	– 25.5	– 5.1	79
	Decalin, tetralin	– 52 **	– 10 **	78
isotactic	Decalin, tetralin	– 82 **	– 16 **	78
Poly(oxyphenylsilylene)	Benzene	– 85	– 17	79
LADDER POLYMERS				
Poly(isobutylphenyl-silsesquioxane) (1 : 1)	Benzene	– 840	– 22	80,100
Poly(isohexylphenyl-silsesquioxane) (1 : 1)	Benzene	– 980	– 19.5	80,100
Poly(*m*-chlorophenyl-silsesquioxane)	Carbon tetrachloride	– 4700 *	– 40 *	100,80
Poly(dichlorophenyl-silsesquioxane)	Bromoform	– 4450	– 50	100,112
	Tetrabromoethane	– 4700	– 53	100,112
Poly(3-methyl-1-butene-silsesquioxane)	Benzene	– 570 *	– 6.5*	81,100
	Butylacetate	– 400 *	– 4.2*	81,82,100
Poly(phenyl-silsesquioxane)	Bromoform	– 1060 to – 1800	– 23 to – 31	83–85, 100

TABLE 4. MAIN-CHAIN HETEROCYCLIC POLYMERS

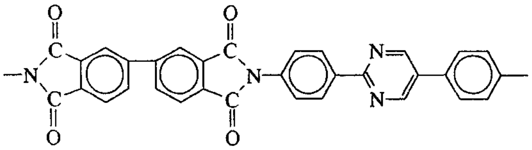
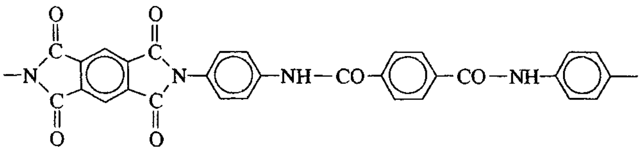
Polymer	Solvent	$(\alpha_{\parallel}-\alpha_{\perp}) \times 10^{25}$ cm^3	$a_{\parallel}-a_{\perp} \times 10^{25}$ cm^3	Refs.
4.1. POLY(IMIDES)				
Poly(*N*-2,4-dimethylphenylmaleimide)	Bromoform	– 200	– 12.5	61,100
Poly(*N*-isobutylmaleimide)	Chlorobenzene	160	10	62,100
Poly(*N*-methylcitraconimide)	Bromoform	150	16.7	63
Poly(*N*,*N*-piperazindiyl-2,5-diketo-1,3-pyrrolidindiyl-hexamethylene-2,5-diketo-1,3-pyrrolidindiyl)	Benzyl alcohol	56	31	64
	Bromoform/cyclohexanol (60 : 40)	30		64
Poly(*p*-tolylmaleimide)	Bromoform	– 160	– 10	65
	H_2SO_4, 101%	500 *	50 *	110
4.2. POLY(PYRROMELLITIMIDES)				
Poly[1,3,5,7-tetraoxo-2,3,6,7-tetrahydro-1H,5H-benzo-[1,2-c,4,5-c′ dipyrrol-2,6-diyl)-1,4-phenylene]	H_2SO_4	2500*–4400*		100
Poly[(1,3,5,7-tetraoxo-2,3,6,7-tetrahydro-1H,5H-benzo [1,2-c,4,5-c′ dipyrrol-2,6-diyl)-1,4-phenyleneimino-terephthaloyl-imino-1,4-phenylene] 	H_2SO_4	3400 *		100

TABLE 4. *cont'd*

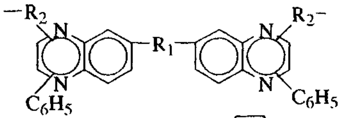
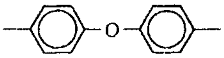
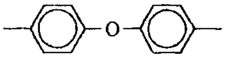
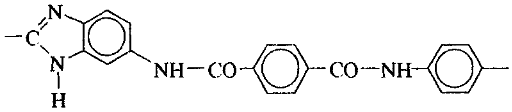
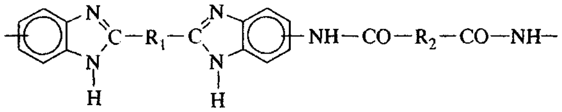
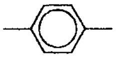
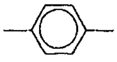
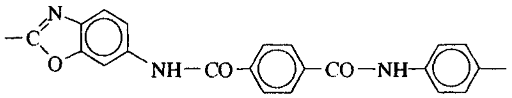
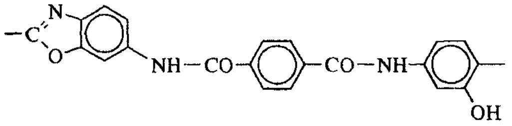
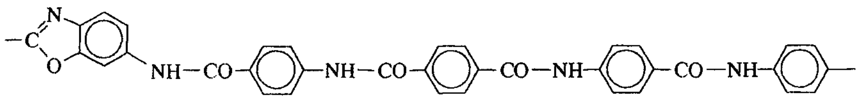
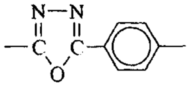
Polymer	Solvent	$(\alpha_{\parallel}-\alpha_{\perp}) \times 10^{25}\ cm^3$	$(a_{\parallel}-a_{\perp}) \times 10^{25}\ cm^3$	Refs.
4.3. POLY(QUINOXALINES)				
				
R_1 = nought, R_2 =	Tetrachloroethane, chloroform	1750*		100,116
R_1 = nought, R_2 = 	Tetrachloroethane, chloroform	1060*		100,116
R_1 = —O—, R_2 = 	Tetrachloroethane, chloroform	650*		100,116
4.4. POLY(BENZIMIDAZOLES), POLY(BENZOXAZOLES)				
Poly(benzimidazole-2,6-diyl-iminoterephthaloylimino-1,4-phenylene)				
	H_2SO_4	5080*	360*	100,124
				
R_1 = , R_2 =	H_2SO_4 H_2SO_4	4900* 3625*		100 150
R_1 = , R_2 =	H_2SO_4	1250*		150
R_1 = , R_2 = 	H_2SO_4	1250*		150
R_1 = , R_2 =	H_2SO_4	750*		150
Poly(benzoxazole-2,6-diyl-iminoterephthaloyliminio-1,4-phenylene)				
	H_2SO_4	5940*	360*	100,125
Poly(benzoxazole-2,6-diyl-iminoterephthaloylimino-1,4-(3-hydroxyphenylene))				
	H_2SO_4	5940*	320*	100,126
Poly(benzoxazole-2,4-diyl-iminoterephtaloylimino-1,3-(4-hydroxyphenylene))	H_2SO_4	2340*	300*	100,126
Poly(benzoxazole-2,6-diyl-iminocarboxy-1,4-phenylene-iminoterephthaloylimino-1,4-phenylene-carboxyimino-1,4-phenylene) 	H_2SO_4	4100*		152
Poly(oxadiazole-2,5-diyl-1,4-phenylene)				
	H_2SO_4	1750*	80*	100,114

TABLE 4. *cont'd*

Polymer	Solvent	$(\alpha_\parallel - \alpha_\perp) \times 10^{25}$ cm^3	$(a_\parallel - a_\perp) \times 10^{25}$ cm^3	Refs.
4.5. POLY(SACCHARIDES)				
CELLULOSE ESTERS				
Benzyl cellulose, DS = 2.5	Dioxane	294*	5 *	67,100
Carboxymethyl cellulose, DS = 0.9	Cadoxene	310*		147
	2 M NaOH	450*		147
	0.5 M NaOH	560*		147
Cellulose acetate, DS = 2.4	Aniline	260*	5.3*	136
	Dioxane	39*	0.78*	136
	Pyridine	0	0	100
	Trichloromethane	− 8.4*	− 0.21*	136
	Tetrachloroethane	− 57*	− 1.6*	136
Cellulose acetate benzoate, DS = 55/245	Dioxane	− 1330*	− 26.6*	137
Cellulose acetate benzhydroxamate, DS = 15/285	Dioxane	− 870*	− 17.4*	137
60/240	Dioxane	− 575*	− 11.5*	137
90/170	Dioxane	− 350*	− 7 *	137
Cellulose acetate cinnamate, DS = 60/200	Dioxane	− 1900*	− 38 *	137,138
160/140	Dioxane	− 1300*	− 26 *	137,138
250/50	Dioxane	− 450*	− 9 *	137,138
Cellulose acetate diphenylacetate, DS = 10/290	Dioxane	1280*	25.6*	137,138
40/150	Dioxane	1200*	24.0*	137,138
20/130	Dioxane	1345*	26.9*	137,138
130/115	Dioxane	1020*	20.4*	137,138
270/30	Dioxane	405*	8.1*	137,138
Cellulose acetate myristate, DS = 10/290	Benzene	− 110*	− 2.2*	137
	o-Dichlorobenzene	− 164*	− 3.1*	136
	Dichloromethane	− 190*	− 3.8*	136
	Trichloromethane	− 210*	− 4.2*	136
	Tetrachloromethane	− 223*	− 4.5*	136
	Pentachloroethane	− 194*	− 4.5*	136
	para-Chlorotoluene	− 171*	− 3.6*	136
	α-Bromonapthaline	142*	3.6*	136
DS = 25/275	Tetrachloromethane	− 228*	− 4.6*	136
50/250	Tetrachloromethane	− 217*	− 4.3*	136
100/200	Tetrachloromethane	− 240*	− 4.8*	136
150/150	Dioxane	− 72*	− 1.4*	136
	Tetrachloroethane	− 150*	− 4.3*	136
200/100	Tetrachloroethane	− 100*	− 3.0*	136
245/55	Tetrachloroethane	− 66*	− 1.8*	136
290/10	Tetrachloroethane	− 25*	− 0.6*	136
Cellulose acetate monophenylacetate, DS = 40/260	Dioxane	365*	7.3*	137
100/150	Dioxane	250*	5.0*	137
200/70	Dioxane	90*	1.8*	137
246/32	Dioxane	50*	1.0*	137
285/5	Dioxane	65*	1.3*	137
Cellulose acetate α-naphthylacetate, DS = 250/50	Dioxane	70*	1.4*	137
275/25	Dioxane	70*	1.4*	137
290/10	Dioxane	55*	1.1*	137
Cellulose acetate nitrobenzoate, DS = 275/25	Dioxane	− 115*	− 2.3*	137
Cellulose acetate triphenylmethylate, DS = 110/145	Dioxane	1100*	22 *	137
Cellulose benzoate, DS = 3.0	Dimethylformamide	− 617*	− 10.4*	66,100
	Chloroform	− 763*	− 16.4*	66,100
	Bromobenzene	− 914*	− 19.6*	66,100
	Dimethylphthalate	− 830*	− 17.8*	66,100
	Dioxane	− 447*	67	
2.16	Dioxane	− 1350*	− 27 *	137
Cellulose butyrate, DS = 3.0	Tetrachloroethane	− 34	− 2.6	72,100
	Bromoform	35*	2.7*	72,100
	Dioxane	61*	1.0*	67
	Methyl ethyl ketone	144*	5.6*	72,100
2.75	Dioxane	90*	1.8*	136
	Trichloromethane	$< \lvert 1 \rvert$*	$< \lvert 0.03 \rvert$	136
	Tetrachloroethane	− 47.3*	− 1.6*	136

TABLE 4. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel}-\alpha_{\perp}) \times 10^{25}\,cm^3$	$(a_{\parallel}-a_{\perp}) \times 10^{25}\,cm^3$	Refs.
Cellulose dimethylphosphonocarbamate	0.01 M NaCl	710 *	16 *	68
DS = 2.0	0.2 M NaCl	640 *	16 *	68
Cellulose diphenylacetate	Acetophenone	1360	22	69
	Dioxane	1030 *	22 *	67
DS = 2.9	Dioxane	1760 *	35.2*	137,138
Cellulose diphenylphosphonocarbamate DS = 2.2	Dioxane	626 *-640	10*- 13.7*	100,129
Cellulose hydroxypropylacetate, DS = 3.3, 2.3	Tetrachloroethane	400	12	144,145
Cellulose hydroxypropylbutyrate, DS = 3.3, 2.2	Tetrachloroethane	270	8.3	145,146
DS = 3.3, 0.6	Tetrachloroethane	490	12	145,146
Cellulose hydroxypropylcaprinate, DS = 3.3, 2.0	Tetrachloroethane	230		145
Cellulose hydroxypropylstearate, DS = 3.3, 0.9	Tetrachloroethane	230		145
Cellulose monophenylacetate	Bromobenzene	600	13	100,129
DS = 2.8	Bromoform	478	10.3	100,129
Cellulose nitrate, DS = 2.8	Cyclohexanone	− 820	− 14	70,100
2.7	Cyclohexanone	− 540	− 9.0	100,130
	Amyl acetate	− 320 *	− 5.4*	100,130
	Acetone	− 115 *	− 1.9*	100,130
	Butyl acetate	− 300 *	− 5.0*	100,130
	Ethyl acetate	− 140 *	− 2.3*	100,130
2.3	Cyclohexanone	− 330	− 8.4	100,131
1.9	Cyclohexanone	− 62	− 2.0	100,132
	Dioxane	149	4.8	100,132
Cellulose phenylcarbamate	Acetophenone	− 1100	− 18	69
DS = 3.0	Benzophenone 55°	− 742		71
	80°	− 572		71
	Dioxane 21°	− 1830 *	− 45.8*	100,134
	65°	− 872 *		100,134
	Ethyl acetate	− 560 *	− 15.2*	100,134
2.2	Dioxane	− 1880 *	− 47.0*	100,133
2.3	Dioxane	− 1700 *	− 34 *	140
	Ethyl acetate/dioxane (0.017/1)	− 1440 *	− 45 *	140
	(0.034/1)	− 1664 *	− 52 *	140
	(0.063/1)	− 1440 *	− 45 *	140
	(0.091/1)	− 1360 *	− 40 *	140
	(0.224/1)	− 1260 *	− 35 *	140
	(0.469/1)	− 962 *	− 26 *	140
2.7	Dioxane	− 2030 *	− 40 *	141
	Ethyl acetate	− 1216 *	− 32 *	141
	Cyclohexanone	− 1254 *	− 38 *	141
	Dimethylacetamide	− 1280 *	− 40 *	141
Cellulose stearate DS = 2.0	Tetrachloroethane	− 500		72
Cyanoethyl cellulose DS = 2.6	Cyclohexanone	900	17.8	100,135
2.66	Cyclohexanone	970 *		139
2.37	Cyclohexanone	715 *		139
Cyanoethylacetyl cellulose	Cyclohexanone, sw. p.	+ 15	0.4	73,74
	Acetone	390 *	17.0*	73,100
	Dimethylformamide	90	3.9	73,100
Cyanoethyl hydroxyethyl cellulose DS = 1.8	Cyclohexanone	900		148
Cyanoethyl hydroxypropyl cellulose DS = 2.4	Cyclohexanone	660		148
Cyanoethyltrityl cellulose	Cyclohexanone, sw. p.	220		74
Cyanoethyl nitrate cellulose DS = 248/26	Cyclohexanone	855 *		139,151
233/52	Cyclohexanone	890 *		139,151
181/79	Cyclohexanone	470 *		139,151
100/117	Cyclohexanone	165 *		139,151
62/192	Cyclohexanone	35 *		139,151
36/213	Cyclohexanone	− 190 *		139,151
34/226	Cyclohexanone	− 115 *		139,151
19/242	Cyclohexanone	− 190 *		139,151
Ethyl cellulose	Carbon tetrachloride	430	11	75
DS = 2.5	Dioxane	512	4.6	100,129
Hydroxypropyl cellulose, DS = 2.5–3.8	Dimethylacetamide	450 *	9.9*	142,143
	Tetrachloroethane	505	11.3	142,143
	Water		12.4*	143

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TABLE 4. *cont'd*

Polymer	Solvent	$(\alpha_{\parallel} - \alpha_{\perp})$ $\times 10^{25}$ cm^3	$(a_{\parallel} - a_{\perp})$ $\times 10^{25}$ cm^3	Refs.
Polymaltotriose	Dimethylsulfoxide	33 to 39	7	149
	Water	109*		149
Sulfate cellulose, sodium salt	Aqueous NaCl 0.2 M	634*	16 *	76, 100
DS = 0.4	0.15 M	645*	17 *	76,100
	0.10 M	680*	16 *	76,100
	0.01 M	980*	16 *	76,100
	0.005 M	1300*	16 *	76,100
	0.001 M	1750*	16 *	76,100
CHITINS				
Chitozane	Acetic acid + NaCl, IS = 0.1 to 0.5	670*		174

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Gelation Properties of Polymer Solutions

A. Hiltner
Department of Macromolecular Science, School of Engineering, Case Western Reserve University, Cleveland, OH, USA

Some polymer solutions show the phenomenon of gelation. The polymeric chains form association complexes at widely separated points at a certain reduced solvent power of the medium. This leads to the formation of a continuous physical network structure extending throughout the volume of the system. The association producing quasi-crosslinkages is a reversible process, so that the gel may be liquified and reset many times. The nature of the linkages is rather imperfectly understood, but the phenomenon is usually encountered with more or less crystalline polymers. Sometimes, sharp X-ray diffraction patterns are observed which disappear at the melting point of the gel.

The table contains data for a selected number of synthetic polymers which are capable of forming physical, thermoreversible gels with various solvents. Since no standard definition or standard measurement methods have been established for physical polymer gels, the gelation properties are taken from the references cited.

EXPLANATION OF ABBREVIATIONS USED

M_w The molecular weight of polymer refers to the weight average molecular weight unless otherwise stated.

λ The branch density of branched polymer.

S The syndiotacticity diad content in %.

T_{gel} The temperature (in degrees centigrade) at which the gel forms when the solution is cooled; the sol–gel transition temperature.

T_m The melting temperature (in degrees centigrade); the gel–sol transition temperature.

ΔH_m When DSC was used, this is the enthalpy associated with the endotherm. When other methods are used, ΔH is obtained from the van't Hoff plot.

Methods Used for the Measurement of Melting Temperature of the Gel

1. *Flow:* A U-tube in which the two limbs are joined by a capillary section is used. The gel is allowed to set with different heights in the two links and the melting point is the temperature at which flow starts from one limb to the other.
2. *Ball drop:* A steel ball with a known diameter or weight is placed on the gel and the gel warmed at a certain heating rate. The ball drops at the gel melting temperature.
3. *DSC:* Differential scanning calorimetry.
4. *Tilting:* The gel is warmed in the test tube and the melting point is observed when the gel begins to flow under its own weight when the upright test tube is tilted.

Polymer	Solvent	M_w	Conc. (g/l)	T_{gel} (°C)	T_m (°C)	ΔH_m (kJ/mol)	Method	Refs.
Poly(ethylene), low density								
$\lambda = 2.9$	Decalin	74000	50–140		54–72		Ball drop	6
$\lambda = 6.8$	Decalin	161000	40–140		58–72			
$\lambda = 5.6$	Decalin	137000	50–140		60–74			
$\lambda = 8.9$	Decalin	175000	50–140		50–67			
$\lambda = 6.8$	Toluene	161000	60–150		68–76			
$\lambda = 6.8$	*o*-Xylene	161000	50–140		67–76			
$\lambda = 6.8$		161000	50–150		68–75			
$\lambda = 6.8$	Tetralin	161000	60–140		72–78			
$\lambda = 3.1$	Cyclohexane-CS	30000	40–75		30–41			
$\lambda = 4.7$	(1/1, v/v)	65000	40–75		36–43			
$\lambda = 12.2$		222000	30–75		34–44			
$\lambda = 7.18$	Cyclohexane-CS_2	30000	65–95		40–55		Ball drop	8
$\lambda = 0$	(1/1, v/v)	10100	30–65		73–75			
$\lambda = 4.07$		15100	50–95		55–65			

Polymer	Solvent	M_w	Conc. (g/l)	T_{gel} (°C)	T_m (°C)	ΔH_m (kJ/mol)	Method	Refs.
Poly(ethylene), high density								26
	o-Dichlorobenzene	220000	120	89		129	Tilting	23
Poly(ethylene-*co*-butene-1)	Decalin	113000	50–140		86–91			
		104000	60–140		87–90.5			
		71000	50–140		83–88			
		55000	60–140		82–89			
Poly(ethylene-*co*-4-methylpentene-1)		80000	60–140		88.5–92.5			
		84000	50–120		89.5–93			
		87000	60–120		89–93			
Poly(ethylene-*co*-octene-1)		83000	50–120		91–94.5			
		119000	50–100		92–95			
		80000	60–120		91–94			
		90000	50–115		90.5–94			
Poly(propylene)	Decahydronaphthalene		50	10	97.7			10
Poly(4-methylpentene-1)	Cyclopentane		100		80		Visual observation	22
	Cyclohexane		5–100		45			
Poly(acrylonitrile)	Dimethyl sulfoxide		72		35			15
Poly(acrylonitrile-*co*-vinyl acetate)	Dimethylacetamide	200000	240–280		42–75		Flow	18
	Dimethyl sulfoxide	200000	270–320		34–46			
	Dimethylformamide	200000	290–310		56–66			
	Ethylene carbonate	200000	230–300		41–72			
	γ-Butyrolactone	200000	250–270		66–73			
Poly(cetyl acrylate)	*n*-Aliphatic alcohols							
	C = 7				28		DSC	24
	C = 8				28			
	C = 9				27			
	C = 10				26			
	C = 12				25			
	Hydrocarbons							
	C = 10				12			
	C = 12				15			
	C = 14				24			
	C = 16				26			
	n-Decane		100		17		DSC	24
			200		18			
			400		18			
			500		20			
			700		25			
			800		26			
			900		30			
	Cetane		300		30	35 (J/g)		
			500		31			
			700		32	79		
			900		34	96		
	Alcohols		100		29	8		
			200		29	12		
			300		28	21		
			400		27	29		
			500		27	38		
			600		27	46		
			700		27	50		
			800		28	59		
			900		29			
Poly(docosyl acrylate)	*n*-Aliphatic alcohols							
	C = 7				57		DSC	24
	C = 8				57			
	C = 10				56			
	C = 12				56			
Poly(octadecyl acrylate)	*n*-Aliphatic alcohols							
	C = 7				38		DSC	24
	C = 8				38			
	C = 10				37			
	C = 12				37			
	Hydrocarbons							
	C = 6				18			
	C = 8				20			
	C = 12				28			

Polymer	Solvent	M_w	Conc. (g/l)	T_{gel} (°C)	T_m (°C)	ΔH_m (kJ/mol)	Method	Refs.
Poly(methyl methacrylate)	Dimethylformamide		A very special case of gelation is observed in cosolutions of isotactic and syndiotactic PMMA.					14
Poly(vinyl acetate)	Glycerin/water (40/60)	60000	50		77	55		19
			100		89			
			200		101			
	(60/40)	60000	20		82	54		
			50		94			
			100		99			
			200		106			
	(80/20)	60000	20		96	71		
			50		101			
			100		112			
			200		123			
	Methanol/water (40/60)	60000	100		35	15		
			151		58			
			200		73			
			250		78			
	N-Methylpyrrolidone	60000	50		87.5	54		
			100		101			
			200		120			
	Formamide	60000	20		62	48		
			50		68			
			100		98			
			200		106			
Poly(vinyl alcohol)	Water		90	7			Tilting	27
			140	20				
			200	47				
			300	58				
highly syndiotactic $S = 65\%$	Phenol/water		0.6		75	58	DSC	20
			0.8		82			
			1		86			
			2		102			
			3		105			
			5		118			
57%			0.4		42	51		
			0.8		59			
			1		60			
			2		72			
			3		79			
			4		88			
			5		93			
45%		4		19	28			
			5		20			
			6.5		29			
			10		37			
			12.5		42			
Poly(vinyl chloride)	Bromobenzene	34000	100		27.3		Ball drop	2
		59000	100		48.0			
		145000	100		88.3			
		235000	100		116			
	Dichloroethane	98000	100		44			2
		145000	100		73			
		154000	80–120		42–72	13.0		
	Dimethyl phthalate	34000	100		85.5			2
		62000	100		99.0			
		145000	100		116			
		135000	100		133			
		154000	10–100		52.0–104.0	50.6		
	Dioxane	200000	100 (w/w)		50–67[a]	–		3,4
		154000	50–120		42.0–84.0	50.6		2
		56000	50–140		45–70	36		1
		103000	40–100		50–75	35		
		114200	30–100		50–80	37		
		133000	20–80		60–85	45		
		62000	100		43.5		Ball drop	2
		145000	100		79.8			
		235000	100		96.9			

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Polymer	Solvent	M_w	Conc. (g/l)	T_{gel} (°C)	T_m (°C)	ΔH_m (kJ/mol)	Method	Refs.
	Bromobenzene	154000	40–120		38.0–82.5	21.0		2
		200000	100 (w/w)		40–63[a]	90–110[b]	DSC	3,4
		56000	92		76.2	34.0		1
	1,2-Dichlorobenzene	200000	100 (w/w)		44–68[a]	87–103[b]		3,4
			100 (w/w)		55–90[a]	90–137[b]		3,4
	Nitrobenzene	200000	100 (w/w)		40–55[a]	57–75[b]		3,4
		56000	92		32.7	23.1		1
	Butanone	200000	100 (w/w)		56–76[a]	98–102[b]		3,4
		56000	92		51.0	17.2		1
	Tritolyl phosphate	200000	100 (w/w)		58–87[a]	96–142[b]		3,4
	Di-isopropyl ketone	200000	100 (w/w)		54–89[a]	89–120[b]		3,4
	Dimethyl phthalate	200000	100 (w/w)		54–74[a]	100–150[b]		3,4
	Nitrochlorobenzene		100 (w/w)		43–75[a]	116–139[b]		3,4
	Dibutyl phthalate	148000	40–70		90–105		Flow	25
		56000	92		93.7	22.3	Flow	1
	Dipentyl phthalate	148000	40–70		97–112			25
	Dihexyl phthalate	148000	40–70		101–119			
	Diheptyl phthalate	148000	40–70		107–123			
	Dinonyl phthalate	148000	50		126			
	Pentan-3-one	56000	92		46.7	10.9		1
	Dimethylformamide	56000	92		20.0			1
	Tetrachloroethane	56000	92		69.1	35.7		1
	Chlorobenzene	56000	92		78.4	61.7		1
	Methoxybenzene	56000	92		85.1	43.1		1
Poly(styrene), atactic	Carbon disulfide	2000000	5–135		– 53–7	31	Tilting	13
		670000	10–140		– 63–0	27		
		410000	17–170		– 56 to – 10	26		
		200000	20–150		– 70 to – 20	24		
		30000	70–190		– 76 to – 12	10		
		20000	90–170		– 72 to – 22	6		
		4000	120–180		– 55 to – 23	5		
	n-Amyl acetate	670000	166		– 52	11.7		
	Isoamyl acetate	670000	166		– 56	11.4		
	n-Butyl acetate	670000	166		– 65	10.6		
	n-Propyl acetate	670000	166		– 68	10.6		
	1-Chloropentane	670000	166		– 76	12.2		
	1-Chlorobutane	670000	166		– 79	8.0		
	1-Chloropropane	670000	166		– 86	5.8		
Poly(styrene), isotactic	Decalin	190000	50		670	62	DSC	11
		670000	10	12	63		Tilting	12
	1-Chlorodecane	670000	10	25	88			
	Nitrobenzene	670000	10	– 2	52			
	Aniline	670000	10	– 20	5			
	Benzaldehyde	670000	10	– 35	20			
Poly(oxy-2,6-dimethyl-phenylene)	1-Bromonaphthalene	25000 (M_v)		25	110		Tilting	12
	1-Chloronaphthalene	25000 (M_v)		25	86			
	Carbon disulfide	25000 (M_v)			0			
Poly(γ-benzyl L-glutamate)	Benzyl alcohol	50000 (M_v)	30		50		Ball drop	21
		80000	30		55			
		150000	30		58			
		300000	30		58			
		150000	50		55			
		150000	100		56			
		150000	200		58			
		150000	300		58.5			
		150000	400		59			
		150000	500		60			

[a] T_1 endotherm.
[b] T_2 endotherm.

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SECTION VIII

ABBREVIATIONS OF POLYMER NAMES

Abbreviations for Thermoplastics, Thermosets, Fibers, Elastomers, and Additives

Hans-G. Elias
Michigan Molecular Institute, 1910 West St. Andrews Rd., Midland, MI 48640, USA

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A. INTRODUCTION

Abbreviations and acronyms for the names of thermoplastics, thermosets, fibers, elastomers, and additives have been proposed by many national and international organizations. Some of these abbreviations were introduced by law, others are trademarks in certain countries. As a result, the same abbreviation is often used for different polymers. The same polymer may also have different abbreviations or acronyms. Furthermore, some abbreviations refer to chemical compounds (IUPAC) whereas abbreviations recommended by ASTM, BS, DIN, and ISO usually refer to plastics, fibers, elastomers, etc., that are *based* on the corresponding polymers, i.e., polymers plus additives, modifiers, fillers, etc.

The following tables report abbreviations either found in the scientific or technical literature or recommended or proposed by the organizations listed below. Note that * and ** are part of the recommended ASTM abbreviations and acronyms and *not* symbols for footnotes.

ANSI/ASTM	American National Standards Institute (ASTM D 1600–75; D 1600–86a; D 1418–77)
ASTM	American Society for Testing of Materials (ASTM D 1600–64; D 1600–86a; D 1418–67; D 4020–81)
BS	British Standards (Standard 3502–1862)
DIN	German Industrial Standard (DIN 7723, 7728, 16913, 55950, 60001)
EDV	Data processing key of the European Textile Characterization Law
EC	European Community
ISO	International Organization for Standardization (ISO 1043–1980, 1629–1980)
IUPAC	International Union for Pure and Applied Chemistry [*Pure Appl. Chem.*, **18**, 583 (1969); **40**, 473 (1974); **59**, 691 (1987)]
WTR	Working Group Toxicology of Rubber Auxiliaries

Section B lists, in alphabetical order, the abbreviations and acronyms for thermoplastics, thermosets, fibers, elastomers, and additives. Sections C and D list the abbreviations for polymers, based on their monomeric units and characteristic groups, respectively. Section E contains abbreviations and acronyms for polymers obtained by chemical transformation of base polymers. Section F contains special abbreviations for blends, reinforced polymers, etc., and Section G the ISO and DIN codes for plastics. Section H lists the special abbreviations connected with the recycling of plastics. Recommended abbreviations and acronyms for elastomers and fibers are given in Sections I and J, respectively.

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B. ABBREVIATIONS IN ALPHABETICAL ORDER

AB	Manila hemp fibers (Abaca) (EDV); see also Ma
ABR	Acrylate–butadiene rubber; elastomeric copolymer from an acrylic ester and butadiene (ANSI/ASTM, IUPAC); see also AR
ABS	Acrylonitrile–butadiene–styrene; a thermoplastic from acrylonitrile, butadiene and styrene (ASTM, DIN, ISO, IUPAC)
AC	Fiber from deacetylated cellulose acetate (EDV)
ACM	Elastic copolymer from an acrylic ester and a small proportion of a vulcanizable monomer, e.g., 2-chlorovinyl ether (ANSI, ASTM)
ACS	Thermoplastic blend of a copolymer from acrylonitrile and styrene with chlorinated poly(ethylene)
ACSP	Acetyl cyclohexylsulfonyl peroxide
ADA	Adipic acid
ADC	Azodicarbonamide (WTR), see also ADEC
ADCK	Activated azodicarbonamide (WTR)
ADEC	Ammonium diethyl dithiocarbamate (WTR); see also ADC
ADPA	Condensation product from acetone and diphenylamine (WTR)
AE	Aminoethyl (with cellulosics)
AES	Thermoplastic quaterpolymer from acrylonitrile, ethylene, propylene, and styrene
AF	Other fibers (i.e., those not specified by the EDV system)
AFK	Asbestos fiber reinforced plastic
AFMU	Elastomeric terpolymer from tetrafluoroethylene, trifluoronitrosomethane, and a small amount of nitrosoperfluorobutyric acid; nitroso rubber (ANSI/ASTM); see also CNR
AG	Alginate fiber (EDV)
Ag	1. Silver (IUPAC) 2. Esparto grass fiber (DIN)
AI	Amide-imide polymers
AIBN	*N,N*-Azobisisobutyronitrile
Ak	Angora wool (DIN)
AL	1. Alfalfa fibers (EDV) 2. Alginate fibers (DIN); see also AG
AMMA	Thermoplastic copolymer from acrylonitrile and methyl methacrylate (ASTM); see also A/MMA
A/MMA	See AMMA
An	Calatropis fiber (DIN)
AN	Acrylonitrile
An–AE	Elastomeric copolymer from acrylonitrile and acrylic ester; see also ANM
ANM	See AN–AE
AO	Antioxidant
Ap	Alpaca wool (DIN)
AP	Elastic copolymer from ethylene and propylene; see also APR, E/P, EPM, and EPR (older German literature)
APH	Alkylated phenol
APR	See AP
APT	Elastomeric copolymer from ethylene, propylene, and an unsaturated termonomer; see also APTK, EPD, EPDM, EPT, EPTR
APTK	Elastomeric copolymer from ethylene, propylene, and an unsaturated termonomer; see also APT, EPD, EPDM, EPT, EPTR
Aq	Anthraquinone
AR	1. Elastomeric copolymer from acrylic esters and olefins; see also ABR 2. Ardein fibers (DIN)
As	1. Arsenic (IUPAC). 2. Asbestos (DIN); see also AS
AS	Asbestos fiber (EDV); see also As
ASA	Thermoplastic copolymer from acrylonitrile, styrene, and acrylic esters (ASTM); see also A/S/A
A/S/A	Thermoplastic copolymer from acrylonitrile, styrene, and acrylic esters (DIN, ISO); see also ASA
ASE	Alkylsulfonic acid ester (ISO)
ASR	Alkylene sulfide rubber
ATE	Aluminium triethyl
ATH	Alumina trihydrate
ATO	Antimony trioxide
AU	1. Elastomeric polyurethane with polyester segments (ANSI/ASTM, ISO) 2. Polyester rubbers with carbon, oxygen, and nitrogen in the chain. Both classifications probably refer to the same type of elastomer
AU-I	AU, cross-linkable with isocyanates
AU-P	AU, cross-linkable with peroxides
BA	Condensation product of butyraldehyde and aniline (WTR)
BAA	Condensation product of butyraldehyde and aniline
BBP	Benzylbutyl phthalate (DIN, ISO)
BD	1. 1,4-Butanediol 2. Derivative of benzofuran
BDMA	Butanediol 1,4-dimethacrylate (WTR)
BDP	Butyldecyl phthalate (WTR)
BDSH	Benzene-1,3-disulfonyl hydrazide (WTR)
BFE	Bromotrifluoroethylene polymers

BFK	Boron fiber reinforced plastic (German technical literature)
BHA	Butylated hydroxyanisole; *t*-butyl-4-methoxyphenol
BHET	Bis(2-hydroxyethyl) terephthalate
BHT	Butylated hydroxytoluene; 2,6-di(*t*-butyl)-*p*-cresol
BiDMC	Bismuth dimethyl dithiocarbamate (WTR); see also BMDC
BIIR	Brominated elastomer from isobutene and isoprene; bromobutyl rubber (ANSI/ASTM)
BMC	Bulk molding compound
BMDC	Bismuth dimethyl dithiocarbamate (WTR)
BOA	Benzyl octyl adipate (= benzyl 2-ethylhexyl adipate) (ISO)
BOP	Benzyl octyl phthalate (= benzyl 2-ethylhexyl phthalate)
BOPP	Biaxially oriented poly(propylene) film; balanced oriented poly(propylene) film
BP	Poly(butadiene) rubber; see also BR and CBR
BPH	2,2′-Methylene-bis(4-methyl-6-*t*-butylphenol) (WTR)
BPO	Dibenzoyl peroxide
BR	Elastomeric poly(butadiene); butadiene rubber (ANSI/ASTM, IUPAC); see also BP and CBR
BSH	Benzene sulfonyl hydrazide (WTR)
BT	Thermoplastic poly(1-butene); see also Pb, PBT
BTDA	3,3′,4,4′-Benzophenonetetracarboxylic dianhydride
BTX	Benzene, toluene, and xylenes
Buna	Butadiene elastomers (old German literature). The first types were synthesized by sodium ("*Na*trium") initiated *bu*tadiene polymerizations, hence the name "Buna"; the various grades were differentiated by numbers (hence "number Buna"). Later Buna types were copolymers from the free-radical copolymerization of butadiene with various comonomers. These types were called "letter Buna" (Buna S = copolymer of butadiene and styrene, Buna N = copolymer of butadiene and acrylonitrile, etc.).
Butyl	Elastomeric copolymer from isobutene and isoprene; butyl rubber (BS); see also GR-I, IIR, PIBI
BVE	Butyl vinyl ether (WTR)
Bw	Cotton ("Baumwolle") (DIN); see also CO
C	1. Carbon (IUPAC) 2. Channel black 3. Cellophane (ASTM); "Cellophan®" is a registered trademark in Germany
C*	Saran coated cellophane (ASTM)
CA	1. Cellulose acetate (ASTM, DIN, ISO, IUPAC); see also AC 2. Hemp fibers (EDV)
CAB	Cellulose acetate–butyrate (ASTM, DIN, ISO, IUPAC)
CAP	Cellulose acetate–propionate (ASTM, DIN, ISO, IUPAC)
CAR	Carbon fiber
CBA	Chemical blowing agent
CBR	Butadiene rubber; 1,4-*cis*-poly(butadiene); see also BP and BR
CBS	*N*-Cyclohexyl-2-benzothiazolesulfene amide
CC	1. Cocos fiber (EDV) 2. Cupro (regenerated cellulose fibers *via* the copper/ammonia process (DIN); see also CU
CDB	Conjugated diene butyl elastomer
CdDEC	Cadmium diethyl dithiocarbamate (WTR); also Cd-DEDC
CDP	Cresyl diphenyl phosphate
CdPDC	Cadmium pentamethylene dithiocarbamate (WTR)
CE	Cellulose plastics in general (ASTM)
CEM	Poly(chlorotrifluoroethylene) (ASTM); see also CFM, CTFE, PCTFE
CF	Thermoset from cresol and formaldehyde; cresol–formaldehyde resin (ASTM, DIN, ISO, IUPAC)
CFK	1. Man-made fiber reinforced plastic (German technical literature: "*C*hemie*f*aserverstärkter *K*unststoff") 2. Carbon fiber reinforced plastic (German technical literature); see also CRP
CFM	1. Poly(chlorotrifluoroethylene) (ANSI/ASTM); see also CEM, CTFE, PCTFE 2. Copolymer from chlorotrifluoroethylene and vinylidene fluoride
CFRP	Carbon fiber reinforced plastics
CHC	Elastomeric copolymer from epichlorohydrin and ethylene oxide; see also ECO
CHDM	1,4-Cyclohexanedimethylol
CHR	Elastomeric poly(epichlorohydrin) (ISO); see also CO
CIIR	Postchlorinated elastomeric copolymer from isobutene and isoprene (ANSI/ASTM)
CL	Poly(vinyl chloride) fiber (EWG; EDV); see also PVC
CM	Postchlorinated poly(ethylene) (ANSI/ASTM); see also CPE
CMBT	Copper mercaptobenzothiazole, see also CuMBT
CMC	1. Carboxymethylcellulose (ASTM, DIN, ISO, IUPAC) 2. Critical micelle concentration

CMHEC	(Carboxymethyl/hydroxyethyl) cellulose
CMF	Classified mineral filler
CN	Cellulose nitrate (ASTM, DIN, ISO, IUPAC); see also NC, C/N
C/N	Cellulose nitrate, see also CN, NC
CNR	Elastomeric terpolymer from tetrafluoroethylene, trifluoronitrosomethane, and a small amount of an unsaturated termonomer, e.g., nitrosoperfluorobutyric acid; nitroso rubber, carboxynitroso rubber; see also AFMU
CO	1. Elastomeric poly(chloromethyl)oxirane; poly(epichlorohydrin) (ANSI/ASTM; ISO); see also CHR 2. Cotton (EDV); see also Bw
COX	Carboxylic rubber
CP	Cellulose propionate (ASTM, DIN, ISO, IUPAC)
C.P.	Chemically pure
CP2	Alternating copolymer from vinyl ether and maleic acid
CP4	Copolymer from acrylic acid and maleic acid
CPE	Chlorinated poly(ethylene) (ASTM); see also CM
CPET	Crystallizable poly(ethylene terephthalate) (i.e., a PET with fast-acting nucleating agents) (trade journals)
CPI	*cis*-Poly(isoprene); see also IR, PIP
CPP	Spinning paper (small cut strips from sodium cellulose or sulfite cellulose paper) or cellulon (wet strips from cellulose pulp) (DIN)
CPVC	1. Postchlorinated poly(vinyl chloride) (ASTM); see also PC, PeCe, PVCC 2. Critical pigment concentration
CR	Poly(chloroprene) (ANSI/ASTM, BS, IUPAC)
CRP	Carbon fiber reinforced plastics; see also CFK
CS	Casein (ASTM, DIN, ISO, IUPAC)
CSM	Chlorosulfonated poly(ethylene) (ANSI/ASTM); see also CSPR, CSR
CSPR	Chlorosulfonated poly(ethylene) (BS); see also CSM, CSR
CSR	Chlorosulfonated poly(ethylene); see also CM, CSPR
CT	1. Cellulose triacetate (DIN); see also CTA, TA 2. Continuous thread
CTA	Cellulose triacetate (ASTM); see also CT, TA
CTFE	Poly(chlorotrifluoroethylene) (ASTM); see also CEM, CFM, PCTFE
CTP	*N*-Cyclohexylthiophthalimide (WTR)
CTS	Compact tension specimen
CU	Copper silk ("cupro silk" = regenerated cellulose fibers) (EDV); see also CC
CuDEC	Copper diethyl dithiocarbamate (WTR); also CDC, CuDC
CuDMC	Copper dimethyl dithiocarbamate (WTR); see also CuDMDC
CuMBT	Copper mercaptobenzothiazole; see also CMBT
Culhp	Copper laminated hard paper (German technical literature)
CV	Viscose (rayon) (DIN); see also VI
DABCO®	Triethylenediamine = Diazabicyclo [2.2.2] octane
DAC	Diallyl chlorendate; diallyl 1,4,5,6,7,7-hexachlorobicyclo[2.2.2]hept-5-ene-2,3-dicarboxylate (ASTM)
DADI	Dianisidine diisocyanate (WTR)
DAF	Diallyl fumarate (ASTM)
DAIP	Diallyl isophthalate resin (ASTM)
DAM	Diallyl isophthalate resin (ASTM)
DAP	Diallyl phthalate resin (ASTM, DIN); see also FDAP
DATBP	Diallyl tetrabromophthalate
DBDPO	Decabromodiphenyl oxide
DBEEA	Dibutoxyethoxyethyl adipate (WTR)
DBEP	Bis(2-butoxyethyl) phthalate
DBF	Dibutyl fumarate
DBNPG	Dibromoneopentyl glycol
DBP	Dibutyl phthalate (ASTM, DIN, ISO, IUPAC)
DBPPD	*N,N'*-Di(*s*-butyl)-*p*-phenylenediamine (WTR)
DBS	Dibutyl sebacate
DBTDL	Dibutyltin dilaurate
DBTU	Dibutyl urea (WTR)
DCBS	Benzothiazyl-2-dicyclohexylsulfene amide (WTR)
DCHP	Dicyclohexyl phthalate
DCP	Dicapryl phthalate (ASTM, DIN, ISO, IUPAC)
DDP	Didecyl phthalate
DE	Diatomaceous earth
DEA	*N,N*-Diethylaniline
DEAE	(Diethylamino)ethyl- (with cellulose)
DEG	Diethylene glycol
DEHP	Bis(2-ethylhexyl) phthalate; see also DOP
DEP	Diethyl phthalate (ISO)
DETA	Diethylenetriamine (WTR)
DETU	Diethyl thiourea (WTR)
DGEBA	Diglycidyl ethers of bisphenol A
DHA	Dehydroacetic acid, acetic anhydride
DHBP	2,4-Dihydroxy benzophenone (WTR)
DHP	Diheptyl phthalate (ISO)
DHS	Dihexyl sebacate (WTR)
DHXP	Dihexyl phthalate (ISO)
DIBA	Diisobutyl adipate
DIBP	Diisobutyl phthalate (DIN, ISO)
DIDA	Diisodecyl adipate (ASTM, DIN, ISO, IUPAC)

DIDG	Diisodecyl glutarate
DIDP	Diisodecyl phthalate (ASTM, DIN, ISO, IUPAC)
DINA	Diisononyl adipate (ISO)
DINP	Diisononyl phthalate (DIN, ISO)
DIOA	Diisooctyl adipate (ASTM, DIN, ISO, IUPAC)
DIOF	Diisooctyl fumarate
DIOM	Diisooctyl maleate (WTR)
DIOP	Diisooctyl phthalate (ASTM, DIN, ISO, IUPAC)
DIOS	Diisooctyl sebacate
DIOZ	Diisooctyl azelate
DIPP	Diisopentyl phthalate
DITDP	Diisotridecyl phthalate (DIN, ISO); see also DITP
DITP	Diisotridecyl phthalate (DIN); see also DITDP
DLTDP	Dilauryl 3,3′-thiodipropionate
DMA	*N,N*-Dimethylacetamide
DMAA	*N,N*-Dimethylacetoacetamide
DMAC	*N,N*-Dimethylacetamide
DMBPPD	*N*-(1,3-Dimethylbutyl)-*N*′-phenyl-*p*-phenylenediamine (WTR)
DMBS	Dimethylbenzothiazylsulfeneamide (WTR)
DMC	Dough molding compound (UP resin) (DIN)
DME	1. Dimethylethanolamine, 2-(dimethylamino)ethanol
DMEP	Bis(2-methoxyethyl) phthalate
DMF	1. *N,N*-Dimethyl phthalate (ISO); 2. *N,N*-dimethyl formamide
DMG	Dimethyl glutarate
DMHPPD	*N,N*′-Di(3-methylheptyl)-*p*-phenylenediamine (WTR)
DMP	Dimethyl phthalate (ISO)
DMPTD	Dimethylphenyl thiuram disulfide (WTR)
DMSO	Dimethyl sulfoxide
DMT	Dimethyl terephthalate
DMTD	2,5-Dimercapto-1,3,4-thiadiazole (WTR)
DMTDP	Dimyristyl-3,3′-thiodipropionate
DMTDS	2,5-Dimercapto-1,3,4-thiadiazole disulfide (WTR)
DNA	1. Deoxyribonucleic acid 2. Dinonyl adipate
DNHZ	Di(*n*-hexyl) azelate
DNODA	Di(*n*-octadecyl) adipate
DNPDP	Di(*n*-octadecyl) phthalate (ASTM)
DNP	Dinonyl phthalate (ASTM, ISO, IUPAC)
DNPT	*N,N*-Dinitrosopentamethylene tetramine
DNS	1. Di(3,5,5-trimethylhexyl) sebacate (WTR) 2. Deoxyribonucleic acid (German: Desoxyribonukleinsäure)
DOA	Dioctyl adipate, bis(2-ethylhexyl)adipate (ASTM, DIN, ISO, IUPAC)
DODP	Di(octadecyl) phthalate (ISO)
DOF	Dioctyl fumarate
DOIP	Dioctyl isophthalate, bis(2-ethylhexyl) isophthalate (DIN, ISO)
DOM	Dioctyl maleate, bis(2-ethylhexyl) maleate (WTR)
DOP	Dioctyl phthalate, bis(2-ethylhexyl) phthalate (ASTM, DIN, ISO, IUPAC)
DOS	Dioctyl sebacate, bis(2-ethylhexyl) sebacate (ASTM, DIN, ISO, IUPAC)
DOTG	*N,N*′-Di(*o*-tolyl)guanidine (WTR)
DOTP	Dioctyl terephthalate, bis(2-ethylhexyl) terephthalate (DIN, ISO)
DOZ	Dioctyl azelate, bis(2-ethylhexyl) azelate (ASTM, DIN, ISO, IUPAC)
DPA	Diphenylamine
DPCF	Diphenyl cresyl phosphate (ASTM, ISO); see also DPCP
DPCP	Diphenyl cresyl phosphate (ASTM, ISO); see also DPCF
DPG	*N,N*′-Diphenylguanidine (WTR)
DPOF	Diphenyl 2-ethylhexyl phosphate (ASTM, ISO); see also EHDPP
DPOP	Diphenyl octyl phosphate
DPP	1. Diphenyl phthalate 2. Dipropyl phthalate
DPPD	*N,N*′-Diphenyl-*p*-phenylene diamine (WTR)
DPQD	Dibenzoyl-*p*-quinone dioxime
DPTD	Di(pentamethylene)thiuram hexasulfide, see also DPTH
DPTH	Di(pentamethylene)thiuram hexasulfide (WTR), see also DPTD
DPDM	Di(pentamethylene)thiuram monosulfide (WTR)
DPTT	Di(pentamethylene)thiuram tetrasulfide (WTR)
DPTU	Diphenyl thiourea (WTR)
DR	Degree of reaction
DRC	Dry rubber content
DS	Degree of substitution
DSTDP	Distearyl 3,3′-dithiopropionate
DTBP	Di(*t*-butyl) peroxide (WTR)
DTDC	Dithiodicaprolactam (WTR)
DTDM	4,4-Dithiodimorpholine (WTR)
DTDP	Di(tridecyl) phthalate
DTPD	1. Di(tridecyl) phthalate 2. *N,N*′-Ditolyl-*p*-phenylenediamine (WTR)
DUP	Di(undecyl) phthalate
DVB	Divinyl benzene
EA	Segmented polyurethane fiber (Elasthan fiber) (EDV); see also PUE
EAA	Ethylene acrylic acid copolymers
EAM	Elastomeric copolymer of ethylene and vinyl acetate (ANSI/ASTM)
EBM	Extrusion blow molding

EC	Ethyl cellulose (ASTM, DIN, ISO, IUPAC)
ECB	Blends from ethylene copolymers with bitumen
ECO	Elastomeric copolymer from ethylene oxide and epichlorohydrin, chloromethyloxirane (ANSI/ASTM); see also CHC
ECTFE	Poly(ethylene-*co*-chlorotrifluoroethylene); see also E-CTFE
E-CTFE	Poly(ethylene-*co*-chlorotrifluoroethylene); see also ECTFE
EDA	Ethylene diamine (WTR)
EDC	Ethylene dichloride, 1,2-dichloroethane
EDMA	Ethylene glycol dimethacrylate
EDTA	Ethylenediaminetetraacetic acid
EEA	Elastomeric copolymer from ethylene and ethyl acrylate (ASTM); see also E/EA
E/EA	Elastomeric copolymer from ethylene and ethyl acrylate (ISO); see also EEA
EG	Ethylene glycol
EHDPP	2-Ethylhexyldiphenyl phosphate; see also DPOF
EHEC	Hydroxyethylcellulose
EL	Elastodiene fiber (EDV); see also EU, LA
ELO	Epoxidized linseed oil (DIN, ISO)
EMA	1. Copolymer from ethylene and methacrylic acid (ASTM) 2. Alternating copolymer from ethylene and maleic anhydride
EOT	Ethylene oxide polysulfide
EP	Epoxy resin (ASTM, DIN, ISO, IUPAC)
E/P	Copolymer from ethylene and propylene (ISO); see also AP, APR, EPM, EPR
EPC	Easy processing channel black
EPD	Elastomeric terpolymer from ethylene, propylene, and a nonconjugated diene (ASTM); see also APT, EPDM, EPT, EPTR
EPDM	Elastomeric terpolymer from ethylene, propylene, and a nonconjugated diene (ASTM); see also, APT, APTK, EPD, EPT, EPTR
EPE	Ester of an epoxy resin (DIN)
EP-G-G	Prepreg from an epoxy resin and a textile glass fabric (German technical literature)
EP-K-L	Prepreg from an epoxy resin and a carbon fiber fabric (German technical literature)
EPM	Elastomeric copolymer of ethylene and propylene (ANSI/ASTM, ISO); see also AP, APR, E/P, EPM, EPR
EPR	Elastomeric copolymer of ethylene and propylene (BS); see also AP, APR, E/P, EPM
EPS	Expanded poly(styrene) [poly(styrene) foam]
EPT	Elastomeric terpolymer from ethylene, propylene and a diene; see also APT, APTK, EPD, EPDM, EPTR
EPTD	Diethyl diphenyl thiuram disulfide (WTR)
EPTM	Diethyl diphenyl thiuram monosulfide (WTR)
EPTR	Elastomeric terpolymer from ethylene, propylene and a diene (BS); see also APT, APTK, EPD, EPDM, EPT
E-PVC	Emulsion-polymerized poly(vinyl chloride)
ERM	Elastin reservoir molding
E-SBR	Copolymer from styrene and butadiene, polymerized in emulsion
ESC	Environmental stress cracking
ESCR	Environmental stress cracking resistance
ESO	Epoxidized soy bean oil (DIN, ISO)
ET	Ethylene polysulfide
ETCH	Ethylene chlorohydrine; 2-chloroethanol
ETFE	Copolymer of ethylene and tetrafluoroethylene (ASTM)
E/TFE	Copolymer of ethylene and tetrafluoroethylene
ETG	Ethylene triglycol
ETMQ	2,2,4-Trimethyl-1,2-dihydro-6-ethoxy quinoline (WTR)
EU	1. Elastomeric polyurethane with polyether segments (ANSI/ASTM) 2. Polyether rubber with carbon, oxygen, and nitrogen in the polymer chain (ISO) 3. Elastodiene fibers (ASTM); see also EL, LA Classifications 1 and 2 probably refer to the same polymer
EVA	Copolymer from ethylene and vinyl acetate (ASTM, DIN, ISO); see also E/VAC, EVM, VAE
E/VAC	Copolymer from ethylene and vinyl acetate (ASTM, DIN); see also E/VAC, EVM, VAE
EVAL®	Copolymer of ethylene and vinyl alcohol
E/VAL	Copolymer of ethylene and vinyl alcohol
EVE	Ethylene vinyl ether
EVOH®	Copolymer with ethylene and vinyl alcohol units
EVM	Elastomer from ethylene and vinyl acetate; see also EVA, E/VAC, VAE
F	1. Fluorine (IUPAC) 2. Furnace black
FC	Fluorocarbon
FDAP	Diallyl phthalate or resins therefrom, see also DAP
FE	Fluorine containing elastomer
FEF	Fast extruding furnace black
FEP	Copolymer from tetrafluoroethylene and hexafluoropropylene (ASTM, DIN, ISO, IUPAC); see also PFEP
FF	1. Resin from furan and formaldehyde (ASTM) 2. Fine furnace black

Fi	Fique (DIN)
FK	Fiber reinforced plastic ("faserverstärkter Kunststoff"; German technical literature)
FKM	Elastomer with saturated main chain and fluoro, perfluoroalkyl, or perfluoroalkoxy substituents (ANSI/ASTM); see also FPM
FL	Fluorofiber (EDV); probably fibers from poly(tetrafluoroethylene)
Fl	Flax (DIN)
FMQ	Methyl fluorosilicone rubber; see also MFQ
FPM	1. Elastomeric copolymer from vinylidene fluoride and hexafluoropropylene (ASTM) 2. Fluoroelastomers in general 3. Rubbers having fluoro and fluoroalkyl or fluoroalkoxy substituent groups at the polymer chain (ISO)
FPVC	Flexible PVC film
FQ	Elastomeric silicone with fluorine containing substituents (ASTM); see also FSI
FR	Flame retardant
FRP	Glass fiber reinforced polyester
FSI	Fluorinated silicone (ASTM); see also FQ
FT	Fine thermal black
FVMQ	Silicone rubber with fluorine, vinyl, and methyl substituents (ANSI/ASTM)
FVSI	Fluorosilicone
GC	Glass coupled
GEP	Glass fiber reinforced epoxy resin
GF	Glass fiber reinforced plastic; see also GFK
GF-EP	Glass fiber reinforced epoxy resin
GFK	Glass fiber reinforced plastic (German technical literature)
GF-PF	Glass fiber reinforced phenolic resin
GF-UP	Glass fiber reinforced unsaturated polyester (German technical literature)
GI	Broom (fibers from) (EDV)
GL	Glass fiber (DIN, EDV)
GP	1. Gutta percha 2. General purpose (ASTM)
GPF	General purpose furnace black
GPO	Elastomeric copolymer from propylene oxide and allyl glycidyl ether (ANSI/ASTM)
GR	1. Glass fiber reinforced 2. Former US symbol for "government rubber"
GR-A	Former US symbol for nitrile rubber; see also GR-N
GRAS	Generally recognized as safe
GR-I	Former US symbol for butyl rubber
GR-N	Former US symbol for nitrile rubber; see also GR-A
GRP	Glass fiber reinforced plastic
GR-P	Glass fiber reinforced plastic
GR-S	Former US symbol for styrene–butadiene rubber
Gu	Guanaco wool (DIN)
GU	Fibers from diene rubbers (old German technical literature)
GUP	Glass fiber reinforced unsaturated polyester resins (German technical literature)
GUR	Ultrahigh molecular weight poly(ethylene); see also UHMPE
GV	Glass fiber reinforced thermoplastics
HA	Human hair (EDV)
HAF	High abrasion furnace black
HBPA	2,2-bis(4-hydroxycyclohexyl)propane
HDI	Hexamethylene-1,6-diisocyanate (WTR)
HDPE	High-density poly(ethylene) (ASTM); in the older German technical literature, HDPE was sometimes used for poly(ethylene) from high pressure polymerizations ("Hochdruck"), i.e., for poly(ethylene)s with mostly *low* densities; see also PEH
He	1. Helium 2. Henequen (DIN); see also HE
HE	Henequen (EDV); see also He
HEC	Hydroxyethylcellulose
HEMA	2-Hydroxyethyl methacrylate
HEXA	Hexamethylene tetramine (WTR); see also HMT
HF	Half linen (EDV)
HFIP	Hexafluoroisopropanol; 1,1,1,3,3,3-hexafluoro-2-propanol; see also HFP
HFP	1. Hexafluoroisopropanol; see also HFIP 2. Hexafluoropropene
Hgw	Hard fabric ("Hartgewebe", German technical literature)
HIPS	High impact poly(styrene)
Hm	Hard mat (German technical literature)
HM	Hot melt adhesive
HMC	Sheet molding compound with high glass fiber content (UP resin) (DIN)
HMDAC	Hexamethylene diamine carbamate (WTR)
HMDI	Hydrogenated diphenylmethane diisocyanate
HMF	High-modulus furnace black
HMPT	Hexamethylphosphoric acid triamide; see also HPT
HMT	Hexamethylene tetramine
HMWPE	Poly(ethylene) with very high molar mass (molecular weight)
H-NBR	Hydrogenated nitrile rubber
HP	Hard paper (German technical literature)
HPA	Hydroxypropyl acrylate
HPC	1. Hydroxypropyl cellulose 2. Hard processing channel black
HPMC	(Hydroxypropyl)methyl cellulose
HPT	Hexamethyl phosphorotriamide; see also HMPT

HR	High resiliency foam
Hs	Hare hair (DIN)
HS	1. Heat stabilized 2. High percent solids
HTBA	High temperature blowing agent
HTE	Hydroxyl terminated polyether
HTST	High-temperature, short-term processing
Hz	Goat hair ("Haar von der Ziege"; DIN)
ICR	Initial concentration rubber (from undiluted natural rubber latex)
IEN	Interpenetrating elastomeric network
IFR	Intumescent flame retardant
IHPN	Interpenetrating homopolymer network
IIR	Elastomeric copolymer from isobutene and isoprene (ANSI/ASTM, IUPAC); see also Butyl, GR-I, PIBI
IM	Poly(isobutylene); see also PIB
IMW	Intermediate molecular weight
IPA	Isophthalic acid
IPDI	3-Isophorone diisocyanate (WTR)
IPN	Interpenetrating polymer network
IPO	Isopropyl oleate
IPP	Isopropyl percarbonate; diisopropyl peroxydicarbonate
IPPD	*N*-Isopropyl-*N*′-phenyl-*p*-phenylenediamine (WTR)
IR	Synthetic *cis*-1,4-poly(isoprene) (ANSI/ASTM, BS, IUPAC); see also CPI, PIP
IRT	Insect resistant treated
IS	Insoluble sulfur (WTR)
IT	Interrupted or split thread
IVE	Isobutyl vinyl ether
Ju	Jute (DIN); see also JU
JU	Jute (EDV); see also Ju
KA	Casein fibers (DIN)
KE	Kenaf (EDV); see also Kf
KEK	Carbon fiber reinforced plastic (DIN)
Kf	Kenaf (DIN); see also KE
KFA	Potassium fatty acid soap
Km	Camel hair (DIN)
Kn	Rabbit hair (DIN)
Ko	Coir (DIN)
Kp	Kapok (DIN); see also KP
KP	Kapok (EDV); see also Kp
Kz	Cashmere goat wool (DIN)
LA	Fibers from diene rubbers (DIN); see also EL, EU
LDPE	Low-density poly(ethylene) (ASTM); in the older German technical literature, LDPE was sometimes used for poly(ethylene) from low pressure polymerizations, i.e., for poly(ethylene)s with mostly *high* densities; see also NDPE
LI	Linen, flax (EDV)
LIM	Liquid impingement molding (now RIM)
LIPN	Latex interpenetrating polymer network
LLDPE	Linear low-density poly(ethylene) (ASTM)
Lm	Llama wool (DIN)
LRM	Liquid reaction molding (now RIM)
LRMR	Reinforced liquid reaction molding
L-SBR	Solution polymerized SBR
M	Medium thermal carbon black
Ma	Manila hemp fibers (Abaca) (DIN)
MA	1. Modacrylic fiber (EDV); see also PAM 2. Maleic anhydride
MABS	Copolymer from methyl methacrylate, acrylonitrile, butadiene, and styrene
MAN	Methacrylonitrile
MBI	Mercaptobenzimidazole; 2-benzimidazolethiol
MBS	1. Copolymer from methyl methacrylate, butadiene, and styrene 2. Benzthiazyl-2-sulfene morpholide (WTR)
MBSS	2-(4-Morpholinyldithio)benzothiazole (WTR)
MBT	Mercaptobenzothiazole; 2-benzthiazolethiol
MBTS	2-Benzthiazolyl disulfide
MC	Methyl cellulose
MCB	Monochlorobenzene
MD	Modal fiber (EDV)
MDA	1. Methylenediamine 2. 4,4′-Diaminodiphenylmethane
MDAC	4-Methyl-7-(diethylamino)coumarine
MDI	4,4′-Diphenylmethane diisocyanate; methylene di-*p*-phenylene diisocyanate
MDPE	Poly(ethylene) with medium density ($\approx 0.93-0.94\ g/cm^3$) (ASTM)
ME	Metal fiber (EDV)
MEK	Methyl ethyl ketone; 2-butanone
MEKP	Methyl ethyl ketone peroxide
MF	Melamine–formaldehyde resin (ASTM, DIN, ISO, IUPAC)
MFK	Metal fiber reinforced plastic (German technical literature)
MFQ	Silicone rubber having both methyl and fluorine substituent groups on the polymer chain (ISO); see also FMQ
MG	Maguey (EDV)
MMA	Methyl methacrylate (ASTM)
Mo	1. Molybdenum (IUPAC) 2. Mohair wool (DIN)
MOCA	4,4′-Methylenebis(2-chloroaniline); 3,3′-dichloro-4,4′-diaminodiphenylmethane
MOD	Modacryl fiber (EWG)
MP	Melamine–phenol–formaldehyde resin; see also MPF
MPE	Metallized polyester film

MPF	Melamine–phenol–formaldehyde resin (ISO); see also MP
MPPPD	*N*-Methyl-2-pentyl-*N*′-phenyl-*p*-phenylene diamine (WTR)
MPQ	Silicone rubbers having both methyl and phenyl substituent groups on the polymer chain (ISO); see also PMQ
MPTD	Dimethyl diphenyl thiuram disulfide (WTR)
M-PVC	PVC, polymerized in bulk (mass) (German technical literature)
MPVQ	Silicone rubbers having methyl, phenyl, and vinyl substituent groups on the polymer chain (ISO); see also PVMQ
MQ	Elastomeric silicones with methyl substituents (ANSI/ASTM)
MR	Mold resistant
Ms	Silk from the silkworm (mulberry spinner; *Bombyx mori L.*) (DIN)
MSA	Maleic anhydride (German technical literature)
MT	Metal fibers (DIN); see also ME
MTI	Methylene tri(*p*-phenylene isocyanate)
MTM	Mixed tertiary mercaptans
MVQ	Silicone rubbers having both methyl and vinyl substituent groups on the polymer chain (ISO); see also VMQ
MWR	Molding with rotation
NBR	Elastomeric copolymer from butadiene and acrylonitrile; nitrile rubber (ANSI/ASTM, BS, IUPAC); see also GR-N, PBAN
NC	Cellulose nitrate; see also SN
NCR	Elastomeric copolymer from acrylonitrile and chloroprene (ANSI/ASTM, IUPAC)
NDBC	Nickel dibutyl dithiocarbamate (WTR)
NDGA	Nordihydroguaiaretic acid
NDI	1,5-Diisocyanatonaphthalene (WTR)
NDOP	*n*-Decyl-*n*-octyl phthalate; see also ODP
NDPA	*N*-Nitrosodiphenylamine (WTR)
NDPE	Low-density poly(ethylene); see also LDPE
NEM	*N*-Ethylmorpholine
Nf	Phormium (DIN)
NHDP	*n*-Hexyl-*n*-decyl phthalate
NIR	Elastomeric copolymer from acrylonitrile and isoprene (ANSI/ASTM)
NK	Natural rubber; see also NR
NMP	*N*-Methylpyrrolidone
NODA	*n*-Octyl-*n*-decyl adipate
NODP	*n*-Octyl-*n*-decyl phthalate; see also ODP
NPG	Neopentyl glycol
NPP	*n*-Propyl percarbonate; dipropyl peroxydicarbonate
NR	Natural rubber (ANSI/ASTM, IUPAC); see also NK
OBSH	*p,p*′-Oxybis(benzenesulfonyl hydrazide)
ODP	Octadecyl phthalate (ISO); see also NODP
ODPA	Octylated diphenylamine (WTR)
ODPP	Octyldiphenyl phthalate
OER	Oil-extended rubber
OPET	Oriented poly(ethylene terephthalate)
OPP	Oriented poly(propylene) film or bottles; see also PP
OPR	Elastomeric polymer from propylene oxide
OPS	Oriented poly(styrene) film
OPVC	Oriented poly(vinyl chloride)
OT	Polysulfide rubber
OTBG	*o*-Tolyl biguanide (WTR)
OTOS	*N*-Oxydiethylenedithiocarbamyl-*N*′-oxydiethylenesulfamide (WTR)
P3FE	Poly(trifluoroethylene) (IUPAC)
PA	1. Polyamide (ASTM, DIN, ISO, IUPAC); the acronym PA is normally followed by a number, a combination of numbers, a letter, or a combination of letters and numbers. A single number *i* refers to a polyamide from an α,ω-amino acid or its lactam with *i* carbon atoms in the aliphatic chain of the monomeric unit. A combination of two numbers indicates polyamides from the polycondensation of a diamine and a dicarboxylic acid; the first number gives the number of methylene groups of aliphatic diamines, the second number the number of carbon atoms of straight-chain aliphatic dicarboxylic acids. Both numbers are sometimes separated by a period. "I" stands for isphthalic acid, "T" for terephthalic acid. 2. Phthalic anhydride
PA*	Saran coated polyamide (ASTM)
PA**	Metal coated polyamide (ASTM)
PAA	Poly(acrylic acid) (ASTM)
PAB	*p*-Aminobiphenyl
PABM	Polyaminobismaleimide
PAC	Poly(acrylonitrile) fiber (DIN, IUPAC); see also PAN, PC
PAE	Phthalate ester plasticizer
PAI	Polyamide-imide (ASTM)
PAM	Modacryl fiber (DIN); see also MA
PAMS	Poly(α-methyl styrene)
PAN	1. Poly(acrylonitrile) fiber (ASTM, IUPAC, EDV); see also PAC, PC. PAN^R is also a German trademark. 2. Phenyl-α-naphthylamine (WTR)
PAPA	Polyazelaic polyanhydride
PAPDC	Pentamethylene ammonium *N*-pentamethylene dithiocarbamate (WTR)
PAPI	Polymethylenepolyphenylene isocyanate; see also PMPPI

PARA	Polyarylamide (ASTM)
PAS	1. Polyaryl sulfone
	2. Poly(acrylic acid) (German technical literature)
PAT	Polyaminotriazole
PB	1. Poly(1-butene) (ASTM, DIN, ISO); see also BT, PBT
	2. Polyurea fiber (EDV); see also PUA
	3. Elastic polydiene fiber (German technical literature)
PBA	Physical blowing agent
PBAN	Copolymer from butadiene and acrylonitrile (ASTM); see also GR-N, NBR
PBB	Polybrominated biphenyl
PBI	Polybenzimidazole
PBMA	Poly(*n*-butyl methacrylate)
PBNA	Phenyl-β-naphthylamine; *N*-phenyl-2-naphthylamine
PBR	Copolymer from butadiene and vinylpyridine (ANSI/ASTM, IUPAC)
PBS	Copolymer from butadiene and styrene (ASTM); see also SB, GR-S, SBR
PBT	1. Poly(butylene terephthalate) (ASTM); see also PBTP, PTMT
	2. Poly(1-butene), see also BT, PB
	3. Poly(*p*-phenylenebenzobisthiazole)
PBTP	Poly(butylene terephthalate) (DIN, ISO); see also PTMT
PC	1. Polycarbonate (ASTM, DIN, ISO, IUPAC); see also PCO
	2. Poly(acrylonitrile) fiber (EWG, EDV); see also PAC, PAN
	3. Formerly: chlorinated PVC; see also CPVC, PeCe, PVCC
PCB	Polychlorinated biphenyl
PCD	Polycarbodiimide
PCDT	Poly(1,4-cyclohexylenedimethylene terephthalate)
PCF	Poly(chlorotrifluoroethylene) fiber (DIN)
PCO	Polycarbonate; see also PC
PCTFE	Poly(chlorotrifluoroethylene) (ASTM, DIN, ISO, IUPAC); see also CEM, CFM, CTFE
PCU	Unchlorinated poly(vinyl chloride) (old German technical literature)
PDAP	Poly(diallyl phthalate) (ASTM, DIN, ISO, IUPAC); see also DAP, FDAP
PDMS	Poly(dimethyl siloxane)
PE	1. Poly(ethylene) (ASTM, DIN, ISO, IUPAC); see also PL
	2. Polyester fiber (EWG)
	3. Pentaerythritol
PEA	Poly(ethyl acrylate)
PEC	Chlorinated poly(ethylene) (DIN, ISO); see also CPE
PeCe	Chlorinated PVC; see also CPVC, PC, PVCC
PEE	Polyester ether fibers (containing diol and *p*-hydroxybenzoate units) (DIN)
PEEK	Polyether ether ketone = Poly(oxy-1,4-phenylene-oxy-1,4-phenylene-carbonyl-1, 4-phenylene)
PEEKK	Polyether ether ketone ketone
PEG	Poly(ethylene glycol)
PEH	Poly(ethylene) with high density; see also HDPE
PEHA	Pentaethylenehexamine (WTR)
PE-HD	Poly(ethylene) with high density (DIN, ISO); see also HDPE, PEH
PEK	Polyether ketone
PEKEKK	Polyether ketone ether ketone ketone
PEKK	Polyether ketone ketone
PEL	Poly(ethylene) with low density; see also LDPE, PE-LD
PEM	Poly(ethylene) with medium density; see also MDPE
PEO	Poly(ethylene oxide) (ASTM, IUPAC); see also PEOX
PEOX	Poly(ethylene oxide) (DIN, ISO); see also PEO
PEP	Thermoplastic copolymer from ethylene and propylene
PES	1. Polyester fiber (DIN); see also PET, PL
	2. Polyether sulfone (ASTM); see also PSU
PESU	Polyether sulfone (ASTM); see also PES
PET	Poly(ethylene terephthalate) (ASTM); see also PETP, PE, PES
PET*	Saran coated PET (ASTM)
PETP	Poly(ethylene terephthalate) (ASTM, DIN, ISO, IUPAC); see also PET, PE, PES
PETS	Pentaerythryl tetrastearate (WTR)
PF	Phenol–formaldehyde resin (ASTM, DIN, ISO, IUPAC)
PFA	Perfluoroalkoxy resins, copolymers of tetrafluoroethylene and perfluorinated alkyl vinyl ethers
PFEP	Copolymer from tetrafluoroethylene and hexafluoropropylene; see also FEP
PF-P-B	Phenolic resin–paper prepreg
PG	Propylene glycol
PHAS	Poly(α-hydroxy acrylic acid)
PHA	Poly(hydroxyalkanoate)
PHB	1. Poly(*p*-hydroxybenzoate); see also POB
	2. Poly(α-hydroxybutyrate)
PHEMA	Poly(2-hydroxyethyl methacrylate)
PHP	Physiological hydrophilic polymers
PI	1. *trans*-1,4-Poly(isoprene), gutta percha (BS)
	2. Polyimide (ASTM)
	3. Paper (EDV)
PIB	Poly(isobutene) (ASTM, BS, DIN, ISO, IUPAC)

PIBI	Elastomeric copolymer from isobutene and isoprene (butyl rubber); see also Butyl, GR-I, IIR
PIBO	Poly(isobutylene oxide)
PIP	Synthetic *cis*-1,4-poly(isoprene); see also CPI, IR
PIR	Poly(isocyanurate) (DIN)
PIS	Poly(isobutylene)
PL	1. Poly(ethylene) (EWG); see also PE 2. Polyester fiber (EDV); see also PES, PET
PMA	1. Pyromellitic acid 2. Pyromellitic dianhydride 3. Poly(methyl acrylate)
PMAC	Polymethoxy acetal
PMCA	Poly(methyl α-chloromethacrylate) (ASTM)
PMF	Processed mineral fiber
PMI	Poly(methacrylimide)
PMMA	(Poly(methyl methacrylate) (ASTM, DIN, ISO, IUPAC)
PMMI	Poly(pyromellitimide)
PMP	Poly(4-methyl-1-pentene) (ASTM, DIN, ISO); see also TPX
PMPPI	Polymethylenepolyphenylene isocyanate; see also PAPI
PMQ	Silicon rubbers with methyl and phenyl substituents (ANSI/ASTM)
PMTT	3-Phenyl-5-mercapto-1,3,4-thiadiazole-2-thione (WTR)
PNA	Polynuclear aromatics
PNAH	Polynuclear aromatic hydrocarbons
PNF	Phosphorus nitrile fluoroelastomer
PNR	Poly(norbornene) rubber
PO	1. Elastomeric poly(propylene oxide) (ASTM) 2. Poly(olefin) 3. Phenoxy resin
POB	Poly(*p*-hydroxybenzoate); see also PHB
POM	Poly(oxymethylene), poly(formaldehyde) (ASTM, DIN, ISO, IUPAC)
POP	Poly(1,4-phenylene oxide) (ASTM); see also PPO
POR	Elastomeric copolymer from propylene oxide and allyl glycidyl ether
PP	Poly(propylene) (ASTM, DIN, EDV, ISO, IUPAC)
PP*	Metallized poly(propylene) (ASTM)
PPA	1. Poly(parabanic acid) 2. Poly(propylene adipate)
PPC	Chlorinated poly(propylene) (DIN)
PPI	Polymeric polyisocyanate
PPO®	Poly(oxy-1,4-phenylene) = "poly(phenylene oxide)"; see also POP
PPOX	Poly(propylene oxide) (ASTM, DIN, ISO)
PPP	Poly(*p*-phenylene)
PPS	Poly(*p*-phenylene sulfide) (ASTM)
PPSU	Poly(phenylene sulfone) (ASTM, DIN, ISO); see also PSU
PPT	Poly(propylene terephthalate)
PQ	Elastomeric silicone with phenyl substituents (ASTM)
PQD	*p*-Quinone dioxime (WTR)
PR	Regenerated protein fiber (EDV)
PS	Poly(styrene) (ASTM, DIN, ISO, IUPAC)
P-S	Pressure-sensitive adhesive
PSA	Pressure-sensitive adhesive
PSAB	Thermoplastic copolymer from styrene, acrylic ester and butadiene (DIN); see also SBV, S/B
PSAN	Thermoplastic copolymer from styrene and acrylonitrile (DIN), see also SAN
PSBR	Elastomeric terpolymer from vinylpyridine, styrene, and butadiene (ANSI/ASTM)
PSF	Polysulfone; see also PSO
PSI	Poly(methyl phenyl siloxane) (ASTM)
PSO	Polysulfone; see also PSF
PST	Poly(styrene) fiber with at least 85% styrene units (DIN)
PS-TSG	Poly(styrene) foam, processed by thermoplastic injection (German technical literature)
PSU	Poly(phenylene sulfone); see also PPSU
PSUL	Polysulfone (ASTM)
PTA	1. Purified terephthalic acid 2. Phthalic anhydride
PTF	Pole(tetrafluoroethylene) fiber
PTFE	Poly(tetrafluoroethylene) (ASTM, DIN, ISO, IUPAC)
PTMA	Poly(tetramethylene adipate)
PTMEG	Poly(tetramethylene ether glycol)
PTMG	Poly(oxytetramethylene glycol)
PTMT	Poly(tetramethylene terephthalate) = poly(butylene terephthalate) see also PBTP
PU	1. Polyurethane elastomer (BS) 2. Polyurethane fiber (EDV)
PUA	Polyurea fiber (DIN); see also PB
PUE	Segmented polyurethane fiber (DIN); see also EA
PUR	Polyurethane (ASTM, DIN, ISO, IUPAC); see also PU
PVA	1. Poly(vinyl acetate); see also PVAC 2. Poly(vinyl alcohol) (ASTM); see also PVAL, PVOH 3. Poly(vinyl alcohol) fiber with at least 85% vinyl alcohol units (DIN); see also VY 4. Poly(vinyl ether) (old German technical literature); see also PVOM, PVME
PVAC	Poly(vinyl acetate) (ASTM, DIN, ISO, IUPAC); see also PVA
PVAL	Poly(vinyl alcohol) (ASTM, DIN, ISO, IUPAC)

PVC	1. Poly(vinyl chloride) (ASTM, DIN, ISO, IUPAC); see also CL 2. Poly(vinyl chloride) fiber with at least 50 wt.% vinyl chloride units (DIN) 3. Pigment volume concentration
PVCA	Copolymer from vinyl chloride and vinyl acetate (ASTM, DIN, IUPAC); see also PVCAC
PVCAC	Copolymer from vinyl chloride and vinyl acetate (ASTM); see also PVCA
PVCC	Chlorinated PVC (DIN, ISO); see also CPVC, PC, PeCe
PVD	Poly(vinylidene chloride) fiber with at least 50 wt.% vinylidene chloride units (DIN); see also PVDC
PVDC	Poly(vinylidene chloride) (ASTM, DIN, ISO, IUPAC); see also PVD
PVDF	Poly(vinylidene fluoride) (ASTM, DIN, ISO, IUPAC); see also PVF
PVF	1. Poly(vinyl fluoride) (ASTM, DIN, ISO, IUPAC) 2. Poly(vinylidene fluoride); see also PVDF
PVFM	Poly(vinyl formal) (ASTM, DIN, ISO, IUPAC); see also PVFO
PVFO	Poly(vinyl formal) (DIN); see also PVFM
PVI	Poly(vinyl isobutyl ether)
PVID	Poly(vinylidene cyanide)
PVK	Poly(*N*-vinylcarbazole) (ASTM, DIN, ISO)
PVM	1. Copolymer from vinyl chloride and vinyl methyl ether 2. Fiber from the copolymer of vinyl and/or vinylidene compounds with a main component of at least 85 wt.% (DIN)
PVME	Poly(vinyl methyl ether)
PVMQ	Silicone rubber with methyl, phenyl, and vinyl substituents (ANSI/ASTM)
PVOH	Poly(vinyl alcohol); see also PVA, PVAL
PVP	Poly(*N*-vinylpyrrolidone) (ASTM, DIN, ISO)
PVSI	Poly(dimethyl siloxane) with phenyl and vinyl substituents (ASTM)
PY	Unsaturated polyester resins (BS)
QMC	Quick molding change
Ra	Ramie (DIN)
RA	Ramie (EDV)
RAM	Restricted area molding
RAN	Residual acrylonitrile (monomer in polymer)
RF	Resorcine–formaldehyde resin
Rh	1. Rhenium (IUPAC) 2. Horse hair ("Rosshaar") (DIN)
RHB	Reheat blow molding
RHC	Rubber hydrocarbon content
Ri	Cow hair ("Rind") (DIN)
RIM	Reaction injection molding
Ro	Rosella (DIN)
RP	Reinforced plastics
RP/C	Reinforced plastics (composite)
RP/M	Reinforced polyester (mortar)
RPVC	Rigid PVC film
RRIM	Reinforced reaction injection molding
RTP	Reinforced thermoplastic
RTV	Room temperature vulcanization
RVCM	Residual vinyl chloride monomer
RUC	Chlorinated isoprene rubber (DIN)
S	Styrene
SAF	Super abrasion furnace black
SAF-HS	High structure SAF
SAF-LS	Low-structure SAF
SAIB	Sucrose acetate isobutyrate
SAL	Salicylic acid
SAN	Thermoplastic copolymer from styrene and acrylonitrile (ASTM, DIN, ISO, IUPAC); see also PSAN
SB	Thermoplastic copolymer from styrene and butadiene (ASTM); see also S/B
S/B	Thermoplastic copolymer from styrene and butadiene (ANSI/ASTM, ISO, IUPAC); see also SB
SBP	1. *s*-Butyl percarbonate; di-*s*-butyl peroxydicarbonate 2. Styrene–butadiene resin
SBR	Elastomeric copolymer from styrene and butadiene (ASTM, BS, IUPAC); see also GR-S
SBS	1. Solid bleached sulfate 2. Styrene–butadiene–styrene triblock copolymer
SCR	Elastomeric copolymer from styrene and chloroprene (ANSI/ASTM, IUPAC)
SDD	Sodium dimethyldithiocarbamate
SDPA	Aralkylated diphenylamines (WTR)
SE	1. Sulfoethyl- (with cellulose) 2. Silk ("Seide") (EDV)
SEBS	Styrene–ethylene/butylene–styrene triblock copolymer (= hydrogenated styrene–isoprene–styrene triblock copolymer)
SEDC	Selenium diethyl dithiocarbamate (WTR)
S-EPDM	Sulfonated ethylene–propylene–diene terpolymer
SF	Structural foam
SFK	Synthetic fiber reinforced plastic (German technical literature)
SFP	Scrapless forming process
SHIPS	Super-high impact poly(styrene)
Si	1. Silicon (IUPAC) 2. Sisal (DIN); see also SI
SI	1. Silicones in general (ASTM, DIN, ISO) 2. Poly(dimethyl siloxane) (ASTM) 3. Thermoplastic silicone (IUPAC) 4. Sisal (EDV); see also SI

SIN	1. Simultaneous interpenetrating network 2. Semi-interpenetrating network
SIPN	Sequential interpenetrating polymer network
SIR	1. Elastomeric copolymer from styrene and isoprene (ANSI/ASTM, IUPAC) 2. Standardized Indonesian rubber
SIS	Styrene–isoprene–styrene triblock copolymer
SL	Slag wool (DIN)
SM	Styrene monomer
SMA	Copolymer from styrene and maleic anhydride (ASTM)
SMC	Sheet molding compound (UP resin)
SMR	Standardized Malaysian rubber
SMS	Copolymer from styrene and α-methylstyrene (ASTM, DIN); see also S/MS
S/MS	Copolymer from styrene and α-methylstyrene (DIN, ISO); see also SMS
Sn	1. Tin (IUPAC) 2. Sunn hemp fibers (DIN); see also SN
SN	Sunn hemp fibers (EDV)
SP	Superior processing rubber (a grade of natural rubber)
SPF	Superior processing furnace black
SPH	Styrenated phenol (WTR)
SPPF	Solid-phase pressure forming
SPSF	Solid-phase stretch forming
S-PVC	Poly(vinyl chloride), polymerized in suspension
SR	Synthetic rubber
SRF	Semi-reinforcing furnace black
SRF-HM	High-modulus SRF
SRF-HM-NS	Nonstaining high-modulus SRF
SRF-LM	Low-modulus SRF
SRF-LM-NS	Nonstaining low-modulus SRF
SRP	Rubber reinforced poly(styrene) (ASTM)
SS	1. Single stage (ASTM) 2. Steam-stripped (to remove residual monomer)
ST	Stone wool (DIN)
SWP	1. Solvent-welded plastics pipe 2. Synthetic wood pulp
T	1. Polysulfide rubber; see also OT, TR 2. Thermal black
TA	Cellulose triacetate (EDV); see also CT, CTA
TAC	Triallyl cyanurate (ASTM)
TATM	Triallyl trimellitate (WTR)
TBBS	Benzothiazyl-2-*t*-butyl sulfenamide (WTR)
TBC	Total Broadhurst Lee process
TBP	*t*-Butyl perbenzoate; see also TBPB
TBPA	Tetrabromophthalic anhydride
TBPB	*t*-Butyl perbenzoate; see also TBP
TBS	*t*-Butylstyrene
TBT	Tetrabutyl titanate
TBTD	Tetrabutyl thiuram disulfide (WTR); see also TBUT
TBTU	Tributyl thiourea (WTR)
TBUT	Tetrabutyl thiuram disulfide (WTR)
TC	Technically classified natural rubber
TCE	Trichloroethylene
TCEF	Trichloroethyl phosphate (ASTM, ISO); see also TCEP
TCF	Tricresyl phosphate, tritolyl phosphate (ASTM, DIN, ISO); see also TCP, TKP, TTP
TCM	Trichloromelamine (WTR)
TCP	Tricresyl phosphate (IUPAC); TCP® is a registered trademark in the United Kingdom; see also TCF, TKP, TTP
TDEC	Tellurium diethyl dithiocarbamate (WTR)
TDI	Tolylene diisocyanate; tolylene isocyanate; methylphenylene diisocyanate; usually an 80:20 mixture of the 2,4- and 2,6-isomers
TDID	Dimeric tolylene diisocyanate
TDM	*t*-Dodecyl mercaptan (WTR)
TEAE	Triethylaminoethyl- (with cellulose)
TEDMA	Triethylene glycol dimethacrylate (WTR)
TEGDA	Triethylene glycol diacetate (WTR)
TEP	Triethyl phosphate
TEPA	Tetraethylene pentamine (WTR)
TETA	Triethylene tetramine
TETD	Tetraethyl thiuram disulfide (WTR)
TFE	Tetrafluoroethylene (ASTM)
THBP	2,4,5-Trihydroxybutyrophenone
THF	Tetrahydrofuran
THT	Tetrahydrothiophene (WTR)
TIOTM	Triisooctyl trimellitate (DIN, ISO)
TKP	Tricresyl phosphate; see also TCE, TCP, TTP
Tl	1. Thallium (IUPAC) 2. American moss (DIN)
TM	Thioplastics
TMA	Trimellitic anhydride
TMC	Thick molding compound
TMETD	Tetramethyl tetraethyl thiuram disulfide (WTR)
TMP	1. Thermal mechanical pulp 2. Trimethylol propane (WTR)
TMPT	Trimethylol propane trimethacrylate (WTR)
TMQ	2,2,4-Trimethyl-1,2-dihydroquinone (WTR)
TMS	Tetramethylsilane
TMTD	Tetramethyl thiuram disulfide (WTR)
TMTS	Tetramethyl thiuram monosulfide (WTR)
TMTT	Tetramethyl thiuram tetrasulfide (WTR)
TMTU	Tetramethyl urea (WTR); see also TMU
TMU	Tetramethyl urea; see also TMTU
TNPP	Trinonyl phenyl phosphate (WTR)
TOF	Trioctyl phosphate = tris(2-ethylhexyl) phosphate (ASTM, DIN, ISO); see also TOP

TOP	Trioctyl phosphate = tris(2-ethylhexyl) phosphate (ASTM, DIN, ISO); see also TOF
TOPM	Tetraoctyl pyromellitate, i.e., tetrakis(2-ethylhexyl) pyromellitate (DIN, ISO)
TOR	*trans*-Poly(octenamer)
TOTM	Trioctyl mellitate = tris(2-ethylhexyl) pyromellitate (DIN, ISO)
TPA	1. 1,4-*trans*-Poly(pentenamer); see also TPR
	2. Terephthalic acid
TPE	Thermoplastic elastomer
TPEL	Thermoplastic rubber or elastomer (ASTM)
TPES	Thermoplastic polyester in general (ASTM)
TPF	Triphenyl phosphate (DIN, ISO); see also TPP
TPI	Thermoplastoid (WTR)
TPO	Thermoplastic olefin elastomer
TPP	Triphenyl phosphate (ASTM, IUPAC); see also TPF
TPR	1. 1,5-*trans*-Poly(pentenamer); see also TPA
	2. Thermoplastic elastomer; see also TR, TPE
TPS	Toughened poly(styrene) (in the UK for HIPS)
TPTD	Tetraisopropyl thiuram disulfide (WTR)
TPU	Thermoplastic polyurethanes
TPUR	Thermoplastic urethane (ASTM)
TPX	Poly(4-methyl-1-pentene); see also PMP
TR	1. Thermoplastic elastomer
	2. Thio rubber (in the UK for polysulfide)
	3. Textile residues or fiber or fabric of unknown composition (EDV)
TRIM	Trimethylolpropane trimethacrylate
Ts	Tussah silk (DIN)
TSH	Toluene sulfonyl hydrazide (WTR)
TSUR	Thermoset polyurethane (ASTM)
TTP	Tricresyl phosphate, tritolyl phosphate (ISO); see also TCE, TCP, TKP
TTT	Triethyltrimethylenetriamine (WTR)
TU	Thiourea
TV	Trivinyl fiber (EDV)
Tz	Tibet goat hair (goat = "Ziege") (DIN)
UE	Polyurethane elastomer (ASTM); see also UR
UF	Urea–formaldehyde resin (ASTM, DIN, ISO, IUPAC)
UFS	Urea–formaldehyde foam
UHMPE	Poly(ethylene) with ultrahigh molar mass
UHMW-PE	Poly(ethylene) with ultrahigh molar mass (molar mass over 3 100 000 g/mol) (ASTM)
UP	Unsaturated polyester (ASTM, DIN, ISO, IUPAC)
UP-G-G	Prepreg from unsaturated polyesters and textile glass fibers
UP-G-M	Prepreg from unsaturated polyesters and textile glass mats
UP-G-R	Prepreg from unsaturated polyesters and textile glass rovings
Ur	Urena (DIN)
UR	Polyurethane elastomers (BS); see also UP
VA	Vinyl acetate
VAC	Vinyl acetate
VAE	Vinyl acetate–ethylene copolymers; see also EVA, E/VAC
VC	Vinyl chloride
VC/E	Copolymer from ethylene and vinyl chloride (ISO)
VC/E/MA	Copolymer from ethylene, vinyl chloride, and maleic anhydride (ISO)
VC/E/VAC	Copolymer from ethylene, vinyl chloride, and vinyl acetate (ISO)
VCI	Volatile corrosion inhibitor
VCM	Vinyl chloride (monomer); see also VC
VC/MA	Copolymer from vinyl chloride and methyl acrylate (ISO)
VC/MMA	Copolymer from vinyl chloride and methyl methacrylate (ISO)
VC/OA	Copolymer from vinyl chloride and octyl acrylate (ISO)
VC/VAC	Copolymer from vinyl chloride and vinyl acetate (ISO)
VC/VDC	Copolymer from vinyl chloride and vinylidene chloride (ISO)
VDC	Vinylidene chloride
Vf	1. Vulcan fiber
	2. Vinyl fluoride
VF/HFP	Copolymer from vinylidene fluoride and hexafluoropropylene
Vi	Vicuna wool (DIN)
VI	Viscose (rayon) (EDV); see also CV
VMQ	Silicone rubber with methyl and phenyl substituents (ANSI/ASTM)
VPE	Cross-linked poly(ethylene) (DIN)
VQ	Elastomeric silicone with vinyl substituents (ASTM)
VRI	Volatile rust inhibitor
VSI	Poly(dimethyl siloxane) with vinyl groups (ASTM)
VT	Vinyl toluene
VVO	Vulcanized vegetable oil = factice (WTR)
VY	Vinal (= poly(vinyl alcohol) fiber) (ASTM, EDV)
WA	Angora (rabbit) wool (EDV)
WB	Beaver wool (EDV)
WFK	Whisker reinforced plastic (German technical literature)
WG	Vicuna wool (EDV)

WK	Camel wool (EDV)
WL	Llama wool (EDV)
WM	1. Plasticizer (German technical literature: "Weichmacher") 2. Mohair wool (EDV)
Wo	1. Tungsten (IUPAC) 2. Sheep's wool (DIN); see also WO
WO	Sheep's wool (EDV); see also Wo
WP	Alpaca wool (EDV)
WS	Cashmere goat wool (EDV)
WT	Otter wool (EDV)
WU	Guanaco wool (EDV)
WV	Virgin sheep wool (EDV)
WY	Yak wool (EDV)
XABS	Elastomeric copolymer from acrylonitrile, butadiene, styrene, and a carboxylic group containing monomer (ASTM)
XLPE	Crosslinked poly(ethylene)
XNBR	Elastomeric copolymer from acrylonitrile, butadiene, and a carboxylic group containing monomer (ANSI/ASTM)
XPS	Expandable (or expanded) poly(styrene)
XSBR	Elastomeric copolymer from butadiene, styrene, and a carboxylic group containing monomer (ANSI/ASTM)
YSBR	Thermoplastic triblock copolymer from styrene and butadiene (ANSI/ASTM); see also SBS
YXSBR	Thermoplastic block copolymer from styrene and butadiene containing carboxylic groups (ANSI/ASTM)
Z5MC	Zinc pentamethylene dithiocarbamate (WTR)
ZBDC	Zinc dibenzyl dithiocarbamate (WTR)
ZBPD	Zinc dibutyl dithiophosphate (WTR)
ZBX	Zinc dibutyl xanthate (WTR)
ZDBC	Zinc dibutyl dithiocarbamate (WTR)
ZDEC	Zinc diethyl dithiocarbamate (WTR)
ZDMC	Zinc dimethyl dithiocarbamate (WTR)
ZE	Zein fibers (DIN)
ZEH	Zinc ethylhexanoate (WTR)
ZEPC	Zinc ethylphenyl dithiocarbamate (WTR)
ZIX	Zinc isopropyl xanthate (WTR)
ZMBI	Zinc 2-mercaptobenzimidazole
ZMBT	Zinc-2-mercaptobenzthiazole

C. ABBREVIATIONS AND ACRONYMS BASED ON POLY(MONOMER) NAMES

The following table contains the abbreviations and acronyms of names of polymeric materials whose base polymers were obtained by chain polymerization (addition polymerization), copolymerization, polycondensation (condensation polymerization), and polyaddition. Note that these abbreviations and acronyms do not apply in industry to polymers *per se* but to polymeric materials, i.e. polymers with or without additives, fillers, plasticizers, etc.

Abbreviations and acronyms are in part based on the poly(monomer) nomenclature, i.e., on the names of the monomers used in the manufacture of polymers, sometimes however, without a prefix "P" for "poly". The names of monomers for copolymers are given in alphabetical order without regard to their prevalence.

Registered trademarks: a) SAN in Japan and the USA; b) PAN in Europe.

Polymers of	ASTM	DIN	ISO	IUPAC	Other
Acrylic ester + acrylonitrile + butadiene	ABA	A/B/A	A/B/A		
Acrylic ester + acrylonitrile + styrene	ASA	A/S/A	A/S/A		
Acrylic ester + ethylene	EEA		E/EA		
Acrylic acid	PAA				PAS
Acrylonitrile	PAN	PAC		PAN	
Acrylonitrile + butadiene	PBAN				
Acrylonitrile + butadiene + methyl methacrylate + styrene					MABS
Acrylonitrile + butadiene + styrene	ABS	ABS	ABS	ABS	
Acrylonitrile + chlorinated poly(ethylene) + styrene		A/PE-C/S	A/CPE/S		ACS
Acrylonitrile + ethylene–propylene–diene + styrene		A/EPDM/S	A/EPDM/S		
Acrylonitrile + methyl methacrylate	AMMA	A/MMA	A/MMA		
Acrylonitrile + styrene	SAN	SAN	SAN	SAN	AS
Adipic acid + hexamethylenediamine	PA 6.6	PA 66	PA 66	PA 6.6	
Adipic acid + hexamethylenediamine + sebacic acid			PA 66/610		
Adipic acid + tetramethylene glycol					PTMA
Allyl diglycol carbonate	ADC				
p-Aminobenzoic acid					PAB

Polymers of	ASTM	DIN	ISO	IUPAC	Other
Aminotriazol					PAT
Aminoundecanoic acid, 11-		PA 11	PA 11		
Azelaic acid anhydride					PAPA
Bisphenol A + phosgene	PC	PC	PC	PC	
Bitumen + ethylene				ECB	
Butadiene + methyl methacrylate + styrene		MBS	MBS		
Butadiene + styrene (thermoplastic)	PBS	S/B	S/B	S/B	SB
Butene-1	PB	PB	PB		BT
Butyl acrylate		PBA	PBA	PBA	
Butylene glycol + terephthalic acid	PBT	PBTP	PBTP		PTMT
Butyl methacrylate					PBMA
ε-Caprolactam	PA 6	PA 6	PA 6	PA 6	
ε-Caprolactam + ω-dodecanolactam			PA 6/12		
Chlorotrifluoroethylene	PCTFE	PCTFE	PCTFE	PCTFE	
Chlorotrifluoroethylene + ethylene					ECTFE
Cresol + formaldehyde	CF	CF	CF	CF	
1,4-Cyclohexanedimethylol + terephthalic acid					PCDT
Diallyl chloroendate (= diallyl ester of 4,5,6,7,7-hexachlorobicyclo-[2,2,1]-5-heptane-2,3-dicarbonic acid)	PDAC				
Diallyl fumarate	PDAF				
Diallyl isophthalate	PDAIP				
Diallyl maleate	PDAM				
Diallyl phthalate	PDAP	PDAP	PDAP	PDAP	DAP
1,4-Dichlorobenzene + disodium sulfide	PPS	PPS			
2,6-Dimethylphenol + oxygen	POP				PPO™
ω-Dodecanolactam (laurolactam)	PA 12	PA 12	PA 12	PA 12	
Ethyl acrylate					PEA
Ethyl acrylate + ethylene	EEA	E/EA	E/EA		
Ethylene	PE	PE	PE	PE	PL
–, chlorinated polymer	CPE	PE-C	PE-C		
–, cross-linked polymer			PE-X		VPE
–, high-density polymer	HDPE	PE-HD	PE-HD		
–, high impact polymer			PE-HI		
–, linear low-density polymer	LLDPE		PE-LLD		
–, low density polymer	LDPE	PE-LD	PE-LD		
–, medium density polymer	MDPE		PE-MD		
–, very low density linear polymer					VLDPE
–, ultra-high molar mass polymer	UHMW-PE		PE-UHMW		
Ethylene + methacrylic acid	EMA				
Ethylene + maleic anhydride + vinyl chloride		VC/E/MA	VC/E/MA		
Ethylene + methyl methacrylate		E/MMA	E/MMA		
Ethylene + propylene		E/P	E/P		PEP
Ethylene + propylene (+ diene)	EPDM	EPDM	EPDM		
Ethylene + tetrafluoroethylene	ETFE	E/TFE	E/TFE		
Ethylene + vinyl acetate	EVA	E/VA	E/VAC		EVAC
Ethylene + vinyl acetate + vinyl chloride		VC/E/VAC		VC/E/VAC	
Ethylene + vinyl chloride		VC/E	VC/E		
Ethylene glycol					PEG
Ethylene glycol + maleic anhydride	UP	UP	UP	UP	
Ethylene glycol + terephthalic acid(ester)	PET	PET	PET	PETP	PETE
–, with glycol comonomer	PETG				
–, fast crystallizing polymer					CPET
–, oriented polymer					OPET
Ethylene oxide	PEO	PEOX	PEOX	PEO	
Formaldehyde (or trioxane)	POM	POM	POM	POM	
Formaldehyde + furan	FF		FF		
Formaldehyde + melamine	MF	MF	MF	MF	
Formaldehyde + melamine + phenol		MPF			
Formaldehyde + phenol	PF	PF	PF	PF	
Formaldehyde + urea	UF	UF	UF	UF	
Furfural + phenol	PFF				
Hexafluoropropylene + tetrafluoroethylene	FEP	FEP	FEP		
Hexamethylenediamine + sebacic acid	PA 6.10	PA 610	PA 610		PA 6.10

Polymers of	ASTM	DIN	ISO	IUPAC	Other
p-Hydroxybenzoic acid	POB				PHB
3-Hydroxybutyric acid					PHB
2-Hydroxyethylmethacrylate					PHEMA
Isobutene (isobutylene)	PIB	PIB	PIB	PIB	IM
Isocyanurates		PIR	PIR		
Laurolactam (dodecanolactam)	PA 12	PA 12	PA 12	PA 12	
Linseed oil, epoxidized		ELO	ELO		
Maleic anhydride + styrene	SMA	S/MA	SMA		
Methacrylimide		PMI	PMI		
Methyl acrylate					PMA
Methyl acrylate + vinyl chloride		VC/MA	VC/MA		
Methyl α-chloromethacrylate	PMCA				
Methyl methacrylate	PMMA	PMMA	PMMA	PMMA	
Methyl methacrylate + vinyl chloride			VC/MMA		
4-Methylpentene-1	PMP	PMP	PMP		TPX
α-Methylstyrene		PMS	PMS		PAMS
α-Methylstyrene + styrene	SMS	S/MS	S/MS		
Octyl acrylate + vinyl chloride		VC/OA	VC/OA		
Perfluoro alkoxy alkane	PFA	PFA	PFA		
Phosphoric acid (polymer)					PPA
Propylene	PP	PP	PP	PP	
–, oriented polymer					OPP
–, biaxially oriented polymer					BOPP
Propylene + tetrafluoroethylene (*alt.*)					TFE-P
Propylene oxide	PPOX	PPOX	PPOX		
Soybean oil, epoxidized		ESO	ESO		
Styrene	PS	PS	PS	PS	
–, expanded (foamed) polymer					EPS
–, high-impact polymer			PS-HI		HIPS
–, impact resistant polymer	SRP	IPS			
–, oriented polymer					OPS
–, biaxially oriented polymer					BPS
Tetrafluoroethylene	PTFE	PTFE	PTFE	PTFE	
Tetrahydrofuran					PTHF
–, polymer with hydroxy endgroups					PTMEG
Triallyl cyanurate	PTAC				
Trifluoroethylene				P3FE	
Trioxane (+ co-monomers)	POM	POM	POM	POM	
Vinyl acetate	PVAC	PVAC	PVAC	PVAC	PVA
Vinyl acetate + vinyl chloride	PVCA	VC/VAC	VC/VAC		
N-Vinylcarbazole	PVK	PVK	PVK		
Vinyl chloride	PVC	PVC	PVC	PVC	PCU;V
–, polymerized in bulk					M-PVC
–, polymerized in emulsion					E-PVC
–, polymerized in suspension					S-PVC
–, polymer as flexible film					FPVC
–, polymer as oriented film					OPVC
–, polymer as rigid film					RPVC
Vinyl chloride + vinylidene chloride		VC/VDC	VC/VDC		
Vinyl fluoride	PVF	PVF	PVF	PVF	
Vinylidene chloride	PVDC	PVDC	PVDC	PVDC	
Vinylidene fluoride	PVDF	PVDF	PVDF	PVDF	
Vinyl methyl ether					PVME
N-Vinylpyrrolidone	PVP	PVP	PVP		

D. ABBREVIATIONS FOR POLYMERS NAMED AFTER A CHARACTERISTIC POLYMER GROUP

Characteristic polymer group	ASTM	DIN	ISO	IUPAC	Other
Amide	PA	PA	PA		
Amide, aromatic (aryl amide)	PARA				PAR
–, metal coated films	PA**				
–, saran coated films	PA*				
Amide-imide	PAI	PAI	PAI		

Characteristic polymer group	ASTM	DIN	ISO	IUPAC	Other
Arylene sulfone					PAS
Benzimidazole					PBI
Bisphenol A-sulfone					PSF
Carbodiimide					PCD
Carbonate, aromatic	PC	PC	PC	PC	
Epoxide (epoxy)	EP	EP	EP	EP	
–, glass fiber reinforced					GEP
Ester, saturated (polyester)		SP	SP		
–, thermoplastic	TPES				
–,–, metallized polymer film					MPE
Ester, unsaturated (polyester)	UP	UP	UP	UP	
–,–, glass fiber reinforced					FRP
Ester–alkyd	PAK				
Ester–ether (thermoplastic elastomer)	TEEE				
Ester–imide	PEI		PEI		
Ester–urethane			PEUR		
Ether-*block*-amide	PEBA	PEBA	PEBA		
Ether ether ketone	PEEK		PEEK		
Ether–imide		PEI			
Ether–sulfone	PES	PES	PES		PES
	PESU				
Imide	PI	PI	PI		
Parabanic acid					PPA
Phenylene ether	PPE	PPE	PPE		PPO™
Phenylene sulfide	PPS		PPS		
Phenylene sulfone	PPSU	PPSU	PPSU		PSU
Silicone (plastics)	SI	SI	SI		
Sulfone	PSU	PSU	PSU		PSU
Urethane	PUR	PUR	PUR	PUR	
–, thermoplastic	TPUR				TPU
–, thermoset	TSUR				

E. ABBREVIATIONS FOR POLYMERS PRODUCED BY CHEMICAL TRANSFORMATION OF OTHER POLYMERS

Resulting polymer	ASTM	DIN	ISO	IUPAC	Other
Carboxymethyl cellulose	CMC	CMC	CMC	CMC	
Carboxymethyl hydroxyethyl cellulose					CMHEC
Casein, crosslinked with formaldehyde	CS	CS	CS	CS	
Cellulose, as Cellophan$^{®}$	C				
–, coated with Saran	C*				
Cellulose acetate	CA	CA	CA	CA	
Cellulose acetobutyrate	CAB	CAB	CAB	CAB	
Cellulose acetopropionate	CAP	CAP	CAP	CAP	
Cellulose nitrate	CN	CN	CN	CN	NC
Cellulose plastics, unspecified	CE				
Cellulose propionate	CP	CP	CP	CP	
Cellulose triacetate	CTA	CTA	CTA		TA
Ethyl cellulose	EC	EC	EC	EC	
Hydroxyethyl cellulose					HEC
Hydroxypropyl cellulose					HPC
Hydroxypropyl methyl cellulose					HPMC
Methyl cellulose		MC	MC		
Poly(ethylene), chlorinated	CPE	PE-C	PE-C		
–, chlorosulfonated	CSM				CSR
Poly(ethylene-*co*-vinyl alcohol)		E/VAL	E/VAL		
	EVAL™				
					EVOH
Poly(propylene), chlorinated		PPC			
Poly(vinyl alcohol)	PVAL	PVAL	PVAL	PVAL	PVOH
Poly(vinyl butyral)	PVB	PVB	PVB		
Poly(vinyl chloride), chlorinated	CPVC	PVC-C	PVC-C		PC, PeCe
Poly(vinyl formal)	PVFM	PVFM	PVFM	PVFM	

F. ABBREVIATIONS FOR BLENDS, REINFORCED POLYMERS, ETC.

For mixtures of polymers, ISO recommends that the symbols for the parent polymers be put in parentheses, separated by a plus sign; for example, (PMMA + ABS) for a physical blend of poly(methyl methacrylate) and ABS.

ASTM recommends GP for "general purpose" and SS for "single stage".

Resulting polymer	ASTM	DIN	ISO	IUPAC	Other
Bulk molding compound					BMC
Elastomers, thermoplastic					
–,–, containing ester and ether groups	TEEE				
–,–, olefin-based	TEO				
–,–, styrene-based	TES				
Epoxide, glass fiber reinforced			EP-G		GEP
Plastic, carbon fiber reinforced		KEK			CFP
–, glass fiber reinforced					GFK
–, man-made fiber reinforced					CFK
–, metal fiber reinforced					MFK
Poly(acrylonitrile-co-styrene) + chlorinated poly(ethylene)					ACS[a]
Poly(styrene), rubber-modified	SRP	IPS			HIPS
Sheet molding compound					SMC
–, with high glass fiber content		HMC			

G. ISO CODES FOR THERMOPLASTIC MATERIALS

The standard designation of a thermoplastic material consists of

- a *description block* (giving the type of material),
- a *standard number block* (consisting of the number of the ISO standard or a national standard such as DIN), followed by a hyphen, and
- an *individual item block* (with five data blocks).

An example is

Molding material DIN 7744-PA 12, XF, 22-030, GF 30

The code letters are arranged after the symbol for the base polymer according to ISO and DIN; in the technical literature, however, they are commonly placed in front of the base symbol, following ASTM, which uses similar code letters and asterisks.

A designation system similar to the above ISO/DIN system has been recommended by ASTM. A typical ASTM designation, for example, would read

Molding material ASTM D-4000 PI000G42360

This molding material is a polyimide (PI), whose properties have been specified via cell table G of the ASTM standard D-4000. This particular cell table identifies five different properties by designating cell limits to the five digits following the letter G. According to cell table G, the "4" indicates a tensile strength of at least 85 MPa. The measured flexural modulus is characterized by "2", the Izod impact strength of 50 J/m by "3", and the heat deflection temperature of 300°C by "6". The fifth digit is undetermined; the "0" indicates an unspecified property.

1. Codes for ISO Data Blocks 1–5

1.1. ISO and DIN Codes for Data Block 1 *Data block* 1 of the individual item block contains the abbreviation of the chemical name of the material, e.g., PA 12 (see example). This abbreviation may be followed by analytical data with respect to the composition of the material; an example is the content of vinyl acetate units in ethylene–vinyl acetate copolymers. Such chemical structure data may be composition, such as content of vinyl acetate (VAC) or acrylonitrile units (AN), configuration as measured by isotacticity ("isotaxy") (IT), branching as revealed by density (D).

These analytical data are, however, not the exact analytical data but rather code numbers for the range (called "cell") which will permit this material to substitute for a similar one. Separated by a hyphen, other supplementary may be given too, e.g., H = homopolymer, P = plasticized, E = polymerized in emulsion, Q = mixture of different polymers, etc. (see ISO and DIN codes for data block 1).

Furthermore, ASTM uses * for saran coated polymer films and ** for metallized polymer films. The technical literature indicates biaxially oriented films by BO and oriented films by O (see Abbreviations in alphabetical order).

Code	ISO data block 1	DIN data block 1
A	–	–
B	Block copolymer	–
C	Chlorinated	Chlorinated
D	–	Density
E	Polymerization in emulsion	Expanded or expandable
F	–	Flexible or fluid (liquid state)
G	–	–
H	Homopolymer	High

Code	ISO data block 1	DIN data block 1
I	–	Impact resistant
J	–	–
K	–	–
L	–	Linear or low
M	Bulk polymerization	Medium or molecular
N	–	Normal or novolac
O	–	–
P	Plasticized	Plasticized
Q	Mixtures of different polymers	–
R	Random copolymer	Resol; formerly also: raised (enhanced)
S	Polymerization in suspension	–
T	–	–
U	Unplasticized	Ultra or unplasticized
V	–	Very
W	–	Weight (mass)
X	No indication	Crosslinked or crosslinkable
Y	–	–
Z	–	–

1.2. ISO Codes for Items in Data Block 2 *Data block* 2 may comprise up to four letters which give qualitative information. The first letter denotes the intended application, e.g., B = blow molding, G = general purpose, X = no indication (see example). The following letters 2, 3, and 4 can code up to three essential additives or supplementary information, for example, D = powder (dry blend), F = special burning characteristics (see example), L = light and weather stabilizer, etc.

Code	Position 1	Code	Positions 2–4
A	Adhesives	A	Antioxidant for processing
B	Blow molding	B	Antiblocking agent
C	Calendering	C	Colored
D	Disc manufacture	D	Powder (dry blend)
E	Extrusion (pipes, profiles, sheets)	E	Additive for expansion
F	Extrusion (films, foils)	F	Special burning characteristics
G	General purpose	G	Granules (pellets)
H	Coating	H	Heat aging stabilizer
K	Cable and wire insulation	K	–
L	Extrusion (monofilament)	L	Light and weather stabilizer
M	Injection molding	M	–
N	–	N	Natural (not colored)
P	Paste resin	P	Polymer modifier
Q	Compression molding	Q	–
R	Rotational molding	R	Mold release agent
S	Powder spray sintering	S	Slip agent, lubricant
T	Tape manufacture	T	Improved transparency
W	–	W	Stabilized against hydrolysis
X	No indication	X	–
Y	Textile yarn	Y	–
Z	–	Z	Antistatic agent

1.3. ISO Codes for Items in Data Block 3 *Data block* 3 contains quantitative information about the designated properties. Such properties include

Molar mass indicators	Intrinsic viscosity ("viscosity number")	IV
	Fikentscher's K value (viscosity-based quantity for PVC)	FK
Macrostructure data	Bulk density	BD
Rheological data	Melt flow rate (melt flow index)	MFR
Thermal data	Vicat temperature	VST
	Torsional stiffness temperature	TST
Mechanical properties	Modulus of elasticity	E
	Tensile stress at 100% strain	TS
	Shore hardness	SH
	Impact strength (notched)	ISN

Each material is characterized by one or more than one property. The following leading criteria are used for the various polymers:

Poly(ethylene)	D, MFR
Poly(propylene)	I, MFR
Poly(styrene) and acrylonitrile–styrene copolymer	VST, MFR
Styrene–acrylonitrile copolymer	VST, MFR, AN
Styrene–butadiene copolymer	VST, MFR, ISN
Acrylonitrile–butadiene–styrene, and acrylonitrile–styrene–acrylic acid copolymers	VST, MFR, ISN, AN
Ethylene–vinyl acetate copolymer	VAC, MFR
Poly(vinyl chloride)	IV, (FK), BD
Poly(vinyl chloride), unplasticized	VST, E, ISN
Poly(vinyl chloride), plasticized	TS, SH, TST
Polyamide	IV, E
Polycarbonate	IV, MFR, E
Poly(methyl methacrylate)	IV, VST
Poly(ethylene terephthalate)	IV

In the example for a polyamide 12, the code "22-030" of data block 3 indicates a polymer with an intrinsic viscosity of 210 ml/g ("cell 22"), and a modulus of elasticity of 280 MPa ("cell 030"). On the other hand, "20-D050" in data block 3 for a poly(ethylene) tested according to DIN 16776 means a material with a density within cell "020" (e.g., 0.918 g/cm^3) and a melt flow rate within the cell "050" (e.g., 4.2 g/min), measured under condition D (a temperature of 190°C under a load of 2.16 kg). The definition of cells for each material and testing procedure can be found in special tables.

1.4. ISO Codes for Extending and Reinforcing Fillers (Data Block 4) *Data block* 4 gives information about the type and content of fillers or reinforcing materials. The first

letter gives the type of filler: C = carbon, G = glass, etc. The second letter indicates the shape of the filler: F = fiber, S = spheres, etc. The third position is a code for the weight content of the filler, e.g., "30" for the "cell" (range) 27.5–32.5 wt.%.

Code	Position 1 (material)	Code	Position 2 (form or structure)
B	Boron	B	Balls, beads, spheres
C	Carbon	C	Chips, cuttings
D	–	D	Powder (dry blend)
E	Clay	E	–
F	–	F	Fiber
G	Glass	G	Ground, grinding stock
H	–	H	Whisker
K	Calcium carbonate	K	Knitted fabric
L	Cellulose	L	Layer
M	Mineral, metal	M	Mat (thick)
N	–	N	Non-woven (fabric, thin)
P	Mica	P	Paper
Q	Silicon	Q	–
R	Aramid	R	Roving
S	Synthetic, organic	S	Scale, flake (spheres: now B)
T	Talcum	T	Cord
V	–	V	Veneer
W	Wood	W	Woven fabric
X	Not specified	X	Not specified
Z	Others	Z	Others

1.5. ISO Codes for Data Block 5 *Data block* 5 is reserved for specifications based on individual agreements between supplier and customer. It may code additional requirements, restrictions, or supplemental information.

H. SPI CODES FOR THE RECYCLING OF PLASTICS

Number code	Letter code	Polymer
1	PETE	Poly(ethylene terephthalate)
2	HDPE	High-density poly(ethylene)
3	V	Vinyl chloride polymers
4	LDPE	Low-density poly(ethylene)
5	PP	Poly(propylene)
6	PS	Poly(styrene)
7	–	All other plastics, including multilayered materials

I. RECOMMENDED ABBREVIATIONS AND ACRONYMS FOR NAMES OF ELASTOMERS

Names of elastomers are listed in alphabetical order of the names of their monomers, regardless of their proportions. A "PM" indicates an after-treatment of the polymer; "Other" refers to old or often used "unofficial" abbreviations; # indicates that the abbreviation is recommended by IUPAC.

Monomers (incl. after-treatment of PM)	ASTM	BS	ISO	Other
Acrylic ester + acrylonitrile	ANM			
Acrylic ester + butadiene	ABR#			AR
Acrylester (+ saturated vulcanizable comonomer)	ACM			
Acrylonitrile + butadiene	NBR#			GR-N
–, PM contains carboxylic groups	XNBR			
–, PM is hydrogenated				H-NBR
Acrylonitrile + butadiene + styrene, PM contains COOH groups	XABS			
Butadiene	BR#			BP, CBR
Butadiene + styrene	SBR#	SBR		GR-S
Butadiene + styrene, PM contains COOH groups	XSBR			
Butadiene + styrene, elastomeric triblock copolymers	YSBR			SBS
Butadiene + styrene, elastomeric block copolymers with COOH groups	YXSBR			
Butadiene + 2-vinylpyridine	PBR#			
Butadiene + 2-vinylpyridine + styrene	PSBR			
Chloroprene	CR#	CR		
Chloroprene + acrylonitrile	NCR#			
Chloroprene + styrene	SCR#			
Cyclooctene (*trans* polymer)				TOR
Cyclopentene (*trans* polymer)				TPA, TPR
Epichlorohydrine	CO#		CO	CHR
Epichlorohydrine + ethylene oxide	ECO			CHC
Ethylene (PM postchlorinated)	CM			
Ethylene (PM perchlorosulfonated)	CSM	CSPR		CSR
Ethylene + acrylic ester	EAM			
Ethylene + ethyl acrylate	EEA		E/EA	
Ethylene + propylene	EPM	EPR	EPM	AP
Ethylene + propylene + non-conjugated diene	EPDM	EPTR		APT, EPT
Ethylene + vinyl acetate	EVM			
Ethylene + tetrafluoroethylene				ETFE
Fluorinated carbon chains (substituents: fluoroperfluoroalkyl-, perfluoroalkoxy-)	FKM		FPM	
Hexafluoropropylene + tetrafluoroethylene				FEP
Hexafluoropropylene + vinylidenefluoride	FPM			
Isobutylene	PIB#	PIB	PIB	PIS

Monomers (incl. after-treatment of PM)	ASTM	BS	ISO	Other
Isobutylene + isoprene	IIR#	Butyl		GR-I, PIBI
Isobutylene + isoprene (postbrominated PM)	BIIR			
Isobutylene + isoprene (postchlorinated PM)	CIIR			
Isoprene (natural rubber)	NR#			NK
Isoprene (natural rubber, easy-processing)				SP
Isoprene (natural rubber, standardized Indonesian)				SIR
Isoprene (natural rubber, standardized Malaysian)				SMR
Isoprene (natural rubber, technical classification)				TC
Isoprene (synthetic rubbers)	IR#	IR		CPI, PIP
Isoprene (chlorinated PM)				RUC
Isoprene + acrylonitrile	NIR			
Isoprene + styrene	SIR#			
Isoprene + styrene (triblock copolymer)				SIS
Isoprene + styrene (hydrogenated triblock copolymer)				SEBS
Norbornene				PNR
Phosphonitrile dichloride, with fluorine-containing substituents				PNF
Propylene oxide	PO			OPR
Propylene oxide + allylglycidyl ether	GPO			POR
Silicone with fluoro substituents	FQ			
Silicone with fluoro + methyl substituents	FMQ		MFQ	
Silicone with fluoro + methyl + vinyl substituents	FVMQ			
Silicone with methyl substituents	MQ			
Silicone with phenyl substituents	PQ			
Silicone with phenyl + methyl substituents	PMQ		MPQ	
Silicone with phenyl + vinyl + methyl substituents	PVMQ		MPVQ	
Silicone with vinyl substituents	VQ			
Silicone with vinyl + methyl substituents	VMQ		MVQ	
Sulfides (thioplastics)				T, TR, OT
Tetrafluoroethylene + trifluoronitrosomethane + nitrosoperfluorobutyric acid (nitroso rubber)	AFMU			CNR
Urethane elastomers	UE	UR		
Urethane elastomers with polyester segments	AU		AU	
Urethane elastomers with polyether segments	EU		EU	
Urethane–polyester elastomers, crosslinkable by isocyanates	AU-I			
Urethane–polyester elastomers, crosslinkable by peroxides	AU-P			
Vinylidenefluoride + hexafluoropropylene	FPM		FPM	
Tetrafluoroethylene + perfluoralkylvinyl ether				PFA
Thermoplastic elastomers, in general	TPEL			TPE, TPR
Thermoplastic olefin elastomers				TPE-O, TPO
Thermoplastic elastomers on basis styrene–diene				TPE-S
Thermoplastic elastomers on basis ester				TPE-E
Thermoplastic elastomers on basis ether–amide				TPE-A

The following abbreviations are also used. ICR: rubber from undiluted latex of natural rubber (initial concentration rubber); OER: oil-extended rubber; RTV: room temperature vulcanization.

J. ABBREVIATIONS FOR TEXTILE FIBERS*

	Short Name		Abbreviation		
Name	ISO	FTC	DIN	ASTM	ETG
NATURAL PROTEIN FIBERS (SILK)					
Mulberry spinner (*Bombyx mori L.*)			Ms		SE
Tussah					Ts
NATURAL PROTEIN FIBERS (WOOL)					
Alpaca (*Llama pacos*)			Ap		WP
Angora rabbit ("Angorakaninchen")			Ak		WA
Beaver					"'B

* ISO: International Standardization Organization; FTC: US Federal Trade Commission; DIN: German Standards (Deutsches Institut für Normung), DIN 60001; "..." indicates the German word from which the abbreviation or acronym was derived; ASTM: American Society for Testing and Materials; ETG: European Textile Characterization Law.

Name	Short Name ISO	Short Name FTC	Abbreviation DIN	Abbreviation ASTM	Abbreviation ETG
Cashmere goat ("Kaschmir-Ziege")			Kz		WS
Guanaco					WU
Llama			Lm		WL
Mohair			Mo		WM
Otter					WT
Sheep			Wo		WO
–, virgin wool					WV
Vicuna			Vi		WG
Yak					WY
NATURAL PROTEIN FIBERS (HAIRS)					
Camel ("Kamel")			Km		WK
Cow ("Rind")			Ri		
Goat ("Haar der Ziege")					Hz
Hare ("Hase")					Hs
Horse ("Rosshaar")			Rh		
Human ("Haar")					HA
Rabbit ("Kaninchen")			Kn		
Tibetan goat ("Tibetziege")					Tz
NATURAL CELLULOSE FIBERS (TEXTILE FIBERS)					
Cotton ("Baumwolle")			Bw		CO
Flax			Fl		LI
–, linen					LI
–, half-linen					HF
Ramie			Ra		RA
NATURAL CELLULOSE FIBERS (HARD FIBERS AND OTHERS)					
Alfalfa					AL
Broom ("Ginster")					GI
Calatropis			An		
Coir ("Kokos")			Ko		CC
Esparto grass (*alfa*)			Ag		
Hemp (*Cannabis*)					CA
–, Bombay (Sunn hemp)			Sn		SN
–, Manila (Abaca)			Ma		AB
Henequen (Agave)			He		
Jute			Ju		JU
Kapok			Kp		KP
Kenaf			Kf		KE
Maguey					MG
Mauritius fiber (Fique)			Fi		
Moss, American			Tl		
Phormium (New Zealand flax)			Nf		
Rosella			Ro		
Sisal			Si		SI
Urena			Ur		
REGENERATED POLYSACCHARIDE FIBERS					
Alginate			AL		AG
Cellulose	Cupro	Cupra (rayon)	CC		CU
	Viscose	Rayon	CV		VI
	Modal	Rayon			MD
	Deacetylated Acetate	Rayon			
Cellulose 2 1/2 acetate	Acetate	Acetate	CA	CA	AC
Cellulose triacetate	triacetate	triacetate	CT	CTA	TA
REGENERATED PROTEIN FIBERS					
Ardein fibers			AR		
Casein fibers			KR		CS
Regenerated protein fibers, in general	Protein	Azlon			PR
Zein fibers			ZE		

	Short Name		Abbreviation		
Name	**ISO**	**FTC**	**DIN**	**ASTM**	**ETG**
SYNTHETIC FIBERS					
Elastodiene fibers			LA	EU	EL
Fluoro fiber					FL
Poly(acrylonitrile)	Acrylic	Acrylic	PAC	PAN	PAN
Poly(acrylonitrile), copolymeric	Modacrylic	Modacrylic	PAM		MA
Polyamide, aliphatic	Nylon, Polyamide	Nylon, Polyamide	PA	PA	PA
Polyamide, aromatic	Aramide	Aramide			
Polyester [poly(ethylene terephthalate]	Polyester	Polyester	PES	PET	PL
–, [from ethylene glycol, terephthalic acid and *p*-hydrooxybenzoic acid]			PEE		
Poly(ethylene)	Polyethylene	Olefin	PE	PE	PE
Poly(propylene)	Polypropylene	Olefin	PP	PP	PP
Poly(styrene) (>88% sty)			PST		
Polyurea			PUA		PB
Polyurethane			PUR	PUR	PU
–, segmented	Elastan	Spandex	PUE		EA
Poly(vinyl alcohol)	Vinylal	Vinal	PVA		VY
Poly(vinyl chloride) (>85% VC)	Chlorofiber		PVC		
Poly(vinyl chloride), copolymeric	Chlorofiber	Vinyon	PVM		
Poly(vinylidene chloride), copolymeric	Chlorofiber	Saran	PVD		
Trivinyl fiber					TV
INORGANIC FIBERS					
Asbestos			As		AS
Glass	Glass	Glass	GL		GL
Metal			MT		ME
Mineral (rock wool)			ST		
Slag wool			SL		
OTHER FIBERS					
Unspecified fibers					AF
Unknown fibers					TR

Chemical Abstract Registry Numbers and Online Database Searching for Polymer Literature

M. Johnson, E. A. Grulke
University of Kentucky, Lexington, KY 40506, USA

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The advent of computerized database searching for polymer literature has made locating technical information both easier and harder. While computers greatly increase the speed and completeness of a search, the algorithms and conventions used are often quite different from those used for hardcopy (paper) indexes. The following discussion and tables give basic information needed to start identifying and searching the most common polymers in the most used databases and paper indexes.

A. NOMENCLATURE

The *Common Name* is the name used by many scientists and engineers, and is used for listing polymers in catalogs such as Aldrich, and engineering indexes such as Engineering Index. Various other common *Synonyms* or *Trade Names* are also listed in the table and used in the literature. The *Chemical Abstracts (CA) Index Name* is the most recent name used by Chemical Abstracts Service (CAS). In general, Chemical Abstracts follows IUPAC guidelines when naming polymers. The *CAS Registry Number* (CAS Reg. No.) is a unique identifying number given to each of the 18 million chemical compounds CAS has indexed. The *Molecular Formula* is the formula for the smallest repeating unit of the polymer. In some cases, such as cellulose, the exact molecular formula is not known.

B. CAS REGISTRY NUMBERS

CAS Registry Numbers provide a consistent method of identifying and searching for polymers in literature databases, and have been used to develop the table in this section. CAS indexes the chemical and chemical engineering literature from about 80000 worldwide journals, conference papers, books, and patent literature.

The way that CAS (or IUPAC) names a compound is often very different from that used in scientific journals or the popular press. Polyethylene provides an excellent example of this problem. The name in CA is currently Ethene, homopolymer. CAS used to index it under Ethylene, polymers. Over 2000 synonyms or trade names are listed for polyethylene compounds, ranging from Alathon (registered trademark of the Lyondell Petrochemical Company) to Suzulon (a tradename used by Aicello Chemical Corporation, but not trademarked). As CAS understates in its publication, "Polymer Searching", "Unfortunately, naming conventions for polymers have not achieved widespread understanding, and molecular formulas are not unique search terms." CAS Registry Numbers are used not only by CAS in their database indexing but by the US Federal Government in their Toxic Substances Inventory, by the US Department of Transportation for regulating transport of chemicals, and by other indexes such as Merck and Aldrich. They are the most precise and unique compound identification.

Authors of polymer literature may not always be able to report the precise structure of their materials. However, they usually do report the monomers used in the polymerization. Thus, while polymers are represented in two ways, as monomers and by final structure (Structural Repeating Unit or SRU), the primary registration of a polymer is by its component monomers. The Registry Number for most

polymers in the table can be used to find the component Registry Numbers for their corresponding monomers. Similarly, the Registry Number for copolymers will lead to the monomer registry numbers. Searching just by the SRU, the homopolymer, or the copolymer number will not retrieve a complete citation list.

C. INDEXING AND CAS REGISTRY NUMBER ASSIGNMENT

Chemical Abstracts assigns Registry Numbers to polymers based on both their monomers and their final structure. The table here usually lists the Registry Number for the homopolymer or copolymer. However, searches that use only one Registry Number for a polymer are often incomplete. Polymers based on more than one monomer should be searched using all the component monomers. All the copolymer references of a specific monomer can be found by searching the monomer's Registry Number. The polymers having the same final structure can be found by searching the final structure's Registry Number.

Some compounds are so well characterized that they do not follow the rules and are indexed only under their structural repeating unit (SRU). These are marked (R) in the table and include common polymers such as Nylon 6 or PET. Some polymers are not indexed by registry numbers at all but only by subject. These include tung oil, cellulose, and linseed oil, which are marked (S) in the table. These materials are exceptions and, in most searching, registry numbers must be used in the CAS online files. Some registry numbers in the Registry File are marked with an asterisk (*). STN gives the message on-line that these "represent substances of unknown or variable composition, complex reaction products, or biological substances that do not meet the criteria for Chemical Abstracts indexing". These substances generally have been registered for regulatory agencies and receive a CA Index Name. Searching these substances in STN files can be done by using the Registry Number(s) from the record, terms derived from the name, terms that are more or less specific than those in the name (which may include other CAS Registry Numbers), or associated trade names. Every likely term should be tried, and additional help should be sought if other references seem likely.

Section E gives the common names and CA Registry Numbers for a number of important polymers. A list of Registry Numbers in numerical order with their corresponding names is available from the authors. Additional synonyms and trade names are provided, as are the CA Index names. Molecular formulae are provided, and can be helpful in searching with structural-related databases. The Search Guide indices have the following meanings:

S search by CA Index names as a subject in the citation file
* search using every likely term – Registry Numbers, name, synonyms, etc.
R search by Registry Numbers for components, copolymers, SRU's
U search using the single Registry Number provided.

The CAS database system is available commercially, most commonly through STN (1-800-848-6538) and Dialog (1-800-334-2564). Most academic and industrial libraries have ready access to these systems and may be consulted for assistance. For illustrative purposes, searches from each system are demonstrated here. The logic of searching each system is the same, but commands and features can vary. For more information about online searching, consult a librarian or the database vendors. The Chemical Abstracts Service book, "Searching for Polymer Information in CAS Online", American Chemical Society, Chemical Abstracts Service, 1990, p. 173, is the best starting source for polymer information within Chemical Abstracts. It may be ordered by calling the STN toll-free number or using the web page.

D. EXAMPLE SEARCHES

1. Example of a Search Using the Polymer CAS Registry Number

The first step in a CA search is to identify the registry numbers. Section E lists registry numbers for many common polymers. The Registry Number for poly-(acrylamide) is 9003-05-8. Leading zeros should be disregarded when searching online, for example, search 009003-05-8 as 9003-05-8. Using the CA Registry Number to search the chemical compound registry file would return the following information (Fig. 1) from the Dialog database. The Dialog File number at the beginning of each output refers to a specific work session for the user. This particular database provides the molecular formula, related CAS Registry Numbers, the CA name, a list of synonyms including tradenames, the CA Registry Number for the monomer, and the number of literature references over the specified time interval.

2. Example of a Search Using the Monomer CAS Registry Number

The CAS Registry Number for the monomer from the previous example, acrylamide, is 79-06-1. Searching by the component Registry Number in the Registry File gives the following record (Fig. 2).

3. Example of a Combined Search

The results of both searches (polymer and monomer CAS Registry Numbers) would be combined to generate a more complete listing of the literature. The following answers (Fig. 3) are found by searching the abstracts file for CA (399 on Dialog) with the monomer and polymer Registry Numbers.

Searching by the homopolymer Registry Number (RN), 9003-05-8, produced most citations. However, over 6000 additional articles containing information about the monomer would have been missed if the monomer Registry Number, 79-06-1, had not been used. Some of these may contain needed information about the polymer. Only 539 articles were indexed using both Registry Numbers.

(Dialog File 398)
CAS REGISTRY NUMBER: 9003-05-8 (POLYMER)
MOLECULAR FORMULA: (C3H5NO)x
REPLACED CAS REGISTRY NUMBER(S): 9082-06-8 12624-24-7 25038-45-3 27754-57-0 33338-03-3 39355-07-2 39387-77-4 51312-40-4 57679-11-5 68247-81-4 72270-86-1 79079-15-5 104981-89-7 114265-35-9 143180-09-0 143180-13-6 143180-22-7
CA NAME(S):
HP = 2-Propenamide (9CI)
NM = homopolymer
HP = Acrylamide (8CI)
NM = polymers
SYNONYMS: Acrylamide homopolymer; Acrylamide polymer; Alcoflood 1175; Alcoflood 935; American Cyanamid KPAM; American Cyanamid P 250; AMF; Aminogen PA; AP 273; Aron F 40; BanDrift; Boze Floc N 46BT; Calgon 470; Calgon 800; Cogum 20P; Cogum 25H; Cyanamer N 300LMW; Cyanamer P 250; Cyanamer P 35; Cytame 5; Diaclear MA 3000H; Diaclear MN 3000H; DK Dry Capsule ESP; Dow ET 597; Dow J 100; Dow 164; DP 1916; DP 9-6193; Drew Floc 41; E 936; ET 597; Flygtol GB; Formula 358; Gelamide 250; Get-Down ; GPA-u; Himoloc OK 507; Himoloc SS 200; Hiset P 700; Hyset P 700SN; Instar NS; J 100; J 100(polymer); K 4; K 4(acrylic polymer); K-PAM; KAL 13; KW 677; Magnifloc 900N; Maquat 100; Migunon NS; Mirbane 301; Nalco Lp 3033; Nalco 7871; Nalco 8871; NL; P 250; P 250(polymer); P 300; P 300(polyacrylamide); PAA 1; PAA 70L; PAM; PAM 50; PAM(homopolymer); Pamid; PC 305; Percol 333; Plex 4847D; Polias 320; Polyacron KR 143; Polyacrylamide; Polyacrylamide resin; Polyhall 2J; Polyhall 5J; Polymerset C 305; Polysic; Polystron 117; Polystron 145; Polystron 191; Polystron 194-7; Pomosist 117; Praestol 2800; Praestol 2810/73; Praestol 6000; Sanpoly A 520; Santac SP 66; Santac SP 67; Seabetter AD; Sedipur TF; Sedipur TF 514; Sepaflux CE 5174; Solidokoll K; Solvitose 433; Stargum AD-S; Stokopol D 2624; Sumifloc FN 10H; Sumirez A 17; Sumirez A 27; Sursolan P 5; Texapret AM; Tulsepar PNS 1; TY 007; Versicol W 11; Versicol W 17; Versicol W 25; Versicol WN 15; Viterra II ; X-Coat P 130C; X-Coat P 180S; Zonen A; 2J; 3330s; 38F
COMPONENT CAS REGISTRY NUMBER(S):
(79-06-1)

Component RN	Component Molecular Formula
1) 79-06-1	C3H5NO

SUBFILE: CHEMNAME 13873 LITERATURE REFERENCE(S) IN FILE 399.
LAST UPDATE: 199611

Figure 1. Dialog database output from searching CAS Registry No. 9003-05-8.

CAS REGISTRY NUMBER: 79-06-1
MOLECULAR FORMULA: C3H5NO
CA NAME(S):
HP = 2-Propenamide (9CI)
HP = Acrylamide (8CI)
SYNONYMS: Acrylic amide; Ethylenecarboxamide; Propenamide; Vinyl amide
SUBFILE: CHEMNAME 6574 LITERATURE REFERENCE(S) IN FILE 399.
LAST UPDATE: 199608

Figure 2. Dialog database output from searching CAS Registry No. 79-06-1.

```
Set Items Description
.... ....... .........
?s rn = 9003-05-8
  S1   14051 RN = 9003-05-8
?s rn = 79-06-1
  S2   6622 RN = 79.06-1
?s s1 or s2
       14051 S1
       6622 S2
  S3   20134 S1 OR S2
?s s1 and s2
       14051 S1
       6622 S2
  S4   539 S1 AND S2
```

Figure 3. Dialog database output from combining the polymer and monomer searches.

4. Example of a Copolymer Search

Poly(acrylonitrile-*co*-butadiene) is a common commercial product. The STN database was searched for this copolymer, using its CAS Registry Number along with those of the monomers. The search method is similar to that for homopolymers; the copolymer and the two monomers are searched separately, and the results are combined. Some records have been edited for clarity and conciseness. In Fig. 4, component 1 is acrylonitrile and component 2 is butadiene.

```
(STN Registry File)

L1 ANSWER 1 OF 1 REGISTRY COPYRIGHT 1997 ACS
RN ***9003-18-3*** REGISTRY
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN 1,3-Butadiene, polymer with 2-propenenitrile (9CI)
CN 1,3-Butadiene, polymer with acrylonitrile (8CI)
CN Acrylonitrile, polymer with 1,3-butadiene (8CI)
OTHER NAMES:
CN 1,3-Butadiene-acrylonitrile copolymer
CN 1,3-Butadiene-acrylonitrile polymer
CN Acrylonitrile-1,3-butadiene copolymer
(30 other chemical names or synonyms or trade names are listed)
MF (C4 H6 . C3 H3 N)x

   CM 1 (Component One)

   CRN 107-13-1 (Component Registry Number)
   CMF C3 H3 N (Component Molecular Formula)

   CM 2 (Component Two)

   CRN 106-99-0 (Component Registry Number)
   CMF C4 H6 (Component Molecular Formula)
```

Figure 4. STN database output from a copolymer search.

Searching by the two component Registry Numbers given above, (107-13-1, acrylonitrile; 106-99-0, butadiene), gives the following records in the Registry File (Fig. 5).

Figure 6 shows the output when all the separate searches (Figs. 4 and 5) are combined. Search strings for each command are shown.

In this case, there are fewer articles for the copolymer (9003-18-3) than for either of the component monomers individually. On the other hand, 550 citations have the two components together, with very little overlap between that set and the copolymer. This once again illustrates the importance of including the monomers to get a complete search in CA files online.

A similar search in the paper version of CA could be done by finding the latest CA name for the homopolymer or copolymer and all related monomers in the Chemical Substance Index, and then referring to the abstracts. The Chemical Substance Index also lists the Registry Numbers for all compounds indexed, and should be checked prior to online work.

Additional search methods include using the trade name, chemical name, and molecular formula in the Registry File to start the search for a polymer Registry Number. The table gives a starting point for common polymers, but with over 700000 polymeric entries, it is impossible to list them all.

```
L2 ANSWER 1 OF 2 REGISTRY COPYRIGHT 1997 ACS
RN ***107-13-1*** REGISTRY
CN 2-Propenenitrile (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Acrylonitrile (8CI)
OTHER NAMES:
CN Acrylon
CN Carbacryl
CN Cyanoethene
CN Cyanoethylene
CN Fumigrain
CN Propenenitrile
CN VCN
CN Ventox
CN Vinyl cyanide

L2 ANSWER 2 OF 2 REGISTRY COPYRIGHT 1997 ACS
RN ***106-99-0*** REGISTRY
CN 1,3-Butadiene (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN .alpha.,.gamma.-Butadiene
CN Biethylene
CN Bivinyl
CN Butadiene
CN Butadiene-1,3
CN Divinyl
CN Erythrene
CN Vinylethylene
MF C4 H6
```

Figure 5. STN database output of comonomer searches.

```
(File CA on STN)

=> s 9003-18-3
L3   7648 9003-18-3
=> s 107-13-1
L4   16353 107-13-1
=> s 106-99-0
L5   12917 106-99-0
=> s l4 and l5
L6   550 L4 AND L5
=> s l3 and l6
L7   19 L3 AND L6
```

Figure 6. STN database output from a combined search for a coplymer and its monomers.

5. Example of an Engineering Database Search

Searching the engineering databases is a less formidable task. In most cases, the searches for polymers are started using the common names of the compound. The indexing of the answer set is then evaluated for other terms to use. The following search is from the Engineering Index (file 8) on Dialog (Fig. 7).

```
Set Items Description
... ....... .........
?s polyoxymethylene (compound entered as one word)
  S1   396 POLYOXYMETHYLENE
?s poly()oxymethylene (compound entered as two words)
     39391 POLY
       155 OXYMETHYLENE
  S2   87 POLY()OXYMETHYLENE
?s s1 or s2
     396 S1
       87 S2
  S3   459 S1 OR S2
?t 1/8/1

1/8/1
DIALOG(R)File 8:(c) 1997 Engineering Info. Inc. All rts. reserv.

04628455
Title: Hybrid effects on mechanical properties of polyoxymethylene
Descriptors: *Polymers; Fracture toughness; Strain rate; Tensile strength;
Bending strength; Impact resistance; Elastic moduli
Identifiers: Polyoxymethylene; Hybrid strength; Impact strength;
Flexural modulus

2/8/2
DIALOG(R)File 8:(c) 1997 Engineering Info. Inc. All rts. reserv.

04572617
Title: Spatially resolved in situ analysis of polymer additives by
two-step laser mass spectrometry
  Descriptors: *Additives; Polyvinyl chlorides; Polypropylenes;
Polyethylene terephthalates; Composition effects; Desorption; Stabilizers
(agents); Carbon dioxide lasers; Laser ablation; Antioxidants
  Identifiers: Polyoxymethylene; Hydroxyphenylbenzotriazole; Polymer
additives
```

Figure 7. Engineering Index output for poly(oxymethylene).

In this case, poly(oxymethylene) is indexed as one word so the search term was appropriate to this database. The two-word search (S2 and S3) was taken from the authors' abstracts, which are searched automatically in this database (unlike in CAS files).

6. Example of a Search with Punctuation in the Polymer Name

Poly(L-proline) is a more difficult search because most databases do not index punctuation. In this case, the compound is entered as if it were three words. In the first search, each word is specified to be in that specific order (adjacent to each other). This search yielded 26 hits (Fig. 8), but the specific records show that the term was found just in the abstract, not in the indexing. Searching by the broader term "polypeptides" would get a larger, less specific, answer set since any polypeptide could be included. The database also shows that "polypeptides" has been an index term since 1977.

Searching poly(L-proline) as three separate words would pull the terms from anywhere in the database record. This method gives more answers than the first search strategy (Fig. 9) but less than the broad polypeptide search.

7. Example of an Engineering Materials Abstracts Search

Similar strategies of searching chemical names and checking indexing should be used for other engineering databases such as Engineering Materials Abstracts. A search of the word, nylon, retrieves a larger answer set than the search of the sequence, nylon 6 (Fig. 10). A check of the indexing determines that nylon 6 is a valid term and would be a more specific, focused search on the topic.

Chemical Abstracts, Engineered Materials, Engineering Index, and other indexes such as Current Contents or the National Technical Information Service are available online through many vendors, on CDROM, at libraries, and over the Internet, via accounts with security and passwords. They are still available in paper copy at many libraries. Before doing any kind of literature search, the researcher must first decide how much information is needed, for what time period, what limits such as language or type of material are to be applied, and how much time is to be devoted to the search. Then each resource can be evaluated for what is covered and how it is indexed so that the proper tools will be used. Finding information is a lot like doing an experiment. Many paths can be explored and different techniques are tried until the researcher is satisfied.

8. Example of a Polymer Trademark Search

A trademark is either a word, phrase, symbol or design, or combination of words, phrases, symbols or designs, which identifies and distinguishes the source of the goods or services of one party from those of others. US trademark rights arise from either (a) actual use of the mark, or (b) the filing of a proper application to register a mark in the Patent

```
?s poly()l()proline
    39391 POLY
    71166 L
      259 PROLINE
  S7   26 POLY()L()PROLINE
?t 7/5

7/5/1
DIALOG(R)File 8:Ei Compendex(R)
(c) 1997 Engineering Info. Inc. All rts. reserv.

03979891 E.I. No: EIP94112411957
Title: Optical activity measurements in solids 7. Polylactides and poly (
beta -hydroxybutyrates)
  Author: Bartus, Jan; Weng, Dexi; Vogl, Otto
  Corporate Source: Polytechnic Univ, Brooklyn, NY, USA
  Source: Polymer International v 34 n 4 Aug 1994. p 433-442
  Publication Year: 1994
  CODEN: PLYIEI ISSN: 0959-8103
  Language: English
  Document Type: JA; (Journal Article) Treatment: X; (Experimental)
  Journal Announcement: 9412W4
  Abstract: The optical activities of poly-(R)-lactide, poly-(S)-lactide,
poly(beta -hydroxybutyrate) and two beta -hydroxyvalerate copolymers were
measured in solution, as solid powders in suspension, and where possible,
as films. Poly-(plus)-3-methyl-1-pentene was also reinvestigated. In some
cases the specific rotation values of powder samples showed significant
differences from the values of the solution measurements. The discrepancies
of the data observed seem to reflect the local environment of the polymer
chains in supermolecular assemblies and consequently the solid state
structure (morphology) of the polymers. The circular dichroism (CD) spectra
of the polymers were also measured in solution and in the form of their
films. For comparison, the CD spectra of the naturally occurring protein
casein and of the synthetic polypeptide poly-(L)-proline were also
measured. (Author abstract) 21 Refs.
  Descriptors: *Polymers; Optical variables measurement; Powders; Plastic
films; Molecular structure; Morphology; Proteins; Casein; Polypeptides;
Sodium compounds
  Identifiers: Polylactides; Polyhydroxybutyrates; Circular dichroism

?s polypeptides
  S1  1783 POLYPEPTIDES (January 1977)
```

Figure 8. Engineering Index output for an adjacent word search.

```
?s poly and l and proline
    39391 POLY
    71166 L
      259 PROLINE
  S8   39 POLY AND L AND PROLINE

Title: Synthesis of crosslinked poly(vinyl alcohol) with L- proline
pendant as the chiral stationary phase for resolution of amino acid
enantiomers
  Abstract: The porous crosslinked poly (vinyl alcohol) beads with the L
-proline pendant was synthesized as the chiral stationary phase (CSP) for
ligand-exchange chromatography of amino...

...and triallyl isocyanurate as a crosslinker, methanolysis of the
copolymer, glycidylation of the formed crosslinked poly (vinyl alcohol),
and final functionalization with L-proline. After the polymer with the
chiral ligand was complexed with copper(II) cations, it was...
```

Figure 9. Engineering Index output for a general word search.

```
?s nylon
  S7   3241 NYLON
?s nylon()6
     3241 NYLON
    18621 6
  S8   1615 NYLON()6

t 8/8/1
  Engineering composites with nylon 6 matrix.
  Descriptors: Conference Paper; Nylon 6- Composite materials;
Styrene
butadiene resins- Composite materials; Thermoplastic elasto-
mers-
  Mechanical properties; Tensile strength; Impact strength
  Section Headings: D2 Materials Development
  Subfile: P Polymers
```

Figure 10. Engineering Materials Abstracts output.

ALATHON Stylized Letters
INTL CLASS: 1 (Chemicals)
U.S. CLASS: 6 (Chemicals and Chemical Compositions)
STATUS: Renewed
SERIAL NO.: 71-569,356
REG. NO.: 543,580
REGISTERED: June 12, 1951
PUBLISHED: March 13, 1951
ORIGINAL REGISTRANT: E.I. DU PONT DE NEMOURS AND COMPANY
(Delaware Corporation), 1007 MARKET STREET, WILMINGTON, DE
(Delaware), USA (United States of America)
3RD NEW OWNER ENTERED AFTER REGISTRATION: OCCIDENTAL CHEMICAL
2400, HOUSTON, TX (Texas), 77046, USA (United States of
America)
RENEWAL OWNER: (New Samek Corporation), 5 GREENWAY PLAZA, SUITE
Renewed: June 12, 1971^RENEWAL OWNER: OCCIDENTAL CHEMICAL
CORPORATION (New York Corporation), 5 GREENWAY PLAZA, SUITE
2400, HOUSTON, TX (Texas), 77046, USA (United States of
America)
Renewed: June 12, 1991
ASSIGNEE(S): CHASE MANHATTAN BANK, THE (NATIONAL ASSOCIATION)
AS
AGENT FOR THE BANKS
Assignor(s): CAIN CHEMICAL INC. (Delaware Corporation)
Reel/Frame: 0564/0786
Recorded: June 8, 1987
Brief: SECURITY INTEREST
ASSIGNEE(S): CAIN CHEMICAL INC. (Delaware Corporation), ELEVEN
GREENWAY PLAZA, SUITE 2700, HOUSTON, TX (Texas), USA (United
States of America)
Assignor(s): E. I. DU PONT DE MEMOURS AND COMPANY (Delaware
Corporation), 1007 MARKET ST., WILMINGTON, DE (Delaware).
USA
(United States of America)
Reel/Frame: 0574/0432
Acknowledged: June 9, 1987
Recorded: August 24, 1987
Brief: ASSIGNS THE ENTIRE INTEREST AND GOOD WILL
ASSIGNEE(S): CAIN CHEMICAL INC. (Delaware Corporation)
Assignor(s): CHASE MANHATTAN BANK, THE (NATIONAL
ASSOCIATION),
AS AGENT
Reel/Frame: 0648/0279
Recorded: December 19, 1988
Brief: RELEASE BY SECURED PARTY OF THE SECURITY AGREEMENT
RECORDED ON JUNE 8, 1987, AT REEL 0564, FRAME 786.
ASSIGNEE(S): OXY PETROCHEMICALS INC.
Assignor(s): CAIN CHEMICAL INC. (Delaware Corporation)
Reel/Frame: 0738/0721
Recorded: June 14, 1990
Brief: CHANGE OF NAME EFFECTIVE SEP. 21, 1989
ASSIGNEE(S): OCCIDENTAL CHEMICAL CORPORATION (New York
Corporation), FIVE GREENWAY PLAZA, SUITE 2400, HOUSTON, TX
(Texas), USA (United States of America)
Assignor(s): OXY PETROCHEMICALS INC. (Delaware Corporation),
FIVE GREENWAY PLAZA, SUITE 2500, HOUSTON, TX (Texas), USA
(United States of America)
Reel/Frame: 0738/0728
Recorded: June 14, 1990
Brief: ASSIGNS THE ENTIRE INTEREST AND GOOD WILL
ASSIGNEE(S): LYONDELL PETROCHEMICAL COMPANY (New York
Corporation), 1221 MCKINNEY ST., SUITE 1600, HOUSTON, TX
(Texas), 77010, USA (United States of America)
Assignor(s): OCCIDENTAL CHEMICAL CORPORATION (New York
Corporation)
Reel/Frame: 1434/0830
Recorded: February 13, 1996
Brief: ASSIGNS THE ENTIRE INTEREST AND GOOD WILL

Figure 11. Trademark database search for Alathon.

and Trademark Office (PTO) stating that the applicant has a bonafide intention to use the mark in commerce regulated by the US Congress. Federal registration is not required to establish rights in a mark, nor is it required to begin use of a mark. However, federal registration can secure benefits beyond the rights acquired by merely using a mark. For example, the owner of a federal registration is presumed to be the owner of the mark for the goods and services specified in the registration, and to be entitled to use the mark nationwide. There are two related but distinct types of rights in a mark: the right to register and the right to use. Generally, the first party who either uses a mark in commerce or files an application in the PTO has the ultimate right to register that mark. The PTO's authority is limited to determining the right to register. The right to use a mark can be more complicated to determine.

Information on polymer trademarks can be found by searching in trademark databases on Dialog. The search is complicated because a name may be trademarked in one country, and yet not in another. Trademarks may be sold, or they may be assigned by one business to another.

A search for Alathon, a registered trademark for polyethylene, is given as an example (Fig. 11). Dialog's trademark scan software provides a description of the goods or services the trademark describes, gives the trademark status, the application number, the registration number and type, and the dates of the action. Previous owners or assignees of the trademark can be identified.

Usually, the trademark database of each country of interest must be checked to determine whether the name is registered.

E. LIST OF CAS REGISTRY NUMBERS OF COMMON POLYMERS

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Alginic acid		9005-32-7	Alginic acid	R	Unk*
Alginic acid, sodium salt		9005-38-3	Alginic acid, sodium salt	R	Unk
Bayberry wax	Myrtle wax	8038-77-5	Fats and Glyceridic oils, bayberry	S*	Unk
Beeswax, refined, yellow		8012-89-3	Beeswax	S*	Unk
Boron nitride		10043-11-5	Boron nitride	R	BN
Candelilla wax, natural		8006-44-8	Beeswax	S*	Unk
Carboxymethyl cellulose	Carboxymethylated cellulose sodium salt; cellulose glycolate	9004-32-4	Cellulose, carboxymethyl ether, sodium salt	R	$(C_2H_4O_3)_x$ Na_x; Unk
Carboxymethyl cellulose, sodium salt	Ambergum, carboxymethyl-cellulose; sodium carboxyl-methyl cellulose	9004-32-4	Cellulose, carboxymethyl ether, sodium salt	R	$(C_2H_4O_3)_x$ Na_x; Unk
Carnauba wax, refined, No. 1, yellow		8015-86-9		S*	Unk
Carrageenan, type I (κ-carrageenan)		9000-07-1	Carrageenan	R	Unk
Carrageenan, type II (ι-carrageenan)		9062-07-1	*i*-Carrageenan	R	Unk
Cellulose		9004-34-6	Cellulose	R	Unk
Cellulose acetate	Acetic acid, cellulose ester	9004-35-7	Cellulose, acetate	R	$(C_2H_4O_2)_x$; Unk
Cellulose acetate butyrate	Acetobutyrate cellulose; cellulose acetobutyrate	9004-36-8	Cellulose, acetate butanoate	R	$(C_4H_8O_2)_x$ $(C_2H_4O_2)_x$; Unk
Cellulose acetate butyrate, acrylamidomethyl		91313-01-8	Cellulose, acetate butanoate, ((1-oxo-2-propenyl)amino)-methyl ether	R	$(C_4H_8O_2)_x$ $(C_4H_7NO_2)_x$ $(C_2H_4O_2)_x$; Unk
Cellulose acetate hydrogen phthalate	Acetyl phthalyl cellulose; cellulose acetate phthalate	9004-38-0	Cellulose, acetate hydrogen 1,2-benzene dicarboxylate	R	$(C_8H_6O_4)_x$ $(C_2H_4O_2)_x$; Unk
Cellulose acetate propionate	Acetylpropionyl cellulose	9004-39-1	Cellulose, acetate propanoate	R	$(C_3H_6O_2)_x$ $(C_2H_4O_2)_x$; Unk
Cellulose acetate propionate, acrylamidomethyl		97635-64-8	Cellulose, acetate propanoate, ((1-oxo-2-propenyl)amino)-methyl ether	R	$(C_4H_7NO_2)_x$ $(C_3H_6O_2)_x$ $(C_2H_4O_2)_x$; Unk
Cellulose acetate trimellitate		52907-01-4	Cellulose, acetate 1,2,4-benzene-tricarboxylate	R	$(C_9H_6O_6)_x$ $(C_2H_4O_2)_x$; Unk
Cellulose diacetate	Diacetyl cellulose	9035-69-2	Cellulose, diacetate	R	$(C_2H_4O_2)_{1/2}$; Unk

* Indicates that the precise molecular formula is unknown.

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Cellulose nitrate	Collodion; soluble gun cotton	9004-70-0	Cellulose, nitrate	R	$(HNO_3)_x$; Unk
Cellulose propionate		9004-48-2	Cellulose, propanoate	R	$(C_3H_6O_2)_x$; Unk
Cellulose sulfate	Sodium cellulose sulfate	9005-22-5	Cellulose, hydrogen sulfate, sodium salt	R	$(H_2O_4S)_x$ Na_x; Unk
Cellulose triacetate	Poroplastic; triacetylcellulose	9012-09-3	Cellulose, triacetate	R	$(C_2H_4O_2)_{1/3}$; Unk
Cellulose tributyrate		39320-16-6	Cellulose, tributanoate	R	$(C_4H_8O_2)_{1/3}$; Unk
Cellulose tricarbanilate		9047-07-8	Cellulose, tris (phenylcarbamate)	R	$(C_7H_7NO_2)_{1/3}$; Unk
Cellulose xanthate	Cellulose carbonodithioate; cellulose hydrogen dithio-carbonate	9032-37-5	Cellulose, hydrogen carbonodithioate	R	$(CH_2OS_2)_x$; Unk
Cellulose, cyanoethylated	Cellulose cyanoethyl ether; cellulose ethylcyanide	9004-41-5	Cellulose, 2-cyanoethyl ether	R	$(C_3H_5NO)_x$; Unk
Cellulose, microcrystalline, colloidal		51395-75-6	Cellulose, mixt. with cellulose carboxymethyl ether sodium salt	R	$(C_2H_4O_3)_x$ Na_x; Unk
Chitin, crab shells		1398-61-4	Chitin	S*	Unk
Chitosan		9012-76-4	Chitosan	R	Unk
Chlorinated poly(vinyl chloride)		68648-82-8	Ethene, chloro-, homopolymer, chlorinated	*	Unk
Chlorinated polyethylene		63231-66-3	Rubber, synthetic, chlorinated polyethylene	S	Unk
Coconut oil	Fats and glyceridic oils	8001-31-8	Coconut oil	S*	Unk
Ethyl cellulose	Cellulose ethyl ether; cellulose ethylate; ethocel, ethyl cellulose ether	9004-57-3	Cellulose, ethyl ether	R	$(C_2H_6O)_x$; Unk
Graphite, fluorinated, polymer		51311-17-2	Carbon fluoride	R	Unk
Guar gum carboxymethyl 2-hydroxypropyl ether, sodium salt	Sodium carboxymethyl hydroxypropyl guar	68130-15-4	Guar gum, carboxymethyl 2-hydroxypropyl ether, sodium salt	R	Unk
Hydroxybutyl methyl cellulose		9041-56-9	Cellulose, hydroxybutyl methyl ether	R	$(C_4H_{10}O_2)_x$ $(CH_4O)_x$; Unk
Hydroxyethyl cellulose (2-hydroxyethyl cellulose)	Cellosize; cellulose hydroxyethyl ether; cellulose hydroxyethylate; glycol cellulose	9004-62-0	Cellulose, 2-hydroxyethyl ether	R	$(C_2H_6O_2)_x$; Unk
Hydroxypropyl cellulose	Cellulose hydroxypropyl ether; hydropropyl cellulose; hydroxypropyl cellulose	9004-64-2	Cellulose, 2-hydroxypropyl ether	R	$(C_3H_8O_2)_x$; Unk
Hydroxypropyl methyl cellulose	Cellulose hydroxypropyl methyl ether	9004-65-3	Cellulose, 2-hydroxypropyl methyl ether	R	$(C_3H_8O_2)_x$ $(CH_4O)_x$; Unk
Hydroxypropyl methyl cellulose phthalate	Cellulose phthalate hydroxypropyl methyl ether	9050-31-1	Cellulose, hydrogen 1,2-benzene-dicarboxylate, 2-hydroxypropyl methyl ether	R	$(C_8H_6O_4)_x$ $(C_3H_8O_2)_x$ $(CH_4O)_x$; Unk
Lignin, alkali	Indulin A	8068-05-1	Lignin, alkali	R	Unk
Lignin, alkali, 2-hydroxypropyl ether		88402-77-1	Lignin, alkali, 2-hydroxypropyl ether	R	$(C_3H_8O_2)_x$; Unk
Lignin, alkali, carboxymethyl ether	Kraft lignin carboxymethyl ether	102962-28-7	Lignin, alkali, carboxymethyl ether	R	$(C_2H_4O_3)_x$; Unk
Lignin, hydrolytic		8072-93-3	Lignin, hydrolytic	R	Unk
Lignin, organosolv	Dioxane lignin	8068-03-9	Lignin, organosolv	R	Unk
Lignin, organosolv, 2-hydroxyethyl ether		90881-34-8	Lignin, organosolv, 2-hydroxyethyl ether	R	$(C_2H_6O_2)_x$; Unk
Lignosulfonic acid, sodium salt		8061-51-6	Lignosulfonic acid, sodium salt	R	Unk
Linseed oil	Fats and glyceridic oils	8001-26-1	Linseed oil	S*	Unk
Maltodextrin		9050-36-6	Maltodextrin	R	Unk
Merrifield's peptide resin, cross-linked	Chloromethylstyrene-*p*-divinylbenzene–styrene copolymer; A221481; chloromethylstyrene–styrene–divinylbenzene copolymer	55844-94-5	Benzene, (chloromethyl)ethenyl-, polymer with diethenylbenzene and ethenylbenzene	R	$(C_{10}H_{10} \cdot C_9H_9Cl \cdot C_8H_8)_x$
Methyl 2-hydroxyethyl cellulose	Hydroxyethyl methyl cellulose	9032-42-2	Cellulose, 2-hydroxyethyl methyl ether	R	$(C_2H_6O_2)_x$ $(CH_4O)_x$; Unk
Methyl cellulose	Methyl ether cellulose	9004-67-5	Cellulose, methyl ether	R	$(CH_4O)_x$; Unk

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Net-Poly(acrylic acid)-inter-net-poly(siloxane)		143106-82-5	2-Propenoic acid, 2-methyl-, 3-(dimethoxymethylsilyl)propyl ester, polymer with butyl 2-propenoate, decamethylcyclopentasiloxane, etc.	R	$(C_{10}H_{30}O_5Si_5 \cdot C_{10}H_{20}O_4Si \cdot C_8H_{24}O_4Si_4 \cdot C_7H_{12}O_2 \cdot C_7H_{10}O_2 \cdot C_6H_{18}O_3Si_3 \cdot C_5H_8O_2)_x$
Nylon 6	Polyamide 6	25038-54-4	Poly(imino(1-oxo-1,6-hexanediyl))	U	$(C_6H_{11}NO)_n$
Nylon 9	Polynonanamide; poly(imino-1-oxononamethylene)	25748-72-5	Nonanoic acid, 9-amino-, homopolymer	R	$(C_9H_{17}NO)_x$
Nylon 11	Poly(imino-1-oxoundecamethylene)	25035-04-5	Poly(imino(1-oxo-1,11-undecanediyl))	R	$(C_{11}H_{21}NO)$
Nylon 12	Polydodecanamide; poly(iminocarbonylundecamethylene); poly(imino-1-oxododecamethylene)	24937-16-4	Poly(imino(1-oxo-1,12-dodecanediyl))	R	$(C_{12}H_{23}NO)_n$
Nylon 46	Adipic acid-1,4-butanediamine copolymer, SRU; poly(tetramethylene adipamide)	50327-22-5	Poly(imino-1,4-butanediylimino (1,6-dioxo-1,6-hexanediyl))	R	$(C_{10}H_{18}N_2O_2)_n$
Nylon 46, monomer-based		50327-77-0	Hexanedioic acid, polymer with 1,4-butanediamine	R	$(C_6H_{10}O_4 \cdot C_4H_{12}N_2)_x$
Nylon 6, 6	Adipic acid-1, 6-hexanediamine copolymer; adipoyl dichloride-hexamethylenediamine polymer, SRU; polyamides, nylon 66; poly(hexamethylene adipamide); poly(iminoadipoyl iminohexamethylene)	32131-17-2	Poly(imino(1,6-dioxo-1,6-hexanediyl)imino-1,6-hexanediyl)	U	$(C_{12}H_{22}N_2O_2)_n$
Nylon 6, 9	Azelaic acid-1,6-hexanediamine salt polymer, SRU	28757-63-3	Poly(imino-1,6-hexanediylimino (1,9-dioxo-1,9-nonanediyl))	R	$(C_{15}H_{28}N_2O_2)_n$
Nylon 6/66	Adipic acid-ε-caprolactam-1,6-hexanediamine copolymer; nylon 6-nylon 66 copolyamide; nylon 6-nylon 66 copolymer; poly(hexamethyleneadipamide)	24993-04-2	Hexanedioic acid, polymer with hexahydro-2H-azepin-2-one and 1,6-hexanediamine	R	$(C_6H_{16}N_2 \cdot C_6H_{11}NO \cdot C_6H_{10}O_4)_x$
Nylon 610	Poly(iminohexamethylene iminosebacoyl); poly(hexamethylenesebacamide)	9008-66-6	Poly(imino-1,6-hexanediylimino-1,10-dioxo-1,10-decanediyl))	R	$(C_{16}H_{30}N_2O_2)_n$
Nylon 612		24936-74-1	Poly(imino-1,6-hexanediylimino (1,12-dioxo-1,12-dodecanediyl))	R	$(C_{18}H_{34}N_2O_2)_n$
Nylon 6/T, poly(hexamethylene terephthalamide)	Hexamethylenediamine–terephthalic acid polymer	24938-03-2	1,4-Benzenedicarboxylic acid, polymer with 1,6-hexanediamine	R	$(C_8H_6O_4 \cdot C_6H_{16}N_2)_x$
Paraffin wax, chunks		8002-74-2	Paraffin waxes and hydrocarbon waxes	S*	Unk
Paraformaldehyde	Paraform	30525-89-4	Paraformaldehyde	R	$(CH_2O)_x$
Phenol–formaldehyde resin	Formaldehyde–phenol polymer	9003-35-4	Phenol, polymer with formaldehyde	R	$(C_6H_6O \cdot CH_2O)_x$
Poly(D-alanine)	Poly-D-alanine	26701-36-0	D-Alanine, homopolymer	R	$(C_3H_7NO_2)_x$
Poly(L-alanine)	Polyalanine	25191-17-7	L-Alanine, homopolymer	R	$(C_3H_7NO_2)_x$
Poly(D,L-alanine)		25281-63-4	DL-Alanine, homopolymer	R	$(C_3H_7NO_2)_x$
Poly(γ-aminobutyric acid)	Poly(4-aminobutyric acid)	53504-43-1	Butanoic acid, 4-amino-, homopolymer	R	$(C_4H_9NO_2)_x$
Poly(L-aspartic acid), sodium salt	Poly(aspartic acid) sodium salt	34345-47-6	L-Aspartic acid, homopolymer, sodium salt	R	$(C_4H_7NO_4)_x \cdot xNa$
Poly(acenaphthylene)	Oligoacenaphthylene	25036-01-5	Acenaphthylene, homopolymer	R	$(C_{12}H_8)_x$
Poly(acrylamide)	Acrylamide polymer	9003-05-8	2-Propenamide, homopolymer	R	$(C_3H_5NO)_x$
Poly(acrylamide-*co*-acrylic acid)	Acrylamide–acrylate polymer; acrylamide–acrylic acid polymer; poly(acrylic acid-acrylamide)	9003-06-9	2-Propenoic acid, polymer with 2-propenamide	R	$(C_3H_5NO \cdot C_3H_4O_2)_x$
Poly(acrylamide-*co*-diallyl dimethyl ammonium chloride)	Acrylamide–diallyldimethyl-ammonium chloride polymer	26590-05-6	2-Propen-1-aminium, *N*,*N*-dimethyl-*N*-2-propenyl-, chloride, polymer with 2-propenamide	R	$(C_8H_{16}N \cdot C_3H_5NO \cdot Cl)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(2-acrylamido, 2-methyl, 1-propane sulfonic acid-*co*-acrylonitrile)		54640-82-3	1-Propanesulfonic acid, 2-methyl-2-((1-oxo-2-propenyl)amino)-, polymer with 2-propenenitrile	R	$(C_7H_{13}NO_4S \cdot C_3H_3N)_x$
Poly(2-acrylamido-2-methyl-1-propane sulfonic acid)		27119-07-9	1-Propanesulfonic acid, 2-methyl-2-((1-oxo-2-propenyl)amino)-, homopolymer	R	$(C_7H_{13}NO_4S)_x$
Poly(2-acrylamido-2-methyl-1-propane sulfone acid-*co*-styrene)		51121-85-8	1-Propanesulfonic acid, 2-methyl-2-((1-oxo-2-propenyl)amino)-, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_7H_{13}NO_4S)_x$
Poly(acrylic acid)	Acrylic acid polymer	9003-01-4	2-Propenoic acid, homopolymer	R	$(C_3H_4O_2)_x$
Poly(acrylic acid), ammonium salt	Ammonium polyacrylate; ammonium polyacrylic acid	9003-03-6	2-Propenoic acid, homopolymer, ammonium salt	R	$(C_3H_4O_2)_x \cdot xH_3N$
Poly(acrylic acid), potassium salt, crosslinked	Potassium polyacrylate	25608-12-2	2-Propenoic acid, homopolymer, potassium salt	R	$(C_3H_4O_2)_x \cdot xK$
Poly(acrylic acid), sodium salt	Acrylic acid polymer, sodium salt	9003-04-7	2-Propenoic acid, homopolymer, sodium salt	R	$(C_3H_4O_2)_x \cdot xNa$
Poly(acrylic acid-*co*-trimethylolpropane), sodium salt	Acrylic acid–sodium acrylate–trimethylolpropane triacrylate copolymer	76774-25-9	2-Propenoic acid, polymer with 2-ethyl-2-(((1-oxo-2-propenyl)-oxy)methyl)-1,3-propanediyl di-2-propenoate and sodium 2-propenoate	R	$(C_{15}H_{20}O_6 \cdot C_3H_4O_2 \cdot C_3H_4O_2 \cdot Na)_x$
Poly(acrylic acid, sodium salt-*graft*-poly(ethylene oxide)), crosslinked	Acrylic acid–vinyl alcohol polymer, sodium salt	27599-56-0	2-Propenoic acid, polymer with ethenol, sodium salt	R	$(C_3H_4O_2 \cdot C_2H_4O)_x \cdot xNa$
Poly(acrylic acid-*co*-acrylamide), potassium salt, crosslinked	Acrylamide–potassium acrylate copolymer	31212-13-2	2-Propenoic acid, potassium salt, polymer with 2-propenamide	R	$(C_3H_5NO \cdot C_3H_4O_2 \cdot K)_x$
Poly(acrylic acid-*co*-maleic acid)		29132-58-9	2-Butenedioic acid (Z)-, polymer with 2-propenoic acid	R	$(C_4H_4O_4 \cdot C_3H_4O_2)_x$
Poly(acrylic acid-*co*-maleic acid), sodium salt	Acrylic acid–maleic anhydride copolymer, sodium salt	52255-49-9	2-Propenoic acid, polymer with 2,5-furandione, sodium salt	R	$(C_4H_2O_3 \cdot C_3H_4O_2)_x \cdot xNa$
Poly(acrylonitrile)	Acrylonitrile polymer; poly(1-cyanoethylene)	25014-41-9	2-Propenenitrile, homopolymer	R	$(C_3H_3N)_x$
Poly(acrylonitrile-*co*-butadiene)	Acrylonitrile–butadiene polymer	9003-18-3	2-Propenenitrile, polymer with 1,3-butadiene	R	$(C_4H_6 \cdot C_3H_3N)_x$
Poly(acrylonitrile-*co*-butadiene), amine terminated		68683-29-4	2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-((2-(1-piperazinyl)ethyl)-amino)butyl-terminated	R	$(C_4H_6 \cdot C_3H_3N)_x$
Poly(acrylonitrile-*co*-butadiene), hydrogenated		88254-10-8	2-Propenenitrile, polymer with 1,3-butadiene, hydrogenated	*	$(C_4H_6 \cdot C_3H_3N)_x$
Poly(acrylonitrile-*co*-butadiene-*co*-acrylic acid), dicarboxy terminated		68891-50-9	2-Propenoic acid, polymer with 1,3-butadiene and 2-propenenitrile, 3-carboxy-1-cyano-1-methylpropyl-terminated	*	$(C_4H_6 \cdot C_3H_4O_2 \cdot C_3H_3N)_x$
Poly(acrylonitrile-*co*-butadiene-*co*-styrene)	Acrylonitrile–butadiene–styrene polymer; cycolac; styrene–acrylonitrile–butadiene polymer	9003-56-9	2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene	R	$(C_8H_8 \cdot C_4H_6 \cdot C_3H_3N)_x$
Poly(acrylonitrile-*co*-vinylidene chloride-*co*-methyl methacrylate)	Acrylonitrile–methyl methacrylate–vinylidene chloride polymer	25214-39-5	2-Propenoic acid, 2-methyl-, methyl ester, polymer with 1,1-dichloroethene and 2-propenenitrile	R	$(C_5H_8O_2 \cdot C_3H_3N \cdot C_2H_2C_2)_x$
Poly(allyl amine hydrochloride)	Allylamine hydrochloride	71550-12-4	2-Propen-1-amine, hydrochloride, homopolymer	R	$(C_3H_7N \cdot ClH)_x$
Poly(*p*-aminobenzaldehyde)	Poly(4-aminobenzaldehyde)	28107-09-7	Benzaldehyde, 4-amino-, homopolymer	R	$(C_7H_7NO)_x$
Poly(anethole sulfonic acid), sodium salt	Polyanethole sulfonate; sodium polyanetholesulfonate	52993-95-0	Benzene, 1-methoxy-4-(1-propenyl)-, (E)-, homopolymer, sulfonated, sodium salt	R	Unk
Poly((α,β)-D,L-aspartic acid), sodium salt		94525-01-6	DL-Aspartic acid, homopolymer, sodium salt	R	$(C_4H_7NO_4)_x \cdot xNa$
Poly(azelaic anhydride)	Azelaic acid polymer	26776-28-3	Nonanedioic acid, homopolymer	R	$(C_9H_{16}O_4)_x$
Poly(1,4-benzene dicarboxy-*alt*-bis(4-phenoxyphenyl) methanone)		55088-54-5	1,4-Benzenedicarbonyl dichloride, polymer with bis(4-phenoxy-phenyl)methanone	R	$(C_{25}H_{18}O_3 \cdot C_8H_4Cl_2O_2)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(benzimidazole)	Diphenyl isophthalate-3,3′,4,4′-tetraaminodiphenyl polymer	25928-81-8	1,3-Benzenedicarboxylic acid, diphenyl ester, polymer with (1,1′-biphenyl)-3,3′,4,4′-tetramine	R	$(C_{20}H_{14}O_4 \cdot C_{12}H_{14}N_4)_x$
Poly(benzoguanamine-*co*-formaldehyde), methylated/ethylated		68037-08-1	Formaldehyde, polymer with 6-phenyl-1,3,5-triazine-2,4-diamine, ethylated/methylated	*	Unk
Poly(benzophenone tetracarboxylic dianhydride-*co*-phenylene diamine)	Benzophenonetetracarboxylic dianhydride-4,4′-oxydianiline-*m*-phenylenediamine copolymer	31942-21-9	1,3-Isobenzofurandione, 5,5′-carbonylbis-, polymer with 1,3-benzenediamine and 4,4′-oxybis(benzenamine)	R	$(C_{17}H_6O_7 \cdot C_{12}H_{12}N_2O \cdot C_6H_8N_2)_x$
Poly(2-(4-benzoyl-3-hydroxyphenoxy) ethyl acrylate)	2-Hydroxy-4-acryloxyethoxybenzophenone polymer	29963-76-6	2-Propenoic acid, 2-(4-benzoyl-3-hydroxyphenoxy)ethyl ester, homopolymer	R	$(C_{18}H_{16}O_5)_x$
Poly(benzyl methacrylate)	Benzyl methacrylate polymer	25085-83-0	2-Propenoic acid, 2-methyl-, phenylmethyl ester, homopolymer	R	$(C_{11}H_{12}O_2)_x$
Poly(β-cyclodextrin-*co*-epichlorohydrin)		25655-42-9	β-Cyclodextrin, polymer with (chloromethyl)oxirane	R	$(C_{42}H_{70}O_{35} \cdot C_3H_5ClO)_x$
Poly(bis(2-chloroethyl)ether-*co*-1,3-bis(3-(dimethylamino)-propyl)urea), quaternary salt		68555-36-2	Urea, *N,N′*-bis(3-(dimethylamino)-propyl)-, polymer with 1,1′-oxybis(2-chloroethane)	R	$(C_{11}H_{26}N_4O \cdot C_4H_8Cl_2O)_x$
Poly(bis(benzyl thio)acetylene)		93975-09-8	Benzene, 1,1′-(1,2-ethynediylbis-(thiomethylene))bis-, homopolymer	R	$(C_{16}H_{14}S_2)_x$
Poly(bis(ethyl thio)acetylene)		93975-08-7	Ethyne, bis(ethylthio)-, homopolymer	R	$(C_6H_{10}S_2)_x$
Poly(bis(methyl thio)acetylene)		93975-07-6	Ethyne, bis(methylthio)-, homopolymer	R	$(C_4H_6S_2)_x$
Poly(bisphenol A-*co*-4-nitrophthalic anhydride-*co*-1,3-phenylene diamine)	2,2-Bis(4-(3,4-dicarboxyphenoxy)-phenyl)propane dianhydride-*m*-phenylenediamine copolymer	61128-46-9	1,3-Isobenzofurandione, 5,5′-((1-methylethylidene) bis(4,1-phenyleneoxy)) bis- polymer with 1,3-benzenediamine	R	$(C_{31}H_{20}O_8 \cdot C_6H_8N_2)_x$
Poly(bisphenol A-*co*-epichlorohydrin)		25036-25-3	Phenol, 4,4′-(1-methylethylidene)-bis-, polymer with 2,2′-((1-ethylethylidene) bis(4,1-phenyleneoxymethylene))-bis(oxirane)	R	$(C_{21}H_{24}O_4 \cdot C_{15}H_{16}O_2)_x$
Poly(bisphenol A-*co*-epichlorohydrin)	Bisphenol A epoxy resin; phenoxy resin	25068-38-6	Phenol, 4,4′-(1-methylethylidene)-bis-, polymer with (chloromethyl)oxirane	R	
Poly(bisphenyl tetracarboxylic dianhydride-*co*-phenylene diamine)	Biphenyl dianhydride-*p*-phenylenediamine copolymer	29319-22-0	(5,5′-Biisobenzofuran)-1,1′,3,3′-tetrone, polymer with 1,4-benzenediamine	R	$(C_{16}H_6O_6 \cdot C_6H_8N_2)_x$
Poly(4-bromostyrene)	*p*-Bromostyrene polymer	24936-50-3	Benzene, 1-bromo-4-ethenyl-, homopolymer	R	$(C_8H_7Br)_x$
Poly(butadiene)	Poly(1-butenylene); butadiene homopolymer	9003-17-2	1,3-Butadiene, homopolymer	R	$(C_4H_6)_x$
Poly(butadiene); *cis* and *trans*	Poly(1-butenylene)	25038-44-2	Poly(1-butene-1,4-diyl)	R	$(C_4H_6)_n$
Poly(butadiene), *cis*		40022-03-5	Poly(1-butene-1,4-diyl),	R	$(C_4H_6)_n$
Poly(butadiene), dicarboxy terminated		68891-79-2	1,3-Butadiene, homopolymer, 3-carboxy-1-cyano-1-methylpropyl-terminated	*	Unk
Poly(butadiene), hydroxyl functionalized		69102-90-5	1,3-Butadiene, homopolymer, hydroxy-terminated	*	Unk
Poly(1,4-butanediol bis(4-aminobenzoate))		54667-43-5	Poly(oxy-1,4-butanediyl), α-(4-aminobenzoyl)-ω-((4-aminobenzoyl)oxy)-	R	$(C_4H_8O)_n$ $C_{14}H_{12}N_2O_3$
Poly(1,4-butanediol/neopentyl glycol-*alt*-adipic acid)		36609-31-1	Hexanedioic acid, polymer with 1,4-butanediol and 2,2-dimethyl-1,3-propanediol	R	$(C_6H_{10}O_4 \cdot C_5H_{12}O_2 \cdot C_4H_{10}O_2)_x$
Poly(butene)	Polybutene; polybutylene	9003-29-6	Butene, homopolymer	R	$(C_4H_8)_x$
Poly(1-butene)	Polybutene	9003-28-5	1-Butene, homopolymer	R	$(C_4H_8)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(butenes), hydrogenated		68937-10-0	Butene, homopolymer, hydrogenated	*	Unk
Poly(butenes), monoepoxide		119275-53-5	1-Butene, polymer with 2-butene and 2-methyl-1-propene, epoxidized	*	$(C_4H_8 \cdot C_4H_8 \cdot C_4H_8)_x$
Poly(butyl acrylate)	Butyl acrylate polymer	9003-49-0	2-Propenoic acid, butyl ester, homopolymer	R	$(C_7H_{12}O_2)_x$
Poly(4-*tert*-butylcyclohexyl methacrylate)		34903-89-4	2-Propenoic acid, 2-methyl-, 4-(1,1-dimethylethyl)cyclohexyl ester, homopolymer	R	$(C_{14}H_{24}O_2)_x$
Poly(butyl methacrylate)	Butyl methacrylate polymer	9003-63-8	2-Propenoic acid, 2-methyl, butyl ester, homopolymer	R	$(C_8H_{14}O_2)_x$
Poly(butyl methacrylate-*co*-isobutyl methacrylate)	Butyl methacrylate – isobutyl methacrylate polymer	9011-53-4	2-Propenoic acid, 2-methyl, butyl ester, polymer with 2-methylpropyl 2-methyl-2-propenoate	R	$(C_8H_{14}O_2 \cdot C_8H_{14}O_2)_x$
Poly(butyl methacrylate-*co*-methyl methacrylate)	Methyl methacrylate – butyl methacrylate polymer	25608-33-7	2-Propenoic acid, 2-methyl-, butyl ester, polymer with methyl 2-methyl-2-propenoate	R	$(C_8H_{14}O_2 \cdot C_5H_8O_2)_x$
Poly(4-*tert*-butylphenyl methacrylate)	*p*-*tert*-Butylphenyl methacrylate polymer	29696-27-3	2-Propenoic acid, 2-methyl-, 4-(1,1-dimethylethyl)phenyl ester, homopolymer	R	$(C_{14}H_{18}O_2)_x$
Poly(4-*tert*-butylstyrene)	*p*-*tert*-Butylstyrene polymer	26009-55-2	Benzene, 1-(1,1-dimethylethyl)-4-ethenyl-, homopolymer	R	$(C_{12}H_{16})_x$
Poly(1,4-butylene adipate)	Adipic acid–butylene glycol copolymer; adipic acid-butylene glycol polymer; PBAG; poly(butylene adipate); poly-(tetramethylene adipate)	25103-87-1	Hexanedioic acid, polymer with 1,4-butanediol	R	$(C_6H_{10}O_4 \cdot C_4H_{10}O_2)_x$
Poly(1,4-butylene adipate-*co*-1,4-butylene succinate)	Adipic acid-1,4-butanediol-HMDI-succinic acid copolymer	119553-67-2	Hexanedioic acid, polymer with butanedioic acid, 1,4-butanediol and 1,6-diisocyanatohexane	R	$(C_8H_{12}N_2O_2 \cdot C_6H_{10}O_4 \cdot C_4H_{10}O_2 \cdot C_4H_6O_4)$
Poly(1,2-butylene glycol)	1,2-Epoxybutane–propylene glycol polymer	31923-86-1	1,2-Propanediol, polymer with ethyloxirane	R	$(C_4H_8O \cdot C_3H_8O_2)_x$
Poly(1,2-butylene glycol), monobutyl ether		144437-84-3	Oxirane, ethyl-, homopolymer, mono(2-butoxy-1-methylethyl) ether	R	$(C_7H_{16}O_2 \cdot C_4H_8O)_x$
Poly(1,4-butylene glutarate), hydroxy terminated	1,4-Butanediol–glutaric acid copolymer	52256-54-9	Pentanedioic acid, polymer with 1,4-butanediol	R	$(C_5H_8O_4 \cdot C_4H_{10}O_2)_x$
Poly(1,4-butylene succinate)	Butylene glycol–succinic acid copolymer; poly(tetramethylene succinate)	25777-14-4	Butanedioic acid, polymer with 1,4-butanediol	R	$(C_4H_{10}O_2 \cdot C_4H_6O_4)_x$
Poly(1,4-butylene succinate-*co* HMDI)	1,4-Butanediol-HMDI-succinic acid copolymer	143606-53-5	Butanedioic acid, polymer with 1,4-butanediol and 1,6-diisocyanatohexane	R	$(C_8H_{12}N_2O_2 \cdot C_4H_{10}O_2 \cdot C_4H_6O_4)_x$
Poly(1,4-butylene terephthalate)	Butanediol–terephthalic acid copolymer; poly(oxytetra-methyleneoxy-terephthalic acid–terephthaloyl); tetramethylene glycol polymer, SRU	24968-12-5	Poly(oxy-1,4-butanediyloxycar-bonyl-1,4-phenylenecarbonyl)	R	$(C_{12}H_{12}O_4)_n$
Poly(caprolactone diol)	Caprolactone – diethylene glycol polymer	36890-68-3	2-Oxepanone, polymer with 2,2′-oxybis(ethanol)	R	$(C_6H_{10}O_2 \cdot C_4H_{10}O_3)_x$
Poly(caprolactone triol)	ε-Caprolactone – trimethylolpropane polymer	37625-56-2	2-Oxepanone, polymer with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol	R	$(C_6H_{14}O_3 \cdot C_6H_{10}O_2)_x$
Poly(caprolactone triol)		54735-63-6	Poly(oxy(1-oxo-1,6-hexanediyl)), α-hydro-ω-hydroxy-, ester with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3 : 1)	R	$(C_6H_{10}O_2)_n$ $(C_6H_{10}O_2)_n$ $(C_6H_{10}O_2)_n$ $C_6H_{14}O_3$
Poly(caprolactone)		24980-41-4	2-Oxepanone, homopolymer	R	$(C_6H_{10}O_2)_x$
Poly(chloroprene)	Chlorobutadiene polymer	9010-98-4	1,3-Butadiene, 2-chloro-, homopolymer	R	$(C_4H_5Cl)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(chlorostyrene)	Chlorostyrene polymer	9022-52-0	Benzene, chloroethenyl-, homopolymer	R	$(C_8H_7Cl)_x$
Poly(4-chlorostyrene)	*p*-Chlorostyrene polymer 4-Chlorostyrene polymer	24991-47-7	Benzene, 1-chloro-4-ethenyl-, homopolymer	R	$(C_8H_7Cl)_x$
Poly(chlorotrifluoroethylene)	Halocarbon oil	9002-83-9	Ethene, chlorotrifluoro-, homopolymer	R	$(C_2ClF_3)_x$
Poly(chlorotrifluoroethylene-*co*-vinylidene fluoride)	Chlorotrifluoroethylene–vinylidene fluoride polymer; trifluorochloroethylene–vinylidene fluoride polymer	9010-75-7	Ethene, chlorotrifluoro-, polymer with 1,1-difluoroethene	R	$(C_2H_2F_2 \cdot C_2ClF_3)_x$
Poly(coumarone-*co*-indene)		35343-70-5	Benzofuran, polymer with 1H-indene	R	$(C_9H_8 \cdot C_8H_6O)_x$
Poly(*o*-cresol glycidyl ether-*co*-formaldehyde)		29690-82-2	Formaldehyde, polymer with (chloromethyl)oxirane and 2-methylphenol	R	$(C_7H_8O \cdot C_3H_5ClO \cdot CH_2O)_x$
Poly(*o*-cresyl glycidyl ether-*co*-formaldehyde)	Cresol–epichlorohydrin–formaldehyde polymer	37382-79-9	Formaldehyde, polymer with (chloromethyl)oxirane and methylphenol	R	$(C_7H_8O \cdot C_3H_5ClO \cdot CH_2O)_x$
Poly(2-cyanobutyl acrylate)	Butyl 2-cyanoacrylate polymer; poly(butyl cyanoacrylate)	25154-80-7	2-Propenoic acid, 2-cyano-, butyl ester, homopolymer	R	$(C_8H_{11}NO_2)_x$
Poly(2-cyanoethyl acrylate)	Poly(ethyl cyanoacrylate);	25067-30-5	2-Propenoic acid, 2-cyano-, ethyl ester, homopolymer	R	$(C_6H_7NO_2)_x$
Poly(2-cyanoheptyl acrylate)		26936-29-8	2-Propenoic acid, 2-cyano-, heptyl ester, homopolymer	R	$(C_{11}H_{17}NO_2)_x$
Poly(2-cyanohexyl acrylate)	Poly(hexyl cyanoacrylate)	26877-39-4	2-Propenoic acid, 2-cyano-, hexyl ester, homopolymer	R	$(C_{10}H_{15}NO_2)_x$
Poly(2-cyanoisobutyl acrylate)	Isobutyl 2-cyanoacrylate polymer	26809-38-1	2-Propenoic acid, 2-cyano-	R	$(C_8H_{11}NO_2)_x$
Poly(2-cyanoisopropyl acrylate)	Poly(isopropyl cyanoacrylate)	25931-02-6	2-Propenoic acid, 2-cyano-, 1-methylethyl ester, homopolymer	R	$(C_7H_9NO_2)_x$
Poly(cyclododecyl acrylate)		56710-66-8	2-Propenoic acid, cyclododecyl ester, homopolymer	R	$(C_{15}H_{26}O_2)_x$
Poly(1,4-cyclohexane dimethylene terephthalate-*co*-ethylene terephthalate)	Dimethyl terephthalate-ethylene glycol-1,4-bis(hydroxymethyl)-cyclohexane copolymer	25640-14-6	1,4-Benzenedicarboxylic acid, dimethyl ester, polymer with 1,4-cyclohexanedimethanol and 2-ethanediol	R	$(C_{10}H_{10}O_4 \cdot C_8H_{16}O_2 \cdot C_2H_6O_2)$
Poly(cyclohexyl methacrylate)		25768-50-7	2-Propenoic acid, 2-methyl-, cyclohexyl ester, homopolymer	R	$(C_{10}H_{16}O_2)_x$
Poly(di(ethylene glycol) glycerol-*alt*-adipic acid)	Diethylene glycol–glycerol–adipic acid copolymer	26760-54-3	Hexanedioic acid, polymer with 2,2′-oxybis(ethanol) and 1,2,3-propanetriol	R	$(C_6H_{10}O_4 \cdot C_4H_{10}O_3 \cdot C_3H_8O_3)$
Poly(diallyl dimethyl ammonium chloride)	Diallyldimethylammonium chloride polymer	26062-79-3	2-Propen-1-aminium, *N,N*-dimethyl-*N*-2-propenyl-, chloride, homopolymer	R	$(C_8H_{16}N \cdot Cl)_x$
Poly(diallyl isophthalate)	Diallyl isophthalate polymer	25035-78-3	1,3-Benzenedicarboxylic acid, di-2-propenyl ester, homopolymer	R	$(C_{14}H_{14}O_4)_x$
Poly(diallyl phthalate)	Diallyl phthalate polymer	25053-15-0	1,2-Benzenedicarboxylic acid, di-2-propenyl ester, homopolymer	R	$(C_{14}H_{14}O_4)_x$
Poly(diaminobenzophenone-*co*-benzophenone tetracarboxylic dianhydride)	Benzophenone tetracarboxylic acid dianhydride-*m,m′*-diaminobenzophenone polymer, SRU	51518-44-6	Poly((1,3-dihydro-1,3-dioxo-2H-isoindole-2,5-diyl)carbonyl-(1,3-dihydro-1,3-dioxo-2H-isoindole-5,2-diyl)-1,3-phenylene-carbonyl-1,3-phenylene)	R	$(C_{30}H_{14}N_2O_6)_n$
Poly((dibenzo-18-crown-6)-*co*-formaldehyde)		53660-42-7	Formaldehyde, polymer with 6,7,9,10,17,18,20,21-octahydro-dibenzo(b,k)(1,4,7,10,13,16) hexaoxacyclooctadecin	R	$(C_{20}H_{24}O_6 \cdot CH_2O)_x$
Poly(dibromostyrene)		62354-98-7	Benzene, dibromoethenyl-, homopolymer	R	$(C_8H_6Br_2)_x$
Poly(dichlorophosphazene)	Dichlorophosphazine polymer; Poly(nitrile(dichlorophosphoranylidyne))	26085-02-9	Poly(nitrilo(dichlorophosphoranylidyne))	R	$(Cl_2NP)_n$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(diethyl fumarate)		2698-06-6	2-Butenedioic acid (E)-, diethyl ester, homopolymer	R	$(C_8H_{12}O_4)_x$
Poly(diethylene glycol adipate)	Adipic acid–diethylene glycol polymer	9010-89-3	Hexanedioic acid, polymer with 2,2′-oxybis(ethanol)	R	$(C_6H_{10}O_4 \cdot C_4H_{10}O_3)_x$
Poly(diethylene glycol/trimethylol propane-*alt*-adipic acid), polyol	Adipic acid–diethylene glycol–trimethylolpropane polymer	28183-09-7	Hexanedioic acid, polymer with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol and 2,2′-oxybis(ethanol)	R	$(C_6H_{14}O_3 \cdot C_6H_{10}O_4 \cdot C_4H_{10}O_3)_x$
Poly(1,2-dihydro-2,2,4-trimethyl quinoline)	Antioxidant HS; trimethyldihydroquinoline polymer	26780-96-1	Quinoline, 1,2-dihydro-2,2,4-trimethyl-, homopolymer	R	$(C_{12}H_{15}N)_x$
Poly(dimer acid-*co*-ethylene glycol), hydrogenated		68855-78-7	Fatty acids, C18-unsatd., dimers, hydrogenated, polymers with ethylene glycol	S	Unk
Poly(*N,N*-dimethylacrylamide)	*N,N*-Dimethylacrylamide polymer	26793-34-0	2-Propenamide, *N,N*-dimethyl-, homopolymer	R	$(C_5H_9NO)_x$
Poly(1,1-dimethyl 3,5-dimethylene piperidinium chloride)		32168-43-7	Poly((1,1-dimethylpiperidinium-3,5-diyl)methylene chloride)	R	$(C_8H_{16}N)_n \cdot Cl$
Poly(2,6-dimethyl-1, 4-phenylene oxide)	Poly(2,6-xylenol)	25134-01-4	Phenol, 2,6-dimethyl-, homopolymer	R	$(C_8H_{10}O)_x$
Poly(2,2-dimethyl-1,3-propylene)	Polyneopentyl glycol succinate	28776-65-0	Poly(oxy(2,2-dimethyl-1,3-propanediyl)oxy(1,4-dioxo-1,4-butanediyl))	R	$(C_9H_{14}O_4)_n$
Poly(dimethyl siloxane), distearate terminated		130169-63-0	Siloxanes and silicones, di-Me, ((1-oxooctadecyl)oxy)-terminated	S	Unk
Poly(dimethyl siloxane), hydride terminated	Hydrogen-terminated di-Me silicones	70900-21-9	Siloxanes and silicones, di-Me, hydrogen-terminated	S	Unk
Poly(dimethyl siloxane), methoxy terminated		68951-97-3	Siloxanes and silicones, di-Me, methoxy-terminated	S	Unk
Poly(dimethyl siloxane), vinyl terminated		68951-99-5	Siloxanes and silicones, di-Me, Me vinyl, mono(vinyl group)-terminated	S	Unk
Poly(dimethyl siloxane-*co*-(3-hydroxypropyl)-methyl siloxane), ethoxylated/propoxylated		68937-55-3	Siloxanes and silicones, di-Me, 3-hydroxypropyl Me, ethoxylated propoxylated	S	Unk
Poly(dimethyl siloxane-*co*-methyl(3-OH-propyl) siloxane)-γ-PEG 3-aminopropyl ether)		133779-15-4	Siloxanes and silicones, di-Me, 3-hydroxypropyl Me, ethers with polyethylene glycol mono(3-aminopropyl) ether	S	Unk
Poly(dimethyl siloxane), hydroxy terminated	Silanol-terminated di-Me siloxanes	70131-67-8	Siloxanes and silicones, di-Me, hydroxy-terminated	S	Unk
Poly(dimethylamine-*co*-epichlorohydrin)	Epichlorohydrin–dimethylamine copolymer	25988-97-0	Methanamine, *N*-methyl-, polymer with (chloromethyl)oxirane	R	$(C_3H_5ClO \cdot C_2H_7N)_x$
Poly(dimethylamine-*co*-epichlorohydrin-*co*-ethylene diamine)		42751-79-1	1,2-Ethanediamine, polymer with (chloromethyl)oxirane and *N*-methylmethanamine	R	$(C_3H_5ClO \cdot C_2H_8N_2 \cdot C_2H_7N)_x$
Poly(dimethylsiloxane)	Dimethyl silicone; dimethylsilanediol polymer	9016-00-6	Poly(oxy(dimethylsilylene))	R	$(C_2H_6OSi)_n$
Poly(dimethylsiloxane), vinyl terminated	Dimethylsiloxanes, dimethylvinylsilyl-terminated	68083-19-2	Siloxanes and Silicones, di-Me, vinyl group-terminated	*	Unk
Poly(dimethylsiloxane-*co*-methylphenyl siloxane)	Methylphenylsiloxane polymer	9005-12-3	Poly(oxy(methylphenylsilylene))	R	$(C_7H_8OSi)_n$
Poly(dipropylene glycol), phenyl phosphite		116265-68-0	Phosphorous acid, triphenyl ester, reaction products with dipropylene glycol	R	$C_{18}H_{15}O_3P \cdot C_6H_{14}O_3$
Poly(3-dodecyl thiophene), regioregular	3-Dodecylthiophene homopolymer	104934-53-4	Thiophene, 3-dodecyl-, homopolymer	R	$(C_{16}H_{28}S)_x$
Poly(epichlorohydrin)	Poly(chloromethyl)ethylene oxide	24969-06-0	Oxirane, (chloromethyl)-, homopolymer	R	$(C_3H_5ClO)_x$
Poly(ethyl acrylate)	Ethyl acrylate polymer	9003-32-1	2-Propenoic acid, ethyl ester, homopolymer	R	$(C_5H_8O_2)_x$
Poly(ethyl methacrylate)	Ethyl methacrylate polymer	9003-42-3	2-Propenoic acid, 2-methyl-, ethyl ester, homopolymer	R	$(C_6H_{10}O_2)_x$

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Poly(ethyl methacrylate-*co*-methyl acrylate)	Acrylic acid methyl ester, polymer with ethyl methacrylate	26572-20-3	2-Propenoic acid, 2-methyl-	R	$(C_6H_{10}O_2 \cdot C_4H_6O_2)_x$
Poly(ethylene adipate)	Adipic acid-ethylene glycol polymer; PEGA; poly(ethylene glycol adipate)	24938-37-2	Hexanedioic acid, polymer with 1,2-ethanediol	R	$(C_6H_{10}O_4 \cdot C_2H_6O_2)_x$
Poly(ethylene adipate), tolylene 2,4-diisocyanate terminated	Adipic acid–ethylene glycol–toluene diisocyanate copolymer	9019-92-5	Hexanedioic acid, polymer with 1,3-diisocyanatomethylbenzene and 1,2-ethanediol	R	$(C_9H_6N_2O_2 \cdot C_6H_{10}O_4 \cdot C_2H_6O_2)_x$
Poly(ethylene azelate)	Azelaic acid–ethylene glycol polymer	26760-99-6	Nonanedioic acid, polymer with 1,2-ethanediol	R	$(C_9H_{16}O_4 \cdot C_2H_6O_2)_x$
Poly(ethylene glycol methyl ether methacrylate)	Methoxypolyethylene glycol monomethacrylate	26915-72-0	HP = Poly(oxy-1,2-ethanediyl), α-(2-methyl-1-oxo-2-propenyl)-ω-methoxy-	R	$(C_2H_4O)_n$ $C_5H_8O_2$
Poly(ethylene glycol)	Carbowax; oxirane polymer; PEG, poly(ethylene oxide), poly(oxyethylene); poly(vinyl oxide)	25322-68-3	Poly(oxy-1,2-ethanediyl), α-hydro-ω-hydroxy-	U	$(C_2H_4O)_nH_2O$
Poly(ethylene glycol), allyl methyl ether		27252-80-8	Poly(oxy-1,2-ethanediyl), α-methyl-ω-(2-propenyloxy)-	R	$(C_2H_4O)_n$ C_4H_8O
Poly(ethylene glycol), bis-2-ethyl-hexanoate		9004-93-7	Poly(oxy-1,2-ethanediyl), α-(2-ethyl-1-oxohexyl)-ω-((2-ethyl-1-oxohexyl)oxy)-	R	$(C_2H_4O)_n$ $C_{16}H_{30}O_3$
Poly(ethylene glycol), butyl ether	Polyoxyethylene butyl alcohol ether	9004-77-7	Poly(oxy-1,2-ethanediyl), α-butyl-ω-hydroxy-	R	$(C_2H_4O)_n$ $C_4H_{10}O$
Poly(ethylene glycol), diacrylate		26570-48-9	Poly(oxy-1,2-ethanediyl), α-(1-oxo-2-propenyl)-ω-((1-oxo-2-propenyl)oxy)-	R	$(C_2H_4O)n$ $C_6H_6O_3$
Poly(ethylene glycol), dibenzoate	Polyoxyethylene dibenzoate	9004-86-8	Poly(oxy-1,2-ethanediyl), α-benzoyl-ω-(benzoyloxy)-	R	$(C_2H_4O)_n$ $C_{14}H_{10}O_3$
Poly(ethylene glycol), dimethacrylate	Polyethylene glycol methacrylate	25852-47-5	Poly(oxy-1,2-ethanediyl), α-(2-methyl-1-oxo-2-propenyl)-ω-((2-methyl-1-oxo-2-propenyl)oxy)-	R	$(C_2H_4O)_n$ $C_8H_{10}O_3$
Poly(ethylene glycol), dimethyl ether	Polyoxyethylene dimethyl ether	24991-55-7	Poly(oxy-1,2-ethanediyl), α-methyl-ω-methoxy-	R	$(C_2H_4O)_n$ C_2H_6O
Poly(ethylene glycol), distearate	Polyethylene oxide distearate	9005-08-7	Poly(oxy-1,2-ethanediyl), α-(1-oxooctadecyl)-ω-((1-oxooctadecyl)oxy)-	R	$(C_2H_4O)_n$ $C_{36}H_{70}O_3$
Poly(ethylene glycol), methyl ether	Carbowax; methoxypoly(ethylene glycol); methyl polyglycol; monomethoxy poly(ethylene oxide)	9004-74-4	Poly(oxy-1,2-ethanediyl), α-methyl-ω-hydroxy-	R	$(C_2H_4O)_nCH_4O$
Poly(ethylene glycol), methyl ether acrylate	Acrylic acid-methoxy(polyethylene glycol) ester	32171-39-4	Poly(oxy-1,2-ethanediyl), α-(1-oxo-2-propenyl)-ω-methoxy-	R	$(C_2H_4O)_n$ $C_4H_6O_2$
Poly(ethylene glycol), 4-nonylphenyl ether acrylate	Tetraethylene glycol nonylphenyl ether acrylate	87079-63-8	2-Propenoic acid, 2-(2-(2-(2-(nonylphenoxy)ethoxy)ethoxy)-ethoxy)ethyl ester	R	$C_{26}H_{42}O_6$
Poly(ethylene glycol), bis carboxymethyl ether	Carboxymethylpolyethylene glycol	39927-08-7	Poly(oxy-1,2-ethanediyl), α-(carboxymethyl)-ω-(carboxymethoxy)-	R	$(C_2H_4O)_n$ $C_4H_6O_5$
Poly(ethylene glycol), bis(3-aminopropyl) terminated		34901-14-9	Poly(oxy-1,2-ethanediyl), α-(3-aminopropyl)-ω-(3-aminopropoxy)-	R	$(C_2H_4O)_n$ $C_6H_{16}N_2O$
Poly(ethylene glycol), divinyl ether		50856-26-3	Poly(oxy-1,2-ethanediyl), α-ethenyl-ω-(ethenyloxy)-	R	$(C_2H_4O)_n$ C_4H_6O
Poly(ethylene glycol), ethyl ether methacrylate		35625-93-5	Poly(oxy-1,2-ethanediyl), α-(2-methyl-1-oxo-2-propenyl)-ω-ethoxy-	R	$(C_2H_4O)_n$ $C_6H_{10}O_2$
Poly(ethylene glycol), methyl glutarate		79934-70-6	Poly(oxy-1,2-ethanediyl), α-(4-carboxy-1-oxobutyl)-ω-methoxy-	R	$(C_2H_4O)_n$ $C_6H_{10}O_4$
Poly(ethylene glycol), phenyl ether acrylate	Phenol ethoxylate acrylate, polyethylene glycol monophenyl ether acrylate	56641-05-5	Poly(oxy-1,2-ethanediyl), α-(1-oxo-2-propenyl)-ω-phenoxy-	R	$(C_2H_4O)_n$ $C_9H_8O_2$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(ethylene glycol), reacted with bisphenol A diglycidyl ether	Bisphenol A diglycidyl ether–polyethylene glycol polymer	37225-26-6	Oxirane, 2,2′-((1-methylethylidene) bis(4,1-phenyleneoxymethylene))bis-polymer with α-hydro-ω-hydroxypoly (oxy-1,2-ethanediyl)	R	$(C_{21}H_{24}O_4 \cdot (C_2H_4O)_n H_2O)_x$
Poly(ethylene glycol), tetrahydrofurfuryl ether	Glycofurol; tetrahydrofurfuryl alcohol polyethylene glycol	31692-85-0	Poly(oxy-1,2-ethanediyl), α-((tetrahydro-2-furanyl)methyl)-ω-hydroxy-	R	$(C_2H_4O)_n C_5H_{10}O_2$
Poly(ethylene glycol), methacrylate		25736-86-1	Poly(oxy-1,2-ethanediyl), α-(2-methyl-1-oxo-2-propenyl)-ω-hydroxy-	R	$(C_2H_4O)_n C_4H_6O_2$
Poly(ethylene glycol-*co*-propylene glycol)	Polyethylene-polypropylene glycol monobutyl ether	9038-95-3	Oxirane, methyl-, polymer with oxirane, monobutyl ether	R	$C_4H_{10}O \cdot (C_3H_6O \cdot C_2H_4O)_x$
Poly(ethylene imine)	Polyaziridine, polyethenimide	9002-98-6	Aziridine, homopolymer	R	$(C_2H_5N)_x$
Poly(ethylene imine)	Ethylenediamine-ethylenimine polymer	25987-06-8	1,2-Ethanediamine, polymer with aziridine	R	$(C_2H_8N_2 \cdot C_2H_5N)_x$
Poly(ethylene imine), ethoxylated	Aziridine–ethylene oxide copolymer	26658-46-8	Aziridine, polymer with oxirane	R	$(C_2H_5N \cdot C_2H_4O)_x$
Poly(ethylene monoalcohol)		71750-71-5	Alcohols, c > 14	S	Unk
Poly(ethylene succinate)	Ethylene glycol–succinic acid polymer	25569-53-3	Butanedioic acid, polymer with 1,2-ethanediol	R	$(C_4H_6O_4 \cdot C_2H_6O_2)_x$
Poly(ethylene terephthalate)	Dimethyl terephthalate–ethylene glycol polymer; PET; poly-(oxyethylene oxyterephthaloyl)	25038-59-9	Poly(oxy-1,2-ethanediyloxycarbonyl-1,4-phenylenecarbonyl)	U	$(C_{10}H_8O_4)_n$
Poly(ethylene)	Poly(methylene)	9002-88-4	Ethene, homopolymer	R	$(C_2H_4)_x$
Poly(ethylene), chlorinated		63231-66-3	Rubber, synthetic, chlorinated polyethylene	S	Unk
Poly(ethylene), chlorosulfonated		68037-39-8	Ethene, homopolymer, chlorinated, chlorosulfonated	*	Unk
Poly(ethylene), oxidized		68441-17-8	Ethene, homopolymer, oxidized	*	Unk
Poly(ethylene-*alt*-chlorotrifluoroethylene)	Chlorotrifluoroethene–ethene copolymer; ethylene–trifluorochloroethylene copolymer	25101-45-5	Ethene, chlorotrifluoro-, polymer with ethene	R	$(C_2H_4 \cdot C_2ClF_3)_x$
Poly(ethylene-*alt*-maleic anhydride)	Maleic anhydride–ethylene polymer	9006-26-2	2,5-Furandione, polymer with ethene	R	$(C_4H_2O_3 \cdot C_2H_4)_x$
Poly(ethylene-*block*-poly (ethylene glycol))		97953-22-5	Alcohols, C > 30, ethoxylated	S	Unk
Poly(ethylene-*co*-1-butene)	Butene–ethylene polymer; ethylene–1-butene copolymer; 1-butene-ethene polymer	25087-34-7	1-Butene, polymer with ethene	R	$(C_4H_8 \cdot C_2H_4)_x$
Poly(ethylene-*co*-1-butene-*co*-1-hexene)	Butene–ethene–hexene-1 copolymer	60785-11-7	1-Hexene, polymer with 1-butene and ethene	R	$(C_6H_{12} \cdot C_4H_8 \cdot C_2H_4)_x$
Poly(ethylene-*co*-1-octene)	Ethylene–1-octene polymer	26221-73-8	1-Octene, polymer with ethene	R	$(C_8H_{16} \cdot C_2H_4)_x$
Poly(ethylene-*co*-acrylic acid)	Acrylic acid–ethylene polymer; ethylene–acrylic acid polymers; primacor	9010-77-9	2-Propenoic acid, polymer with ethene	R	$(C_3H_4O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-acrylic acid), sodium salt	Ethylene–acrylic acid polymer, sodium salt	25750-82-7	2-Propenoic acid, polymer with ethene, sodium salt	R	$(C_3H_4O_2 \cdot C_2H_4)_x \cdot xNa$
Poly(ethylene-*co*-acrylic acid), zinc salt		28208-80-2	2-Propenoic acid, polymer with ethene, zinc salt	R	$(C_3H_4O_2 \cdot C_2H_4)_x \cdot xZn$
Poly(ethylene-*co*-butyl acrylate)	Butyl acrylate–ethylene copolymer	25750-84-9	2-Propenoic acid, butyl ester, polymer with ethene	R	$(C_7H_{12}O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-butyl acrylate-*co*-maleic anhydride)		64652-60-4	2-Propenoic acid, butyl ester, polymer with ethene and 2,5-furandione	R	$(C_7H_{12}O_2 \cdot C_4H_2O_3 \cdot C_2H_4)_x$
Poly(ethylene-*co*-carbon monoxide)	Carbon monoxide–ethylene copolymer	25052-62-4	Ethene, polymer with carbon monoxide	R	$(C_2H_4 \cdot CO)_x$
Poly(ethylene-*co*-ethyl acrylate)	Ethyl acrylate–ethylene polymer	9010-86-0	2-Propenoic acid, ethyl ester, polymer with ethene	R	$(C_5H_8O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-ethyl acrylate-*co*-maleic anhydride)		41171-14-6	2-Propenoic acid, ethyl ester, polymer with ethene and 2,5-furandione	R	$(C_5H_8O_2 \cdot C_4H_2O_3 \cdot C_2H_4)_x$
Poly(ethylene-*co*-glycidyl methacrylate)	2,3-Epoxypropyl methacrylate–ethylene copolymer	26061-90-5	2-Propenoic acid, 2-methyl-, oxiranylmethyl ester, polymer with ethene	R	$(C_7H_{10}O_3 \cdot C_2H_4)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(ethylene-*co*-methacrylic acid)	Ethylene–methacrylic acid copolymers; Poly(ethylene-methacrylic acid)	25053-53-6	2-Propenoic acid, 2-methyl-, polymer with ethene	R	$(C_4H_6O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-methacrylic acid), sodium salt	Ethylene–methacrylic acid polymer, sodium salt	25608-26-8	2-Propenoic acid, 2-methyl, polymer with ethene, sodium salt	R	$(C_4H_6O_2 \cdot C_2H_4)_x \cdot xNa$
Poly(ethylene-*co*-methacrylic acid), zinc salt		28516-43-0	2-Propenoic acid, 2-methyl-, polymer with ethene, zinc salt	R	$(C_4H_6O_2 \cdot C_2H_4)_x \cdot xZn$
Poly(ethylene-*co*-methyl acrylate)	Ethylene–methyl acrylate polymer	25103-74-6	2-Propenoic acid, methyl ester, polymer with ethene	R	$(C_4H_6O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-methyl acrylate-*co*-acrylic acid)		41525-41-1	2-Propenoic acid, polymer with ethene and methyl 2-propenoate	R	$(C_4H_6O_2 \cdot C_3H_4O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-methyl acrylate-*co*-glycidyl methacrylate)		51541-08-3	2-Propenoic acid, 2-methyl-, oxiranylmethyl ester, polymer with ethene and methyl 2-propenoate	R	$(C_7H_{10}O_3 \cdot C_4H_6O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-propylene)	Ethylene–propene copolymer; poly(ethylene-propylene); polypro, polypropylene–polyethylene copolymer	9010-79-1	1-Propene, polymer with ethene	R	$(C_3H_6 \cdot C_2H_4)_x$
Poly(ethylene-*co*-propylene-*co*-5-methylene-2-norbornene)	Ethylene–ethylidenebicycloheptene–propene copolymer; ethylene–ethylidenenorbornene–propylene polymer	25038-36-2	Bicyclo(2.2.1)hept-2-ene, 5-ethylidene-, polymer with ethene and 1-propene	R	$(C_9H_{12} \cdot C_3H_6 \cdot C_2H_4)_x$
Poly(ethylene-*co*-tetrafluoroethylene)	Ethylene copolymer with tetrafluoroethylene	25038-71-5	Ethene, tetrafluoro-, polymer with ethene	R	$(C_2H_4 \cdot C_2F_4)_x$
Poly(ethylene-*co*-vinyl acetate)	Vinyl acetate–ethylene polymer	24937-78-8	Acetic acid ethenyl ester, polymer with ethene	R	$(C_4H_6O_2 \cdot C_2H_4)_x$
Poly(ethylene-*co*-vinyl acetate-*co*-carbon monoxide)	Carbon monoxide–ethylene–vinyl acetate polymer	26337-35-9	Acetic acid ethenyl ester, polymer with carbon monoxide and ethene	R	$(C_4H_6O_2 \cdot C_2H_4 \cdot CO)_x$
Poly(ethylene-*graft*-maleic anhydride)		106343-08-2	2,5-Furandione, polymer with ethene, graft	R	$(C_4H_2O_3 \cdot C_2H_4)_x$
Poly(ethylene-*ran*-butylene), mono-ol		68954-09-6	1,3-Butadiene, homopolymer, hydrogenated	*	Unk
Poly(2-ethylhexyl acrylate)	2-Ethylhexyl acrylate polymer	9003-77-4	2-Propenoic acid, 2-ethylhexyl ester, homopolymer	R	$(C_{11}H_{20}O_2)_x$
Poly(2-ethylhexyl methacrylate)		25719-51-1	2-Propenoic acid, 2-methyl-, 2-ethylhexyl ester, homopolymer	R	$(C_{12}H_{22}O_2)_x$
Poly(2-ethyl-2-oxazoline)	2-Ethyl-2-oxazoline polymer; 2-ethyloxazoline homopolymer	25805-17-8	Oxazole, 2-ethyl-4,5-dihydro-, homopolymer	R	$(C_5H_9NO)_x$
Poly(4-ethylstyrene-*co*-divinylbenzene)	Divinylbenzene–ethylstyrene polymer	9043-77-0	Benzene, diethenyl-polymer with ethenylethylbenzene	R	$(C_{10}H_{12} \cdot C_{10}H_{10})_x$
Poly(furfuryl alcohol)		25212-86-6	2-Furanmethanol, homopolymer	R	$(C_5H_6O_2)_x$
Poly(D-glutamic acid), sodium salt		30811-79-1	D-Glutamic acid, homopolymer, sodium salt	R	$(C_5H_9NO_4)_x \cdot xNa$
Poly(L-glutamic acid), sodium salt	Poly(glutamic acid) sodium salt	26247-79-0	L-Glutamic acid, homopolymer, sodium salt	R	$(C_5H_9NO_4)_x \cdot xNa$
Poly(glycine)	Nylon 2, poly(imino(1-oxoethylene))	25718-94-9	Glycine, homopolymer	R	$(C_2H_5NO_2)_x$
Poly(glycolide)	Hydroxyacetic acid polymer; poly(glycolic acid)	26124-68-5	Acetic acid, hydroxy-, homopolymer	R	$(C_2H_4O_3)_x$
Poly(hexadecyl methacrylate)	Poly(cetyl methacrylate)	25986-80-5	2-Propenoic acid, 2-methyl-, hexadecyl ester, homopolymer	R	$(C_{20}H_{38}O_2)_x$
Poly(hexafluoroisopropylidene diphthalic anhydride-*co*-oxydianiline)	Hexafluoroisopropylidenebis-(phthalic anhydride)-oxydianiline copolymer	032240-73-6	1,3-Isobenzofurandione, 5,5′-(2,2,2-trifluoro-1-(trifluoromethyl)-ethylidene)bis-, polymer with 4,4′-oxybis(benzenamine)	R	$(C_{19}H_6F_6O_6 \cdot C_{12}H_{12}N_2O)_x$
Poly(1,6-hexamethylene adipate)	Adipic acid–hexanediol polymer	25212-06-0	Hexanedioic acid, polymer with 1,6-hexanediol	R	$(C_6H_{14}O_2 \cdot C_6H_{10}O_4)_x$
Poly(1,6-hexanediol/neopentyl glycol/di(ethylene glycol)-*alt*-adipic acid) diol		68492-71-7	Hexanedioic acid, polymer with 2,2-dimethyl-1,3-propanediol, 2-ethyl-2-(hydroxymethyl)-1,3-propanediol, 1,6-hexanediol and 2,2′-oxybis(ethanol)	R	$(C_6H_{14}O_3 \cdot C_6H_{14}O_2 \cdot C_6H_{10}O_4 \cdot C_5H_{12}O_2 \cdot C_4H_{10}O_3)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(1,6-hexanediol/neopentyl glycol-*alt*-adipic acid)	Adipic acid–hexamethylene glycol–neopentyl glycol polymer	25214-14-6	Hexanedioic acid, polymer with 2,2-dimethyl-1,3-propanediol and 1,6-hexanediol	R	$(C_6H_{14}O_2 \cdot C_6H_{10}O_4 \cdot C_5H_{12}O_2)_x$
Poly(hexamethylene diisocyanate)	HMDI homopolymer	28182-81-2	Hexane, 1,6-diisocyanato-, homopolymer	R	$(C_8H_{12}N_2O_2)_x$
Poly(hexyl methacrylate)	Hexyl methacrylate polymer	25087-17-6	2-Propenoic acid, 2-methyl-, hexyl ester, homopolymer	R	$(C_{10}H_{18}O_2)_x$
Poly(1-hexene)		25067-06-5	1-Hexene, homopolymer	R	$(C_6H_{12})_x$
Poly(3-hexyl thiophene), regioregular		140934-50-1	Thiophene, 3-hexyl-, homopolymer	R	$(C_{10}H_{16}S)_x$
Poly(L-histidine)	Polyhistidine	26062-48-6	L-Histidine, homopolymer	R	$(C_6H_7N_3O)_x$
Poly(L-histidine hydrochloride)	Polyhirtidine hydrochloride	61857-39-4	L-Histidine, homopolymer, hydrochloride	R	$(C_6H_9N_3O_2)_x \cdot xClH$
Poly(4-hydroxybenzoate)	Poly(*p*-acetoxybenzoic acid)	26099-71-8	Poly(oxy-1,4-phenylenecarbonyl)	R	$(C_7H_4O_2)_n$
Poly(4-hydroxy benzoic acid-*co*-6-hydroxy-2-naphthoic acid)	*p*-Acetoxybenzoic acid-6-acetoxy-2-naphthoic acid polymer	70679-92-4	2-Naphthalenecarboxylic acid, 6-(acetyloxy)-, polymer with 4-(acetyloxy)benzoic acid	R	$(C_{13}H_{10}O_4 \cdot C_9H_8O_4)_x$
Poly(3-hydroxybutyric acid)	Poly(β-hydroxybutyric acid)	26063-00-3	Butanoic acid, 3-hydroxy-, homopolymer	R	$(C_4H_8O_3)_x$
Poly(3-hydroxybutyric acid-*co*-3-hydroxy valeric acid)	Bipol PHBV; 3-hydroxy butanoic acid-3-hydroxy valeric acid copolymer	80181-31-3	Pentanoic acid, 3-hydroxy-, polymer with 3-hydroxybutanoic acid	R	$(C_5H_{10}O_3 \cdot C_4H_8O_3)_x$
Poly(2-hydroxyethyl methacrylate)	Ethylene glycol monomethacrylate polymer	25249-16-5	2-Propenoic acid, 2-methyl-, 2-hydroxyethyl ester, homopolymer	R	$(C_6H_{10}O_3)_x$
Poly(2-hydroxypropyl methacrylate)		25703-79-1	2-Propenoic acid, 2-methyl, 2-hydroxypropyl ester, homopolymer	R	$(C_7H_{12}O_3)_x$
Poly(imino(tetrachloroterephthaloyl)-iminohexamethylene)	Hexamethylenediamine-perchloroterephthaloyl dichloride copolymer, SRU	071164-49-3	Poly(iminocarbonyl(2,3,5,6-tetrachloro-1,4-phenylene)-carbonylimino-1,6-hexanediyl)	R	$(C_{14}H_{14}Cl_4N_2O_2)_n$
Poly(isobornyl methacrylate)	Methacrylic acid, isobornyl ester, polymers	64114-51-8	2-Propenoic acid, 2-methyl-, 1,7,7-trimethylbicyclo(2.2.1) hept-2-yl ester, exo-, homopolymer	R	$(C_{14}H_{22}O_2)_x$
Poly(isobutyl methacrylate)	Isobutyl methacrylate polymer	9011-15-8	2-Propenoic acid, 2-methyl-, 2-methylpropylester, homopolymer	R	$(C_8H_{14}O_2)_x$
Poly(isobutylene)	Poly(1,1-dimethylethylene); isobutene polymer; isobutylene polymer; polyisobutene	9003-27-4	1-Propene, 2-methyl, homopolymer	R	$(C_4H_8)_x$
Poly(isobutylene-*alt*-maleic anhydride)		26426-80-2	2,5-Furandione, polymer with 2-methyl-1-propene	R	$(C_4H_8 \cdot C_4H_2O_3)_x$
Poly(isobutylene-*co*-isoprene)	Isobutylene–isoprene polymer	9010-85-9	1,3-Butadiene, 2-methyl, polymer with 2-methyl-1-propene	R	$(C_5H_8 \cdot C_4H_8)_x$
Poly(isobutylene-*co*-isoprene)		68081-82-3	1,3-Butadiene, 2-methyl-, polymer with 2-methyl-1-propene, chlorinated	*	$(C_5H_8 \cdot C_4H_8)_x$
Poly(isobutylene-*co*-isoprene), brominated		68441-14-5	1,3-Butadiene, 2-methyl-, polymer with 2-methyl-1-propene, brominated	*	$(C_5H_8 \cdot C_4H_8)_x$
Poly(isodecyl methacrylate)		27300-12-7	2-Propenoic acid, 2-methyl-, isodecyl ester, homopolymer	R	$(C_{14}H_{26}O_2)_x$
Poly(isophorone diisocyanate)		53880-05-0	Cyclohexane, 5-isocyanato-1-(isocyanatomethyl)-1,3,3-trimethyl-, homopolymer	R	$(C_{12}H_{18}N_2O_2)_x$
Poly(isophorone diisocyanate-*co*-poly(propylene glycol))	Isophorone diisocyanate–polypropylene ether glycol polymer; polypropylene glycol–isophorone diisocyanate copolymer	039323-37-0	Poly(oxy(methyl-1,2-ethanediyl)), α-hydro-ω-hydroxy-, polymer with	R	$(C_{12}H_{18}N_2O_2 \cdot (C_3H_6O)_n H_2O)_x$
Poly(isoprene), *cis*	Poly(1-methyl-1-butenylene)	9003-31-0	1,3-Butadiene, 2-methyl-, homopolymer	R	$(C_5H_8)_x$
Poly(isoprene), *trans*		104389-32-4	Poly(1-methyl-1-butene-1,4-diyl), (E)-	R	$(C_5H_8)n$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(isoprene)-*block*-poly(butadiene)	Butadiene–isoprene polymer; 1,3-Butadiene–isoprene polymer	25102-52-7	1,3-Butadiene, 2-methyl-, polymer with 1,3-butadiene	R	$(C_5H_8 \cdot C_4H_6)_x$
Poly(isoprene-*graft*-maleic acid monomethyl ester)		128000-08-8	1,3-Butadiene, 2-methyl-, homopolymer, maleated, mono-methyl esters	*	Unk
Poly(2-isopropenyl-2-oxazoline-*co*-methyl methacrylate)		27341-60-2	2-Propenoic acid, 2-methyl-, methyl ester, polymer	R	$(C_6H_9NO \cdot C_5H_8O_2)_x$
Poly(isopropyl methacrylate)		26655-94-7	2-Propenoic acid, 2-methyl-, 1-methylethyl ester, homopolymer	R	$(C_7H_{12}O_2)_x$
Poly(isopropyl vinyl ether)	Isopropyl vinyl ether polymer	25585-49-3	Propane, 2-(ethenyloxy)-, homopolymer	R	$(C_5H_{10}O)_x$
Poly(itaconic acid)	Poly(2-methylenesuccinic acid)	25119-64-6	Butanedioic acid, methylene, homopolymer	R	$(C_5H_6O_4)_x$
Poly(lactide)	Lactide polymer; poly(DL-lactide)	26680-10-4	1,4-Dioxane-2,5-dione, 3,6-dimethyl-homopolymer	R	$(C_6H_8O_4)_x$
Poly(D,L-lactide-*co*-glycolide)	Glycolide-DL-lactide polymer; polyglactin	26780-50-7	1,4-Dioxane-2,5-dione, 3,6-dimethylpolymer with 1,4-dioxane-2,5-dione	R	$(C_6H_8O_4 \cdot C_4H_4O_4)_x$
Poly(lauryl lactam)-*block*-poly(tetrahydrofuran)	Maleic anhydride-1-tetradecene polymer	31473-53-7	2,5-Furandione, polymer with 1-tetradecene	R	$(C_{14}H_{28} \cdot C_4H_2O_3)_x$
Poly(lauryl methacrylate)	Poly(dodecyl methacrylate)	25719-52-2	2-Propenoic acid, 2-methyl-, dodecyl ester, homopolymer	R	$(C_{16}H_{30}O_2)_x$
Poly(lauryl methacrylate-*co*-ethylene glycol dimethacrylate)	Ethylene glycol dimethacrylate–lauryl methacrylate copolymer	61181-29-1	2-Propenoic acid, 2-methyl-, 1,2-ethanediyl ester, polymer with dodecyl 2-methyl-2-propenoate	R	$(C_{16}H_{30}O_2 \cdot C_{10}H_{14}O_4)_x$
Poly(D,L-lysine hydrobromide)		73565-55-6	DL-Lysine, homopolymer, hydrobromide	R	$(C_6H_{14}N_2O_2)_x \cdot xBrH$
Poly(L-leucine)	Polyleucine	25248-98-0	L-Leucine, homopolymer	R	$(C_6H_{13}NO_2)_x$
Poly(L-leucine hydrobromide)	Poly-L-lysine hydrogen bromide; polylysine hydrobromide	25988-63-0	L-Lysine, homopolymer, hydrobromide	R	$(C_6H_{14}N_2O_2)_x \cdot xBrH$
Poly(D-lysine hydrobromide)		27964-99-4	D-Lysine, homopolymer, hydrobromide	R	$(C_6H_{14}N_2O_2)_x \cdot xBrH$
Poly(L-lysine hydrochloride)	Lysine homopolymer hydrochloride	28826-16-6	L-Lysine, homopolymer, hydrochloride	R	$(C_6H_{14}N_2O_2)_x \cdot xClH$
Poly(L-lysine)	Lysine homopolymer	25104-18-1	L-Lysine, homopolymer	R	$(C_6H_{14}N_2O_2)_x$
Poly(maleic anhydride-*alt*-1-octadecene)	1-Octadecene–maleic anhydride polymer	25266-02-8	2,5-Furandione, polymer with 1-octadecene	R	$(C_{18}H_{36} \cdot C_4H_2O_3)_x$
Poly(maleic anhydride-*alt*-α-olefin)		68036-97-5	1,3,5-Triazine-2,4,6-triamine, polymer with formaldehyde, butylated methylated	*	$(C_3H_6N_6 \cdot CH_2O)_x$
Poly(melamine-*co*-formaldehyde), butylated		68002-25-5	1,3,5-Triazine-2,4,6-triamine, polymer with formaldehyde, butylated	*	$(C_3H_6N_6 \cdot CH_2O)_x$
Poly(melamine-*co*-formaldehyde), butylated		68459-79-0	Alkenes, C24-28 α-, polymers with maleic anhydride	S	Unk
Poly(melamine-*co*-formaldehyde), butylated/methylated		70750-53-7	Terpenes and terpenoids, limonene fraction, polymd.	S	Unk
Poly(melamine-*co*-formaldehyde), methylated	Laurolactam–polytetramethylene glycol copolymer	84732-38-7	Azacyclotridecan-2-one, polymer with α-hydro-ω-hydroxypoly-(oxy-1,4-butanediyl)	R	$(C_{12}H_{23}NO \cdot (C_4H_8O)_n H_2O)_x$
Poly(melamine-*co*-formaldehyde), isobutylated		68002-21-1	1,3,5-Triazine-2,4,6-triamine, polymer with formaldehyde, isobutylated	*	$(C_3H_6N_6 \cdot CH_2O)_x$
Poly(methacrylic acid), sodium salt		54193-36-1	2-Propenoic acid, 2-methyl-, homopolymer, sodium salt	R	$(C_4H_6O_2)_x \cdot xNa$
Poly(L-methionine)	Methionine homopolymer	26242-79-0	L-Methionine, homopolymer	R	$(C_5H_{11}NO_2S)_x$
Poly(4-methoxystyrene)	Poly(*p*-methoxystyrene); poly(4-vinylanisole)	24936-44-5	Benzene, 1-ethenyl-4-methoxy-, homopolymer	R	$(C_9H_{10}O)_x$
Polymethylene polyphenylene isocyanate	Poly(phenyl isocyanate-*co*-formaldehyde), poly(methylene poly(phenyl isocyanate))	9016-87-9	Isocyanic acid, polymethylene-polyphenylene ester	R	Unk

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(methyl acrylate)	Methyl acrylate polymer	9003-21-8	2-Propenoic acid, methyl ester, homopolymer	R	$(C_4H_6O_2)_x$
Poly(4,4′-methylene bis(phenyl isocyanate)-*alt*-butanediol/ di-PG/polycaprolactone))		68084-39-9	2-Oxepanone, polymer with 1,4-butanediol, 1,1′-methylenebis(isocyanatobenzene) and oxybis(propanol)	R	$(C_{15}H_{10}N_2O_2 \cdot C_6H_{14}O_3 \cdot C_6H_{10}O_2 \cdot C_4H_{10}O_2)_x$
Poly(4,4′-methylene bisphenyl isocyanate)	1,4-Butanediol-methylenedi-*p*-phenylene isocyanate-polytetramethylene–ether glycol copolymer	9018-04-6	1,4-Butanediol, polymer with α-hydro-ω-hydroxypoly-(oxy-1,4-butanediyl) and 1,1′-methylenebis(4-isocyanatobenzene)	R	$(C_{15}H_{10}N_2O_2 \cdot C_4H_{10}O_2 \cdot (C_4H_8O)_n H_2O)_x$
Poly(methyl methacrylate)	Methacrylic acid methyl ester; methyl methacrylate polymer	9011-14-7	2-Propenoic acid, 2-methyl, methyl ester, homopolymer	R	$(C_5H_8O_2)_x$
Poly(methyl methacrylate-*co*-butadiene-*co*-styrene)	Butadiene–methyl methacrylate–styrene polymer	25053-09-2	2-Propenoic acid,2-methyl-, methyl ester, polymer with 1,3-butadiene and ethenylbenzene	R	$(C_8H_8 \cdot C_5H_8O_2 \cdot C_4H_6)_x$
Poly(methyl methacrylate-*co*-ethyl acrylate)	Methyl methacrylate–ethyl acrylate polymer	9010-88-2	2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate	R	$(C_5H_8O_2 \cdot C_5H_8O_2)_x$
Poly(3-methyl 1,5-pentanediol adipate)	Adipic acid-3-methyl-1,5-pentanediol copolymer	39751-34-3	Hexanedioic acid, polymer with 3-methyl-1,5-pentanediol	R	$(C_6H_{14}O_2 \cdot C_6H_{10}O_4)_x$
Poly(4-methyl-1-pentene)	Methylpentene polymer; 4-methylpentene homopolymer	25068-26-2	1-Pentene, 4-methyl-, homopolymer	R	$(C_6H_{12})x$
Poly(methyl sorbate)		30813-48-0	2,4-Hexadienoic acid, methyl ester, (E,E)-, homopolymer	R	$(C_7H_{10}O_2)_x$
Poly(4-methyl styrene)	*p*-Methylstyrene polymer; 4-methylstyrene homopolymer	24936-41-2	Benzene, 1-ethenyl-4-methyl-, homopolymer	R	$(C_9H_{10})_x$
Poly(α-methyl styrene)	α-Methylstyrene polymer	25014-31-7	Benzene, (1-methylethenyl)-, homopolymer	R	$(C_9H_{10})_x$
Poly(methyl styrene-*co*-indene), hydrogenated		69430-35-9	Hydrocarbons, C6–C20, polymers, hydrogenated	S	Unk
Poly(methyl vinyl ether-*alt*-maleic acid monoethyl ester)	Ethyl maleate–methyl vinyl ether polymer; maleic acid monoethyl ester–methyl vinyl ether polymer; monoethyl maleate–methyl vinyl ether polymer	25087-06-3	2-Butenedioic acid (Z)-, monoethyl ester, polymer with methoxyethene	R	$(C_6H_8O_4 \cdot C_3H_6O)_x$
Poly(methyl vinyl ether-*alt*-maleic acid monoisopropyl ester)		31307-95-6	2-Butenedioic acid (Z)-, mono(1-methylethyl) ester, polymer with methoxyethene	R	$(C_7H_{10}O_4 \cdot C_3H_6O)_x$
Poly(methyl vinyl ether-*alt*-maleic acid)	Maleic acid–methyl vinyl ether copolymer; maleic acid–methyl vinyl ether polymer	25153-40-6	2-Butenedioic acid (Z)-, polymer with methoxyethene	R	$(C_4H_4O_4 \cdot C_3H_6O)_x$
Poly(methyl vinyl ether-*alt*-maleic anhydride)	Maleic anhydride–methyl vinyl ether polymer	9011-16-9	2,5-Furandione, polymer with methoxyethene	R	$(C_4H_2O_3 \cdot C_3H_6O)_x$
Poly(methyl vinyl ether-*alt*-maleic anhydride)	1,9-Decadiene–maleic anhydride–methyl vinyl ether copolymer	136392-67-1	2,5-Furandione, polymer with 1,9-decadiene and methoxyethene	R	$(C_{10}H_{18} \cdot C_4H_2O_3 \cdot C_3H_6O)_x$
Poly(methylhydrosiloxane)	Methyl hydrogen siloxane	9004-73-3	Poly(oxy(methylsilylene))	R	$(CH_4OSi)_n$
Poly(neopentyl glycol adipate)	Adipic acid–neopentyl glycol copolymer	27925-07-1	Hexanedioic acid, polymer with 2,2-dimethyl-1,3-propanediol	R	$(C_6H_{10}O_4 \cdot C_5H_{12}O_2)_x$
Poly(neopentyl glycol sebacate)		28759-54-8	Poly(oxy(2,2-dimethyl-1,3-propanediyl)oxy(1,10-dioxo-1,10-decanediyl))	R	$(C_{15}H_{26}O_4)_n$
Poly(neopentyl methacrylate)		34903-87-2	2-Propenoic acid, 2-methyl-, 2,2-dimethylpropyl ester, homopolymer	R	$(C_9H_{16}O_2)_x$
Poly(norbornene)	Poly(2-norbornene); polynorbornenylene	25038-76-0	Bicyclo(2.2.1)hept-2-ene, homopolymer	R	$(C_7H_{10})_x$
Poly(octadecyl methacrylate)	Stearyl methacrylate homopolymer	25639-21-8	2-Propenoic acid, 2-methyl-, octadecyl ester, homopolymer	R	$(C_{22}H_{42}O_2)_x$
Poly(octadecyl vinyl ether-*co*-maleic anhydride)	Maleic anhydride–octadecyl vinyl ether polymer	28214-64-4	2,5-Furandione, polymer with 1-(ethenyloxy)octadecane	R	$(C_{20}H_{40}O \cdot C_4H_2O_3)_x$
Poly(octyl acrylate)	Octyl acrylate polymer	25266-13-1	2-Propenoic acid, octyl ester, homopolymer	R	$(C_{11}H_{20}O_2)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(3-octyl thiophene), regioregular		104934-51-2	Thiophene, 3-octyl-, homopolymer	R	$(C_{12}H_{20}S)x$
Poly(L-ornithine)	Polyornithine	25104-12-5	L-Ornithine, homopolymer	R	$(C_5H_{12}N_2O_2)_x$
Poly(L-ornithine hydrobromide)	Polyorthine hydrobromide	27378-49-0	L-Ornithine, homopolymer, hydrobromide	R	$(C_5H_{12}N_2O_2)_x \cdot xBrH$
Poly(D,L-ornithine hydrobromide)		82682-33-5	DL-Ornithine, homopolymer, hydrobromide	R	$(C_5H_{12}N_2O_2)_x \cdot xBrH$
Poly(L-ornithine hydrochloride)	Poly-L-ornithine-hydrochloride	26982-21-8	L-Ornithine, homopolymer, hydrochloride	R	$(C_5H_{12}N_2O_2)_x \cdot xClH$
Poly[oxy(2,6-dimethyl-1,4-phenylene)]	Poly(2,6-dimethyl-*p*-phenylene ether); poly(2,6-dimethyl-1,4-phenylene oxide), SRU	24938-67-8	Poly(oxy(2,6-dimethyl-1,4-phenylene))	R	
Poly(oxy-1,4-phenylene oxy-1,4-phenylene carbonyl 1,4-phenylene)	4,4′-Difluorobenzophenone–hydroquinone copolymer, SRU; PEEK	31694-16-3	Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)	R	$(C_{19}H_{12}O_3)_n$
Poly(oxycarbonyloxy-1,4-phenyleneisopropylidene-1,4-phenylene)	Bisphenol A polycarbonate; poly (4,4′-isopropylidenediphenyl carbonate)	24936-68-3	Poly(oxycarbonyloxy-1,4-phenylene(1-methylethylidene)-1,4-phenylene)	R	$(C_{16}H_{14}O_3)_n$
Poly(oxymethylene)	Poly(formaldehyde); formaldehyde polymer	9002-81-7	Poly(oxymethylene)	R	$(CH_2O)_n$
Poly(oxymethylene), acetate end-capped	Poly(oxymethylene) diacetate	25231-38-3	Poly(oxymethylene), α-acetyl-ω-(acetyloxy)-	R	$(CH_2O)_n$ $C_4H_6O_3$
Poly(oxymethylene-*co*-1,3-dioxepane)	Butanediol formal–trioxane copolymer; formaldehyde tetramethylene acetal–trioxane copolymer; 1,3-dioxepane-trioxane polymer	25214-85-1	1,3-Dioxepane, polymer with 1,3,5-trioxane	R	$(C_5H_{10}O_2 \cdot C_3H_6O_3)_x$
Poly(PAMAM), starburst dendrimer	Starburst 2nd generation	93376-66-0	4,7,11,14,18,21,25,28,32,35-Decaazaoctatriacontane-diamide, etc	R	$C_{142}H_{288}N_{58}O_{28}$
Poly(perfluoropropylene oxide-*co*-perfluoro formaldehyde)		69991-67-9	1-Propene, 1,1,2,3,3,3-hexafluoro-, oxidized, polymd.	*	Unk
Poly(*n*,*n*′-1,4-phenylene-3,3′,4,4′-benzophenone tetracarboxylic imid/amic acid	Benzophenonetetracarboxylic dianhydride-*p*-phenylenediamine polymer, SRU	26023-21-2	Poly((1,3-dihydro-1,3-dioxo-2H-isoindole-2,5-diyl)carbonyl-(1,3-dihydro-1,3-dioxo-2H-isoindole-5,2-diyl)-1,4-phenylene)	U	$(C_{23}H_{10}N_2O_5)_n$
Poly(*n*,*n*′-1,3-phenylene isophthalamide)	Isophthaloyl chloride-1,3-phenylenediamine polymer	25765-47-3	1,3-Benzenedicarbonyl dichloride, polymer with 1,3- benzene-diamine	R	$(C_8H_4Cl_2O_2 \cdot C_6H_8N_2)_x$
Poly(*n*,*n*-1,4-phenylene terephthalamide)	*p*-Phenylenediamine–terephthaloyl chloride copolymer	26125-61-1	1,4-Benzenedicarbonyl dichloride, polymer with 1,4-benzene-diamine	R	$(C_8H_4Cl_2O_2 \cdot C_6H_8N_2)_x$
Poly((phenyl glycidyl ether)-*co*-dicyclopentadiene)		119345-05-0	Phenol, polymer with 3a,4,7,7a-tetrahydro-4,7-methano-1H-indene, glycidyl ether	*	$(C_{10}H_{12} \cdot C_6H_6O)_x$
Poly(phenyl glycidyl ether-*co*-formaldehyde)		28064-14-4	Phenol, polymer with formaldehyde, glycidyl ether	R	$(C_6H_6O \cdot CH_2O)_x$
Poly(phenyl vinyl ketone)	Poly(acrylophenone)	26742-84-7	2-Propen-1-one, 1-phenyl-, homopolymer	R	$(C_9H_8O)_x$
Poly(1,4-phenylene diisocyanate-*co*-poly(1,4-butanediol))		89339-41-3	Poly(oxy-1,4-butanediyl),α-hydro-ω-hydroxy-, polymer with 1,4-diisocyanatobenzene	R	$(C_8H_4N_2O_2 \cdot (C_4H_8O)_n H_2O)_x$
Poly(1,4-phenylene ether ether sulfone)		28212-68-2	Poly(oxy-1,4-phenyleneoxy-1,4-phenylenesulfonyl-1,4-phenylene)	R	$(C_{18}H_{12}O_4S)_n$
Poly(1,4-phenylene ether sulfone)		25667-42-9	Poly(oxy-1,4-phenylenesulfonyl-1,4-phenylene)	U	$(C_{12}H_8O_3S)_n$
Poly(phenylene oxide)	Poly(phenylene ether)	9041-80-9	Poly(oxyphenylene)	R	$(C_6H_4O)_n$
Poly(1,4-phenylene sulfide)	*p*-Dichlorobenzene-sodium sulfide polymer; poly(*p*-phenylene sulfide)	25212-74-2	Poly(thio-1,4-phenylene)	U	$(C_6H_4S)_n$
Poly(*p*-phenylene terephthalamide)	PPTA	24938-64-5	Poly(imino-1,4-phenyleneimino-carbonyl-1,4-phenylene-carbonyl)	U	$(C_{14}H_{10}N_2O_2)_n$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(α-pinene)		70750-57-1	Terpenes and terpenoids, turpentine-oil, α-pinene fraction, polymd.	S	Unk
Poly(poly(tetrahydrofuran) carbonate), diol		92538-66-4	Carbonic acid, diethyl ester, polymer with α-hydro-ω-hydroxypoly(oxy-1,4-butanediyl)	R	$(C_5H_{10}O_3 \cdot (C_4H_8O)_n H_2O)_x$
Poly(L-proline)	Polyproline; proline homopolymer	25191-13-3	L-Proline, homopolymer	R	$(C_5H_9NO_2)_x$
Poly(1,3-propylene adipate)	Ethyl acrylate–ethylene–glycidyl methacrylate polymer	35830-43-4	2-Propenoic acid, 2-methyl-, oxiranylmethyl ester, polymer with ethene and ethyl 2-propenoate	R	$(C_7H_{10}O_3 \cdot C_5H_8O_2 \cdot C_2H_4)_x$
Poly(propylene carbonate)	Carbon dioxide–propylene oxide polymer	25511-85-7	Oxirane, methyl-, polymer with carbon dioxide	R	$(C_3H_6O \cdot CO_2)_x$
Poly(1,3-propylene glutarate)	Poly(trimethylene glutarate)	52256-48-1	Pentanedioic acid, polymer with 1,3-propanediol	R	$(C_5H_8O_4 \cdot C_3H_8O_2)_x$
Poly(propylene glycol bis(2-aminopropyl ether))	Poly(oxypropylene)diamine	9046-10-0	Poly(oxy(methyl-1,2-ethanediyl)), α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)-	R	$(C_3H_6O)_n C_6H_{16}N_2O$
Poly(propylene glycol)	Oxirane, methyl-, homopolymer; poly(propylene oxide); PPG: propylene glycol–propylene oxide polymer	25322-69-4	Poly(oxy(methyl-1,2-ethanediyl)), α-hydro-ω-hydroxy-	U	$(C_3H_6O)_nH_2O$
Poly(propylene glycol), 4-nonyl phenol ether acrylate		71926-19-7	Poly(oxy(methyl-1,2-ethanediyl)), α-(1-oxo-2-propenyl)-ω-(nonylphenoxy)-	R	$(C_3H_6O)_n C_{18}H_{26}O_2$
Poly(propylene glycol), diacrylate		52496-08-9	Poly(oxy(methyl-1,2-ethanediyl)), α-(1-oxo-2-propenyl)-ω-((1-oxo-2-propenyl)oxy)-	R	$(C_3H_6O)_n C_6H_6O_3$
Poly(propylene glycol), dimethacrylate		25852-49-7	Poly(oxy(methyl-1,2-ethanediyl)), α-(2-methyl-1-oxo-2-propenyl)-ω-((2-methyl-1-oxo-2-propenyl)oxy)-	R	$(C_3H_6O)_n C_8H_{10}O_3$
Poly(propylene glycol), methacrylate		39420-45-6	Poly(oxy(methyl-1,2-ethanediyl)), α-(2-methyl-1-oxo-2-propenyl)-ω-hydroxy-	R	$(C_3H_6O)_n C_4H_6O_2$
Poly(propylene glycol), dibenzoate		72245-46-6	Poly(oxy(methyl-1,2-ethanediyl)), α-benzoyl-ω-(benzoyloxy)-	R	$(C_3H_6O)_n C_{14}H_{10}O_3$
Poly(propylene glycol), diglycidyl ether		26142-30-3	Poly(oxy(methyl-1,2-ethanediyl)), α-(oxiranylmethyl)-ω-(oxiranylmethoxy)-	R	$(C_3H_6O)_n C_6H_{10}O_3$
Poly(propylene glycol), monobutyl ether	Butoxypolypropylene glycol; polyoxypropylene monobutyl ether	9003-13-8	Poly(oxy(methyl-1,2-ethanediyl)), α-butyl-ω-hydroxy-	R	$(C_3H_6O)_n C_4H_{10}O$
Poly(propylene glycol)-*co*-poly(ethylene glycol)	Ethylene glycol–propylene glycol copolymer; ethylene glycol–propylene oxide copolymer; ethylene oxide–propylene oxide copolymer ethylene glycol ether; methyloxirane–oxirane copolymer	9003-11-6	Oxirane methyl, polymer with oxirane	R	$(C_3H_6O \cdot C_2H_4O)_x$
Poly(propylene glycol-*block*-PEG-*block*-PPG bis (2-aminopropyl ether))	Ethylene oxide–propylene oxide copolymer bis(2-aminopropyl)-ether	65605-36-9	Oxirane, methyl-, polymer with oxirane, bis(2-aminopropyl) ether	R	$(C_3H_9NO)_{1/2} (C_3H_6O \cdot C_2H_4O)_x$
Poly(1,3-propylene succinate)	Poly(trimethylene succinate)	28158-21-6	Butanedioic acid, polymer with 1,3-propanediol	R	$(C_4H_6O_4 \cdot C_3H_8O_2)_x$
Poly(propylene)	Poly(propene); propene polymer	9003-07-0	1-Propene, homopolymer	R	$(C_3H_6)_x$
Poly(propylene), chlorinated		68442-33-1	1-Propene, homopolymer, chlorinated	*	Unk
Poly(propylene), isotactic	Isotactic propylene polymer; polypro	25085-53-4	1-Propene, homopolymer isotactic	R	$(C_3H_6)_x$
Poly(propylene-*alt*-ethylene, multiarm		127883-08-3	Benzene, diethenyl-, polymer with 2-methyl-1,3-butadiene, hydrogenated	*	$(C_{10}H_{10} \cdot C_5H_8)_x$
Poly(propylene-*co*-1-butene)		29160-13-2	1-Butene, polymer with 1-propene	R	$(C_4H_8 \cdot C_3H_6)_x$
Poly(propylene-*co*-tetrafluoroethylene)	Propene–tetrafluoroethene polymer	27029-05-6	1-Propene, polymer with tetrafluoroethene	R	$(C_3H_6 \cdot C_2F_4)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(propylene-*graft*-maleic anhydride)	Maleic anhydride–PN 240 graft copolymer	107001-49-0	2,5-Furandione, polymer with 1-propene, graft	R	$(C_4H_2O_3 \cdot C_3H_6)_x$
Poly(pyromellitic dianhydride-*co*-4,4′-oxydianiline)	Diaminodiphenyl ether–pyromellitic dianhydride polymer; oxydianiline–pyromellitic dianhydride polymer	25038-81-7	1H, 3H-Benzo(1,2-c:4,5-c′)-difuran-1,3,5,7-tetrone, polymer with 4,4′-oxybis(benzenamine)	R	$(C_{12}H_{12}N_2O \cdot C_{10}H_2O_6)_x$
Poly(sebacic anhydride)	Sebacic acid polyanhydride	26776-29-4	Decanedioic acid, homopolymer	R	$(C_{10}H_{18}O_4)_x$
Poly(L-serine)	Polyserine	25821-52-7	L-Serine, homopolymer	R	$(C_3H_7NO_3)_x$
Poly(sodium 4-styrene sulfonate)	Poly(sodium *p*-styrenesulfonate); poly(sodium *p*-vinylbenzene-sulfonate)	25704-18-1	Benzenesulfonic acid, 4-ethenyl-, sodium salt, homopolymer	R	$(C_8H_8O_3S \cdot Na)_x$
Poly(styrene)	Poly(1-phenylethylene); poly-(vinylbenzene)	9003-53-6	Benzene, ethenyl-, homopolymer	R	$(C_8H_8)_x$
Poly(styrene-*alt*-maleic acid), sodium salt	Maleic acid anhydride–styrene polymer, sodium salt; 2,5-furandione–styrene copolymer, sodium salt	25736-61-2	2,5-Furandione, polymer with ethenylbenzene, sodium salt	R	$(C_8H_8 \cdot C_4H_2O_3)_x \cdot x$Na
Poly(styrene-*b*-butadiene)	Butadiene–styrene polymer, polybutadiene–polystyrene copolymer, styrene–butadiene polymer	9003-55-8	Benzene, ethenyl-, polymer with 1,3-butadiene	R	$(C_8H_8 \cdot C_4H_6)x$
Poly(styrene-*b*-poly(ethylene-*ran*-butylene)-*b*-poly(styrene))		66070-58-4	Benzene, ethenyl-, polymer with 1,3-butadiene, hydrogenated	*	Unk
Poly(styrene-*block*-poly-(oxyethylene))	Ethylene oxide–styrene polymer	25267-79-2	Oxirane, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_2H_4O)_x$
Poly(styrene-*block*-polyisoprene-*block*-polystyrene)	Isoprene–styrene polymer	25038-32-8	Benzene, ethenyl-, polymer with 2-methyl-1,3-butadiene	R	$(C_8H_8 \cdot C_5H_8)_x$
Poly(styrene-*co*-acrylonitrile)	Acrylonitrile–styrene polymer; polystyrene–acrylonitrile; styrene–acrylonitrile polymer	9003-54-7	2-Propenenitrile, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_3H_3N)_x$
Poly(styrene-*co*-allyl alcohol)	Allyl alcohol–styrene polymer	25119-62-4	2-Propen-1-ol, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_3H_6O)_x$
Poly(styrene-*co*-α-methyl-styrene)	Styrene-α–methylstyrene polymer	9011-11-4	Benzene, ethenyl-, polymer with (1-methylethenyl)benzene	R	$(C_9H_{10} \cdot C_8H_8)_x$
Poly(styrene-*co*-divinyl benzene)		69011-14-9	Benzene, diethenyl-, polymer with ethenylbenzene and ethenylethylbenzene, chloromethylated	*	$(C_{10}H_{12} \cdot C_{10}H_{10} \cdot C_8H_8)_x$
Poly(styrene-*co*-divinyl benzene), amine functionalized		69011-17-2	Methanamine, *N*-methyl-, reaction products with chloromethylated divinylbenzene–ethenylethyl-benzene-styrene polymer	*	$(C_{10}H_{12} \cdot C_{10}H_{10} \cdot C_8H_8 \cdot C_2H_7N)_x$
Poly(styrene-*co*-maleic acid), isobutyl/methyl mixed ester		63528-92-7	2-Butenedioic acid (Z)-, monomethyl ester, polymer with ethenylbenzene, 2,5-furandione and (Z)-2-methyl-propyl hydrogen 2-butenedioate	R	$(C_8H_{12}O_4 \cdot C_8H_8 \cdot C_5H_6O_4 \cdot C_4H_2O_3)_x$
Poly(styrene-*co*-maleic acid), partial 2-butoxy-ethyl ester		68890-84-6	2,5-Furandione, polymer with ethenylbenzene, 2-butoxyethyl ester	R	Unk
Poly(styrene-*co*-maleic acid), partial 2-butoxyethyl ester, cumene terminated		160611-50-7	2,5-Furandione, telomer with ethenylbenzene and (1-methyl-ethyl)benzene, 2-butoxyethyl ester	R	$C_9H_{12} \cdot (C_8H_8 \cdot C_4H_2O_3)_x \cdot xC_6H_{14}O_2$
Poly(styrene-*co*-maleic acid), partial cyclohexyl/1-PR ester, cumene terminated		160611-51-8	2,5-Furandione, telomer with ethenylbenzene and (1-methyl ethyl)benzene, cyclohexyl 1-methylethyl ester	R	$C_9H_{12} \cdot (C_8H_8 \cdot C_4H_2O_3)_x \cdot xC_6H_{12}O \cdot xC_3H_8O$
Poly(styrene-*co*-maleic acid), partial cyclohexyl/ isopropyl ester		68890-82-4	2,5-Furandione, polymer with ethenylbenzene, cyclohexyl 1-methylethyl ester	R	Unk
Poly(styrene-*co*-maleic acid), partial isobutyl ester	Hydrogen isobutyl maleate–styrene copolymer	28571-95-1	2-Butenedioic acid (Z)-, mono (2-methylpropyl) ester, polymer with ethenylbenzene	R	$(C_8H_{12}O_4 \cdot C_8H_8)_x$
Poly(styrene-*co*-maleic acid), partial isooctyl ester		68441-87-2	2,5-Furandione, polymer with ethenylbenzene, isooctyl ester	R	Unk

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(styrene-*co*-maleic acid), partial propyl ester	Maleic anhydride–styrene polymer, propyl ester	68890-81-3	2,5-Furandione, polymer with ethenylbenzene, propyl ester	R	Unk
Poly(styrene-*co*-maleic acid), partial propyl ester, cumene terminated		160611-48-3	2,5-Furandione, telomer with ethenylbenzene and (1-methyl ethyl)benzene, propyl ester	R	$C_9H_{12} \cdot (C_8H_8 \cdot C_4H_2O_3)_x \cdot xC_3H_8O$
Poly(styrene-*co*-maleic acid), *sec*-butyl/methyl mixed ester		65652-36-0	2-Butenedioic acid (Z)-, monomethyl ester, polymer with ethenylbenzene, 2,5-furandione and (Z)-1-methyl-propyl hydrogen 2-butenedioate	R	$(C_8H_{12}O_4 \cdot C_8H_8 \cdot C_5H_6O_4 \cdot C_4H_2O_3)_x$
Poly(styrene-*co*-maleic anhydride)	Maleic anhydride–styrene polymers	9011-13-6	2,5-Furandione, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_4H_2O_3)_x$
Poly(styrene-*co*-maleic anhydride), cumene terminated		26762-29-8	2,5-Furandione, telomer with ethenylbenzene and (1-methyl-ethyl)benzene	R	$C_9H_{12} \cdot (C_8H_8 \cdot C_4H_2O_3)$
Poly(styrene sulfonic acid-*co*-maleic acid), sodium salt		68037-40-1	2,5-Furandione, polymer with ethenylbenzene, sulfonated, sodium salt	*	$(C_8H_8 \cdot C_4H_2O_3 \cdot Na)_x$
Poly(sulfone)	Bisphenol A–bis(chlorophenyl) sulfone copolymer, SRU	25135-51-7	Poly(oxy-1,4-phenylenesulfonyl-1,4-phenyleneoxy-1,4-phenylene(1-methylethylidene)-1,4-phenylene)	U	$(C_{27}H_{22}O_4S)_n$
Poly(*tert*-butyl methacrylate)		25189-00-8	2-Propenoic acid, 2-methyl-, 1,1-dimethylethyl ester, homopolymer	R	$(C_8H_{14}O_2)_x$
Poly(tetrafluoroethylene)	Poly(difluoromethylene); fluoro-polymers; perfluoroethylene polymer	9002-84-0	Ethene, tetrafluoro-homopolymer	R	$(C_2F_4)_x$
Poly(tetrahydrofuran)	Poly(butylene oxide); tetrahy-drofuran homopolymer, SRU; THF polymer, SRU	25190-06-1	Poly(oxy-1,4-butanediyl), α-hydro-ω-hydroxy-	R	$(C_4H_8O)_nH_2O$
Poly(tetrahydrofuran), bis(3-aminopropyl) terminated	Polytetramethylene glycol bis(3-aminopropyl) ether	72088-96-1	Poly(oxy-1,4-butanediyl), α-(3-aminopropyl)-ω-(3-aminopropoxy)-	R	$(C_4H_8O)_n C_6H_{16}N_2O$
Poly(tetrahydrofuran), linear	Oxirane–THF copolymer; polyethylene-poly(tetramethylene) glycol	27637-03-2	Furan, tetrahydro-, polymer with oxirane	R	$(C_4H_8O \cdot C_2H_4O)_x$
Poly(thioisobutylene)	Isobutylene sulfide polymer	26373-01-3	Thiirane, 2,2-dimethyl-, homopolymer	R	$(C_4H_8S)_x$
Poly(thiophenylene)	Poly(phenylene sulfide)	9016-75-5	Poly(thiophenylene)	U	$(C_6H_4S)_x$
Poly(*p*-toluene sulfonamide-*co*-formaldehyde)	Formaldehyde-*p*-toluenesulfonamide polymer	25035-71-6	Benzenesulfonamide, 4-methyl-, polymer with formaldehyde	R	$(C_7H_9NO_2S \cdot CH_2O)_x$
Poly(tolylene 2,4-diisocyanate)	2,4-Toluene diisocyanate polymer	26006-20-2	Benzene, 2,4-diisocyanato-1-methyl- homopolymer	R	$(C_9H_6N_2O_2)_x$
Poly(tolylene 2,4-diisocyanate-*co*-poly(1,4-butanediol))	Poly(tetramethylene ether glycol)–TDI copolymer; polytetra-methylene glycol–tolylene isocyanate polymer	9069-50-5	Poly(oxy-1,4-butanediyl), α-hydro-ω-hydroxy-, polymer with 1,3-diisocyanatomethyl-benzene	R	$(C_9H_6N_2O_2 \cdot (C_4H_8O)_n H_2O)_x$
Poly(tolylene 2,4-diisocyanate-*co*-poly(propylene glycol))	Polyoxypropylene glycol–tolylene diisocyanate polymer; polypro-pylene glycol–TDI polymer	9057-91-4	Poly(oxy(methyl-1,2-ethanediyl)), α-hydro-ω-hydroxy-, polymer with 1,3-diisocyanatomethyl-benzene	R	$(C_9H_6N_2O_2 \cdot (C_3H_6O)_n H_2O)_x$
Poly(trimethylolpropane/di(propylene glycol)-*alt*-adipic acid/phthalic anhydride))		68133-07-3	Hexanedioic acid, polymer with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol, 1,3-isobenzo-furandione and 1,1′-oxybis-(2-propanol)	R	$(C_8H_4O_3 \cdot C_6H_{14}O_3 \cdot C_6H_{14}O_3 \cdot C_6H_{10}O_4)_x$
Poly(L-tyrosine)	Polytyrosine	25619-78-7	L-Tyrosine, homopolymer	R	$(C_9H_{11}NO_3)_x$
Poly(L-tyrosine hydrobromide)		27378-49-0	L-Tyrosine, homopolymer, hydrobromide	R	$(C_5H_{12}N_2O_2)_x \cdot xBrH$
Poly(urea-*co*-formaldehyde), butylated		68002-19-7	Urea, polymer with formaldehyde, butylated	*	Unk
Poly(urea-*co*-formaldehyde), methylated		68071-45-4	Urea, polymer with formaldehyde, methylated	*	$(CH_4N_2O \cdot CH_2O)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(vinyl acetate)	Poly(1-acetoxyethylene); PVAC	9003-20-7	Acetic acid ethenyl ester, homopolymer	R	$(C_4H_6O_2)_x$
Poly(vinyl acetate-*co*-butyl maleate-*co*-isobornyl acrylate)		136392-68-2	2-Butenedioic acid (Z)-, dibutyl ester, polymer with ethenyl acetate and exo-1,7,7-trimethyl-bicyclo(2.2.1)hept-2-yl 2-propenoate	R	$(C_{13}H_{20}O_2 \cdot C_{12}H_{20}O_4 \cdot C_4H_6O_2)_x$
Poly(vinyl acetate-*co*-crotonic acid)	Crotonic acid–vinyl acetate polymer	25609-89-6	2-Butenoic acid, polymer with ethenyl acetate	R	$(C_4H_6O_2 \cdot C_4H_6O_2)_x$
Poly(vinyl alcohol)	Poly(1-hydroxyethylene); gohsenal; lemol; polyvinol; polyviol	9002-89-5	Ethenol, homopolymer	R	$(C_2H_4O)_x$
Poly(vinyl alcohol-*co*-ethylene)	Ethylene–vinyl alcohol polymer	25067-34-9	Ethenol, polymer with ethene	R	$(C_2H_4O \cdot C_2H_4)_x$
Poly(vinyl alcohol-*co*-vinyl acetate)	Vinyl alcohol–vinyl acetate polymer	25213-24-5	Acetic acid ethenyl ester, polymer with ethenol	R	$(C_4H_6O_2 \cdot C_2H_4O)_x$
Poly(4-vinyl biphenyl)		25232-08-0	1,1′-Biphenyl, 4-ethenyl-homopolymer	R	$(C_{14}H_{12})_x$
Poly(vinyl bromide)	Bromoethylene polymer	25951-54-6	Ethene, bromo-, homopolymer	R	$(C_2H_3Br)_x$
Poly(vinyl butyral)		63148-65-2	Vinyl acetal polymers, butyrals	S	Unk
Poly(vinyl butyral-*co*-vinyl alcohol-*co*-vinyl acetate)		27360-07-2	Acetic acid ethenyl ester, polymer with 1,1-bis(ethenyloxy)butane and ethenol	R	$(C_8H_{14}O_2 \cdot C_4H_6O_2 \cdot C_2H_4O)_x$
Poly(vinyl butyrate)		24991-31-9	Butanoic acid, ethenyl ester, homopolymer	R	$(C_6H_{10}O_2)_x$
Poly(vinyl chloride)	Poly(1-chloroethylene)	9002-86-2	Ethane, chloro-homopolymer	R	$(C_2H_3Cl)_x$
Poly(vinyl chloride-*co*-vinyl acetate)	Vinyl chloride–vinyl acetate polymer	9003-22-9	Acetic acid ethenyl ester, polymer with chloroethene	R	$(C_4H_6O_2 \cdot C_2H_3Cl)_x$
Poly(vinyl chloride-*co*-vinyl acetate-*co*-2-hydroxypropyl acrylate)		41618-91-1	2-Propenoic acid, 2-hydroxypropyl ester, polymer with chloroethene and ethenyl acetate	R	$(C_6H_{10}O_3 \cdot C_4H_6O_2 \cdot C_2H_3Cl)_x$
Poly(vinyl chloride-*co*-vinyl acetate-*co*-maleic acid)	Maleic acid–vinyl acetate–vinyl; vinyl acetate–vinyl chloride–maleic acid polymer	9005-09-8	2-Butenedioic acid (Z)-, 2-Butenedioic acid (Z)-	R	$(C_4H_6O_2 \cdot C_4H_4O_4 \cdot C_2H_3Cl)_x$
Poly(vinyl chloride-*co*-vinyl acetate-vinyl alcohol)	Vinyl acetate–vinyl alcohol–vinyl chloride polymer; vinyl chloride–vinyl acetate–vinyl alcohol copolymer	25086-48-0	Acetic acid ethenyl ester, polymer with chloroethene and ethenol	R	$(C_4H_6O_2 \cdot C_2H_4O \cdot C_2H_3Cl)_x$
Poly(vinyl cinnamate)		24968-99-8	2-Propenoic acid,3-phenyl-, ethenyl ester, homopolymer	R	$(C_{11}H_{10}O_2)_x$
Poly(vinyl ethyl ether)	Poly(ethyl vinyl ether)	25104-37-4	Ethene, ethoxy-, homopolymer	R	$(C_4H_8O)_x$
Poly(vinyl fluoride)	Monofluoroethylene polymer	24981-14-4	Ethene, fluoro-, homopolymer	R	$(C_2H_3F)_x$
Poly(vinyl formal)	Poly(divinyl formal)	9003-33-2	1,1′-(methylenebis(oxy))bis-, homopolymer	R	$(C_5H_8O_2)_x$
Poly(*N*-vinyl-methylacetamide)	Poly(*N*-methyl-*N*-vinylacetamide)	26616-03-5	Acetamide, *N*-ethenyl-*N*-methyl-, homopolymer	R	$(C_5H_9NO)_x$
Poly(vinyl methyl ether)	Methyl vinyl ether homopolymer	9003-09-2	Ethene methoxy, homopolymer	R	$(C_3H_6O)_x$
Poly(vinyl methyl ketone)	Methyl vinyl ketone polymer	25038-87-3	3-Buten-2-one, homopolymer	R	$(C_4H_6O)_x$
Poly(2-vinyl naphthalene)		28406-56-6	Naphthalene, 2-ethenyl-, homopolymer	R	$(C_{12}H_{10})_x$
Poly(vinyl *n*-octodecylcarbamate)		36671-85-9	Carbamic acid, octadecyl-, ethenyl ester, homopolymer	R	$(C_{21}H_{41}NO_2)_x$
Poly(4-vinyl phenol)	*p*-Vinylphenol polymer; *p*-vinylphenol polymer	24979-70-2	Phenol, 4-ethenyl-, homopolymer	R	$(C_8H_8O)_x$
Poly(vinyl propionate)	Vinyl propionate polymer	25035-84-1	Propanoic acid, ethenyl ester, homopolymer	R	$(C_5H_8O_2)_x$
Poly(2-vinyl pyridine)	2-Vinylpyridine polymer	25014-15-7	Pyridine, 2-ethenyl-, homopolymer	R	$(C_7H_7N)_x$
Poly(2-vinyl pyridine-*co*-styrene)	2-Vinylpyridine-styrene polymer	24980-54-9	Pyridine, 2-ethenyl-, polymer with styrene	R	$(C_8H_8 \cdot C_7H_7N)_x$
Poly(vinyl pyrrolidone)	Poly(*n*-pyrrolidinylethylene); poly(vinylpyrrolidone); vinylpyrrolidone polymer	9003-39-8	2-Pyrrolidinone, 1-ethenyl-, homopolymer	R	$(C_6H_9NO)_x$
Poly(vinyl pyrrolidone), iodine complex		25655-41-8	2-Pyrrolidinone, 1-ethenyl-, homopolymer, compd. with iodine	R	$(C_6H_9NO)_x \cdot xI_2$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(1-vinyl pyrrolidone-*co*-acrylic acid)	Acrylic acid–vinylpyrrolidone polymer	28062-44-4	2-Propenoic acid, polymer with 1-ethenyl-2-pyrrolidinone	R	$(C_6H_9NO \cdot C_3H_4O_2)_x$
Poly(1-vinyl pyrrolidone-*co*-2-dimethylamino-ethyl methacrylate)		30581-59-0	2-Propenoic acid, 2-methyl-, 2-(dimethylamino)ethyl ester, polymer with 1-ethenyl-2-pyrrolidinone	R	$(C_8H_{15}NO_2 \cdot C_6H_9NO)_x$
Poly(1-vinyl pyrrolidone-*co*-styrene)	Styrene-*N*-vinylpyrrolidone polymer; vinylpyrrolidinone–styrene polymer	25086-29-7	2-Pyrrolidinone, 1-ethenyl-, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_6H_9NO)_x$
Poly(1-vinyl pyrrolidone-*co*-vinyl acetate)	*N*-Vinyl-2-pyrrolidone–vinyl acetate copolymer; poly(vinyl acetate–vinylpyrrolidinone); vinyl acetate–vinylpyrrolidone copolymer	25086-89-9	Acetic acid ethenyl ester, polymer with 1-ethenyl-2-pyrrolidinone	R	$(C_6H_9NO \cdot C_4H_6O_2)_x$
Poly(1-vinyl pyrrolidone-γ-(1-triacontene))		136445-69-7	Alkenes, C > 10 α-, polymers with vinylpyrrolidone	S	Unk
Poly(1-vinyl pyrrolidone-γ-1-hexadecene)		63231-81-2	2-Pyrrolidinone, 1-ethenyl-hexadecyl-, homopolymer	R	$(C_{22}H_{41}NO)_x$
Poly(vinyl stearate)	Vinyl stearate polymer	9003-95-6	Octadecanoic acid, ethenyl ester, homopolymer	R	$(C_{20}H_{38}O_2)_x$
Poly(vinyl sulfate), potassium salt		26182-60-5	Sulfuric acid, monoethenyl ester, potassium salt, homopolymer	R	$(C_2H_4O_4S \cdot K)_x$
Poly(vinyl sulfonic acid), sodium salt	Ethenesulfonic acid polymer sodium salt; ethenesulfonic acid polymer sodium salt	25053-27-4	Ethenesulfonic acid, homopolymer, sodium salt	R	$(C_2H_4O_3S)_x \cdot xNa$
Poly(vinyl toluene)	Poly(methylstyrene); vinyltoluene polymer	9017-21-4	Benzene, ethenylmethyl-homopolymer	R	$(C_9H_{10})x$
Poly(vinyl toluene-*co*-alpha-methylstyrene)	α-Methylstyrene–vinyltoluene polymer	9017-27-0	Benzene, ethenylmethyl-, polymer with (1-methylethenyl)benzene	R	$(C_9H_{10} \cdot C_9H_{10})_x$
Poly(vinylcarbazole); Poly(9-vinyl carbazole)	Poly(*n*-carbazolylethylene); poly(*N*-vinylcarbazole)	25067-59-8	9H-Carbazole, 9-ethenyl-, homopolymer	R	$(C_{14}H_{11}N)_x$
Poly(vinylcyclohexane)		25498-06-0	Cyclohexane, ethenyl-, homopolymer	R	$(C_8H_{14})_x$
Poly(vinylferrocene)		34801-99-5	Ferrocene, ethenyl-, homopolymer	R	$(C_{12}H_{12}Fe)_x$
Poly(vinylidene chloride)	Poly(1,1-dichloroethylene)	9002-85-1	Ethene,1,1-dichloro-, homopolymer	R	$(C_2H_2Cl_2)_x$
Poly(vinylidene chloride-*co*-acrylonitrile)	Acrylonitrile–vinylidene chloride polymer	9010-76-8	2-Propenenitrile, polymer with 1,1-dichloroethene	R	$(C_3H_3N \cdot C_2H_2Cl_2)_x$
Poly(vinylidene chloride-*co*-methyl acrylate)	Methyl acrylate–vinylidene chloride polymer	25038-72-6	2-Propenoic acid, methyl ester, polymer with 1,1-dichloro ethene	R	$(C_4H_6O_2 \cdot C_2H_2Cl_2)_x$
Poly(vinylidene chloride-*co*-vinyl chloride)	Vinyl chloride–vinylidene chloride polymer	9011-06-7	Ethene, 1,1-dichloro-, polymer with chloroethylene	R	$(C_2H_3Cl \cdot C_2H_2Cl_2)_x$
Poly(vinylidene fluoride)	Poly(1,1-difluoroethylene); PVDF	24937-79-9	Ethene, 1,1-difluoro-, homopolymer	R	$(C_2H_2F_2)_x$
Poly(vinylidene fluoride-*co*-hexafluoropropylene)	Hexafluoropropene–vinylidene fluoride polymer	9011-17-0	1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene	R	$(C_3F_6 \cdot C_2H_2F_2)_x$
Poly(vinylidene fluoride-*co*-hexafluoropropylene-*co*-tetrafluoroethylene)	Hexafluoropropene–tetrafluoro-ethylene–vinylidene fluoride polymer; vinylidene fluoride–tetrafluoroethylene–perfluoro-propylene copolymer	25190-89-0	1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene and tetrafluoroethene	R	$(C_3F_6 \cdot C_2H_2F_2 \cdot C_2F_4)_x$
Poly(vinylidene fluoride-*co*-tetrafluoroethylene-*co*-propylene)	Propene–tetrafluoroethylene–vinylidene fluoride copolymer	54675-89-7	1-Propene, polymer with 1,1-difluoroethene and tetrafluoroethene	R	$(C_3H_6 \cdot C_2H_2F_2 \cdot C_2F_4)_x$
Poly(vinylisobutyl ether)	Isobutyl vinyl ether polymer	9003-44-5	Propane, 1-(ethenyloxy)-2-methyl-, homopolymer	R	$(C_6H_{12}O)_x$
Poly(4-vinyl pyridine)	4-Vinylpyridine homopolymer	25232-41-1	Pyridine, 4-ethenyl-, homopolymer	R	$(C_7H_7N)_x$
Poly(4-vinyl pyridine-*co*-butyl methacrylate)	Butyl methacrylate-4-vinylpyridine polymer	53761-76-5	2-Propenoic acid, 2-methyl-, butyl ester, polymer with 4-ethenylpyridine	R	$(C_8H_{14}O_2. C_7H_7N)_x$
Poly(4-vinyl pyridene-*co*-styrene)		26222-40-2	Pyridine, 4-ethenyl-, polymer with ethenylbenzene	R	$(C_8H_8 \cdot C_7H_7N)_x$
Poly(4-vinyl pyridine hydrochloride), crosslinked		29323-87-3	Pyridine, 4-ethenyl-, hydro-chloride, homopolymer	R	$(C_7H_7N \cdot ClH)_x$
Poly(4-vinyl pyridine), crosslinked	Divinylbenzene-4-vinylpyridine polymer	9017-40-7	Pyridine, 4-ethenyl-, polymer with diethenylbenzene	R	$(C_{10}H_{10} \cdot C_7H_7N)_x$

Common name	Synonyms	CAS Registry No.	CA name	Search method	Molecular formula
Poly(4-vinyl pyridinium dichromate)		82246-45-5	Chromic acid ($H_2Cr_2O_7$), salt with diethenylbenzene polymer with 4-ethenylpyridine	R	$(C_{10}H_{10} \cdot C_7H_7N)_x \cdot xCr_2H_2O_7$
Poly(4-vinyl pyridinium tribromide)		91650-35-0	Hydrogen tribromide, compd. with 4-ethenylpyridine (1 : 1), homopolymer	R	$(C_7H_7N \cdot Br_3H)_x$
Poly(*p*-xylylene)		25951-90-0	Benzene, 1,4-dimethyl-, homopolymer	R	$(C_8H_{10})_x$
Rosin, ester with glycerol		8050-31-5	Resin acids and rosin acids, esters with glycerol	S*	Unk
Rosin, ester with pentaerythritol		8050-26-8	Resin acids and rosin acids, esters with pentaerythritol	S*	Unk
Rubber, chlorinated		9006-03-5	Rubber, chlorinated	R	Unk
Safflower seed oil		8001-23-8	Safflower oil	S*	Unk
Silicone oil	Methyl phenyl silicones	63148-58-3	Siloxanes and Silicones, Me Ph	S	Unk
Soybean oil	Fats and glyceridic oils	8001-22-7	Soybean oil	S*	Unk
Starch	Arrowroot starch; potato starch; rice starch; tapioca starch	9005-25-8	Starch	R	Unk
Starch, soluble		9005-84-9	Amylodextrin	R	Unk
Starch-*graft*-poly(acrylic acid), sodium salt	Acrylic acid–starch polymer sodium salt	60323-79-7	Starch, polymer with 2-propenoic acid, sodium salt	R	$(C_3H_4O_2 \cdot \text{Unk})_x \cdot x\text{Na}$
Tri-*o*-benzyl cellulose		91104-69-7	Cellulose, tris(phenylmethyl) ether	R	$(C_7H_8O)_{1/3}$; Unk
Tung oil	Fats and glyceridic oils	8001-20-5	Tung oil	S*	Unk
Zein		9010-66-6	Zeins	S*	Unk

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